APPENDIX C

Background Information

SB 5 General Plan Amendment for 200-Year Flood Protection

SB 5 General Plan Amendment for 200-Year Flood Protection
City of Live Oak

Background Information

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Exhibits

ACRONYMS AND ABBREVIATIONS

Cal OES	California Office of Emergency Services
CEQA	California Environmental Quality Act
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Velley Flood Protection Plan
CVFMPP	Central Valley Flood Management Planning Program
DSOD	DWR Division of Safety of Dams
DWR	California Department of Water Resources
EIR	Environmental Impact Report
FEMA	Federal Emergency management Agency
FIRM	Federal Insurance Rate Maps
FRWLP	Feather River West Levee Project
GPA	General Plan Amendment
LHMP	Local Hazard Mitigation Plan
LMA	Local Management Agency
MOU	Memorandum of Understanding
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management
RFMP	Regional Flood Management Plan
SBFCA	Sutter Butte Flood Control Agency
SBPFS	Sutter Basin Pilot Feasibility Study
SFMP	Statewide Flood Management Program
SPFC	State Plan of Flood Control
SRFCP	Sacramento River Flood Control Project
SSJRBCS	Sacramento and San Joaquin River Basins Comprehensive Study
SSIA	Statewide System Investment Approach
TSP	Tentatively Selected Plan
ULDC	Urban Levee Design Criteria
ULOP	Urban Levels of Flood Protection
USACE	United States Army Corps of Engineers

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1 INTRODUCTION

1.1 SB 5 GENERAL PLAN AMENDMENT

The City of Live Oak is amending the General Plan to be consistent with the Central Valley Flood Protection Act of 2008 (SB 5, 2007), which requires cities and counties within the Sacramento-San Joaquin Valley to incorporate Urban Level of Flood Protection requirements in their general plans. The intent of SB 5 and related flood management bills is to strengthen the linkage between local land use planning decisions and floodplain management practices, and provide new requirements and standards for flood protection. Together these bills added and amended sections of the California Government Code, Health and Safety Code, Public Resources Code, and Water Code.

1.2 BACKGROUND INFORMATION ORGANIZATION

The SB 5 Bills require cities and counties to amend their local general plans no later than July 2, 2015, and to update local zoning ordinances to be consistent with their amended general plan by July 2, 2016. This document (Appendix C) provides the background information needed to fulfill the requirements of SB 5 and related bills. Appendix C is organized as follows:

- Section 1.0 Introduction provides an overview of the City of Live Oak and new general plan requirements of the SB 5 bills that will be met through the General Plan Amendment
- Section 2.0 Regional hydrology provides summary of historical flooding and structural flood management and protection systems
- Section 3.0 Local flooding management and protection, including background information on areas subject to flooding, flood emergency response, and other non-structural flood management strategies
- Section 4.0 Flood Protection Goals, Policies, and Implementation Programs
- Section 5.0 Safety Element Amendment Consultation Letters and Responses

1.3 CITY OF LIVE OAK

First settled in 1866, and incorporated in 1947, the City of Live Oak is located within the Sacramento Valley in Sutter County, California. As of 2014, the City has a population of approximately 8,500 residents. (ACS, 2014) The City is located between the Sutter Buttes to the west and the Feather River to the east, the Butte-Sutter County boundary to the north, and the unincorporated areas of Sutter County to the south. The nearest cities are Gridley to the north in Butte County and Yuba City to the south. The City of Live Oak adopted its General Plan with the most recent comprehensive update in 2010.

The City of Live Oak is responsible for providing residents with public facilities and services, such as police and fire protection; water, wastewater, and solid waste disposal services; stormwater drainage facilities, and parks/recreation services. Additionally, the City needs to evaluate community safety concerns from both man-made and natural hazards and develop policies and procedures to avoid these hazards, and create adequate emergency response. Public safety concerns include flood hazards such as localized flooding, potential flooding

from regional flood-protection system failure, and emergency response in the event of flooding. Flood management and protection services are delivered in cooperation with a variety of federal, state and local agencies. Locally, these agencies include the local maintaining agencies (LMA), which are directly responsible for levee maintenance, Sutter County Sheriff's Office, Sutter County Fire Department, and the Sutter County Office of Emergency Management (OEM). Community goals, policies, and implementation programs related to flood management and protection and emergency evacuation are included in the City's General Plan.

1.4 CALIFORNIA 200-YEAR FLOOD PROTECTION STANDARDS

On October 10, 2007, the California Legislature signed Senate Bill 5 (SB 5) into law, which enacted the Central Valley Flood Protection Act of 2008. SB 5, and a series of related Senate and Assembly bills, including SB 17, and Assembly Bills (AB) 5, 70, 156, and 162, establishes the State standard for flood protection in urban areas as protection from the 200-year frequency flood. Under these bills, both "urban and urbanizing" areas (cities and counties) in the Sacramento-San Joaquin Valley must provide Urban Levels of Flood Protection (ULOP) (200-year) standards no later than 2025. California Government Code defines urban and urbanizing areas, as follows:

Urban Area - A developed area in which there are 10,000 residents or more (California Government Code [CGC] §65007(l)).

Urbanizing Area - A developed area or an area outside a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years (CGC §65007(m)).

ULOP flood protection standards are to be instituted through local general plans and zoning. Each SB 5 affected city and county must amend their general plan to contain flood protection and management information and requirements as outlined in CGC §65962.9. After General Plan Amendment adoption, these cities and counties must update local zoning ordinances to be consistent with their amended general plan (CGC §65962.1). Unless the local land use agency certifies that 200-year flood protection has been provided, or that "adequate progress" has been made toward provision of 200-year flood protection by 2025, new development is prohibited in urban or urbanizing areas potentially exposed to 200-year flooding more than three feet deep.

1.5 SB 5 FLOOD PROTECTION AND RELATED FLOOD MANAGEMENT BILLS

The California Legislature enacted six interrelated flood management bills, summarized below, in 2007 to improve flood management in a sustainable way. Four of these bills (SB 5, AB 70, AB 156, and AB 162) affect the responsibility of cities and counties to address flood risks as part of local land use planning processes.

1.5.1 SB 5 (MACHADO, 2007)

SB 5 establishes the State flood standard for urban and urbanizing areas in Water Code §9602(i) as the ULOP, which now requires 200-year flood protection. SB 5 limits urban and urbanizing areas in the Sacramento-San Joaquin Valley from approving development projects unless they provide 200-year flood protection, or are making progress toward achieving 200-year flood protection. SB 17 and AB 162, as described below, are companion bills that the California Legislature signed into law at the same time as SB 5.

1.5.2 SB 17 (FLOREZ, 2007) AND AB 5 (WOLK, 2007)

SB 17 and AB 5 renamed the State Reclamation Board in the Department of Water Resources (DWR) as the Central Valley Flood Protection Board (CVFPB), transferring the duties and corresponding funding allocated to the Reclamation Board. The laws also provide the administrative requirements for the CVFPB. Among a number of mandates, the bills directed DWR to prepare a preliminary report of the State Plan of Flood Control (SPFC) facilities and the Central Valley Flood Protection Plan (CVFPP) for CVFPB adoption. The CVFPP (DWR, 2012) is a strategic flood management plan that guides California's participation with cooperation from federal and local agencies in managing flood risk along the Sacramento and San Joaquin river system. The CVFPP comprehensively addresses flood risks, setting out improvements in operation and maintenance practices, and provides institutional support for flood management. The CVFPP provides guidance for regional flood management plans (RFMPs), flooding requirements of local general plans and zoning, and local flood management and facility improvement plans.

1.5.3 AB 156 (LAIRD, 2007)

AB 156 provides additions to the California Water Code (CWC) that institutes requirements for local maintaining agencies who maintain either project levees or non-project levees that also benefit land within the boundaries of an area protected by a project levee. These local maintaining agencies must submit each year, specific information relative to the project levee they operate and maintain (e.g., known conditions that might impair or compromise project levee flood protection).

1.5.4 AB 162 (WOLK, 2007)

AB 162 supplements the SB 5 requirements for those cities and counties that are also located within the boundaries of the Sacramento-San Joaquin Drainage District. Created by the State Legislature in 1913, the statute allows the State Engineer at the time to procure data and perform surveys and examinations of the San Joaquin and Sacramento rivers and their tributaries for furthering the CVFPB's plan for controlling floodwaters of the rivers, preserving navigation, and protecting lands susceptible to their overflows. AB 162 stipulates additional requirements for cities and counties in amending their general plan Safety Element, as well as requirements for the Land Use and Conservation Elements. AB 162 also requires that cities and counties consult with agencies during preparation and amendment of general plan Safety Elements, and contains specifications related to Housing Element updates. The City of Live Oak is within the Drainage District. At this time, there are no proposed changes to the City's General Plan Housing Element.

1.5.5 AB 70 (JONES, 2007)

AB 70 makes a local government jointly liable with the State, for property damage costs resulting from a flood if it unreasonably approves new development in areas protected by SPFC facilities.

1.6 200-YEAR FLOOD REQUIREMENTS FOR LOCAL GOVERNMENTS

Over the last 60 years, California has experienced more than 30 major flood events, resulting in more than 300 lives lost, more than 750 injuries, and billions of dollars in disaster claims.[1] Therefore, the State established a

[1] DWR, State Flood Management Planning Program, http://www.water.ca.gov/sfmp/

long-term goal to improve flood protection. This goal includes promoting a clear understanding of the flood risk in California, expanding information and technical assistance to flood protection and land use agencies, improving flood protection and facility design standards, and an enforcement system for the new requirements. The Statewide Flood Management Planning (SFMP) program is led by the DWR through the FloodSAFE Initiative and the Division of Statewide Integrated Water Management. The Central Valley Flood Management Program is an effort to improve flood management specifically for the Central Valley. Two integral features of the program directed to local governments within the Central Valley include the Urban Level of Flood Protection and the Central Valley Flood Protection Plan (DWR, 2012).

1.6.1 URBAN LEVELS OF FLOOD PROTECTION (ULOP)

A key requirement of SB 5 is for certain urban and urbanizing areas within the Sacramento-San Joaquin Valley to provide ULOP. The ULOP is defined as the "level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the Department of Water Resources." ULOP does "not mean shallow flooding or flooding from local drainage that meets the criteria of the national Federal Emergency Management Agency standard for flood protection." (CGC §6507[n]) Levees that are intended to provide ULOP must conform to State-defined Urban Levee Design Criteria (i.e., 200-year flood protection).

There are five locational criteria for the ULOP to apply, an SB 5 affected city or county must meet all criteria. The City of Live Oak meets three criteria (the City is an urban or urbanizing area that is planned or anticipated to have 10,000 residents within the next ten years, the City is within the Sacramento-San Joaquin Valley, and the City is located within a watershed with a contributing area of more than 10 square miles). The City does not meet the remaining two criteria: 1) is located within a flood hazard zone that is mapped as either a special hazard area or an area of moderate hazard on Federal Emergency Management Agency's (FEMA) official (i.e., effective) Flood Insurance Rate Map for the National Flood Insurance Program (NFIP) and 2) is located within an area with a potential flood depth above 3 feet from sources other than localized conditions. Localized conditions include localized rainfall, water from stormwater and drainage problems, and temporary water and wastewater distribution system failure. Therefore, the City of Live Oak is not subject to the ULOP standard.

1.6.2 CENTRAL VALLEY FLOOD PROTECTION PLAN (CVFPP)

Adopted by the CVFPB in 2012, the CVFPP provides a broad understanding of the potential for flooding in the Central Valley, describes the existing flood protection systems and the adequacy of these systems, and sets out a statewide strategy for funding flood protection improvements. The financing strategy is known as the Statewide System Investment Approach (SSIA). The CVFPP is primarily concerned with SPFC facilities, which are shared federal-State flood control facilities (e.g., levees, channels, pumping plants) the State is obligated to cooperate in maintaining and improving. The primary regional goal of the CVFPP is to improve flood risk management by reducing the chance of flooding and damages once flooding occurs, and public safety, preparedness, and emergency response. Secondary goals include improving operations and maintenance of flood management systems, integrating the recovery and restoration of key ecosystem functions into the flood management system, improving institutional support, and promoting multi-benefit projects. The CVFPP also identifies the need for more area-specific regional flood management plans (RFMPs). An RFMP has been drafted for the Feather River Region (SBFCA, 2014), which includes the Butte Basin, Sutter Basin, terraces, and alluvium. The Live Oak 2030

General Plan Area is within the Sutter Basin. The CVFPP is updated on a 5-year cycle and local plans must be consistent with the CVFPP.

1.7 LIVE OAK 2030 GENERAL PLAN

Pursuant to CGC §65000, each planning agency (city or county) is required to prepare and adopt a "comprehensive, long-term general plan for the physical development of the county or city, and of any land outside its boundaries which in the planning agency's judgement bears relation to its planning." A general plan describes the communities land use and development objectives, goals, policies, and implementation programs. The City of Live Oak conducted a comprehensive update of its general plan, which the City adopted in 2010. (City of Live Oak, 2010a) The Live Oak Land Use Diagram is shown in Figure 1 (Figure LU-5 in the Land Use Element).

Live Oak's 2030 General Plan provides goals, policies, and implementation programs for development through 2030, and addresses the seven general plan elements required by law. These seven elements include land use, circulation (transportation and local public utilities and facilities), housing, conservation, open space, noise, and safety. The City's 2030 General Plan also provides elements that address other local conditions, specifically community character and parks and recreation. The safety element requires policies and programs to protect the community from risks associated with seismic, geologic, flood, and wildfire hazards. The City of Live Oak's existing safety goals, policies, and implementation programs related to community flood protection and management are located in the 2030 General Plan Public Safety Element, the Public Utilities, Services, and Facilities Element, and the Conservation and Open Space Element. The SB 5 GPA will amend the City's 2030 General Plan to incorporate SB 5 and other related flood management and protection bill requirements.

1.8 SB 5 SAFETY ELEMENT REQUIREMENTS

The Live Oak 2030 General Plan adopted in 2010 preceded the requirements of the SB 5 bills. The 2030 General Plan Safety Element includes the Safety Element requirements in effect at the time (GOV §65302(g) (1)); FEMA 100-year flood protection was the accepted flood protection standard:

> *A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires. The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peak load water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards.*

The SB 5 bills provide detailed Safety Element requirements related to flood protection, including the addition of specific information, and for the establishment of goals, policies, and implementation measures that reflect current statewide flood protection strategies and feasible implementation measures. Live Oak's 2030 General Plan needs to be amended to reflect the requirements of the SB 5 Bills.

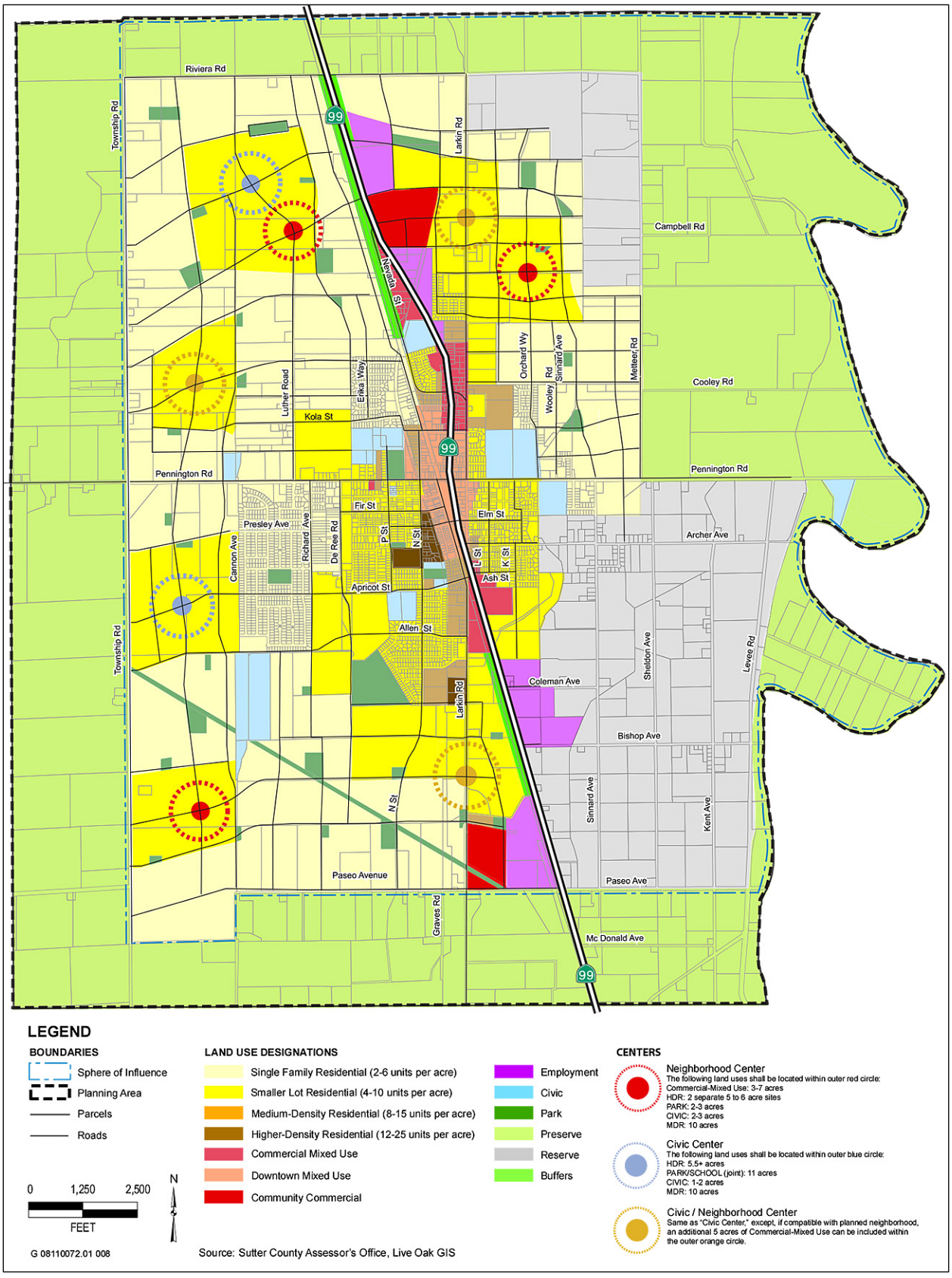


Figure 1 – Live Oak Land Use Diagram

California Government Code §65302(g) (2) states that the safety element, upon the next revision of the housing element on or after January 1, 2009, shall also do the following:

(A) Identify information regarding flood hazards, including, but not limited to, the following:

Flood hazard zones. As used in this subdivision, "flood hazard zone" means an area subject to flooding that is delineated as either a special hazard area or an area of moderate or minimal hazard on an official flood insurance rate map issued by the Federal Emergency Management Agency (FEMA). The identification of a flood hazard zone does not imply that areas outside the flood hazard zones or uses permitted within flood hazard zones will be free from flooding or flood damage.

(i) National Flood Insurance Program maps published by FEMA.

(ii) Information about flood hazards that is available from the United States Army Corps of Engineers.

(iii) Designated floodway maps that are available from the Central Valley Flood Protection Board.

(iv) Dam failure inundation maps prepared pursuant to Section 8589.5 that are available from the Office of Emergency Services.

(v) Awareness Floodplain Mapping Program maps and 200-year flood plain maps that are or may be available from, or accepted by, the Department of Water Resources.

(vi) Maps of levee protection zones.

(vii) Areas subject to inundation in the event of the failure of project or nonproject levees or floodwalls.

(viii) Historical data on flooding, including locally prepared maps of areas that are subject to flooding, areas that are vulnerable to flooding after wildfires, and sites that have been repeatedly damaged by flooding.

(ix) Existing and planned development in flood hazard zones, including structures, roads, utilities, and essential public facilities.

(x) Local, state, and federal agencies with responsibility for flood protection, including special districts and local offices of emergency services.

(B) Establish a set of comprehensive goals, policies, and objectives based on the information identified pursuant to subparagraph (A), for the protection of the community from the unreasonable risks of flooding, including, but not limited to:

(i) Avoiding or minimizing the risks of flooding to new development.

(ii) Evaluating whether new development should be located in flood hazard zones, and identifying construction methods or other methods to minimize damage if new development is located in flood hazard zones.

(iii) Maintaining the structural and operational integrity of essential public facilities during flooding.

(iv) Locating, when feasible, new essential public facilities outside of flood hazard zones, including hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities or identifying construction methods or other methods to minimize damage if these facilities are located in flood hazard zones.

(v) Establishing cooperative working relationships among public agencies with responsibility for flood protection.

(C) Establish a set of feasible implementation measures designed to carry out the goals, policies, and objectives established pursuant to subparagraph (B).

The Live Oak 2030 General contains information, goals, policies, and implementation programs related to the Safety Element requirements in three locations:

- Public Safety Element, Background and Context - Flood Hazards Section
- Public Utilities, Services, and Facilities Element, Drainage and Flood Protection Section
- Conservation and Open Space Element

The Conservation and Open Space Element provides limited information to flooding and flood control, peripherally identifying notable hydrologic features in and bordering the 2030 General Plan Area, as well as groundwater resources, and includes goals, policies and implementation programs for the protection of water resources. Detailed information related to flooding from the Sacramento River and its tributaries, including the Feather River, and flooding-related information required by the SB bills is not provided here.

1.9 GENERAL PLAN AMENDMENTS AGENCY CONSULTATION AND REVIEW

Government Codes §65302(g) (5) and 65302.7 require agency consultation and review. Prior to amending the safety element, cities and counties are required to consult with the CVFPB, the California Office of Emergency Services (Cal OES), and the California Geological Survey of the Department of Conservation. Cities and counties must also submit the draft safety element for review by CVFPB, and "every local agency that provides flood protection to the city or county." For the City of Live Oak, this agency is the Sutter Butte Flood Control Agency (SBFCA) Documentation of the City's consultation and agency review are found in Section 5.0.

1.10 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

A general plan amendment is considered a "project" according to the California Environmental Quality Act (CEQA) Guidelines (Guidelines §15378(a)(1)), and its potential environmental effects of the proposed general plan amendment's goals, policies, and implementation programs must be considered before the general plan amendment can be adopted. The City is using its certified 2030 General Plan environmental impact report (EIR) to address potential impacts or rule out effects if otherwise consistent with the general plan. Therefore, the City as the lead agency prepared an addendum to the 2030 General Plan EIR in conjunction with the SB 5 GPA. Prior to

adoption of the SB 5 GPA, and after the required agency review of the SB 5 GPA, the City Council will consider whether the amendment would have a significant effect on the environment, and consider adopting the 2030 General Plan EIR Addendum.

1.11 GENERAL PLAN AMENDMENT ADOPTION

The City of Live Oak will conduct public hearings for consideration of the SB 5 GPA before the Live Oak Planning Commission and City Council in October, 2016. Hearings will be noticed in accordance with the requirements of Government Code §65353 and §65091. After considering the Planning Commission's recommendations, the City Council will consider approving the SB 5 GPA, and certifying the 2030 General Plan EIR Addendum. The City Council is also anticipated to make findings that the City of Live Oak Title 17 Zoning Regulations (amended December 21, 2011) is consistent with the SB 5 GPA and a zoning update is not required, and that the SB 5 GPA is consistent with the existing 2030 General Plan.

2 REGIONAL HYDROLOGY AND FLOOD PROTECTION

The Sacramento River Basin is the largest river basin in California, covering approximately 27,000 square miles, and supplies water for much of California. Major water supplies in the region are provided through surface storage reservoirs. There are more than 40 major surface water reservoirs in the region. Sutter County, including the 2030 Live Oak General Plan Area, is within the Sacramento River Basin, situated between the Sacramento River on the west and the Feather River on the east. The 2030 General Plan Area and most of Sutter County are located within the Feather River watershed (See Figure 2). Flow in the lower Feather River above the 2030 General Plan Area is controlled mainly by releases from Lake Oroville, the second largest reservoir within the Sacramento River Basin.

The flood management system along the Sacramento River and its tributaries manages flood flows originating from the Sacramento River Basin. Major tributaries to the Sacramento River include the Feather, Yuba, Bear, and American Rivers, which discharge to the Sacramento River from the east. The primary tributary to the Sacramento River upstream of the Live Oak 2030 General Plan Area is the Feather River. The Feather River West Levee system protects the 326-square mile Sutter Basin area, within the larger Sacramento River Basin, which includes the Cities of Live Oak, Yuba City, Biggs, and Gridley.

2.1 REGIONAL FLOODING AND FLOOD PROTECTION HISTORY

Initial local levee construction was based upon historical water levels. Competing levees on either side of the Feather River, as well as increased sedimentation from upstream hydraulic mining, constrained the flood carrying capacity of the river. As a result, the levees were overtopped, failed, and then rebuilt to a higher elevation. While the federal courts put an end to hydraulic mining, the California Debris Commission proposed a comprehensive plan consisting of levees, weirs, and bypasses to reduce the risk of flooding in the Sacramento Valley. In 1911, the State formally adopted the plan, and the California Reclamation Board (now known as the Central Valley Flood Protection Board or CVFPB) was empowered to approve plans for the construction of levees along the Sacramento River, its tributaries and within any of the overflow basins. The Sacramento River Flood Control Project (SRFCP), which encircles the Sacramento River Basin, was initially authorized by the Flood Control Act of 1917. Since then the United States Army Corps of Engineers (USACE), the State, and local communities continue to extend the system and improve the existing levees. In 1938, USACE rebuilt the Feather River West Bank Levees from Shanghai Bend to Yuba City in accordance with the established design criteria. (USACE, 2013)

The Sutter Basin topography provides for broad and shallow floodplains with a northeast to southwest flow toward the deeper southern basin. Since 1950, extensive flooding has occurred in the Sutter Basin during 19 events.[2] Past flooding events have caused loss of life and extensive economic damage. Two major flood events include the Christmas Flood in 1955 and the January 1997 Floods.

On December 23, 1955 and proceeded by abnormal and heavy rainfall, a break in the levee on the Feather River south of Yuba City occurred at about midnight. At the time, there was no upstream- dedicated flood storage at Oroville or New Bullards Bar Dams and Reservoirs because they had not been constructed yet.

[2] USACE, 2013

Source: CVFMPP, 2010

Figure 2 – Sacramento River Basin, 5 Major Watersheds with SPFC facilities

The cities of Linda, Oliverhurst, Yuba City, and Marysville were evacuated. The initial surge of water spread westerly through Gilsizer Slough to the Sutter Bypass and northerly into Yuba City. The bridge over the Feather River at 5th Street was washed-out and telephone service was lost south of Colusa Avenue. To the north, the water spread north of Colusa Avenue (Highway 20) in several areas. Within less than 24 hours, the heart of Sutter County was flooded from the Feather River on the east and south to the Sutter Bypass on the west and southwest. Nearly 100,000 acres were flooded and resulted in 38 deaths, injuries to 3,200 people, and nearly $40 million in property damage. In 1997, a series of storms doubled the average snow pack in the Sierra Nevada Mountains. Eventual runoff from the snowpack was quickly filling several dams and Sutter County was notified about the potential for substantial uncontrolled releases into the river from the Oroville Dam, resulting in voluntary and mandatory evacuation for several areas in the County. A levee in the Sutter Bypass experienced a massive break. The City of Meridian was the hardest hit area in Sutter County with approximately 50 square miles under water. Virtually every facility was destroyed or damaged, including nearly 100 homes and a school, which was standing in four feet of water. No lives were lost, but the estimated financial losses to individuals and businesses were about $18 million. Not including long-term damage to orchard trees, agricultural losses exceeded $5 million, and losses to County public agencies amounted to approximately $10 million. DWR's Regional Flood Atlas - Draft (DWR, 2013) contains a more detailed flood history of the Feather River Region area as a whole, as well as descriptions of individual events. In the City of Live Oak, there have been seven historical claims for flood losses totaling $66,660. These were for pre-Flood Insurance Rate Map (FIRM) structures. National Insurance Program data indicates that there are no repetitive loss buildings in the City (County of Sutter, 2013a, b).

Geotechnical analysis and evaluation of past levee performance indicated that existing project levees within the Sutter Basin, which are part of the authorized SRFCP, did not meet USACE levee design criteria, and were at risk of breach failure at stages less than overtopping the levees. Because residents, businesses, and local governments within the Sutter Basin were acutely aware of the flood risks, they created the Sutter Butte Flood Control Agency (SBFCA) to address flood protection, as well as tax assessments specifically for reducing the flood risk. The SBFCA formally sought partnership in improving flood protection in the form of a continuing feasibility study with CVFPB and the federal government to address the flood risk. When USACE's Federal Pilot Program for planning modernization was initiated in 2011 to develop a new risk-informed planning process paradigm, both SBFCA and CVFPB readily supported and signed on to be part of the pilot program (USACE, 2013).

2.2 FLOOD PROTECTION FACILITIES

Federal agencies provide flood protection, primarily through the USACE, by evaluating flood risk and developing federal design standards for the construction of federally authorized flood control facilities such as reservoirs, bypasses and levees. Although the State has had a long-term partnership with the federal government, being the primary agency responsible for inspecting and maintaining the federally constructed flood control facilities, historically, the State did not have a major role in the planning, design standard development, or in flood protection facility construction, until the passage of the SB 5 bills.

2.2.1 UPSTREAM RESERVOIRS

The construction of large reservoirs on the Sacramento, Feather, and Yuba River offer flood risk reduction by regulating flood discharge flows. The Oroville Dam and Reservoir, built in 1967, and operated by the State of California, is a unit of the Feather River Project, which is part of the State Water Project. The State Water Project is a water storage and delivery system of reservoirs, aqueducts, powerplants, and pumping plants. The Oroville

Dam is located on the Feather River, a tributary of the Sacramento River, in the Feather River Canyon, about 6 miles upstream from the town of Oroville. The dam was built for multi-purpose functions: water supply, flood control, power generation, recreation, and conservation. The reservoir provides water supply to the areas adjacent to the Feather River, as well as additional water for diversions from Sacramento-San Joaquin Delta to areas in the San Joaquin Valley, San Francisco Bay Area, and Southern California. The 750,000 acre-feet flood control storage space in the Oroville Reservoir provides flood protection to the cities of Marysville, Yuba City, Oroville, and many smaller communities located in the floodplain, including Live Oak.

New Bullards Bar, built in 1969 and operated by the Yuba County Water Agency, is located on the Yuba River. It provides 170,000 acre-feet of flood control space. Operations at New Bullards Bar are coordinated with operations at Oroville to control flood flows on the Feather River. For both Oroville and New Bullards Bar, the flood control space was purchased under Section 7 of the Flood Control Act of 1944 (58 Stat. 890) by the federal government. Any encroachment into the flood control space must be released during the flood season, as defined by the water control operations manual.

Flood control operations for the Feather River (as defined in the Oroville and New Bullards Bar Water Control Manuals) require Feather River flows to not exceed 150,000 cubic feet per second (cfs) at Oroville, 180,000 cfs above Yuba River, and 300,000 cfs below Yuba River. Insofar as possible, the Feather River below Bear River must be limited to 320,000 cfs. During very large floods, releases greater than 150,000 cfs at Oroville may be required, as indicated by the emergency operations, in order to minimize uncontrolled spillway discharges.

Given the unregulated local flows in the Feather River and Yuba River drainage areas as well as the uncertainties associated with regulating for downstream controls, the State, in cooperation with

Yuba County Water Agency and USACE, has invested heavily in coordinating operations, including developing models, establishing off-site data servers, and holding annual mock operations scenarios. (USACE, 2013)

2.2.2 FEDERAL LEVEES

Federal levees are referred to as “project” levees and are built to comply with USACE guidelines. Flood management facilities protecting the City of Live Oak consist of federal project levees along the west side of the Feather River. The levees are a portion of the Sacramento River Flood Control Projects (SRFCP), which includes levees on the Sacramento River with adjacent reaches of its tributaries, including the Feather River, and distributaries. Construction of the SRFCP began in 1918 and continued for decades. The SRFCP includes most of the levees, weirs, control structures, bypass channels, and river channels that comprise the State Plan of Flood Control (SPFC). About 980 miles of levees were involved in the project. The State of California adopted and authorized the SRFCP in1953 and assurances of co-operation were provided in the 1953 Memorandum of Understanding (MOU) (USACE and the California Reclamation Board, 1953). This MOU included levee construction standards for river project levees and bypass levees, and outlined maintenance responsibilities. The plan specified no differences in levee standards for urban versus agricultural levees. All levees on the Feather River within the Sutter Basin are part of the SRFCP that was constructed by USACE (CVFMPP, 2010).

2.2.3 STATE PLAN OF FLOOD CONTROL (SPFC) LEVEES

Under long-term federal-State agreements, the State commits to the maintenance of federally constructed flood protection facilities, which are part of the State Plan of Flood Control (SPFC). The SPFC by definition (CWC §9110(f)) consists of:

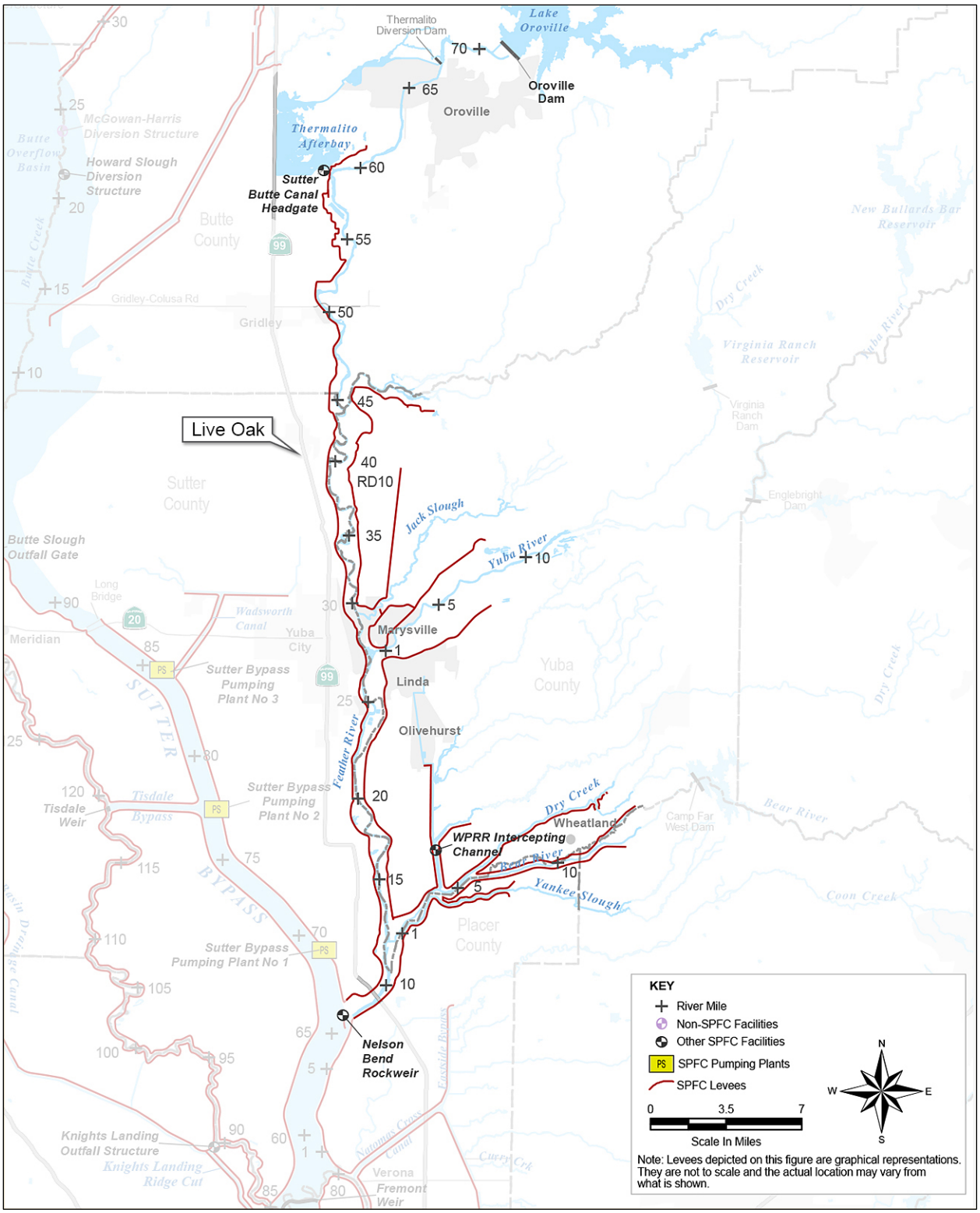
> *"the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento Flood Control Project described in Section 8350, and of flood control projects in the Sacramento River and San Joaquin River watersheds .. .... for which the (state) has provided the assurances of non-federal cooperation to the United States, and those facilities identified in Section 8361."*

The State Plan of Flood Control facilities in the Feather River Watershed include levees as well as channels, weirs, and pumping plants. Figure 3 shows the SPFC facilities in the Feather River Watershed in relation to the City of Live Oak.

During the development of the Central Valley Flood Protection Plan (CVFPP), the areas protected by the facilities of the SPFC were organized into flood planning regions, including the Feather River Region, to account for variations in land use conditions, flood protection facilities and flood hazards. The Feather River Region includes areas protected by SPFC levees (project levees) near the Feather, Yuba, and Bear Rivers above Verona. This region's land uses are primarily rural, but does include several urban areas, including Biggs, Gridley, Live Oak, Marysville, Yuba City, Olivehurst, and Linda (DWR, 2013a).

Levee maintenance work is delegated by the State to the local maintaining agencies (LMAs), which can be any city, county, district or other political subdivision of the State that is authorized to maintain levees.

Existing levees along the Feather River, Sutter Bypass, Cherokee Canal, and Wadsworth Canal, as well as the Butte Basin, are features of the SRFCP. The SRFCP is designed to keep flows from frequent flood events within the river, and convey and divert larger flood flows into the Yolo and Sutter bypass system. The Sutter Bypass borders the Sutter Basin on the southwest, receives flood flows from the Sacramento River, Feather River, and Butte Basin. The CVFPB is responsible for operations and maintenance of the SRFCP levees. Under the oversight of the CVFPB, which is staffed by DWR, the SRFCP levees within the Sutter Basin are maintained by three different local maintenance agencies: DWR, Sutter maintenance yard; Levee District 1; and Levee District 9. The levees are maintained in accordance with a Standard Operations and Maintenance Manual for the SRFCP prepared by USACE (USACE, 2013).



Source: CVFMPP, 2010

Figure 3 – Feather River Watershed, SPFC facilities

2.3 FEATHER RIVER WEST LEVEE PROJECT (FRWLP)

As mentioned earlier, residents, businesses, and local governments of Sutter Basin are keenly aware of flood risk, which led to creation of the SBFCA. The SBFCA is a joint powers agency formed in 2007 by the Counties of Butte and Sutter, the Cities of Biggs, Gridley, Live Oak, and Yuba City, and Levee Districts 1 and 9. The agency has the authority to finance and construct regional levee improvements. In 2007, SBFCA embarked on a comprehensive evaluation of the Feather River West Levee (FRWL) system to evaluate and identify the deficiencies, their magnitude and severity, and the remedial measures required to bring the FRWL system up to the current federal and state flood protections standards. SBFCA's goal is to achieve a minimum 200-year level of flood protection for urbanized and urbanizing areas within the Sutter Basin, as much of the County was considered vulnerable to flooding from levee failure.

While only the southwest portion of the Sutter Basin, including the southern portion of Yuba City, are susceptible to flooding from the Sutter Bypass, nearly the entire Basin, including Live Oak, is susceptible to flooding from the Feather River. The local Feather River Levee Project (FRWLP) involves the construction of slurry walls, stability berms, and seepage berms to remediate the identified geological problems, including under-seepage and embankment instability for about 41 miles of the existing Feather River project levees from the Thermolito Afterbay south to a point approximately 4 miles north of the Feather River-Sutter Bypass confluents. The FRWLP is a distinct project formulated independently and separate from the Federal Sutter Basin pilot project. The FRWLP is intended to advance the implementation of local flood risk-reduction measures in conjunction with implementation of a Federal Project. (USACE. 2013)

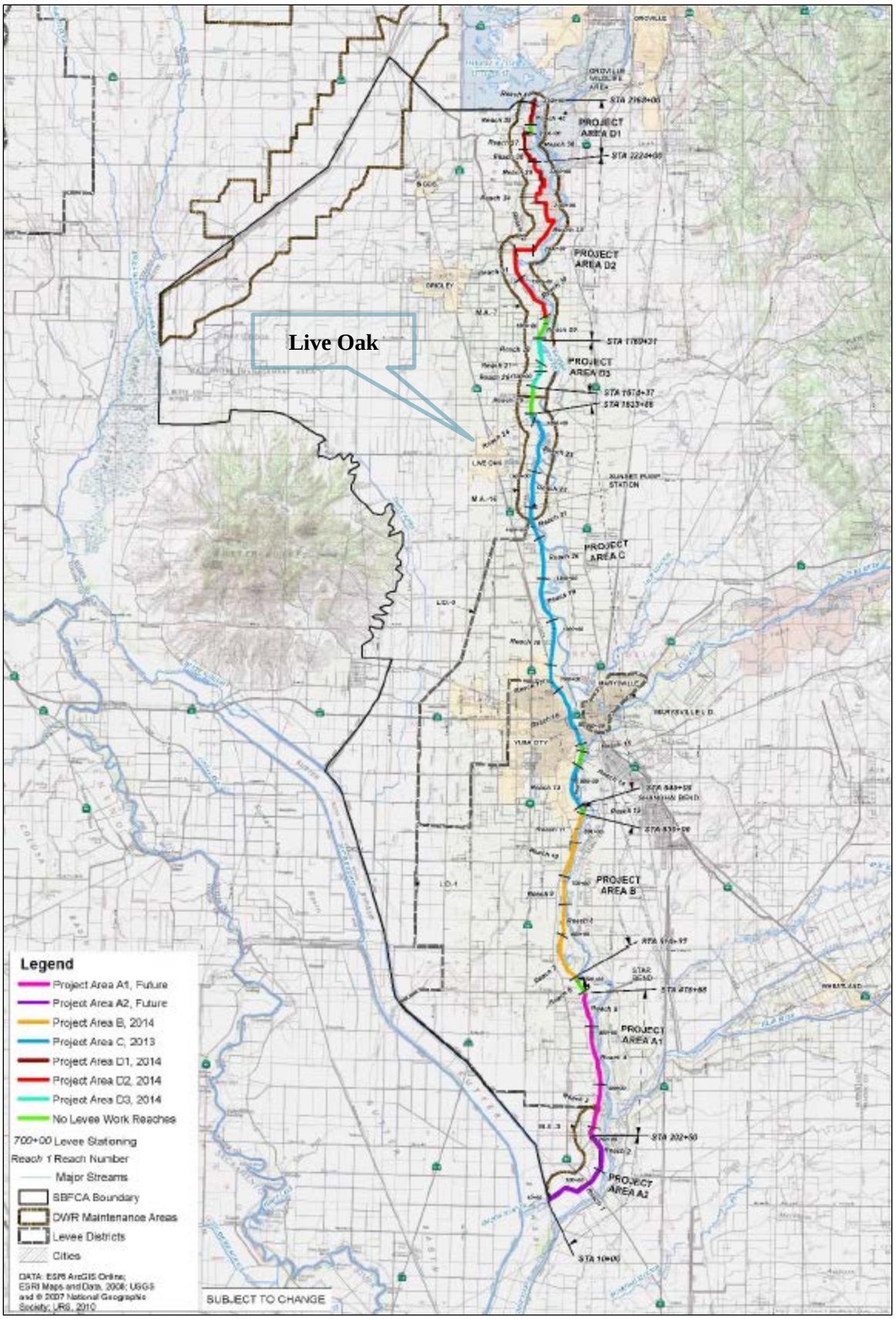
As a part of ongoing efforts to achieve a minimum 200-year level of flood protection for urban areas in the Sutter Basin, SBFCA divided the FRWL Project (FRWLP) into four project areas: Project Areas A, B, C, and D (See Figure 4). In 2013, the SBFCA first started construction on the required state 200-year flood protection improvements (Project Areas B, C, and D). Construction is expected to be completed in 2017. Planning work for Project Area A (south of Yuba City), is ongoing and the goal is to improve this reach to ensure the required 100-year protection for this section of the levee system. It is important to note that Reaches 26-28 (FRWL stationing 1674+37 thru 1769+31) are not being remediated to provide a 200-year level of protection since these levees are located on high ground and the 200-year water surface would not contribute to the Sutter Basin floodplain if these levees were removed[3] (SBFCA, 2014a).

The 200-Year Post-Feather River West Levee Project Floodplain Mapping report (SFBCA, 2016) documents the development of the post-Feather River West Levee Project (FRWLP) 200-year floodplain maps. The study analyzed potential flooding under three scenarios: interior drainage problems, Sutter Bypass levee breaches, and Feather River Levee breaches south of Star Bend (outside of the FRWLP Areas B, C, and D). Interior drainage sources are localized flooding problems often caused by storm drain system overload, or an unusually heavy amount of rainfall. The Report presents the 200-year post-project floodplain extent based upon completion of the FRWLP improvements for Project Areas B, C, D, and the Star Bend setback, which runs from Thermalito Afterbay to south of Star Bend (River Mile 17.0; Levee STA 478+68). This Report did not analyze or address flood risk from the Cherokee Canal or Butte Sink. The Cherokee Canal is a component of the SPFC that diverts excess floodwater originating in the foothills northeast of the Thermalito Afterbay. Cherokee Canal is a channelized portion of Dry Creek that flows southwesterly from central Butte County to the Butte Sink. The

[3] Sutter Butte Main Canal: Investigation Regarding Inflow from a Feather River West Levee Breach, PBI, 2011

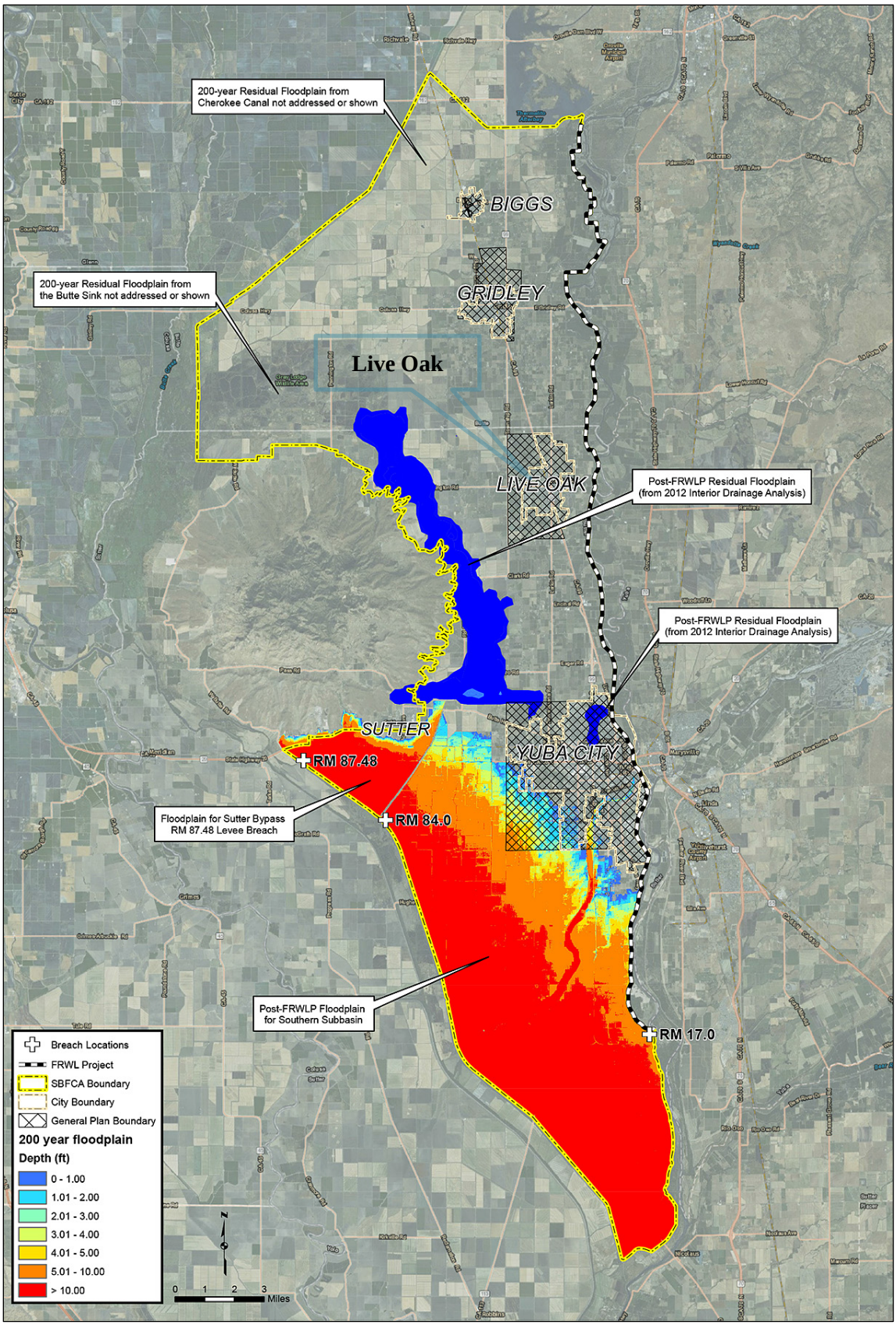
Cherokee Canal and Butte Sink are located in the furthest northwest region of the Sutter Basin and are primarily in FEMA Zone A (inundated by 100-year flooding; FEMA base flood elevations [BFEs] have not been determined). However, available FEMA 100-year mapping and 200-year mapping produced by the San Joaquin River Basins Comprehensive Study (USACE, 2002), available on DWR Best Available Maps (BAM) website (http://gis.bam.water.ca.gov/bam/) show that flooding from these sources are outside the reach of the Live Oak 2030 General Plan area.

In total, the comprehensive 200-year post-FRWLP floodplain map incorporates potential 200-year flooding of the Sutter Basin under each of the above noted scenarios. The resulting 200-year post-floodplain map for the entire Sutter Basin highlighting depths greater than 3-feet is shown in Figure 5. As shown in Figure 5, under the above flooding scenarios and with completion of the FRWLP, it is unlikely that 200-year flooding would reach the Live Oak 2030 General Plan Area.



Source: SBFCA, 2016

Figure 4 – FRWLP Construction Phasing Plan



Source: SFBCA and Peterson.Brustad,Inc., 2016

Figure 5 – Sutter Basin 200-Year Post- FRWLP Project Residual Floodplain Depths

3 FLOODING IN THE CITY OF LIVE OAK

High-intensity rainfall is the primary cause of localized flooding. Flooding from weather events frequently occurs in developed or urbanized areas with large amounts of impervious surfaces or in areas that have inadequate storm drainage systems. Riverine flooding occurs during or after prolonged periods of rainfall, or if rain events and snowmelt are combined. The Feather River, which forms the eastern border of the 2030 General Plan Area, consists of a large watershed that stretches to the Sierra Crest. The city's location in the lower portions of the Feather River Watershed exposes the community to substantial risk from riverine flooding.

Additionally, riverine flooding can overwhelm the integrity of the local or regional levee system. Levee failure can result if water overtops a levee, if high river levels saturate the levee banks, or if the levee itself is structurally defective. Levee failure can occur very rapidly with little warning. Once a levee is breached, floodwaters can inundate large low-lying areas. Levee overtopping or failure could cause catastrophic flooding in the 2030 General Plan Area. However, as noted in the above section (Sutter Butte Flood Control Agency), the goal of the Feather River West Bank Levee Project improvements is to protect the Sutter Basin, including the Live Oak 2030 General Plan Area, by providing 200-year flood protection.

Dam failure occurs when a dam is not structurally sound or is unable to withstand damages resulting from seismic activity. The degree and speed of dam failure depends on the dam's structural characteristics. The Planning Area is susceptible to a variety of dam failure hazards. Due to the relatively flat topography surrounding the City, dam failure would result in sheet flow. This is opposed to the "bowl effect" of the southern portions of the County. As shown in a later section (3.1.3 – Local Flood Hazard Areas) of this document, the City of Live Oak should have ample warning time to prepare evacuation.

3.1 LOCAL FLOOD PROTECTION

The Live Oak 2030 General Plan area is relatively flat due to its location in the Sacramento Valley, near the Feather River. The drainage pattern of the city is split into two drainage sheds. The majority of the land west of the Southern Pacific Railroad drains south to Reclamation District (RD) No. 777 drainage canal Lateral No. 1. The land east of the railroad drains south and is collected in Live Oak Slough, which is the main canal for Reclamation District (RD) 777. Live Oak is susceptible to localized flooding by Live Oak Slough, which runs along the east side of the City. These channels drain into the East Intercepting Canal or the West Intercepting Canal, which drain in the Wadsworth Canal, a levee channel that flows into the Sutter Bypass channel. The West and East Intercepting canals and the Wadsworth Canal are owned, operated, and maintained by DWR.

3.1.1 RECLAMATION DISTRICT NO. 777 (RD 777)

RD 777 provides drainage to most of the Live Oak General Plan Area. The District operates laterals 1, 2, 6, 6A, 14, and the Main Canal (Live Oak Slough) in the area in and around the Planning Area. The original RD 777 drainage channel capacities were documented in a 1921 letter to the RD 777 Board of Trustees. The drainage channels were sized to provide a capacity of 15 cubic feet per second (cfs) per square mile of tributary area. This flow rate was based on a daily runoff value of 0.5 inches (RD 777 2006: 3-1).

3.1.2 RECLAMATION DISTRICT 2056 (RD 2056)

RD 2056 provides storm drainage to an area in the northwestern portion of Live Oak's 2030 General Plan Area. The original RD 2056 drainage channel capacities were sized to provide a capacity of 15 cfs per square mile of tributary area, based on a daily runoff of 0.5 inches. Drainage facilities would be designed to accommodate the runoff from the full buildout of the Live Oak 2030 General Plan (City of Live Oak 2006c: 22).

3.1.3 LOCAL FLOOD HAZARD AREAS

As noted in Section 2.2, SB 5 affected cities are required to include information related to flooding in their general plan Safety Element. Required flood hazard information and maps include information from USACE, and maps identifying CVFPB floodways, dam failure inundation, Awareness Floodplains, DWR 200-year designated floodplains, Levee Protection Flood Zones, and areas potentially subject to flooding in the event of a failure of levees and floodwalls. Although some of the required information overlaps or is superseded by more recent or accurate information, all required information and maps are included and/ or addressed, as follows:

1. **Flood Hazard Zones** – defined in SB 5 as "an area subject to flooding that is delineated as either a special hazard areas or an area of moderate or minimal hazard on an official flood insurance rate map issued by the Federal Emergency Management Agency [FEMA]."

   Flood Insurance Rate Maps (FIRMS) for the City of Live Oak and the Planning Area include FIRM Panel 0603940030B and 0603940035B issued by the FEMA. Panel 0603930030B map is not printed by FEMA as the area is Zoned X, which FEMA defines as having minimal flooding hazards. These areas are deemed protected from the one percent annual (100-year) chance flood by levee, dirt, or other structures that are subject to possible failure or overtopping during larger floods. Referencing FIRM Panel 0603940035B (Panel 35 of 325), the area surrounding the City limits of Live Oak (Planning Area) is in Zone X500, which is a 0.2 percent annual (500-year) chance flood event floodplain. FIRM Panel 0603950001c shows a small area in the Live Oak 2030 General Plan Area is susceptible to flooding (Zone A). Zone A is defined as an area of 100-year flood; base flood elevations and flood hazard factors not determined. As discussed in Section 3.1 of this document, this area is susceptible to localized flooding from the Live Oak Slough. FEMA floodplain mapping is also shown in the Feather River Regional Flood Atlas-Draft, Map 16.

   In January 2014, the City of Live Oak received a Letter of Map Revision (LOMR) from FEMA with an annotated FIRM panel map, which revises the small area in the City's Plan Area that is susceptible to localized flooding from Zone A to "Contained" (in storm drain), and indicates incorporation of the modification. However, per FEMA, the FIRM panel map will not be physically revised until changes warrant physical revision and republication in the future. Figure 6 (Figure Safety-1 in Public Safety Element) shows the FEMA 100- and 500-year floodplain maps, combined, and has been updated to reflect the LOMR.

2. **United States Army Corps of Engineers (USACE) Information** – The USACE was responsible for preparing the Sacramento and San Joaquin River Basins Comprehensive Study (SSJRBCS) after the floods of 1997. In addition to a post-1997 flood risk and damage assessment, the SSJRBCS (USACE, 2002) addresses the entire Central Valley flood control system, plan development for flood control and environmental restoration, and hydrologic/hydraulic modeling of the system including reservoir operations. Among other things, the SSJRBCS includes mapping of the 100-year floodplain and of the 200-year and 500-year floodplains. The SSJRCS maps are posted and available for review on the DWR Best Available Mapping web site : http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/

   USACE also initiated the Sutter Basin Pilot Feasibility Study (SBPFS) in 2000 at the request of Sutter County through the California Central Valley Flood Protection Board (formerly the California Reclamation Board). The SBPFS Final Report (USACE, 2013) addressed the flood risk in the Sutter Basin in Sutter and Butte

Counties, including assessing the risk for flooding; describes a range of alternatives formulated to reduce flood risk; and identifies a Tentatively Selected Plan (TSP) for implementation. The SBPFS Final Report-Final Environmental Impact Report/Supplemental Environmental Impact Statement can be found at: http://www.spk.usace.army.mil/Portals/12/documents/civil_works/Sutter/Final_Report/SutterPilotFeasibilityReport_FEIR-SEIS.pdf

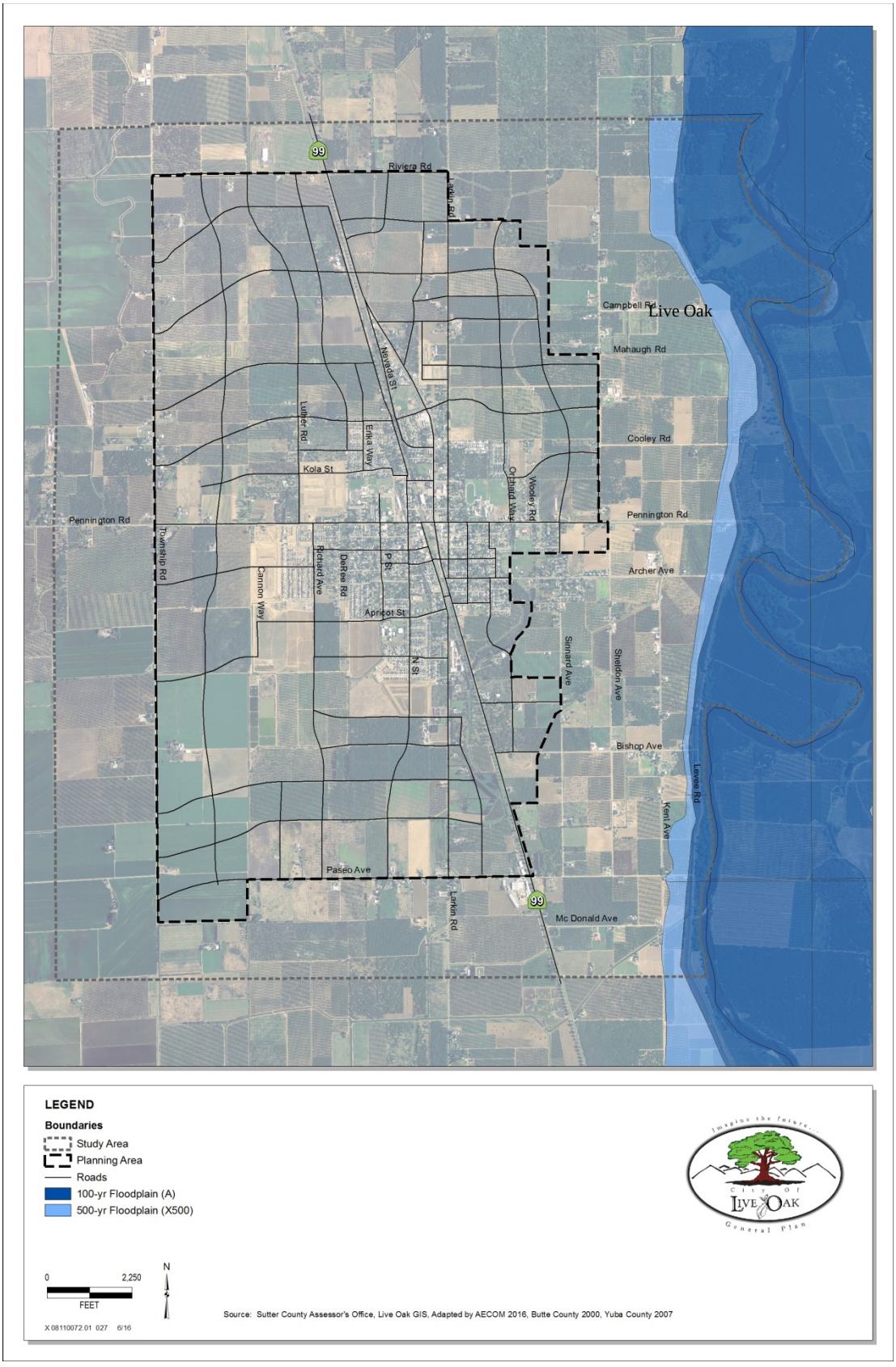
More recent and locally-accurate 200-year floodplain maps have been developed for the Sutter Basin (SBFCA, 2016). Subsequent to the request for the Feasibility Study, the SBFCA and the State proposed to implement the Feather River West Levee Project (FRWLP), which is similar to the Feasibility Study. SBFCA requested and received approval under 33 United States Code Section 408 for certain levee improvement work in the SBPFS study area. SBFCA's stated intent was to begin construction on the FRWLP to address the most critical sections of the existing levee and thereby advancing construction of the federal project expected to result from the SBPFS. Construction began on the FRWLP in 2013. The 200-Year Post-Feather River West Levee Project Floodplain Mapping (SBFCA, 2016) was developed to show the floodplain extents based upon completion of the FRWLP 200-year flood protection improvements (See Figure 5).

3. **CVFPB Designated Floodway Maps** – Floodways refer to channel of the stream and the reasonably required portion of the adjoining floodplain for flood passage, and is the primary non-structural flood management program employed through the CVFPB (CVFMPP, 2010). The CVFP has the authority to designate floodways as a means to manage land use in these floodways to maintain adequate flood passage capacity. Available CVFPB designated floodway maps are posted on the CVFPB website: http://www.cvfpb.ca.gov/maps/. Review of the website confirms that the CVFPB has not designated any floodways in or adjacent to the City of Live Oak.

4. **Levee Flood Protection Zones (LFPZs)** – LFPZs estimate the maximum area that may be inundated if a project levee were to fail when water surface elevation is at the top of a project levee. LFPZs describe areas that would be flooded to more than three feet in depth, and areas that would be flooded to a depth of less than 3 feet, if the river water level contained by a SPFC levee is at the top then released because of levee failure. DWR is required to develop these maps to estimate the maximum potential for flooding due to levee failure. The LPFZ inundation areas in Live Oak are shown on Figure 7 (Map 3 of the Feather River Atlas – Draft (DWR, 2013) and available online at http://gis.lfpz.water.ca.gov/lfpz/). As noted by DWR, lands not in a LPFZ are not invulnerable to flood risk as some may also experience flooding from other sources.

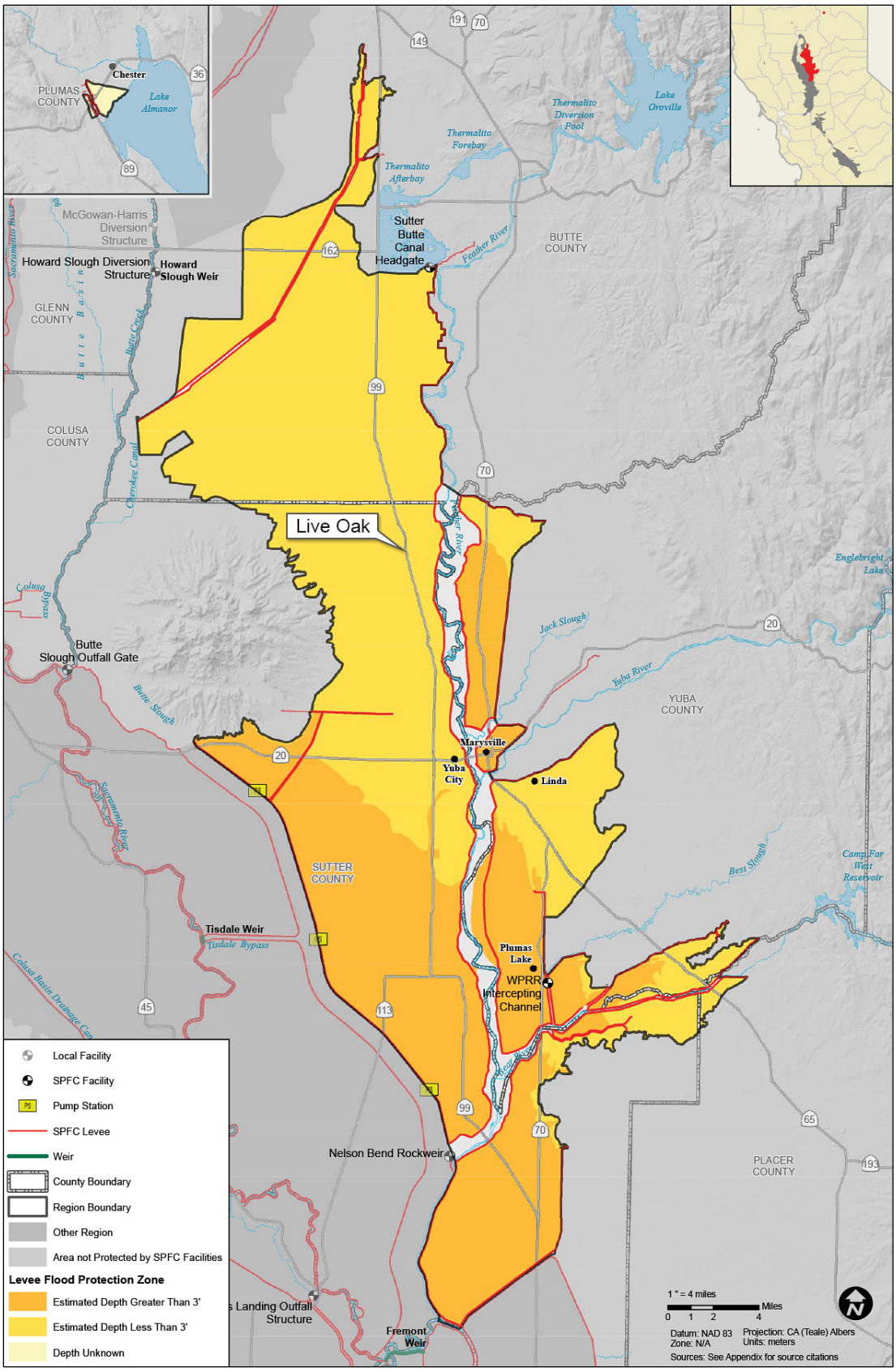
5. **Areas Subject to Inundation in the Event of Failure of Project or Non-Project Levees or Floodwalls** – The maximum potential flooding from failure of project levees is described by LFPZs. Areas subject to potential inundation as a result of levee failure of project levees are also described by the FEMA Flood Insurance Rate Maps and floodplain mapping in both the USACE Sacramento-San Joaquin River Basins Comprehensive Study and the Sutter Basin Pilot Feasibility Final Report – FEIR/SEIS. As mentioned earlier, the 200-Year Post -Feather River West Levee Project Floodplain Mapping (SBFCA, 2016) shows floodplain extents based upon completion of the FRWLP 200-year flood protection improvements.

6. **Awareness Floodplain Mapping Program** – DWR established the Awareness Floodplain Mapping project to identify flood hazard areas that may not otherwise be mapped, e.g. under the FEMA National Flood Insurance Program (NFIP), and to provide communities with an additional tool for understanding potential flood hazards. The DRW Awareness Floodplain Maps can be found at http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/awareness_floodplain_maps/. The website states there are no completed studies or Awareness Floodplain Maps available for Sutter County. However, there is a discrepancy as the DWR Best Available Mapping (http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/) shows an Awareness Map floodplain along the Live Oak Slough, which is described in Section 3.1.



Source: City of Live Oak 2030 General Plan

Figure 6 – Floodplain Map



Source: DWR, 2013

Figure 7 – Feather River Levee Flood Protection Zones

7. **Dam Failure Inundation Maps** – Flood inundation maps prepared by DWR indicate that the 2030 General Plan Area and much of the surrounding area is within the flood hazard zone for the Oroville and Thermalito Afterbay dams. An evacuation plan is integrated into the Sutter County Office of Emergency Management, Emergency Operations Plan (2015).

   Dam inundation mapping procedures (19 CCR §2575) are required by the State Office of Emergency Services (OES) for all dams where human life is potentially endangered by dam flooding inundation. The Sutter County OES provides for the development, establishment, and maintenance of programs and procedures to help protect the lives and property of Sutter County residents from the effects of natural disasters, including floods from dam failures. The County OES works with the County and individual city departments with disaster exercises and evacuation preparations. Sutter County utilizes three emergency activation phases in its flood warning system (City of Live Oak, 2010b).

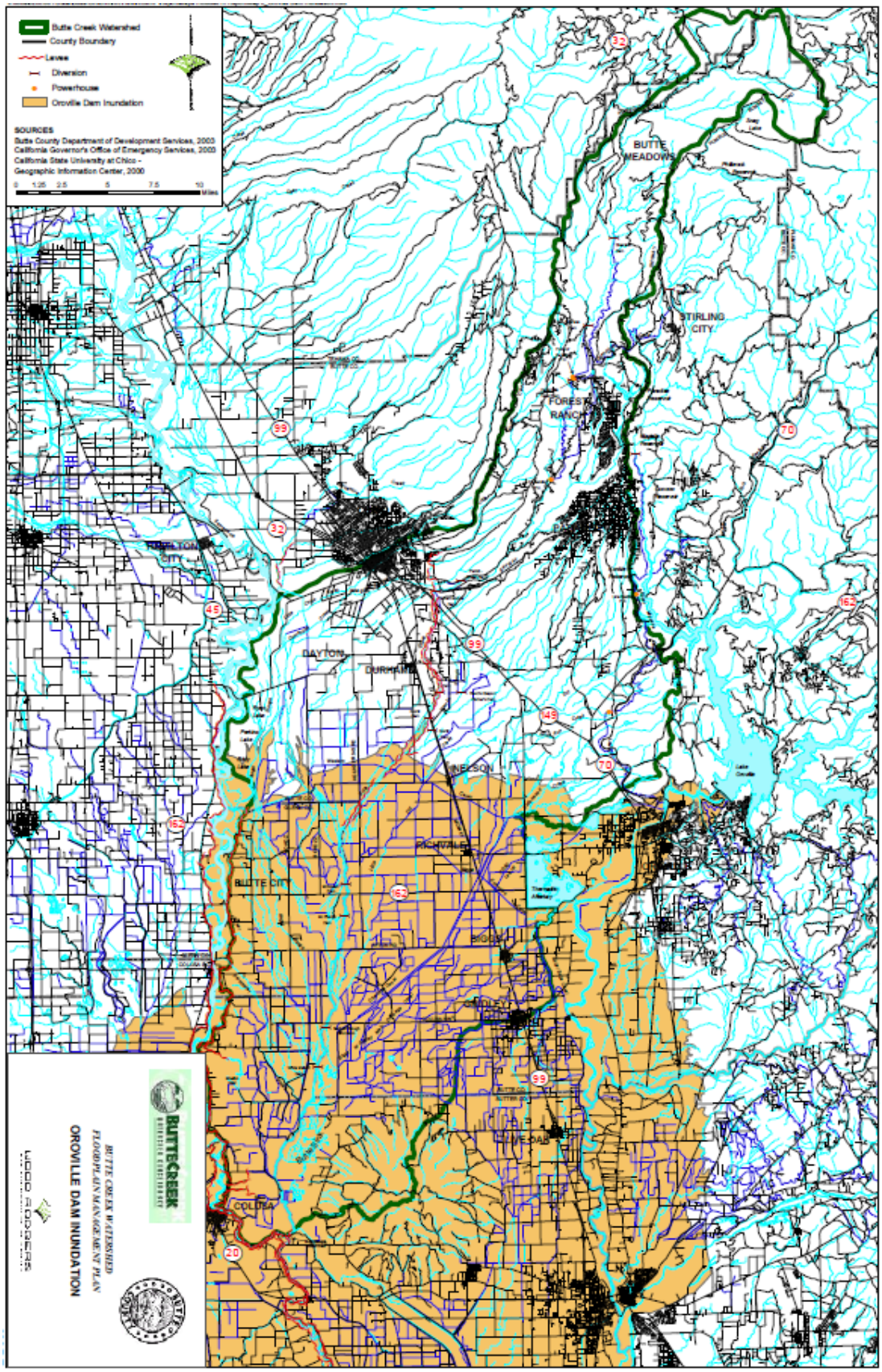
   The City of Live Oak planning area is subject to inundation from Oroville and Thermalito Afterbay Dams in the event of dam failure (County of Sutter Emergency Operations Plan, Annex 5, Floods and Dam Failure, 2015). Oroville Dam is on the Feather River, approximately 20 miles northeast of Live Oak. Live Oak is downstream from this dam. Lake Oroville is the widened section of the river held back by the dam. Lake Oroville has a capacity of 3.5 million acre-feet. Regulated flood releases from the Oroville Dam are 150,000 cfs. Channel capacity of the regulated Feather River channel downstream ranges from 210,000 to 320,000 cfs. Figure 8 shows Oroville Dam inundation in the event of dam failure. Limited development is happening in the City. While future development my place more structures in the dam inundation areas, due to the low risk of dam failure, development will be allowed in all these areas. Additionally, as noted in the County's Emergency Operations Plan, the City of Live Oak should have ample warning time to prepare evacuation in the event of dam failure.

   - Estimated Flood Arrival Times for Oroville Dam Failure (reported by DWR):
     Location Main Channel Flood Wave: City of Live Oak - 4.3 hours
     Total Inundation Time: City of Live Oak - 11.3 hours

   - Estimated Flood Arrival Times for Thermalito Afterbay Dam Failure (reported by DWR):
     Location Main Channel Flood Wave: City of Live Oak - 12.4 hours
     Total Inundation Time: City of Live Oak - 15.5 hours

   The Oroville and Thermalito Afterbay dams have been constructed and are maintained consistent with California Water Code Division 3, which has regulatory jurisdiction over the dams and contains specific requirements for maintenance and operations, emergency work, investigations and studies (Part 1, Chapter 4), repairs and alterations (Part 1, Chapter 5) and inspections and approvals (Part 1, Chapter 7). State Law requires that dams be evaluated regularly to verify their structural integrity, including resistance to earthquake damage.

   Although unlikely, failure of a dam would release stored water that could inundate downstream areas and result in loss of life, damage to property, displacement of residents and damage to water resource and other infrastructure. However, there is no substantial evidence to suggest that dam failure is likely.



Source: Butte County, 2005

Figure 8 – Oroville Dam Inundation

3.2 EXPOSURE TO FLOODING: POPULATION, ESSENTIAL FACILITIES, REAL PROPERTY, PLANNED GROWTH

The California Flood Future report (DWR, 2013) provides a look at the statewide exposure to flood risk, identifies and addresses the barriers to improved flood management, and encourages land use plan practices that reduce the consequences of flooding. The current SPFC system protects a population of over one-million people and many billions of dollars in public and private assets currently located within floodplains. These at-risk assets include major freeways, railroads, airports, water supply systems, utilities, and other public and private infrastructure of national, regional and statewide importance.

Potential flooding involves significant risks to lives and property in the City of Live Oak, including potential loss of life and injury, damage to and destruction of buildings, permanent or temporary loss of utility services, damage to transportation infrastructure, and interruption in the delivery of goods and services, as well as general social and economic impacts on the community. As identified in the Sutter County Local Hazard Mitigation Plan (LHMP), critical facilities in Live Oak include at risk population facilities, including schools, congregate care facilities, and essential service facilities. Essential service facilities in Live Oak include evacuation shelters, fire station, police/sheriff's office, medical health facility, wastewater treatment facility, and government, water supply, stormwater, and waste water facilities (Sutter County, 2013a). Based on recent analysis, the Feather River West Levee Project improvements will provide 200-year flood protection for population and assets within the City of Live Oak.

3.3 EMERGENCY RESPONSE

Emergency response to flooding and flooding threats is primarily the responsibility of local agencies including the City of Live Oak, the Sutter County Fire Department, Sutter County Sheriff's Office, and the Sutter County Office of Emergency Services. The State of California and the federal government serve a larger coordinating role in emergency response planning, financing, and logistical support; these agencies have established uniform Incident Command Systems, which are the basis for County, City, and other agency emergency action plans.

One of the goals of the Sutter County LHMP includes improving community awareness, education, and preparedness for hazards that threaten the County's communities. This awareness includes information regarding evacuation and sheltering options, during and after a disaster event. Appendix F of the Sutter County LHMP specifically addresses risk assessment and mitigation related to localized flooding. Annex A (City of Live Oak) of the Sutter County LHMP details the hazard mitigation planning elements specific to Live Oak, with a focus on providing additional detail on the risk assessment and mitigation strategy for the community. The Sutter County LHMP along with Annex A functions as the City of Live Oak's Flood Safety Plan, and addresses planned responses to emergencies affecting the City.

The Sutter County LHMP also references the Sutter County Emergency Operations Plan (2015), which addresses in detail the planned response to emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting Sutter County. The Emergency Plan has been developed to provide a comprehensive (multi-use) emergency management program for Sutter County; it is designed to establish the framework for implementation of the California Standardized Emergency Management System (SES) for Sutter County, a political subdivision of the State of California, located within Mutual Aid Region III (as designated by the Governor's Office of Emergency Services). Further, the Emergency Plan and its associated

annexes meet those conditions of emergency management and the basic tenets of Incident Command System (ICS) required by the National Incident Management System (NIMS). The purpose of both is to provide uniform incident management organization and procedures that can be used effectively and simultaneously by public safety agencies at all levels of government, including local agencies in Sutter County. The Emergency Plan is intended to facilitate multi-agency and multi-jurisdictional emergency operations coordination, particularly between Sutter County and local governments, including special districts and state agencies. (County of Sutter, 2013a)

The potential for emergencies related to geologic hazards, flood, fire, and hazardous materials requires the City to have a planned evacuation route. In the event of a flooding incident or threatened incident, the City of Live Oak plays a key role in response together with the Sutter County Sheriff's Office and the Sutter County Fire Department. The Sutter County Emergency Operations Plan designates planned evacuation routes. State Route (SR) 99 is the primary evacuation route for hazard events affecting the Live Oak Planning Area (See Figure SAFETY-2 in the Public Safety Element).

3.4 OTHER NON-STRUCTURAL FLOOD MANAGEMENT STRATEGIES

In addition to the provision of flood protection structures and emergency response planning, several other agencies regulate floodplain areas and/or resources commonly found within these areas to provide flood management resources for the prevention and preparation for flood events. These resources include flood-related information, mapping and plans, establishment of standards and criteria, inspection, maintenance, and improvement of existing facilities and planning to minimize flood exposure.

3.4.1 LEVEE MAINTENANCE

Under the oversight of the CVFPB, the SRFCP levees within the Sutter Basin are maintained by three different local maintenance agencies: DWR, Sutter maintenance yard; Levee District 1; and Levee District 9. These agencies have primary responsibility for operating, inspecting, and correcting problems with SPFC levees and other structures near the City's General Plan area. The levees are maintained in accordance with a Standard Operations and Maintenance Manual for the SRFCP prepared by USACE.

3.4.2 EXPOSURE REDUCTION

The City of Live Oak reduces flood risk exposure primarily through its land use planning and zoning authority; the zoning code is the primary implementing mechanism of the General Plan. Unlike the General Plan, which provides long-range, comprehensive general policies for the general direction of land use in the City, the Zoning Code provides more specific description of the types of uses that are allowed in certain areas, development standards (e.g. setbacks, building heights, lot coverage) and other detailed guidance for property development. The zoning code is required to be consistent with the General Plan.

Live Oak discourages urban development in 100-year floodplain areas. The City's floodplain ordinance (Chapter 15.21 of the City's Municipal Code) prohibits development in the floodplain unless stringent guidelines are met. Existing 2030 General Plan goals, policies and implementation measures do not include the ULOP 200-year flood protection standard. As an SB 5 affected city, adoption of the SB 5 GPA will be the City's first step in incorporating goals and policies that support this new standard.

The City also reduces exposure to flood risk through its participation in the FEMA NFIP, which promotes reduced flood insurance premiums for development that is not located within the 100-year floodplain. This benefit indirectly effects floodplain management by encouraging development outside the 100-year floodplain. The management program objective is to protect people and property within the City. As a participant NFIP, the City of Live Oak has administered floodplain management regulations that meet the minimum requirements of the NFIP. The City of Live Oak will continue to comply with the requirements of the NFIP in the future.

Ongoing development has occurred within the City over the last few years, and additional growth of the city is anticipated in the City's revised General Plan, particularly in/around the southwest, northwest, and northeast quadrants of the City. A critical element in planning for the City's new growth is determining infrastructure needs and funding mechanisms to pay for the required infrastructure. Development of agricultural land results in construction of buildings and pavement, which greatly increases the runoff rate and total volume of runoff. Consequently, new drainage facilities, including storm drain collection systems, open channels, detention basins, and pump stations, are needed to manage the increased runoff and to prevent flooding.

There are two primary sources of stormwater runoff that are of concern to the City: regional runoff, which originates outside the City and runoff from properties located inside the City. The City owns and maintains storm drainpipe systems, detention basins, and pump stations to provide drainage and prevent flooding within the City and convey runoff to the Reclamation District 777 (RD 777) open channel drainage system. At buildout of the City of Live Oak 2030 General Plan, the northwest corner of the City will be within RD 2056 service area. Minor street flooding occurs, although infrequently, in the City of Live Oak. Many of the road and streets within the City of Live Oak were constructed without curbs and gutters, which contributes to minor nuisance ponding of storm water. In the 2011 Live Oak Drainage Study, an analysis of existing drainage infrastructure was performed resulting in 10-year storm depths in some areas up to 1-foot or less. Many homes in Live Oak are built on raised foundations, so flooding depths of less than 1-foot may not actually enter the homes. A 100-year analysis resulted in flooding in some areas of up to 1-foot or 2-feet deep. Future development in the City will add more impervious surfaces and need to drain those waters. The City has a track record of addressing localized flooding in the past, and will continue those efforts in the future (County of Sutter, 2013b).

3.4.3 STANDARDS AND CRITERIA

With the passage of the SB 5 Bills, the State has assumed a more active role in flood management. The State's involvement now includes: collecting and disseminating floodplain mapping and other information, developing an inventory of State Plan of Flood Control facilities, establishing the 200-year flood protection standard for urban areas (ULOP), establishing the Urban Levee Design Criteria (ULDC); and requiring local governments to either provide 200-year flood protection or cease urban development in flood-prone areas until it has made "adequate progress" toward 200-year flood protection by 2025.

3.4.4 FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

On April 1, 1979, then President Jimmy Carter signed the executive order that created FEMA. FEMA co-ordinates the federal government's role in preventing or mitigating for the effects of, and preparing and responding to domestic natural and man-made disasters that overwhelm the resources of local and state authorities. FEMA provides a wide range of emergency assistance, including response to flood emergencies. FEMA is also the primary federal agency for floodplain mapping and management. FEMA administers the

National Flood Insurance Program (NFIP). As a means to encourage communities to adopt and enforce floodplain management regulations, the NFIP subsidizes flood insurance for property owners within a NFIP participating community if the community regulates land use and development in accordance with FEMA standards. These standards are based partly on the designation of floodplain areas in FEMA-prepared Flood Insurance Rate Maps (FIRMs). FIRMs are updated periodically to reflect the level of flood protection provided in flood-prone areas as well as changing conditions such as land use, water flow, levee condition, and drainage patterns. The FIRMs are considered the "regulatory floodplain" from a federal and local perspective, and considered the "base flood plain" by the USACE.

The design and condition of levees are key elements of FIRM mapping. Under and through seepage problems have resulted in major levee failures in Yuba City in 1955 and 1997. As a result, the levees did not provide 100-year flood protection as required by FEMA, or the State's requirement for 200-year flood protection for urban and urbanizing areas. The Feather River West Levee Project (FRWLP) anticipated to be completed in 2017, will rehabilitate 44 miles of levees along the west bank of the Feather River, from Thermalito Afterbay south to the Sutter Bypass, addressing underseepage and through seepage which is caused by water pressure and velocity both under and through the levees. The project provides 200-year level of flood protection for the City of Live Oak 2030 General Plan Area (County of Sutter, 2013b).

3.4.5 U.S. ARMY CORPS OF ENGINEERS (USACE)

USACE has approximately 37,000 dedicated civilians and soldiers delivering engineering services. The USACE is primarily responsible for planning, designing, and constructing federally authorized flood management facilities, as wells as analysis of flood risk and flood protection improvement feasibility and operation of flood control reservoirs and other facilities. These responsibilities include analysis, engineering, construction and inspection of federal levees.

The USACE develops and adopts levee and other flood protection standards in cooperation with the State. The USACE is responsible for implementing most federally-authorized flood control projects, in partnership with State and local agencies. These projects are constructed under agreements where the State of California, through DWR and the CVFPB, and with the local maintaining agencies, assumes liability and principal maintenance responsibility for facilities constructed by the USACE. All of the levees providing flood protection in the vicinity of Live Oak are federal project levees. Any modification of an existing federal flood management project requires approval from USACE under 33 USC 408.

USACE conducts routine annual levee inspections and more-detailed periodic 5-year inspection to determine whether federal maintenance standards are met. In 2000, USACE initiated the Sutter Basin Pilot Feasibility Study (SBPFS) at the request of Sutter County through the CCVFPB. SBFCA became a joint non-federal sponsor with the CVFBP of the Feasibility Study. The SBPFS Final Report assesses the risk of flooding in the Sutter Basin, describes the range of alternatives formulated to reduce flood risk, and identifies a Tentatively Selected Plan (TSP) for implementation. The TSP consists of levee improvements to existing levees of the Sacramento River Flood Control Project, extending along approximately 41 miles of the Feather River. Prior to completion of the SBPFS and Final Draft Report (2013), the SBFCA and the State proposed to implement the Feather River West Levee Project (FRWLP), which is similar to the Study, with a goal of 200-year flood protection. FRWLP construction began in 2013.

3.4.6 CALIFORNIA DEPARTMENT OF WATER RESOURCES (DWR)

DWR's primary responsibility is for managing and protecting California's water. In cooperation with other agencies, DWR works to protect people, and protect, restore, and enhance the natural and human environments. To that end, DWR has broad range of water-related responsibilities. In addition to oversight and inspection of the SPFC facilities, including the Feather River levees, DWR oversees LMA activities. As mentioned earlier, levee maintenance is delated to LMAs. In the Sutter Basin, the LMAs include the Sutter maintenance yard; Levee District 1; and Levee District 9. DWR administers State-funding programs to assist LMAs with levee maintenance and improvements. Additionally, DWR serves as the States National Flood Insurance Program (NFIP) Coordinating Office for FEMA.

The SB 5 increased the flood protection standard to a 1-in 200-year flood event (ULOP), and because DWR provides flood-related technical, financial, and emergency response assistance to local agencies, DWRs role expanded under the SB 5 bills. DWR activities related to flood protection are coordinated through FloodSAFE. Launched in 2006, and recognizing that addressing flood damage statewide will take decades, FloodSAFE California is a long-term strategic initiative to reduce flood risk, with an emphasis on the Central Valley and the Delta. Communities and resources in these areas face high risk of catastrophic damage. As the State's principal flood management agency, the California Legislature assigned the State's initial 200-year flood protection strategy to DWR and the Central Valley Flood Protection Board, which is staffed by DWR. Pursuant to the SB 5 bills, initial efforts include publication of floodplain mapping, preparation of the CVFPP, and definition of urban flood protection and levee standard. FloodSAFE is also an important component of DWR's Integrated Water Management Plan, which is designed to achieve a sustainable, robust, and resilient flood and water management system.

The new requirements triggered the need for substantial additional technical evaluation, public information and planning, engineering and financing for necessary improvements. The DWR efforts under FloodSAFE, include:

- preparing the first inventory of SPFC facilities, which are identified in the State Plan of Flood Control Descriptive Document (CVFMPP, 2010).

- conducting urban levee evaluation (ULEs) and non-urban levee evaluation (NULEs) for hidden defects. ULE and NULEs programs determine if project and non-project levees meet levee design standards, and needed remedial measures to meet these standards. These programs provide a more detailed evaluation of local flood protection systems.

- developing Urban Levee Design Criteria (ULDC), which provides guidance for design, evaluation, operation, and maintenance of levees and floodwalls in urban and urbanizing areas. (DWR, 2012)

- developing Urban Level of Protection (ULOP) Criteria, which aids local governments in interpreting the SB 5, and related flood protection bill requirements. The ULOP provides minimum criteria for determining the applicability of the SB 5 bills to local government land-use decisions and the required findings, including supporting evidence, to permit future development in floodplain areas.

- providing Best Available Mapping (BAM), which is a compilation of "best" available mapping of flood risk and exposure, based on existing information. These maps provide initial assistance for flood protection planning and will be updated with more detailed information at a later time. Current mapping includes FEMA

Digital FIRM (DFIRM) maps, LFPZ maps, maps of federal and non-federal project levees, USACE floodplain mapping and Awareness Floodplain Maps.

- creating the California Levee Database, which has locational information for more than 10,000 miles of levees and flood control structures throughout California. In partnership with FEMA, DWR starting assembling levee ownership and risk factor information while ensuring compatibility and coordination with similar federal (i.e. USACE) efforts.

- funding the development of the RFMPs, which details DWR's vision for local flood management, and that it will use for future DWR studies. RFMPs include flood hazard identification, risk analysis, review of existing protection measures, identification of potential projects and funding, evaluation of system resiliency, and compatibility with State goals and Integrated Regional Water Management Plans (IRWMP). The Sutter Butte Flood Control Agency (SBFCA) completed a draft RFMP for the Feather River Region, which includes Live Oak. The RFMP is an important resource for this General Plan Amendment.

3.4.7 CALIFORNIA GOVERNOR'S OFFICE OF EMERGENCY SERVICES (CAL OES)

The California Governor's Office of Emergency Services (Cal OES) is responsible for overseeing and coordinating State emergency preparedness, response, recovery, and homeland security activities. When areas within California are affected by disaster that affect public safety, Cal OES dispatches team members to work with local leaders and first responders. The goal of the agency is to protect lives and property, and recovery from both natural and man-made disasters, including wild land fires, earthquakes, storms, droughts, terrorism, hazardous material spills, and flooding. Cal OES develops emergency response plans such as the State Emergency Management System (SEMS). Cal OES coordinates with regional OESs to ensure consistent delivery of emergency services. In California, dams are regulated by DWR, Division of Safety of Dams (DSOD). Inundation maps are a crucial part of a comprehensive emergency action planning (EAP). DSOD determines the hazard classification of a dam based on potential consequences. EAPs and inundation mapping of High Hazard Potential (HHP) dams are under the jurisdiction of CAL OES Dam Safety Program within the Hazard Mitigation Division. Additionally, the California Dam Safety Act requires dam owners to submit maps of potential inundation from dam failure to Cal OES, which in turn makes these maps available to the county OES and other local emergency preparedness agencies.

3.4.8 SUTTER COUNTY

As a jurisdiction participating in the NFIP, Sutter County is responsible for implementing FEMA floodplain management regulations in the unincorporated area.

The Sutter County Office of Emergency Management (OEM) serves many of the same functions as the California OES but is responsible for overall coordination of local emergency planning and response, including planning and response to flooding events. The County OEM is responsible for planning, response, and recovery activities associated with natural or man-made emergencies and disasters, including flooding events, throughout the County and coordination of those activities with local agencies, the California Emergency Management Agency (CalEMA) and FEMA. The County OEM has prepared and makes available to the public a range of flood protection materials. The County also prepared the County Emergency Operations Plan (EOP) that address the planned response to emergency situations in or affecting the County. The EOP and its associated annexes, is

intended to facilities multi-agency and multi-jurisdictional coordination, particularly between Sutter County and local governments, including special districts and state agencies, in emergency operations. It is designed to establish a framework for implementation of the California Standardized Emergency Management System (SEMS) for the County, a political subdivision of the State of California, located within Mutual Aid Region III (as designated by the Governor's Office of Emergency Services). The EOP Floods and Dam Failure Annex (Annex 5) addresses localized flooding, slow-rise flooding associated with levee system failure, and flooding caused by catastrophic failure of one or more dams in the region. The Annex also provides information and guidance for the Emergency Operation Team during a flooding disaster/emergency. EOP Evacuation and Mass Care/Shelter Annex (Annex 9) was written to augment existing checklists and Standard Operating Procedures (SOP) currently in place. The ultimate decision to evacuate an area is usually left to the elected officials in chard of that jurisdictional unit, who are advised by the local Emergency Operations Director. The Annex identifies general procedures for evacuation and shelter.

3.4.9 SUTTER BUTTE FLOOD CONTROL AGENCY (SBFCA)

As mentioned earlier in this document, the SBFCA is a joint powers agency formed in 2007 by the counties of Butte and Sutter; the cities of Live Oak, Gridley, Biggs, Yuba City; and the Levee Districts 1 and 9. SBFCA plans, designs and co-ordinates regional flood control improvements to protect lives and property in the Sutter Basin. Funded by DWR, the SBFCA in partnership with DWR, Yuba County Water Agency (YCWA), Three Rivers Levee Improvement Authority (TRLIA), and Marysville Levee Commission developed the Feather River Regional Flood Management Plan (2014). The Plan aligns the Feather River Region's flood management priorities with the CVFPP in managing flood risk in the Sacramento River and the San Joaquin River. The CVFPP provides a broad vision to help guide regional and State-level financing plans for system-wide improvements. The regional planning effort has been divided into six regions, including the Feather River Region. The Regional Flood Management Plans (RFMP) brings the CVFPP to fruition by further providing a level of detail that was needed to clearly define local and regional flood management needs. The purpose of RFMP is to clearly establish regional flood management priorities and facilitate future funding and implementation of flood-risk reduction projects.

The primary regional goal of the CVFPP is to improve flood risk management in reducing the chance of flooding and damages once flooding occurs, and improve public safety, preparedness, and emergency response. Secondary goals include improving operations and maintenance of flood management systems, integrating the recovery and restoration of key ecosystem functions into the flood management system, improving institutional support, and promoting multi-benefit projects. The Feather Region RFMP are consistent with these broader goals. The Feather River Management Plan specific objectives include:

- Urban and Urbanizing - Provide 200-year flood protection for urban and urbanizing areas of the region, including Marysville, Yuba City, portions of Sutter, RD 784 and Wheatland.
- Small Communities - Provide 100-year flood protection for the small communities in the region, including Rio Oso and Nicolaus.
- Rural Agricultural Areas - Improve flood protection for the rural agricultural areas within the region.

- Flood System Sustainability - Improve the flexibility and sustainability of the regional flood management system in light of climate change and regulatory constraints by reducing the costs and increasing the effectiveness of levee maintaining agencies.

- Agricultural Sustainability - Support and strengthen the regional economy, primarily founded on highly productive farmland; achieve wildlife habitat objectives through preservation and/or modification of current agricultural practices to the extent feasible; and modify State and federal floodplain regulations to help sustain agricultural uses of regional floodplain.

- Multiple Objectives - Incorporate multiple objectives such as environmental restoration, agricultural enhancement, improved water quality, open space, energy production, and recreation, to the extent compatible with existing land uses and supported by affected landowners.

- State Systemwide Investment Approach (SSIA) and Regional Projects - Describe opportunities to link SSIA to regional projects and/or objectives. Accordingly, describe challenges of these linkages.

4 FLOOD PROTECTION GOALS, POLICIES, AND IMPLEMENTATION PROGRAMS

As described in the SB 5 Bills, the Safety Element shall establish goals, policies and objectives "for the protection of lives and property that will reduce the risk of flood damage." As described in more detail in

AB 162, the Safety Element shall:

> "establish a set of comprehensive goals, policies, and objectives based on the information identified pursuant to subparagraph (A), for the protection of the community from the unreasonable risks of flooding, including, but not limited to:
>
> (i) Avoiding or minimizing the risks of flooding to new development.
>
> (ii) Evaluating whether new development should be located in flood hazard zones, and identifying construction methods or other methods to minimize damage if new development is located in flood hazard zones.
>
> (iii) Maintaining the structural and operational integrity of essential public facilities during flooding.
>
> (iv) Locating, when feasible, new essential public facilities outside of flood hazard zones, including hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities.
>
> (v) Establishing cooperative working relationships among public agencies with responsibility for flood protection."

The 2030 General Plan Public Safety Element, Public Utilities, Services and Facilities Element, and the Conservation and Open Space Element include goals, policies, and implementation programs that meet the Safety Element requirements related to flood protection and management. These goals, policies, and implementation programs, with the addition of the proposed amended Safety Element policies PS-3.6 and PS-3.7, meet the SB 5 and AB 162 requirements. The proposed amended Safety Element policies PS-3.6 and PS-3.7 are shown below in underline. The applicable goals, policies, and implementation programs are listed below:

Public Safety Element:

Goal PS-2: Minimize the loss of life and damage to property caused by flood events.

- Policy PS-2.1: The City will coordinate with the Sutter Butte Flood Control Agency to ensure that flood control facilities protecting Live Oak's Planning Area from flood risks to the City are well maintained and capable of protecting existing and proposed structures from flooding, in accordance with state law.

- Policy PS-2.2: The City will regulate development within floodplains according to state and federal requirements to minimize human and environmental risks and maintain the City's eligibility under the National Flood Insurance Program.

- Policy PS-2.3: The City will require evaluation of potential flood hazards before approving development projects.

- Policy PS-2.4: The City will require applicants for development to submit drainage studies that adhere to City stormwater design requirements and incorporate measures from the City's master drainage plan to prevent on- or off-site flooding.

- Policy PS-2.5: New development shall be required to be consistent with regional flood control improvement efforts. New development shall contribute on a fair-share basis to regional solutions to improve flood protection to meet state and federal standards.

- Policy PS-2.6: The City will use the most current flood hazard and floodplain information from state and federal agencies (such as the State Department of Water Resources, the Federal Emergency Management Agency, and the Army Corps of Engineers) as a basis for project review and to guide development in accordance with federal and state regulations.

- Policy PS-2.7: As feasible, new development should incorporate stormwater treatment practices that allow percolation to the underlying aquifer and minimize off-site surface runoff (and therefore flooding).

- Policy PS-2.8: If any project, including the modification of an existing project, falls within the jurisdiction regulated by the Central Valley Flood Protection Board (CVFPB) (e.g., levees, regulated streams, and designated floodways), the city must apply for an encroachment permit from the CVFPB.

Goal PS-3: Provide for adequate emergency response

- Policy PS-3.1: The City shall maintain and update the City's emergency response plan as needed and ensure ongoing consistency with the General Plan.

- Policy PS-3.4: The City will coordinate with the County Office of Emergency Services to identify and establish evacuation routes and operation plans to be used in case of dam failure, flood disaster, and fire. The City will provide relevant outreach to residents and businesses regarding evacuation routes for each hazard type.

- Policy PS-3.6: As feasible, locate new essential facilities outside of flood hazard zones, including hospitals and healthcare facilities, emergency shelters, fire stations, emergency response centers and emergency communication facilities.

- Policy PS-3.7: Essential facilities that must be located within flood hazard zones should incorporate feasible site design or building construction features that will minimize flood damage and increase functionality during flooding events.

- Implementation Program PS-1: The City will continue its participation with the regional flood protection joint powers authority addressing the assessment and improvement of levees on the west side of the Feather River

to meet federal and state standards. The City will implement development impact fees to provide for necessary levee studies and improvement programs in coordination with the regional flood control joint powers authority. The City will proactively identify and take advantage of federal, state, and regional funding that may be available for use in flood protection improvements.

- Implementation Program PS-3: Consistent with state law, the City will consult with the Central Valley Flood Protection Board and local flood protection agencies serving the Planning Area, to obtain updated floodway and floodplain maps, data, and policies. When this information is available, if necessary, the City will update the General Plan and revise all applicable development standards, including the zoning code. Subdivision approvals, development agreements, permits, and other City entitlements will incorporate these revised City policies and regulations.

- Implementation Program PS-4: If necessary, the City will update the General Plan to incorporate 200-year floodplain mapping from the California Department of Water Resources and Central Valley Flood Protection Board, once available.

- Implementation Program PS-5: In review of new development projects, require disclosure of risk where proposed development would occur in flood risk areas. This disclosure may include notifying new residents in these areas and encouraging purchase of appropriate insurance.

Public Utilities, Services, and Facilities

Goal PUBLIC-4: Provide storm drainage systems that protect property and public safety and that prevent erosion and flooding.

- Policy Public-4.9: The City will include in the drainage master plan and capital improvements planning a program to repair canal levees, where necessary, to prevent overtopping during storm events.

Goal PUBLIC-6: Protect property and public health through adequate flood protection.

- Policy PUBLIC-6.1: The City will coordinate with ongoing regional efforts to verify and improve flood protection for the Planning Area, consistent with state and federal regulations.

- Policy PUBLIC-6.2: The City will assess fees for new development on a fair-share basis to fund regional flood protection improvements needed to meet state and federal standards.

- Policy PUBLIC-6.3: The City will proactively identify and take advantage of regional, state, and federal funding that may be available for use in flood protection improvements.

- Implementation Program Public-6.1: The City will continue its participation with the regional flood protection joint powers authority addressing the assessment and improvement of levees on the west side of the Feather River to meet state and federal standards.

Conservation and Open Space Element:

Goal WATER-1: Maintain and improve groundwater and surface water quality.

- Policy Water-1.3: The City will require developments to use best management and design practices to reduce stormwater runoff levels, improve infiltration to replenish groundwater sources, and reduce pollutants close to their source. The City will require new development to use permeable surfaces for hardscape wherever possible. Impervious surfaces such as driveways, streets, and parking lots should be interspersed with vegetated areas that allow for infiltration of stormwater. LID techniques, such as rain gardens, filter strips, swales, and other natural drainage strategies, should be used to absorb stormwater, reduce polluted urban runoff, recharge groundwater, and reduce flooding.

5 SAFETY ELEMENT CONSULTATION LETTERS AND RESPONSES

LIVE OAK
CALIFORNIA

May 11, 2016

Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, CA 95821
Attn: Leslie Gallagher, Acting Executive Officer

Subject: Amendment of the Live Oak General Plan Safety Element in accordance with SB 5 and AB 162, 200-Year Floodplain Requirements

Ms. Gallagher:

The City of Live Oak has begun the process of amending the Safety Element of its 2030 General Plan in order to comply with the requirements of Senate Bill 5 and Assembly Bill 162 (2007). As required by Government Code Section 65302(g)(5), the City is writing to consult with the Central Valley Flood Protection Board regarding the general plan amendment and to obtain any information that the City should consider incorporating into the general plan amendment. The City is amending its Safety Element in accordance with the California Department of Water Resources publications, *Implementing California Flood Legislation into Local Land Use Planning: A Handbook for Local Communities* (October 2010) and *Guidance on General Plan Amendments for Addressing Flood Risk* (September 2014).

Once the draft Safety Element amendment is complete, the City will submit it to your agency for review 90 days prior to amendment adoption. in accordance with Government Code Section 65302.7.

Please provide us at your earliest convenience any information that would be relevant to City's general plan amendment process. If you have any questions or need additional information, please contact June Cowles, City of Live Oak Contract Planner at 530-695-2112 or by e-mail at jcowles@mbakerintl.com.

Thank you,

June Cowles
City Contract Planner

cc; Matthew Hertel, AECOM
Jim Goodwin, City Manager

City Hall: 530-695-2112 Fax: 530-695-2595 9955 Live Oak Blvd., Live Oak, CA 95953
www.liveoakcity.org

From: Cowles, June
To: Hertel, Matthew
Subject: Fwd: General Plan Safety Element Review for Live Oak
Date: Wednesday, May 18, 2016 11:11:32 AM
Attachments: Safety Element Review Crosswalk_SEPT 2014_V2.doc
Live Oak City - Amendment of the Live Oak General Plan Safety Element in....pdf

Matt, please see below.
Sent from my Verizon Wireless 4G LTE DROID

-------- Original Message --------
Subject: General Plan Safety Element Review for Live Oak
From: "Porbaha, Mohammad Ali@DWR" <Mohammad.Porbaha@water.ca.gov>
To: "Cowles, June" <JCowles@mbakerintl.com>
CC: "Butler, Eric@DWR" <Eric.Butler@water.ca.gov>

To: June Cowles, Live Oak City Contract Planner
From : Central Valley Flood Protection Board (CVFPB)

This message is to acknowledge receipt of your May 11, 2016 letter to the CVFPB regarding your desire to submit an application for review of amendments to the Live Oak General Plan Safety Element.

- Attached is a revised version of the Safety Element Review Crosswalk. Please make sure the second and the third columns are well populated and well justified.
- Please make sure all figures/maps have labels, date and reference the data source.
- Please submit one hard copy of the revised amendments (with track changes, if possible), a cover letter and the digital version of all materials (including the crosswalk) using a portable device.

Let me know, if you have any questions. Thanks.

ALI

ALI PORBAHA
(916) 574-2378
Central Valley Flood Protection Board
3310 El Camino Avenue, Suite 151
Sacramento, CA 95821

LIVE OAK
CALIFORNIA

May 11, 2016

California Office of Emergency Services
3650 Schriever Avenue
Mather, CA 95655
Attn: Mark Ghilarducci, Director

Subject: Amendment of the Live Oak General Plan Safety Element in accordance with SB 5 and AB 162, 200-Year Floodplain Requirements

Mr. Ghilarducci:

The City of Live Oak has begun the process of amending the Safety Element of its 2030 General Plan in order to comply with the requirements of Senate Bill 5 and Assembly Bill 162 (2007). As required by Government Code Section 65302(g)(5), the City is writing to consult with the California Office of Emergency Services regarding the general plan amendment and to obtain any information that the City should consider incorporating into the general plan amendment. **The City specifically requests that your agency provide dam failure inundation maps for areas in proximity to the City of Live Oak (i.e. Oroville, Afterbay).**

The City is amending its Safety Element in accordance with the California Department of Water Resources publications, *Implementing California Flood Legislation into Local Land Use Planning: A Handbook for Local Communities* (October 2010) and *Guidance on General Plan Amendments for Addressing Flood Risk* (September 2014).

Please provide us at your earliest convenience any information that would be relevant to City's general plan amendment process. If you have any questions or need additional information, please contact June Cowles, City of Live Oak Contract Planner at 530-695-2112 or by e-mail at jcowles@mbakerintl.com.

Thank you,

June Cowles
City Contract Planner

cc; Matthew Hertel, AECOM
Jim Goodwin, City Manager

City Hall: 530-695-2112 **Fax**: 530-695-2595 9955 Live Oak Blvd., Live Oak, CA 95953
www.liveoakcity.org

LIVE OAK
CALIFORNIA

May 11, 2016

California Geological Survey of the Department of Conservation
801 K Street, MS 12-30
Sacramento, CA 95814

Subject: Amendment of the Live Oak General Plan Safety Element in accordance with SB 5 and AB 162, 200-Year Floodplain Requirements

To Whom it May Concern:

The City of Live Oak has begun the process of amending the Safety Element of its 2030 General Plan in order to comply with the requirements of Senate Bill 5 and Assembly Bill 162 (2007). As required by Government Code Section 65302(g)(5), the City is writing to consult with the California Geological Survey of the Department of Conservation regarding the general plan amendment and to obtain any information that the City should consider incorporating into the general plan amendment.

The City is amending its Safety Element in accordance with the California Department of Water Resources publications, *Implementing California Flood Legislation into Local Land Use Planning: A Handbook for Local Communities* (October 2010) and *Guidance on General Plan Amendments for Addressing Flood Risk* (September 2014).

Please provide us at your earliest convenience any information that would be relevant to City's general plan amendment process. If you have any questions or need additional information, please contact June Cowles, City of Live Oak Contract Planner at 530-695-2112 or by e-mail at jcowles@mbakerintl.com.

Thank you,

June Cowles
City Contract Planner

cc; Matthew Hertel, AECOM
Jim Goodwin, City Manager

City Hall: 530-695-2112 **Fax**: 530-695-2595 9955 Live Oak Blvd., Live Oak, CA 95953
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Reynolds, Lisa

From:	Hertel, Matthew
Sent:	Friday, May 06, 2016 12:48 PM
To:	m.inamine@sutterbutteflood.org
Cc:	June Cowles (jcowles@pmcworld.com); Jim Goodwin (citymgr@liveoakcity.org)
Subject:	City of Live Oak - Amendment of the Live Oak General Plan Safety Element in accordance with SB 5 and AB 162, 200-Year Floodplain Requirements
Categories:	Active

Good Afternoon Mr. Inamine,

The City of Live Oak has begun the process of amending the Safety Element of its 2030 General Plan in order to comply with the requirements of Senate Bill 5 and Assembly Bill 162 (2007). The City is amending its Safety Element in accordance with the California Department of Water Resources publications, *Implementing California Flood Legislation into Local Land Use Planning: A Handbook for Local Communities* (October 2010) and *Guidance on General Plan Amendments for Addressing Flood Risk* (September 2014).

The City has received the 200-Year Post-Feather River West Levee Project Floodplain Mapping, and we will be incorporating this information into the safety element amendment.

Please provide any additional information that the City should consider incorporating into the general plan amendment. Specific data needs include:

- Historical data on flooding including locally prepared maps of areas that are subject to flooding, areas that are vulnerable to flooding after wildfires, and sites that have been repeatedly damaged by flooding. A similar request will be sent to DWR.
- Dam failure inundation maps for areas in proximity to the City of Live Oak (i.e. Oroville, Afterbay). A similar request will be sent to the California Office of Emergency Services.

Once the draft Safety Element amendment is complete, the City will submit it to your agency for review 90 days prior to amendment adoption in accordance with Government Code Section 65302.7.

Thank you for your time.

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