4.5 HYDROLOGY AND WATER RESOURCES

This section presents the existing conditions with regard to surface water and groundwater resources within the City of Live Oak's Planning Area, summarizes the regulatory and planning framework, and analyzes the impacts on surface water and groundwater resources associated with implementation of the 2030 General Plan. Impacts on water supply and wastewater treatment are discussed in Section 4.10, "Public Utilities."

4.5.1 REGULATORY SETTING

Detailed below are the federal, state, and local laws, regulations, and policies that pertain to surface water and groundwater in the Planning Area. They provide the regulatory framework for addressing all aspects of hydrology and water quality that would be impacted with implementation of the General Plan.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Clean Water Act

The Environmental Protection Agency (EPA) is the lead federal agency responsible for managing water quality. The Clean Water Act (CWA) of 1972 is the primary federal law that governs and authorizes EPA and the states to implement activities to control water quality. The various elements of the CWA that address water quality and are applicable to the proposed project are discussed below. Wetland protection elements administered by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA, including permits to dredge or fill wetlands, are discussed in Section 4.6, "Biological Resources."

Water Quality Criteria and Standards

Under federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question and (2) criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use.

EPA is the federal agency with primary authority for implementing regulations adopted under the CWA. EPA has delegated to the State of California the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the state's Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), described below.

National Pollutant Discharge Elimination System Permit Program

The National Pollutant Discharge Elimination System (NPDES) permit program was established in the CWA to regulate municipal and industrial discharges to surface waters of the United States. A discharge from any point source is unlawful unless the discharge is in compliance with an NPDES permit. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of

stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. The Planning Area is subject to the requirements of Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, and required that NPDES permits be issued for construction activity for projects that disturb 1 acre or more. Phase 2 of the municipal permit system (known as the NPDES General Permit for Small Municipal Separate Storm Sewer Systems [MS4s]) required small municipal areas of less than 100,000 persons to develop stormwater management programs. California's Regional Water Quality Control Boards (RWQCBs) are responsible for implementing the NPDES permit system (see additional information under "State Plans, Policies, Regulations, and Laws" below). The Planning Area is within the jurisdiction of the Central Valley RWQCB.

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Resources Control Board (SWRCB) to the nine RWQCBs.

Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses, water quality, and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Safe Drinking Water Act

Under the Safe Drinking Water Act (Public Law 93-523) passed in 1974, EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA's primary and secondary maximum contaminant levels (MCLs), which are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 and 1996 established an accelerated schedule for setting MCLs for drinking water.

EPA has delegated to the California Department of Public Health (CDPH) the responsibility for administering California's drinking-water program. DPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations, and described in "Title 22 Standards" below.

Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a Total Maximum Daily Load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows links between loading reductions and the attainment of water quality objectives. The EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of a TMDL, it is intended that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

National Toxics Rule and California Toxics Rule

In 1992, EPA promulgated the National Toxics Rule under the Clean Water Act to establish numeric criteria for priority toxic pollutants for California. The National Toxics Rule established water quality standards for 42 pollutants not covered under California's statewide water quality regulations at that time. As a result of the court ordered revocation of California's statewide Basin Plans in September 1994, EPA initiated efforts to promulgate additional federal water quality standards for California. In May 2000, EPA issued the California Toxics Rule, which includes all the priority pollutants for which EPA has issued numeric criteria not included in the National Toxics Rule.

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations that limit development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection covered by the FIRMs is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (AEP) (i.e., the 100-year flood event). Specifically, where levees provide flood protection, the levee crown is required by FEMA to have 3 feet of freeboard above the 1-in-100-AEP water surface elevation, except in the vicinity of a structure such as a bridge, where the levee crown must have 4 feet of freeboard for a distance of 100 feet upstream and downstream from the structure. As developments are proposed and constructed FEMA is also responsible for issuing revisions to FIRMs, such as Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) through the local agencies that work with the National Flood Insurance Program.

Executive Order 11988

Executive Order 11988 (Floodplain Management) addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to do the following:

- avoid incompatible floodplain development,
- be consistent with the standards and criteria of the NFIP, and
- restore and preserve natural and beneficial floodplain values.

U.S. Army Corps of Engineers Sacramento and San Joaquin River Basins Comprehensive Study

The Sacramento and San Joaquin River Basins Comprehensive Study is a joint effort by the State Reclamation Board and USACE, in coordination with federal, state, and local agencies, groups, and organizations in California's Central Valley, to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins.

The study is a region-wide planning effort, rather than a regulatory program; however, consistency with its goals and objectives is important for any project affecting flood control in the Sacramento and San Joaquin River basins. The Planning Area is in the Sacramento River Basin portion of the comprehensive study area.

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation (USBR) is part of the U.S. Department of the Interior and is responsible for development and conservation of most water resources in the western United States. While the original purpose of the Bureau was to provide for the reclamation of arid and semiarid lands in the west, the agency's current mission covers a wider range of interrelated functions, including:

- providing municipal and industrial water supplies through the Central Valley Project (CVP);
- generating hydroelectric power;
- providing irrigation water for agriculture;
- improving water quality, flood control, and river navigation;
- providing river regulation and control and fish and wildlife enhancement;
- offering water-based recreation opportunities; and
- conducting research on a variety of water-related topics.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) is responsible for issuing permits for the placement of fill or discharge of material into waters of the United States. These permits are required under Sections 401 and 404 of the Clean Water Act. Water supply projects that involve instream construction, such as dams or other types of diversion structures, trigger the need for these permits and related environmental reviews by USACE. USACE also is responsible for flood control planning and assisting State and local agencies with the design and funding of local flood control projects.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

State Water Resources Control Board

In California, the SWRCB has broad authority over water-quality control issues for the state. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include CDPH (for drinking-water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Game (DFG), and the Office of Environmental Health and Hazard Assessment.

Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. California water quality objectives (or "criteria" under the Clean Water Act) are found in the Basin Plans adopted by the State Water Resources Control Board and each of the nine Regional Water Quality Control Boards. The Central Valley RWQCB is responsible for the Planning Area and surrounding region. State regulations applicable to the demonstration of adequate water supply for the future water demands resulting from implementation of the proposed project are addressed further in Section 4.10, "Public Utilities."

Title 22 Standards

Water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water and (2) criteria (i.e., numeric or narrative limits) to protect those beneficial uses. Municipal and domestic supply (MUN) is among the "beneficial uses" as defined in Section 13050(f) of the Porter-Cologne Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation. Maximum contaminant levels, MCLs, are components of the drinking water standards adopted by the CDHS pursuant to the California Safe Drinking Water Act. California MCLs may be found in Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 15, Domestic Water Quality and Monitoring. The CDPH is responsible for Title 22 of the CCR (Article 16, Section 64449) as well, which also defines secondary drinking water standards, established primarily for reasons of consumer acceptance (i.e., taste) rather than because of health issues.

Drinking water MCLs are directly applicable to water supply systems "at the tap," i.e., at the point of use by consumers in their home, office, etc., and are enforceable by CDHS and Sutter County Health Department. California MCLs, both Primary and Secondary, are directly applicable to groundwater and surface water resources when they are specifically referenced as water quality objectives in the pertinent Basin Plan. In such cases, MCLs become enforceable limits by the State and Regional Water Boards. When fully health protective, MCLs may also be used to interpret narrative water quality objectives prohibiting toxicity to humans in water designated as a source of drinking water (MUN) in the Basin Plan.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act is California's statutory authority for the protection of water quality. Under the act, the state must adopt water quality policies, plans, and objectives that protect the state's waters for the use and enjoyment of the people. The act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update Basin Plans. Basin Plans are the regional water quality control plans required by both the CWA and Porter-Cologne Act in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The act also requires waste dischargers to notify the RWQCBs of their activities through the filing of reports of waste discharge (RWDs) and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to RWDs and/or WDRs for broad categories of "low threat" discharge activities that have minimal potential for adverse water quality effects when implemented according to prescribed terms and conditions.

Live Oak is within the jurisdiction of the Central Valley RWQCB, which is responsible for the preparation and implementation of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (CVRWQCB 2006). The Basin Plan defines the beneficial uses, water quality objectives, implementation programs, and surveillance and monitoring programs for waters of the Sacramento River and San Joaquin River Basins. The Basin Plan contains specific numeric water quality objectives that are applicable to certain water bodies or portions of water bodies. Objectives have been established for bacteria, dissolved oxygen, pH, pesticides, electrical conductivity, total dissolved solids, temperature, turbidity, and trace elements. Numerous narrative water quality objectives have also been established.

California State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described above, the SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy provides as follows:

- Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the State and would not unreasonably affect present and anticipated beneficial uses of such water.

- Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements, which would ensure (1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the State would be maintained.

California Toxics Rule and State Implementation Plan

The California Toxics Rule (CTR) was issued in 2000 in response to requirements of the EPA National Toxics Rule (NTR), and establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are subject CWA Section 303(c). The CTR includes criteria for the protection of aquatic life and human health. Human health criteria (water and organism based) apply to all waters with a Municipal and Domestic Water Supply Beneficial Use designation as indicated in the Basin Plans.

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan (SIP), was adopted by the SWRCB in 2000. It establishes provisions for translating CTR criteria, NTR criteria, and Basin Plan water quality objectives for toxic pollutants into NPDES permit effluent limits, effluent compliance determinations, monitoring for 2,3,7,8-TCDD (dioxin) and its toxic equivalents, chronic (long-term) toxicity control provisions, initiating site-specific water quality objective development, and granting of exceptions for effluent compliance. The goal of the SIP is to establish a standardized approach for the permitting of discharges of toxic effluents to inland surface waters, enclosed bays, and estuaries in a consistent fashion throughout the state.

NPDES Permit System and Waste Discharge Requirements for Construction

The SWRCB and Central Valley RWQCB have adopted specific NPDES permits for a variety of activities that have potential to discharge wastes to waters of the state. The SWRCB's statewide Phase 2 stormwater general permit for construction activity (Order 99-08-DWQ, as amended) is applicable to all land-disturbing construction activities that would disturb more than 1 acre. The Central Valley RWQCB's general NPDES permit for construction dewatering activity (Order 5-00-175) authorizes direct discharges to surface waters up to 250,000 gallons per day for no more than a 4-month period each year. All of the NPDES permits involve similar processes, including submittal to the Central Valley RWQCB of notices of intent (NOI) to discharge, and implementation of storm water pollution prevention plans (SWPPPs) that include best management practices (BMPs) to minimize those discharges. As mentioned above, the Central Valley RWQCB may also issue site-specific WDRs, or waivers to WDRs, for certain waste discharges to land or waters of the state. In particular, Central Valley RWQCB Resolution R5-2003-0008 identifies activities subject to waivers of RWDs and/or WDRs, including minor dredging activities and construction dewatering activities that discharge to land.

Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of permanent post-construction BMPs that would remain in service to protect water quality throughout the life of the project. All NPDES permits also have inspection, monitoring, and reporting requirements. In response to a court decision, the Central Valley RWQCB also implemented mandatory water quality sampling requirements in Resolution 2001-046 for visible and non-visible contaminants in discharges from construction activities. Water quality sampling is now required if the activity could result in the discharge of turbidity or sediment to a water body that is listed as impaired under Section 303(d) because of sediment or siltation, or if a release of a non-visible contaminant occurs. Where such

pollutants are known or should be known to be present and have the potential to contact runoff, sampling and analysis is required. NPDES permits require the implementation of design and operational BMPs to reduce the level of contaminant runoff. Types of BMPs include source controls, treatment controls, and site planning measures.

Phase 2 of the municipal permit system (known as the NPDES general permit for small municipal separate storm sewer systems [MS4s]) require municipal areas of less than 100,000 persons to develop stormwater management programs. Phase 2 is intended to further reduce adverse impacts on water quality and aquatic habitat by instituting the use of BMPs on previously unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation (EPA 2000).

Urban Water Management Planning Act

Each urban water supplier in California is required to prepare an Urban Water Management Plan (UWMP) and update the plan on or before December 31 in years ending in 5 and 0, pursuant to California Water Code Sections 10610–10657, as last amended by Senate Bill (SB) 318 (Chapter 688, Statutes of 2004), the Urban Water Management Planning Act. SB 318 is the 18th amendment to the original bill requiring a UWMP, which was initially enacted in 1983.

Senate Bill 610

SB 610 (Chapter 643, Statues of 2001) became effective January 1, 2002. The purpose of SB 610 is to strengthen the process by which local agencies determine whether current and future water supplies are adequate and sufficient to meet current and future demand. SB 610 amended the California Public Resources Code to incorporate California Water Code requirements within the CEQA process for certain types of projects.[1] SB 610 also amended the Water Code to broaden the types of information included in an UWMP (Water Code Section 10610 et seq.).

Senate Bill 221

SB 221 (Chapter 642, Statues of 2001) requires a county or city to include as a condition of approval of any tentative map, parcel map, or development agreement for certain residential subdivisions a requirement that a "sufficient water supply" be available. Proof of a sufficient water supply must be based on a written verification from the public water system that would serve the development.

Recycled Wastewater Requirements

Wastewater recycling in California is regulated under Title 22, Division 4, of the CCRs under the jurisdiction of DPH. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. The regulations establish acceptable levels of constituents in recycled water for a range of uses and prescribe means for ensuring reliability in the production of recycled water. Using recycled water for non-potable uses is common throughout the state and is an effective means of maximizing use of water resources. The RWQCB establishes water reclamation requirements under the Title 22 regulations and is responsible for implementing wastewater recycling projects.

[1] Projects requiring water supply assessments include: (1) A proposed residential development of more than 500 dwelling Units; (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space; (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; (4) A proposed hotel or motel, or both, having more than 500 rooms; (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area; (6) A mixed-use project that includes one or more of the projects specified in this subdivision; or, (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project. (State Water Code Section 10912 (a).

Senate Bill 5

Senate Bill (SB) 5, signed into law on October 10, 2007, enacts the Central Valley Flood Protection Act of 2008. Requirements of the Department of Water Resources (DWR) and the Central Valley Flood Protection Board (previously known as the State Reclamation Board) under SB 5 are:

- To prepare and adopt a Central Valley Flood Protection Plan (the Plan) (described below) by 2012.
- To establish 200-year protection as the minimum urban level of flood protection, effective with respect to specific development projects as of 2015 or 2025, as explained below.

  The DWR is directed to produce preliminary (i.e., Best Available) maps for 100-year and 200-year floodplains protected by project levees, and to make them available to cities and counties in the Sacramento-San Joaquin Valley (i.e., Central Valley) (Water Code Section 9610[a]). These best available maps were made available on September 8, 2008, and can be found at the California Department of Water Resources <http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/>.

- Sets deadlines for cities and counties in the Central Valley to amend their general plans and their zoning ordinances to conform to the Plan within 24 months and 36 months (i.e., approximately 2014 and 2015), respectively, of its adoption.
- Obligates Central Valley counties to develop flood emergency plans within 24 months of adoption of the Plan.
- By 2009 the Department of Water Resources ("Department") must propose amendments to the California Building Standards Code ("Building Code") to protect areas with flood depths anticipated to exceed three feet for the 200-year flood event. SB 5 requires that the Building Code amendments are designed to reduce the risk of flood damage and increase safety.
- No later than 2015, but potentially sooner depending on when the Central Valley Flood Protection Plan takes effect, SB 5 prohibits local governments from entering development agreements or approving entitlements or permits, including ministerial permits which result in construction of a new residence in a flood zone unless one of three conditions are met:

  - flood management facilities provide level of protection necessary to withstand 200-year flood event;
  - the development agreement or other entitlements include conditions that provide protections necessary to withstand 200-year flood event; or
  - the local flood management agency has made adequate progress on construction of a flood protection system that shall result in protections necessary to withstand 200-year flood event by 2025 in urban areas, which are defined as any contiguous area in which 10,000 or more residents are protected by project levees (Public Resources Code 5096.805), which in the case of the Planning Area is the Feather River levee system. The Planning Area is considered an urban area under SB 5.

Central Valley Flood Protection Plan

The Central Valley Flood Protection Plan (CVFPP, as set forth in Water Code, Section 9614) is a descriptive document that includes the following elements:

- a description of the Flood Management System, its performance, and the challenges to modifying it;

- a description of the facilities included in the State Plan of Flood Control;
- a description of probable impacts of projected climate change, land-use patterns, and other potential challenges;
- an evaluation of needed structural improvements and a list of facilities recommended for removal; and
- a description of both structural and nonstructural methods for providing an urban level of flood protection to currently urbanized areas in the Central Valley.

California Department of Water Resources

The California Department of Water Resources (DWR) is responsible for preparation of the California Water Plan, management of the State Water Project (SWP), regulation of dams, provision of flood protection, and other functions related to surface water and groundwater resources. These other functions include helping water agencies prepare their Urban Water Management Plans (UWMPs), which are discussed in Section 4.10 "Public Utilities".

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Sutter County General Plan

The following goals and policies from the *Sutter County General Plan* (Sutter County 1996) that are related to hydrology and water quality pertain to the proposed project. The policies of the General Plan do not yet reflect the requirements established by SB 5 pertaining to planning and other efforts necessary to ultimately provide for 200-year flood protection; under the act, the General Plan would need to be modified sometime after 2012, when the Central Valley Flood Protection Plan is scheduled to be adopted. See the discussion above.

- **Policy 3.D-1:** The County shall continue to require that all new development outside the Special Flood Hazard Area as defined by the Federal Emergency Management Agency (FEMA) must be protected from a 50 year storm event.
- **Policy 3.D-2:** The County shall require new development to adequately mitigate increases in storm water flows and/or volume and to avoid cumulative increases in downstream flows.
- **Policy 3.D-3:** The County shall discourage residential development in areas which are subject to inundation by surface water.
- **Policy 3.D-4:** The County shall require that new development conforms to the appropriate County requirements and standards governing drainage.
- **Policy 3.D-5:** The County shall require new development projects to provide adequate drainage facilities.
- **Policy 3.D-6:** The County shall restrict new development in areas prone to flooding, or that have a seasonal high water table and/or water seepage problems, in order to prevent the contamination of ground and surface water by septic systems.
- **Policy 4.A-1:** The County shall require development setbacks from all water courses.
- **Policy 4.A-2:** The County shall strive to protect groundwater resources by:
  - Identifying and controlling sources of potential contamination.
  - Protecting groundwater recharge areas.
  - Discouraging overdraft.

- Encouraging the preparation and implementation of groundwater management plans.
- Encouraging regional coordination of issues related to the groundwater basins.

- **Policy 4.A-3:** The County shall encourage water conservation practices, including drought-resistant landscaping, drip irrigation systems and the use of "graywater" for landscaping irrigation.

- **Policy 4.A-4:** Monitoring of agricultural water runoff should be encouraged to ensure that pollutants are not being returned to the overall water system.

- **Policy 7.C-1:** The County shall continue to participate in the Federal Flood Insurance Program.

- **Policy 7.C-2:** When new development or substantial improvement of existing development occurs within a special flood hazard area, as defined by FEMA, the development or improvement shall comply with the County Flood Damage Prevention Regulations.

- **Policy 7.C-3:** The County shall coordinate efforts with local, regional, state, and federal agencies to maintain the existing levee system to protect life and property from the Intermediate Regional Flood (100-year storm event).

Sutter County Department of Public Works Design Standards

The Sutter County Department of Public Works Design Standards, adopted by the Sutter County Board of Supervisors on January 24, 2006, sets guidelines for regulating and designing streets, highways, alleys, drainage, sewerage, street lighting, water supply facilities, and related public improvements (Sutter County 2006). It is the policy of Sutter County to protect all new habitable structures, and two lanes of travel in each direction for arterial roadways, from the 100-year flood event (Sutter County 2007:260).

Section 5 of the Design Standards "Storm Drainage Design" details the stormwater design criteria and includes the following:

5-4 National Flood Insurance Program – Petitions for a Letter of Map Amendment (L.O.M.A.) or Letter of Map revision (L.O.M.R.), including any fee required by Federal Emergency Management Agency (F.E.M.A.), shall be submitted to the Public Works Department prior to approval of a tentative map or approval of improvement plans.

5-5 Drainage Capacity Design – All drainage systems shall be designed to accommodate the ultimate development of the entire upstream watershed.

5-6 Surface Drainage Guidance Design – The engineer shall be responsible for designing a grading plan which ensures storm waters from a 100-year design storm flow through a development without flooding structures in the event of malfunction or overloading of the drainage collection system.

5-7 Drainage Diversions

A. The diversion of natural drainage shall be allowed only within the limits of the proposed improvement, and natural drainage shall enter and leave the improved area at its original horizontal and vertical alignment unless an agreement, the form of which shall be approved by the Director of Public Works (Director), has been executed with all affected property owners.

B. Temporary drainage diversions during construction shall be approved by the Director and appropriate district.

5-8 Drainage Easements

A. All publicly maintained drainage facilities shall be located in either a public street right-of-way, public utility easement specifically dedicated to include drainage facilities, or a dedicated drainage easement.

B. Offsite drainage easements shall be required whenever there is a concentrated discharge of drainage water.

C. Dedication of offsite easements shall be completed and submitted to the Director with copies of deeds or title reports for the affected properties before improvement plans shall be approved.

D. Closed Conduits Design Criteria

E. Open Channels – Easements for open channels shall have sufficient width to contain the channel, fencing where required, and a 15 foot all weather access service road. A service road may not be required where the channel bottom is lined and a suitable access ramp is provided when approved by the Director.

5-9 Runoff Calculation Design Criteria – including peak discharge, runoff coefficient, and rainfall intensity

All development in Sutter County must comply with the County's Flood Damage Prevention Ordinance. Sutter County is a participant in the National Flood Insurance Program, and is responsible for coordinating the processing of revisions to FIRMS via coordination with FEMA.

Sutter County Codes and Ordinances, Chapter 9. Flood Damage Prevention

The flood Damage and Prevention Ordinance includes methods and provisions for:

(a) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

(b) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(c) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;

(d) Controlling, filling, grading, dredging, and other development which may increase flood damage; and

(e) Preventing or regulating the construction of flood barriers which would unnaturally divert flood waters or which may increase flood hazards in other areas.

Sec. 6-9.501. Standards of Construction

(c) Elevation and Floodproofing.

(1) New construction and substantial improvement of any structure shall have the lowest floor, including basement, elevated to or above the base flood elevation. Nonresidential structures may meet the standards in Section 6-9.501(c)(3) below. Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered professional engineer or surveyor, or verified by the community building inspector to be properly elevated. Such certification or verification shall be provided to the Public Works Director.

(2) New construction and substantial improvement of any structure in Zone AO shall have the lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or at least two (2) feet if no depth number is specified. Nonresidential structures may meet the standards in Section 6-9.501(c)(3) below. Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered professional engineer or surveyor, or verified by the community building inspector to be properly elevated. Such certification or verification shall be provided to the Public Works Director.

(3) Nonresidential construction shall either be elevated in conformance with the above paragraphs or together with attendant utility and sanitary facilities:

(i) Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;

(ii) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

(iii) Be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the Public Works Director.

Sec. 6-9.503 Standards for subdivisions.

(a) All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.

(b) All final subdivision plans shall provide the elevation of proposed structure(s), pads, and adjacent grade. If the site is filled above the base flood, the final pad elevation shall be certified by a registered professional engineer or surveyor and provided to the Public Works.

(c) All subdivision proposals shall be consistent with the need to minimize flood damage.

(d) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

(e) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood hazards.

Sec. 6-9.505 Floodways

Located within areas of special flood hazard established in Section 6-9.302 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

(a) Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(b) If the above is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions of this article.

(c) All subdivision proposals shall be consistent with the need to minimize flood damage.

(d) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

(e) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage as set forth in Section 6-9.403(a)(1). Certification of compliance shall be required of the developer.

City of Live Oak Public Works Improvement Standards

City of Live Oak drainage design criteria were published in the City of Live Oak Public Works Improvement Standards (City of Live Oak 2003). The criteria are summarized as follows:

- Placement of any fills across an existing drainage course shall incorporate a means by which excess flows not handled by the design drainage system can flow overland via essentially the same course as prior to placing the fill across the drainage course, without inundating or damaging any structure.

- The rational formula (City of Live Oak 2003: 22) shall be used for calculating hydrologic and pipe and/or channel design characteristics, i.e., size, type, slope, velocities and entrance, and outlet structures, etc.

- When the flow of water in gutters caused by a 10-year storm extends more than eight feet from the face of the curb or overtops the curb, underground storm drains are required. Inlet spacing shall not exceed 500 feet. Valley gutters, flow across sidewalks (except on streets abutting single family residential development), concentrated discharges of drainage onto the street shall be eliminated.

- Building pads shall not be inundated during the 100-year storm.

- Traffic lanes shall not be inundated during a design frequency (10-year, 25-year, 100-year) storm. All existing streets shall be assumed to be constructed to final standards. All major drainage channels and natural streams shall be assumed to be constructed to final standards.

- Culverts shall be analyzed using a ponding water (i.e., zero velocity) condition upstream unless a definite channel exists or is proposed upstream. Inlet and outlet transition structures shall be provided to minimize entrance and exit losses.

- Minimum size of proposed culverts shall be 12 inches in diameter. The minimum size of pipes shall also be 12 inches in diameter if maintained by the City.

- Areas less than forty acres, and where the proposed drainage structure will not be placed in a natural or constructed sump, shall be protected from a 10-year frequency storm. Culverts under moderate fills are to pass a 10-year storm without static head (i.e., ponding water), and under high fills to pass a 25-year storm with head; however, no damage due to ponding is to occur.

- Areas larger than 40 acres and less than 160 acres shall be protected from a 25-year frequency storm. Culverts under moderate fills on collector and local streets are to pass a 25-year storm without static head, and under high fills to pass a 100-year storm with head; however, no damage due to ponding is to occur.

- Areas larger than 160 acres, or where culverts are to be placed under high fills, where a sump condition exists and damage would result due to ponding and where major streets or a freeway are to be crossed, shall be protected from a 100-year frequency storm. Culverts must pass a 100-year storm with head; however, no damage due to ponding is to occur.

- The minimum time of concentration (i.e., the time it takes water to travel along the culvert or other hydraulic length) shall be 10 minutes.

- Storm drain pipelines shall be accurately constructed to the design lines and grades.

- The extremely flat grades necessary in the City of Live Oak require particularly careful construction to maintain invert grades within ±0.05 feet vertically. All storm drains should be designed for a minimum velocity of 2 feet per second, flowing full. Precast pipes 24" or larger in diameter may be laid on a horizontal curve. The radius of curve shall not be less than 300' unless special pipe joints with longer lips are used.

- Existing drainage ditches and channels belonging to RD 777 adjoining the City shall be piped, improved, or graded and/or enlarged as necessary to carry the design flows listed in the City of Live Oak Master Drainage Plan at the design grade of the channels. Headwalls and wingwalls shall be provided at each end of pipes or box culverts and cleanout access structures shall be provided at intervals of 1,000 feet maximum. Roadway crossings of existing ditches shall be a reinforced concrete pipe, box culvert, or slab bridge with headwalls and wingwalls, sized to carry the design flow of the ditch, at the design grade of the ditch.

Reclamation District 777

Reclamation District No. 777 (RD 777) provides drainage to most of the Planning 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).

Reclamation District 2056

Reclamation District No. 2056 (RD 2056) provides storm drainage to an area in the northwestern portion of Live Oak's Planning 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 2030 General Plan (City of Live Oak 2006c: 22).

Sutter Butte Flood Control Agency

The Sutter Butte Flood Control Agency (SBFCA) plans, designs and coordinates regional flood control improvements to protect lives and property in the Sutter Basin. The SBFCA is directed by a Board of elected leaders from the counties of Butte and Sutter and the cities of Yuba, Live Oak, Gridley and Biggs and Levee Districts 1 and 9.

The SBFCA is currently investigating the possibility of beginning rehabilitation efforts along a stretch of west Feather River levees from Yuba City north to the Thermalito Afterbay. Because this work would take place before the USACE finishes the Feasibility Study (Described in "Regional Hydrology" below), it is called the Early Implementation Project (EIP).

SBFCA staff believes that the EIP restoration and rehabilitation efforts could be completed by mid 2013, and might provide protection at the 100-year storm (or possibly higher) level to most of the residents of the Sutter Basin from 7 to 10 years faster than the USACE program. The EIP focuses on the stretch of levees north of Yuba City because problems in this section will get action no matter which of the alternative plans the Corps of Engineers eventually selects (SBFCA 2009).

Sutter County Office of Emergency Services

The County Office of Emergency Services (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 or human-caused disasters, including floods from dam or levee failures. The County OES works with the County and individual city departments with disaster exercises and evacuation preparations. The County annually reviews its Dam Evacuation Plan, Slow Rise Flood Threat Plan, and applicable sections of the County Emergency Response Plan (Sutter County 2007, 2009).

4.5.2 ENVIRONMENTAL SETTING

REGIONAL HYDROLOGY

Sutter County and the Planning Area are within the Sacramento Basin. The Basin covers approximately 27,200 square miles, and supplies water for much of California, including urban and agricultural areas. Annual runoff in the basin averages about 22.4 million acre feet (maf), which is nearly one-third of the state's total natural runoff.

Major water supplies in the region are provided through surface storage reservoirs. The two largest surface water projects in the region are Shasta Lake, a key component of the Central Valley Project (CVP), on the upper Sacramento River, and Lake Oroville, part of the State Water Project (SWP), on the Feather River. In all, there are more than 40 major surface water reservoirs in the region (DWR 2005:6-3).

The primary tributary to the Sacramento River upstream of the Planning Area is the Feather River, which forms a major portion of Sutter County's eastern boundary, including near the Planning Area. The confluence is located approximately 1 mile upstream of the northwest corner of the Natomas Basin. The Planning Area and most of Sutter County are located within the Lower Feather River watershed, a subwatershed of the Sacramento Basin. The Lower Feather River watershed drains an area of approximately 176,725 acres. Flow in the lower Feather River above the Planning Area is controlled mainly by releases from Lake Oroville, the second largest reservoir within the Sacramento River basin (CALFED 2003:5-18).

Sutter County is located between the Sacramento River on the west and the Feather River on the east, in the northern portion of the relatively flat Sacramento Valley. Similar to Mediterranean climates, Sutter County's climate is generally characterized by hot, dry summers, with relatively moderate, wet winters. Precipitation rates are greatest during late fall to early spring followed by the dry season from later spring to early fall. Because there are no significant water storage reservoirs in Sutter County, rainfall percolates into the soil, runs off into local streams and rivers, and evaporates. By late summer, most small creeks and streams are generally dry and the rivers are at their lowest levels. Some small creeks have water during the dry season due to agricultural irrigation and drainage and/or from drainage in upstream urban areas (Sutter County 2008:4.3-2).

The primary method of flood control in Sutter County is a system of levees along the Sacramento and Feather Rivers. There are approximately 280 miles of levees within the county. Recent and on-going studies have found that some of these levees do not meet, or have not been certified as meeting, the current levee design criteria for protection against the 100-year flood. As a result, much of the county is considered vulnerable to flooding due to levee failure. It is anticipated that the Sutter County Feasibility Study, being conducted by the USACE and scheduled for completion in 2011, will produce a plan to provide 100-year flood protection to the major urban areas within the county, with a planning objective to achieve 200-year flood protection pursuant to Senate Bill 5 requirements and to obtain FEMA levee certification by 2016.

LOCAL SURFACE WATER HYDROLOGY

Local weather conditions in the vicinity of Live Oak are represented by measurements recorded at the Marysville meteorological station, approximately seven miles south of the Planning Area along the Yuba River (NOAA 1992). The normal annual precipitation, which occurs primarily from November through March, is approximately 21 inches, which is typical of the Mediterranean type climate described above.

The Wadsworth subwatershed is located in the northeast corner of Sutter County within the Lower Feather River watershed, and includes a total area of approximately 58,240 acres. This watershed includes the eastern portion of the Sutter Buttes and a small area within Butte County. The Planning Area is fully contained within this watershed, which drains from the north to the south through a series of channels. Those channels include:

- Live Oak Slough (also called the RD 777 Main Canal), which is owned, operated and maintained by RD 777. This channel drains portions of the Planning Area that lie generally east of the Union Pacific Railroad.

- RD 777 Laterals 1, 2, and the RD 777 West Intercepting Canal (RD 777 WIC), which are owned, operated and maintained by RD 777. This channel drains portions of the Planning Area that lie generally west of the Union Pacific Railroad.

- Morrison Slough is within the RD 2056 service area; however, the majority of Morrison Slough is located on private property, and does not receive routine maintenance by a public agency, except at public roadway crossings.

These channels drain into the East Intercepting Canal or the West Intercepting Canal, which drain into 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 the DWR (Sutter County 2008:3.1-49).

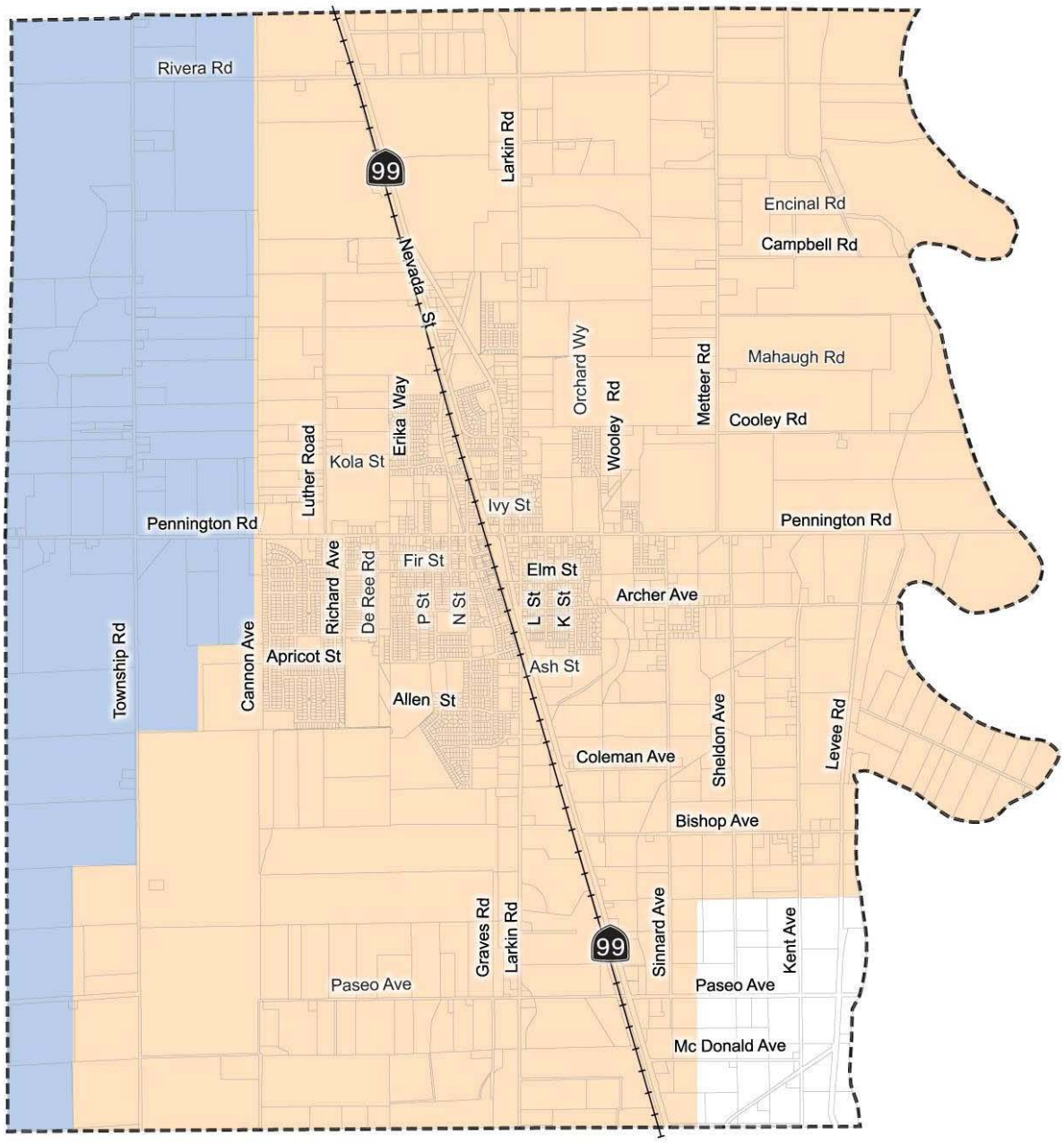
RD No. 777 operates Laterals 1, 2, 6, 6A, 14 and the Main Canal (Live Oak Slough) in the area in and around the Planning Area. Exhibit 4.5-1 illustrates the reclamation district service areas, and Exhibit 4.5-2 illustrates the location of drainage facilities in the Planning Area. The existing city utilizes piped systems within most developments. Older developments are mostly surface drained. In portions of the Planning Area outside the city limits, drainage is mainly via roadside ditches.

Under the current conditions, existing drainage facilities are at maximum capacity. The Planning Area is relatively flat and the drainage pattern is split into two drainage sheds. The majority of the land west of the Union Pacific Railroad drains south to Reclamation District No. 777 – Lateral No. 1. The land east of the railroad drains south and is collected in Live Oak Slough, which is the main canal for RD 777.

Live Oak Slough (Main Canal) is a main drain which collects run-off from Live Oak and outlying regions and transports the flow downstream to the East Interceptor Canal. The Planning Area is susceptible to flooding from Live Oak Slough, which runs along the east side of the City. This water body potentially affects an area bounded by Juniper Street, Larkin Road, Pennington Road, L Street, Archer Avenue, State Highway 99, and the Union Pacific Railroad right-of-way, which is designated as being in flood hazard zone A (100-year floodplain) on the Sutter County Flood Insurance Rate Map (see Exhibit 4.5-3). The rest of the City is in area C, an area of minimal flooding (outside the 500-year floodplain). Minor street flooding occurs, although infrequently, within the city limits. Some of these locations include De Ree Road, Luther School, L Street (between Date Street and Pennington Road), and at several Highway 99 cross culverts that do not have connections to the City's storm drain systems. Many of the roads and streets within the city limits were constructed without curbs and gutters, which contributes to minor nuisance ponding of storm water (Sutter County 2008:3.1-55).

The Planning Area is subject to inundation from Oroville and Thermalito Afterbay Dams in the event of dam failure (Sutter County 2007: 171 – 172). 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. On July 22, 2008, the DWR certified the Final Environmental Impact Report (FEIR), for Federal Energy Regulatory Commission (FERC) relicensing for the Oroville Dam (FERC Project No. 2100, State Clearinghouse # 2001102011).

The Thermalito Forebay and the Thermalito Afterbay are bodies of water located west of Oroville Dam. They are downstream from the dam just north of the Feather River. These bodies of water are connected to each other and to the Feather River via smaller waterways. The Thermalito Forebay and the Thermalito Afterbay are used to control flooding along the Feather River and have the capacity to store extra water temporarily, when the need arises. Potential dam failure effects for the Planning Area are shown on Table 4.5-1



LEGEND

Boundaries

- Study Area
- Parcels

- RD 777 Service Area
- RD 2056 Service Area

0 1,7500 3,500

FEET

N

G 08110072.01 017

Source: Sutter County Assessor's Office, Live Oak GIS, Adapted by EDAW 2008

Exhibit 4.5-1

RD 777 and RD 2056 Service Areas

Table 4.5-1 Potential Dam Failure Effects for Live Oak, CA		
	Oroville Dam	Thermalito Afterbay Dam
Dam Owner	DWR	DWR
Capacity (acre feet)	3,537,577	57,041
Estimated Flood Arrival Time (hours)	4.3	12.4
Total Inundation Time (hours)	11.3	15.5
Both Dams are on Feather River, owned by State DWR Source: Sutter County 2007; 2008		

GROUNDWATER HYDROLOGY

The Planning Area is within the East Butte Groundwater Subbasin, a subbasin of the Sacramento Valley Groundwater Basin bounded on the west and northwest by Butte Creek, on the northeast by the, Sierra Nevada/Cascade ranges, on the southeast by the Feather River and the south by the Sutter Buttes. The northeast boundary along the Cascade Ranges is primarily a geographic boundary with some groundwater recharge occurring beyond that boundary.

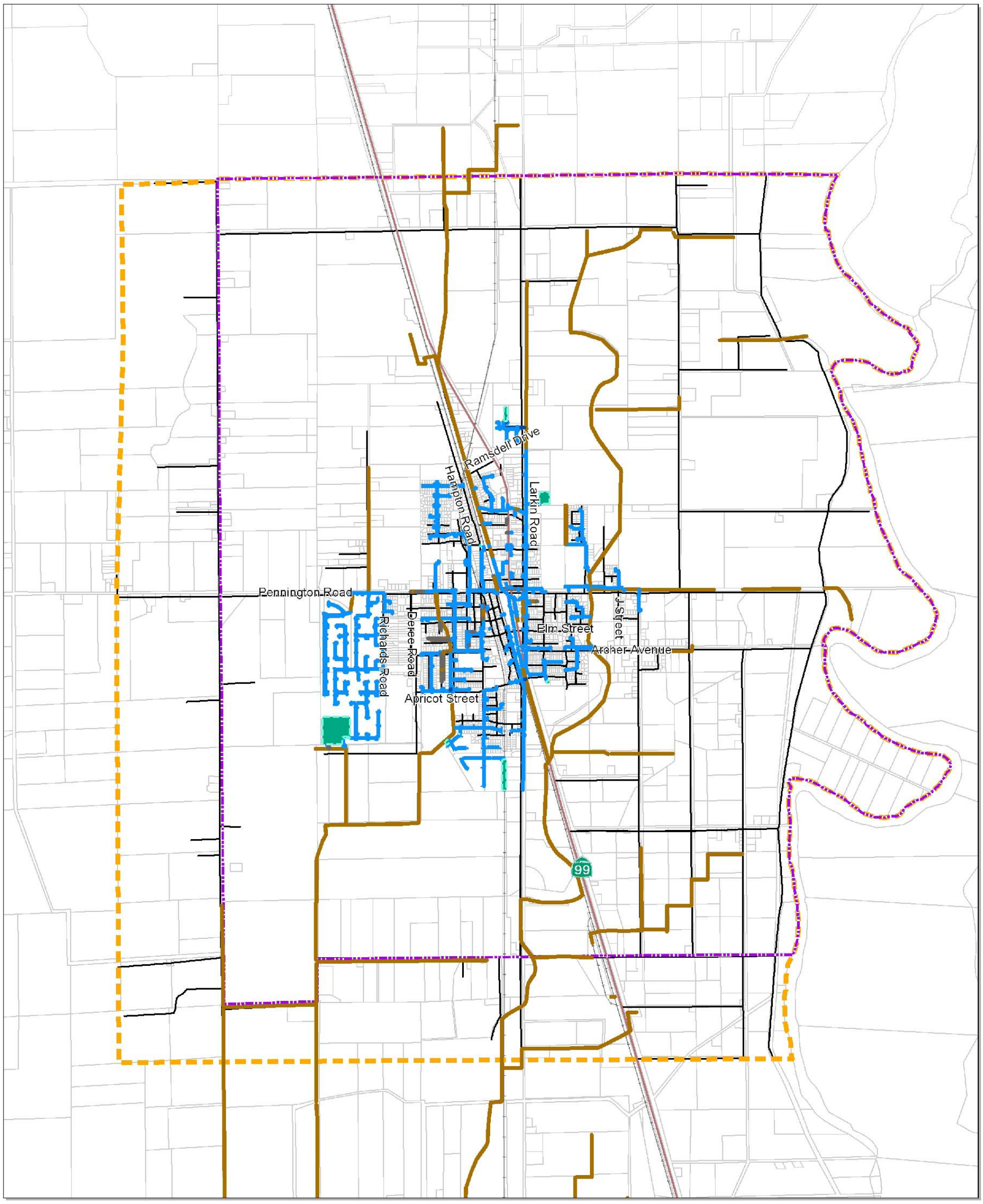
Groundwater in the East Butte Subbasin varies greatly with each season. Depths fluctuate greatly depending on the type of aquifer as well as the type of water year, i.e., a wet year, a drought year or year with normal precipitation. In the northern portion of the subbasin, composite well fluctuations (composite wells are monitoring wells that represent groundwater levels that combine confined and unconfined portions of the aquifer system) average about 15 feet during normal years and 30 to 40 feet during drought years. Annual groundwater fluctuations in the confined and semi-confined aquifer system range from 15 to 30 feet during normal years (DWR 2004:1-3).

In the Live Oak Planning Area, groundwater flows from north to south at a relatively flat gradient. The general direction of groundwater flow and the depth to groundwater have remained somewhat stable since the mid 1940s. Groundwater has been measured at a depths ranging from one to five feet near the west end of the Planning Area, extending to approximately 16 to 20 feet below the surface. To the west of the current City limits, groundwater has been encountered at approximately 7.5 feet below the surface (City of Live Oak 2006b: 5–6). Historical groundwater well information near the northwest end of the Planning Area indicates water levels are variable and have fluctuated over time from approximately three to approximately 14 feet below the surface (City of Live Oak 2006a: 1–2). No water level data is available for the City of Live Oak municipal wells. However, hydrographs for nine wells in the area surrounding Live Oak provide water level data extending back as far as 1947 and up to 2005. These data indicate a groundwater flow direction to the south, at a gradient of about 2.4 feet per mile (ECO:LOGIC 2009).[2]

Sources of groundwater recharge in the 2030 Plan area and surrounding region include the Sacramento River, the Feather River, and runoff from the Sierra Nevada snow melt (City of Live Oak 2006a:10). Groundwater recharge from the Thermalito Afterbay has also been observed (DWR 2004:3).

Water supply for domestic water service and fire flow is supplied from five wells owned and operated by the City; their locations are shown on Exhibit 4.5-4. See Chapter 4.10 “Public Utilities” for details on groundwater supply and demand.

[2] ECO:LOGIC. EIR Support for General Plan Update team. Memo to Matthew Gerken. July, 2009.



LEGEND

- Study Area Boundary
- Sphere of Influence
- Detention Basin
- Storm Drain
- Ditch
- Culvert
- Force Main

0 1,250 2,500
FEET

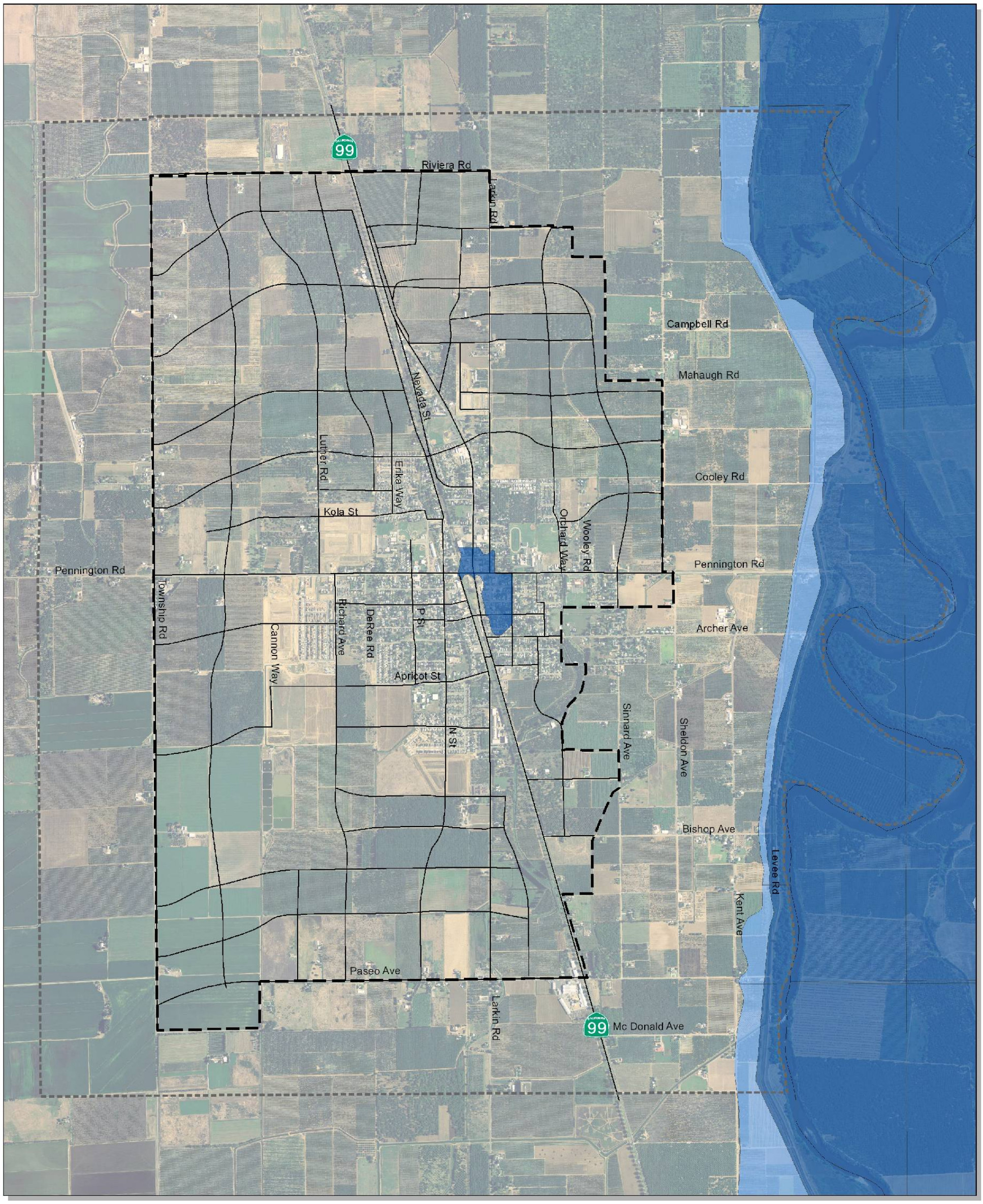
N

Base map: CASIL Layers
X 08110072.01 021 8/09

Source: City of Live Oak, 2008

Imagine the future...
City Of Live Oak
General Plan

Exhibit 4.5-2
Existing Drainage Facilities



LEGEND

Boundaries

- Study Area
- Planning Area
- Roads
- 100-yr Floodplain (A)
- 500-yr Floodplain (X500)

Imagine the future... City Of Live Oak General Plan

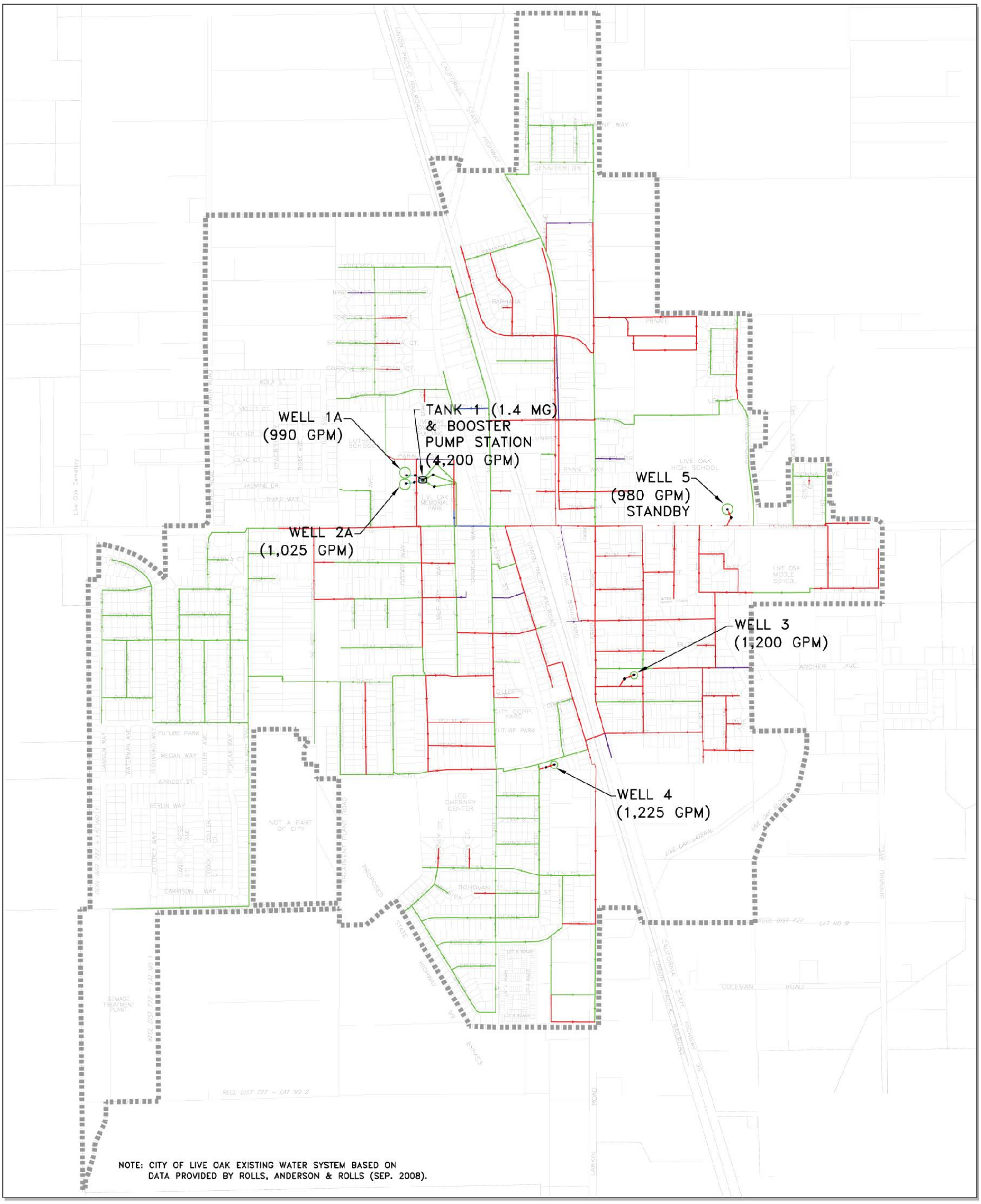
Exhibit 4.5-3
Planning Area Floodplain

0 2,250
FEET

N

X 08110072.01 027 8/09

Source: Sutter County Assessor's Office, Live Oak GIS, Adapted by EDAW 2008, Butte County 2000, Yuba County 2007



LEGEND

Boundaries
- City Limit
- Parcels

Pipe Diameter (inches)
- 2-4
- 6
- 8
- 10
- 12
- 16

0 875 1,750
FEET

N

G 08110072.01 026 05/09

Source: Sutter County Assessor's Office, Live Oak GIS, Adapted by EDAW 2008

Imagine the future...
City Of Live Oak General Plan

Exhibit 4.5-4
Water System

WATER QUALITY

Surface Water

The Lower Feather River (from Lake Oroville Dam to the confluence with the Sacramento River) is the segment located adjacent to the Planning Area. Designated beneficial uses of the Feather River are shown on Table 4.5-2.

Table 4.5-2
Beneficial Uses for the Lower Feather River

Beneficial Use Designation	Definition
Municipal and Domestic Supply	Community, military, or individual water supply systems including, but not limited to, drinking water supply
Agricultural Supply	Farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing
Industrial Service Supply	Industrial activities that do not depend primarily on water quality including, but not limited to mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization
Contact Water Recreation	Recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs
Noncontact Water Recreation	Recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities
Warm Freshwater Habitat	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Cold Freshwater Habitat	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Wildlife Habitat	Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources
Spawning, Reproduction, and/or Early Development	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish

The Lower Feather River is included on the 303(d) list of impaired waters for Chlorpyrifos (an organophosphate insecticide used in agriculture but banned for sale in the US for domestic use in 2001), Group A pesticides, mercury, and unknown toxicity. Agriculture is the main source for Group A pesticides. A TMDL standard for Group A pesticides is under development, and scheduled for publication in 2011. The sources for Chlorpyrifos and unknown toxicity are listed as unknown on the 303(d) list. However, Chlorpyrifos is an insecticide, and is only registered for agricultural use in the United States. Final TMDLs are scheduled to be developed for Chlorpyrifos by 2019. Resource extraction is the main source for mercury, with a TMDL scheduled for development by the end of 2009 (State Water Resources Control Board 2006).

The U.S. Geological Survey (USGS) completed an evaluation of water quality conditions of the Feather River in the vicinity of Live Oak as a component of an overall analysis of conditions in the Sacramento River watershed under the auspices of the National Water Quality Assessment (NAWQA) Program (U.S. USGS 2000). Table 4.5-3 summarizes average concentrations from monthly water samples for conventional physical and inorganic chemical constituents measured in the Feather River at Nicolaus (approximately 15 miles south of the Planning Area) from February 1996 through April 1998 (U.S. Geological Survey 2000).

In general, the data indicate that the river is low in Total Dissolved Solids (TDS), an indicator of salinity, as shown by measurements of electrical conductivity EC, total hardness, and specific cations and anions. The water has neutral pH, moderate alkalinity, and adequate dissolved oxygen (DO) levels for aquatic organisms. The water from the river is also generally low in nutrients (nitrogen and phosphorus) that can cause growth of nuisance algae and aquatic vascular plants. Trace metal content is low in the river, and although mercury is routinely detected, the concentrations have not exceeded ambient CTR criteria. Pesticides have been detected in the Feather River. With the exception of the drinking-water standard for carbofuran, there are no applicable regulatory criteria established for the pesticides that have been detected.

The California DFG has established guidance values for aquatic-life chronic (i.e., 4-day-average) criteria applicable to the organophosphate pesticides diazinon and chlorpyrifos. The DFG guidance values and other reference dose values for aquatic life or human health hazards that have been established for many pesticides are generally indicative of the lowest concentrations at which toxic effects have been detected. The average concentration of diazinon in the Feather River at Nicolaus exceeded the DFG guidance level of 50 nanograms per liter (ng/L) in the NAWQA analysis. However, diazinon was not detected in the latest Sacramento River Watershed Program (described below) monitoring at that station conducted in 2004 (SRWP 2005). Pesticide levels in the Feather River are presumably related to the influence of the extensive agricultural and urban activities (e.g., Oroville, Marysville, and Yuba City) occurring in the surrounding watershed.

The Feather River also been evaluated since 1998 as part of DWR's Sacramento River Watershed Program (SRWP 2005: vii). Water quality data have generally supported the earlier findings of the USGS NAWQA program data. In addition, toxicity data from the DWR program have indicated that Feather River water has occasionally been toxic to test organisms (SRWP 2005:76–79).

Groundwater

Groundwater resources in California are assumed to support drinking-water quality beneficial uses, unless proven otherwise, pursuant to SWRCB Resolution 88-63. Groundwater is used as the domestic supply for the City. The City's domestic wells are monitored for general mineral, general physical and inorganic chemical parameters pursuant to Title 22 requirements described above in Section 4.5-1, "Regulatory Setting." The City's domestic supply wells are shown on Exhibit 4.5-4.

In general, the chemistry of groundwater in the Sacramento Valley is greatly influenced by the chemistry of recharge water (Feather River DEIR 5.3-26). The primary groundwater chemistry in the subbasin is calcium, magnesium, sodium, chloride, sulfate, and bicarbonate, which may occur in any combination. Data from 4 water quality wells maintained by the DWR in the Easte Butte Subbasin and 44 wells from CDPH have shown localized high concentrations of manganese, iron, magnesium, total dissolved solids, conductivity, and calcium (DWR 2004: 4).

The new Federal arsenic limit of 10 µg/L (micrograms per liter or parts per billion [ppb]) went into effect in January 2006. The previous standard was 50 µg/L, and the system was previously in compliance. Because the State cannot adopt a standard which is less stringent than the Federal limit, pursuant to the CWA, the State limit is now 10 µg/L. Arsenic in the City's water supply wells which operate on a regular basis ranges from a low of 9.6 µg/L in a sample collected in Well 3, to as high as 43 ppb in a sample collected in Well 4. None of the City's

Table 4.5-3
Summary of Conventional Water Quality Constituents in the Feather River

Constituent	Water Quality Objective	Feather River at Nicolaus
Conventional Physical and Chemical Constituents		
Temperature	<16.4°C [a]	15.2°C
Flow (cfs)		359
EC (µS/cm)		84
DO (mg/L)	7.0 [b]	10.5
DO Saturation (%)	85 [b]	104
pH (standard units)	6.5 to 8.5 [c]	7.7
Alkalinity (mg/L $CaCO_3$)		34.2
Total Hardness (mg/L $CaCO_3$)		34.8
Suspended Sediment (mg/L)	narrative [d]	36.5
Calcium (mg/L)		8.2
Magnesium (mg/L)		3.5
Sodium (mg/L)		3.3
Potassium (mg/L)		0.9
Chloride (mg/L)	500 [e]	1.9
Sulfate (mg/L)	500 [e]	3.2
Silica (mg/L)		12.8
NO_2+NO_3 (mg/L N)	NO_3<10 [f]	0.17
Total Phosphorus (mg/L)		0.03
Trace Metals		
Arsenic (µg/L)	50 [g]	1.0
Chromium (µg/L)	180 [g]	<MRL
Copper (µg/L)	5.1 [g]	1.3
Mercury (µg/L)	0.050 [h]	0.0085
Nickel (µg/L)	52 [g]	1.0
Zinc (µg/L)	120 [g]	1.6
Organic Pesticides		
Molinate (ng/L)	13,000 [i]	373
Simazine (ng/L)	3,400 [j]	88.9
Carbofuran (ng/L)	40,000 [e], 500 [i]	38.5
Diazinon (ng/L)	51 [k]	98
Carbaryl (ng/L)	700 [j]	142
Thiobencarb (ng/L)	1,000 [a]	167
Chlorpyrifos (ng/L)	14 [k]	<25
Methidathion (ng/L)		57

Notes: $CaCo_3$ = calcium carbonate; µg/L = micrograms per liter; µS/cm = microsiemens per centimeter; mg/L = milligrams per liter; MRL = method reporting limit; ng/L = nanograms per liter; NO_2 = nitrogen dioxide; NO_3 = nitrogen trioxide

[a] RWQCB Basin Plan water quality objective for allowable change from controllable factors
[b] RWQCB Basin Plan water quality objective
[c] RWQCB Basin Plan water quality objective; <0.5 allowable change from controllable factors
[d] RWQCB Basin Plan narrative objective: water shall not contain constituent in concentrations that would cause nuisance or adversely affect beneficial uses
[e] Secondary drinking water maximum contaminant level (MCL)
[f] Primary drinking water maximum contaminant level (MCL)
[g] California Toxics Rule aquatic life criteria for 4-day average dissolved concentration
[h] California Toxics Rule human health maximum criteria total recoverable concentration
[i] California DFG hazard assessment value
[j] U.S. EPA Integrated Risk Information System reference dose for drinking water quality
[k] California DFG aquatic life guidance value for 4-day average concentration

Source: Constituent measurements from USGS 2000

existing wells meet the new standard, and the City has instituted a ferric chloride coagulation/pyrolucite media filtration (C/F) arsenic removal process for wells 1A, 2A, 3, and 4. The new treatment system, designed to correct the arsenic problem, was brought online in 2008 (City of Live Oak 2006b:12–14; 2008). Well 5 is out of service at the present time due to arsenic and nitrate exceedances (Richard Hinrichs, pers. comm. [2009]).

The following well water quality summarization is from a report describing the City's existing water supply facilities (City of Live Oak 2008; 3–7; 2009: 3–4). Historically, water pumped from Wells 1A, 2A and 5 has had higher nitrate concentrations than water from Wells 3 and 4. Nitrate concentration in Well 1A ranged from 8.9 mg/L (milligrams per liter or parts per million [ppm]) in a sample taken on February 14, 1995 to 106.8 mg/L in a sample taken on April 7, 2005. This maximum value was the only recorded violation of the 45 mg/L MCL for Well 1A, and based on subsequent sampling, is considered to be an erroneous result, either due to lab or sampling errors. However, Well 1A has had other recent results of up to 35.6 mg/L taken on June 16, 2005, which is close to the MCL. The Nitrate concentration in Well 2A ranged from 13.7 mg/L in a sample taken on April 4, 1995 to 41.25 mg/L in a sample taken on August 22, 2005. The nitrate concentration in Well 5 (out of service) has ranged from a maximum of 69 mg/L from a sample taken on June 11, 2001 to 7.83 mg/L on a sample taken on November 7, 2005. The June 11, 2001 is the only MCL violation recorded for this well with the next highest nitrate concentration from a sample being 27 mg/L from a sample taken on October 3, 2001. No organic contaminant water quality exceedances have occurred. Hardness in the range of 150 to 250 mg/L as $CaCO_3$, (calcium carbonate) can be considered hard. Hardness of the water varies from a minimum of 164 mg/L at Well 1A, to a maximum of 251 mg/L at Well 4. Although hardness reduces the cleansing capacity of soaps, it has little effect on synthetic detergents and is not considered a water quality problem below 300 mg/L. Arsenic and Manganese MCLs were exceeded in 2008. Well 3 tests for 2,4 D, Atrazine, Carbofuran, Glyphosate, Molinate, Simazine, Thoibencarb, were missed in November 2008. Subsequent testing in January 2009 showed no detectable concentrations of these contaminants (City of Live Oak 2009: 4).

Water Supply and Demand

This subsection describes water demands for City of Live Oak. For further information, please also see the discussion of water demand in Section 4.10, "Public Utilities." Water supply for domestic water service and fire flow is supplied from five wells owned and operated by the City. The wells are numbered 1 through 5 (see Exhibit 4.5-4). Wells 1 and 2 were modified due to the addition of a 1.4-million-gallon water storage tank and booster pump station. The modifications included new pumps and reconstruction of the wells, referred to as Wells 1A and 2A. The California Department of Health Services (DHS) considers the modifications to be of such an extent that the wells are now considered new water supply sources. The City relies on Wells 1A and 2A for the majority of the water produced within the City. Wells 1A and 2A discharge directly to the storage tank. Water is then pumped from the tank into the distribution system using the booster pump station. During peak demands in the summer and fall, the capacity of Wells 1A and 2A are unable to meet demands and Wells 3 and 4 make up the difference (City of Live Oak 2006b: 1). Well 5 is currently out of service (City of Live Oak 2009: 1).

The total pumping capacity of the booster pump station and all the wells if pumping into the system at the same time is estimated to be 7,605 gpm. The Department of Health Services indicated, in its May 10, 2005 Annual Inspection Report, that the estimated minimum required source capacity should be 5,987 gpm (City of Live Oak 2006b: 10). Table 4.10-1 in Section 4.10, "Public Utilities," shows pumping capacity for each well.

4.5.3 IMPACTS AND MITIGATION MEASURES

ANALYSIS METHODOLOGY

The effects of the 2030 General Plan were compared to environmental baseline conditions (i.e., existing conditions) to determine impacts. There is overlap of some 2030 General Plan policies, regulations, and programs as they pertain to water quality and hydrology. For instance, flooding is addressed in the Land Use, Public Facilities and Services, Transportation and Circulation, and Health and Safety chapters. Where policies,

regulations, or programs are utilized for mitigation in more than one impact, their first instance will be described and referred to in subsequent references.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines) and Senate Bill 5 (discussed above), a drainage, hydrology, or water quality impact is considered significant if implementation of the proposed project would do any of the following:

- violate any water quality standards or waste discharge requirements, including NPDES waste discharge or stormwater runoff requirements, state or federal antidegradation policies, enforceable water quality standards contained in the Central Valley RWQCB Basin Plan or statewide water-quality control plans, or federal rulemakings to establish water quality standards in California;
- otherwise substantially degrade water quality through contribution of additional sources of polluted runoff;
- create or contribute runoff water that would exceed the capacity (peak flow) of existing or planned stormwater drainage systems;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site, or result in increased flooding on- or off-site;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a substantial lowering of the level of the local groundwater table;
- place within a flood hazard area structures that would impede or redirect flood flows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

For purposes of these thresholds, "flood hazard area" means an area that does not meet the minimum level of flood protection required by state or federal law, whichever is more stringent. 100-year protection shall be the standard applicable until 2015, or perhaps earlier, depending on when the Central Valley Flood Protection Plan takes effect. At that point, the applicable standard shall be governed by SB 5, namely, either 200-year protection or "adequate progress" toward meeting the 200-year protection standard by 2025.

The project site is located in an area not subject to seiche or tsunami, and the area topography is relatively level and not subject to mudflow. Therefore these issues are not discussed further in this section.

IMPACT ANALYSIS

IMPACT 4.5-1 Violation of Water Quality Standards. *Development anticipated under the 2030 General Plan would result in additional discharges of pollutants to receiving water bodies from nonpoint sources. Such pollutants would result in adverse changes to the water quality of local water bodies. However, with adoption and implementation of the proposed goals, policies, and programs in the 2030 General Plan, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be* ***less than significant****.*

An increase in the amount of impervious surfaces (e.g., rooftops, sidewalks, driveways, streets, parking lots) as a result of implementation of the 2030 General Plan would result in higher rates of runoff during rain events. Surface runoff from impervious surfaces can be a source of surface water pollution. Sediment, organic contaminants, nutrients, trace metals, pathogens (e.g., bacteria and viruses), and oil and grease compounds are

common urban runoff pollutants. Sources of these pollutants may be erosion from disturbed areas, deposition of atmospheric particles derived from automobiles or industrial sources, corrosion or decay of building materials, rainfall contact with toxic substances, and spills of toxic materials on surfaces that receive rainfall and generate runoff. New urban industrial and commercial development can generate urban runoff from parking areas, as well as any areas of hazardous materials storage exposed to rainfall.

Sediment sources include roads and parking lots, destabilized landscaped areas, streambanks, unprotected slopes, and denuded or disturbed areas. Sediments, in addition to being contaminants in their own right, transport other contaminants such as trace metals, nutrients, and hydrocarbons that adsorb to suspended sediment particles. Nutrients include nitrogen, phosphorus, and other organic compounds that can be found in organic litter, fertilizers, food waste, sewage, and sediment. Animal wastes, sanitary sewer overflow, and improperly sited or functioning septic systems can contribute bacteria and viruses either to surface waters or to groundwater through percolation. Sources of oil and grease compounds include motor vehicles, food service establishments, and fueling stations.

Construction activities associated with General Plan implementation would occur over large areas, and substantial construction-related alteration of drainages could result in soil erosion and stormwater discharges of suspended solids, increased turbidity, and potential mobilization of other pollutants from construction sites, as contaminated runoff to on-site and ultimately off-site drainage channels. This is discussed in Impact 4.5-3 below.

Relevant Goals, Policies, and Programs of the Draft General Plan

The 2030 General Plan includes policies that would protect water quality and enhance water resources.

Water Quality Protection

Land Use Element

The Land Use Element of the 2030 General Plan contains the following policy designed to protect water quality in the Planning Area:

- **Policy LU-5.3:** New developments shall be designed to be compact and make efficient use of land in order to reduce up-front and ongoing infrastructure and service costs, minimize environmental impacts, and enhance the livability of the community. This may include, but will not necessarily be limited to the following water quality protection measures:

    - New development shall contribute toward meeting area-wide drainage needs in public rights-of-way and neighborhood and community parks, to reduce the amount of land that must be devoted to stormwater management.

    - New development (public and private) should use Low Impact Development stormwater management methods, so that less land is needed for drainage conveyance and detention.

Conservation and Open Space Element

The Conservation and Open Space Element of the 2030 General Plan contains the following policies designed to protect water quality in the Planning Area:

- **Policy Water-1.1:** New development shall incorporate drainage system design that emphasizes infiltration and decentralized treatment (rather than traditional piped approaches that quickly convey stormwater to large centralized treatment facilities), to the greatest extent feasible.

- **Policy Water-1.2:** Existing swales and sloughs should be preserved, restored, and used for stormwater drainage whenever possible.

- **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.

- **Policy Water-1.4:** The City will require development projects to incorporate appropriately scaled stormwater facilities. The City will place emphasis on making these holding areas serve multiple functions, such as soccer fields or passive recreation areas.

- **Implementation Program Water-1:** The City will revise the Public Works Improvement Standards, as necessary, to encourage use of natural drainage systems and low impact development principles in order to reduce stormwater infrastructure costs and improve water quality. The City will make revisions required to emphasize the slowing down and dispersing of stormwater by using existing landscaped swales and constructing new swales to convey stormwater runoff, encouraging sheet flow and the use of landscaped infiltration basins in planter strips along roadways, and employing other best management practices, as appropriate. The City will establish standards and fee programs to require and/or provide incentives for methods to slow down and filter stormwater, as outlined in this Element. These measures include, but are not limited to, reduced pavement, permeable pavement, vegetation that retains and filters stormwater, and the use of drainage sheet flow and filtration.

Public Utilities, Services, and Facilities Element

The Public Utilities, Services, and Facilities Element of the 2030 General Plan contains the following policies and programs designed to protect the water quality standards in the Planning Area:

- **Policy PUBLIC-1.2:** The City will maintain and improve water quality according to state and federal standards.

- **Policy PUBLIC-1.8:** The City will proactively leverage state, regional, and federal funding for water supply and water quality improvements to serve developed areas.

- **Implementation Program PUBLIC-1.2:** The City will continue the arsenic removal program, as necessary, in order to meet all federal and state standards for all groundwater wells in the city. The City will implement a study to investigate the need for additional programs for water treatment, monitoring, and cleanup of other constituents (pollutants), as necessary. The City will implement a nitrate monitoring program that will include periodic monitoring and impose time standards for any cleanup needed.

- **Policy PUBLIC-3.9:** The City will ensure compliance with state and federal standards for wastewater disposal. Monitoring and reporting programs may be required, as appropriate.

- **Implementation Program PUBLIC-3.1:** The City will adopt a wastewater master plan that is consistent with the 2030 General Plan, to provide for phased improvements to meet future needs. The Wastewater Master Plan will identify improvements and funding required to comply with Regional Water Quality Control Board and other applicable state and federal water quality standards. The City will update the wastewater master plan, as necessary, to address growth needs, regulatory changes, technological innovations, and regional plans for wastewater treatment and disposal. As part of the wastewater master planning process, the

City will identify improvements needed to meet applicable state and federal wastewater disposal standards. The City will incorporate analysis from the wastewater master plan into its capital and ongoing fee programs.

- **Policy PUBLIC-5.1:** The City's drainage master plan will plan and provide for appropriate components of natural drainage systems to provide water quality benefits and allow stormwater facilities to provide community amenities.

- **Policy PUBLIC-5.2:** The City's drainage master plan should incorporate the use of newly constructed, appropriately landscaped drainage swales to filter, slow down, and better convey stormwater runoff.

- **Policy PUBLIC-5.3:** Existing Reclamation District 777 and Reclamation District 2056 drainage channels should be improved, to the greatest extent feasible, to create more naturalized swales that provide stormwater conveyance. These channels should be restored with native, low-maintenance landscaping to filter stormwater and enhance neighborhood aesthetics.

- **Policy PUBLIC-5.4:** New single-family residential projects should be designed to allow building drainage to sheet flow across the front yard to be filtered through drainage swales located in the landscaped planter strip between the sidewalk and street, where possible.

- **Policy PUBLIC-5.5:** Under the City's drainage master plan, open playfield portions of parks will be used for stormwater detention.

Public Safety

- **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.

- **Policy PS-4.3:** The City will coordinate with appropriate federal, state, and regional agencies to address local sources of groundwater and soil contamination, including underground storage tanks, septic tanks, agriculture, and industrial uses.

- **Policy PS-4.5:** The City will support efforts to identify and remediate soils and groundwater contaminated with toxic materials, and to identify and eliminate sources contributing to such contamination.

Protection and Enhancement of Water Resources

Land Use

- **Policy LU-5.6:** New residential development proposed adjacent to cultivated agricultural lands outside the City's Sphere of Influence shall provide buffers to reduce potential conflicts. The width of public rights-of-way, drainages, and easements may count as part of the buffer. Within agricultural buffer areas, allowed land uses include drainage swales, landscaped areas, and linear parks that would provide open space passive water treatment.

Conservation and Open Space Element

The Conservation and Open Spaces Element of the 2030 General Plan contains the following policies to protect and enhance the water resources in the Planning Area, which would in turn enhance hydrology and water quality:

- **Policy Biological-3.2:** The City will take advantage of opportunities to enhance and restore existing riparian areas along Live Oak Slough and other drainage canals. Where feasible, these resources shall be incorporated into open space corridors, public landscapes, and park during the preparation of the Parks and Recreation Master Plan.

- **Policy Biological-3.4:** If development or expansion of the Live Oak Park and Recreation Area on the Feather River occurs, the City will encourage designs, construction, and operation to protect sensitive riparian habitat.

Conclusion

Under the Policies LU-5.3 and Water-1.1 to 1.4 and Implementation Program Water-1, the City describes requirements for best management and design practices including naturalized drainage swales, planter strips, and other LID techniques. These LID standards are designed to reduce stormwater runoff levels, improve infiltration to replenish groundwater sources, and reduce pollutants close to their source. Under Implementation Program PUBLIC-3.1, a wastewater master plan will be adopted and updated as necessary to address growth needs, regulatory changes, technological innovations, and regional plans for wastewater treatment and disposal. These policies and implementation programs are designed to meet the NPDES MS4, Title 22, California Toxics Rule (CTR), and Basin Plan water quality objectives described in "State Plans, Policies, Regulations, and Laws" above.

Several technical studies have been conducted regarding the impacts of the water quality control features on surface water as described in the Policies and Implementation Programs (e.g., *Preliminary Data Summary of Urban Storm Water Best Management Practices* [EPA 1999]; *Truckee River Basin Stormwater Management Program* [County of Placer 2007]) and groundwater (e.g., *California Storm Water Best Management Practices Handbook* prepared by the Stormwater Quality Task Force [CASQA 2003]). These studies have found that water quality control features such as revegetation, erosion control measures, detention and infiltration basins, and LID features have been successful in controlling water quality and avoiding water quality impacts (metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater). Technical studies associated with the Truckee River Basin Stormwater Management Program demonstrated that the use of a variety BMPs such as source control, detention basins, revegetation and erosion control, have been able to maintain surface water quality conditions in adjacent receiving waters.

The arsenic removal program, nitrate monitoring program, and investigation of the need for additional programs for water treatment, monitoring, and cleanup of other pollutants (as necessary) under Implementation Program PUBLIC-1.2 would reduce the potential for groundwater quality impacts to a less-than-significant level because the data and information would be acquired necessary to manage the groundwater and surface water resources such that adverse impacts do not occur. A baseline dataset would be established, and trends in groundwater depth and groundwater and surface water quality would be tracked spatially and temporally on a regular basis. This would enable detection of any negative changes to groundwater quantity or quality and treatment adjusted accordingly, in order to meet the regulatory requirements of Title 22, CTR, and Basin Plan water quality objectives described in "State Plans, Policies, Regulations, and Laws" above. If necessary, additional strategies to maintain the quality of groundwater in the Planning Area would be implemented following additional CEQA review, if necessary.

Therefore, adoption and implementation of the proposed goals, policies, and programs in the 2030 General Plan, combined with enforcement of current land use, stormwater, grading, and erosion control regulations as described in Section 4.5.1, "Regulatory Setting," would reduce this impact to a **less-than-significant** level.

Mitigation Measure

No mitigation beyond the 2030 General Plan policies and programs is required.

IMPACT 4.5-2 **On-Site and Downstream Erosion and Sedimentation.** *Development and land use changes consistent with the 2030 General Plan would increase the amount of impervious surfaces, thereby increasing the total volume and peak discharge rate of stormwater runoff. This could alter local drainage patterns, increasing watershed flow rates above the natural background level (i.e., peak flow rates). Increased peak flow rates may exceed drainage system capacities, exacerbate erosion in overland flow and drainage swales and creeks, and result in*

downstream sedimentation. Sedimentation, in turn, could increase the rate of deposition in natural receiving waters and reduce conveyance capacities, resulting in an increased risk of flooding. Erosion of upstream areas and related downstream sedimentation typically leads to adverse changes to water quality and hydrology. However, with adoption and implementation of the proposed policies and programs in the 2030 General Plan, combined with current grading, erosion, and flood control regulations, this impact would be ***less than significant****.*

Storm drainage and flood control are also addressed in the City of Live Oak drainage design criteria, which are included in the City of Live Oak Public Works Improvement Standards (see "Regulatory Setting" section above). Sutter County Codes and Ordinances Chapter 9, in the Sutter County Department of Public Works Design Standards also address storm drainage and flood control and resulting erosion and sedimentation. These design criteria, ordinances, and design standards would reduce downstream flooding and erosion by several means. Projects under the 2030 General Plan would be required to accommodate the ultimate development of the entire upstream watershed, such that storm waters from a 100-year design storm would flow through a development without affecting structures in the event of malfunction or overloading of the drainage collection system. The diversion of natural drainage would be allowed only within the limits of proposed projects, and natural drainage would be required to enter and leave improved areas at its original horizontal and vertical alignment unless an agreement (pursuant to Section 5-7 of the Sutter County Department of Public Works Design Standards) is executed with all affected property owners. All development in Sutter County, including development within the City of Live Oak (the City requires compliance with the County's Master Drainage Plan), would be required to comply with the County's Flood Damage Prevention Ordinance, which includes methods and provisions for coordination with FEMA and protection against the 100-year flood and on-site and downstream erosion and sedimentation. The County's Standards of Construction (Sec. 6-9.501) and Standards for Subdivisions (Sec. 6-9.503) contain elevation and flood proofing performance standards for projects under the 2030 General Plan, and Sec. 6-9.505 "Floodways" contain performance standards such that that encroachments would not result in any increase in flood levels during the occurrence of the base flood discharge and flood damage would be minimized.

City of Live Oak drainage design criteria were published in the City of Live Oak Public Works Improvement Standards (City of Live Oak 2003) and contain performance standards to ensure the containment and/or conveyance of the 10-year, 25-year, and 100-year storm without inundating or damaging any structure or increasing flood levels, as well as coordination with Reclamation Districts RD 777 and RD 2056 which provide drainage infrastructure to the Planning Area.

Relevant Goals, Policies, and Programs of the Draft General Plan

Conservation and Open Space

Under Implementation Program Water-1, the City would make revisions to its drainage requirements. These revised requirements would emphasize slowing down and dispersing stormwater by using existing landscaped swales and constructing new swales to convey stormwater runoff, encourage sheet flow and the use of landscaped infiltration basins in planter strips along roadways, and encourage employment of other best management practices, as appropriate. The City would establish standards and fee programs to require and/or provide incentives for methods to slow down and filter stormwater. These measures would reduce the potential for erosion and sedimentation from land use changes under the 2030 General Plan.

Public Utilities, Services, and Facilities

The following Public Utilities, Services, and Facilities measures address stormwater drainage and increases in runoff volume and sedimentation as a result of the 2030 General Plan.

- **Policy PUBLIC-4.1:** The City will prepare and maintain a drainage master plan to provide phased extension of drainage infrastructure to serve new growth and address existing deficiencies.

- **Policy PUBLIC-4.2:** As part of the master plan and capital improvements planning, the City will set priorities and make repairs to the City's existing stormwater drainage system.

- **Policy PUBLIC-4.3:** The City will develop a funding mechanism to improve existing drainage systems and develop new ones in existing City areas that currently lack stormwater drainage infrastructure.

- **Policy PUBLIC-4.4:** New development shall construct and dedicate facilities for drainage collection, conveyance, and detention, and shall contribute on a fair-share basis to areawide drainage facilities, as directed by the City's drainage master plan.

- **Policy PUBLIC-4.5:** Drainage infrastructure will be phased to serve the new growth area. Temporary drainage facilities may be required at some phases of new development, to be replaced by permanent facilities at buildout.

- **Policy PUBLIC-4.6:** The City will identify regional, state, or federal funding and will leverage this funding, as appropriate, to make improvements to the City's existing drainage infrastructure to encourage infill development.

- **Policy PUBLIC-4.7:** The City will explore opportunities in the new growth area to provide oversized stormwater drainage infrastructure that can accommodate both flows from new development and flows from existing city areas that lack the necessary infrastructure. The City or Redevelopment Agency will consider reimbursing new development for these improvements, on a fair-share basis.

- **Policy PUBLIC-4.8:** During the planning of new development and the installation of drainage infrastructure, appropriate steps shall be taken to avoid increasing any drainage problems in the existing developed city.

- **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.

- **Policy PUBLIC-4.10:** The City will coordinate with the California Department of Transportation (Caltrans) to improve drainage infrastructure and address inter-agency flooding issues.

- **Policy PUBLIC-4.11:** The City's drainage master plan will incorporate regional, state, and federal standards and regulations, as appropriate, and will be consistent with RD 777 and RD 2056 standards, as applicable.

- **Policy PUBLIC-4.12:** New development shall be designed to control surface runoff discharges to comply with City standards, National Pollutant Discharge Elimination System Permit requirements, and Regional Water Quality Control Board standards, as applicable.

- **Policy PUBLIC-5.6:** Drainage swales should have adjacent pathways to allow circulation of pedestrians, bicyclists, and stormwater in the same corridor, connecting with parks that are also designed to detain stormwater (see also the Parks and Recreation Element).

- **Policy PUBLIC-5.8:** New development should use low impact development (LID) techniques such as preserving or restoring natural landscape features for drainage, minimizing hard (impervious) surfaces, and using other methods that reduce, recycle, and filter stormwater.

- **Policy PUBLIC-5.9:** The City will provide incentives designed to induce the construction of low impact development (LID) designs in development. The City's reduced drainage fees should be designed to offset additional costs involved in using LID features, if possible.

Parks and Recreation Element

- **Policy PARKS-2.5:** The City will encourage multiple uses of the linear park and open space system. These facilities will be designed for recreational, circulation, and stormwater drainage conveyance and detention purposes.

Public Safety

The following Public Safety measures address stormwater drainage and increases in runoff volume and sedimentation as a result of the 2030 General Plan.

- **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-2.7:** 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, downstream erosion and sedimentation).

Conclusion

Public Policies 4-1 to 4-12 would reduce downstream flooding and erosion because they require that the City prepare and maintain a drainage master plan with performance standards such that new development under the 2030 General Plan would be designed to control surface runoff discharges to comply with the City standards, National Pollutant Discharge Elimination System Permit requirements, and Regional Water Quality Control Board standards described in the "Regulatory Setting" section above. Public Policies PS-2.4 and PS-2.7 require applicants to submit drainage studies that adhere to City stormwater design requirements described above and incorporate measures from the City's drainage master plan.

Therefore, adoption and implementation of the proposed policies and programs in the 2030 General Plan, combined with enforcement of the existing City and County grading, erosion, and flood control regulations as described above in this impact and in the "Regulatory Setting" section above would reduce this impact to a **less-than-significant** level.

Mitigation Measure

No mitigation beyond the 2030 General Plan policies and programs is required.

IMPACT 4.5-3 Construction-Related Water Quality Impacts. *Construction and grading activities during development consistent with the 2030 General Plan could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms. However, with implementation of existing regulations and water quality policies and programs contained in the 2030 General Plan, this impact would be less than significant.*

Construction and grading activities during development consistent with the 2030 General Plan could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality by altering the dissolved-oxygen content, temperature, pH, suspended-sediment and turbidity levels, or nutrient content, or by

causing toxic effects in the aquatic environment. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms.

Localized erosion hazards are regarded as relatively low because the project site is generally flat. However, intense rainfall and associated stormwater runoff could result in short periods of sheet erosion within areas of exposed or stockpiled soils. If uncontrolled, these soil materials could cause sedimentation and blockage of drainage channels. Further, the compaction of soils by heavy equipment may reduce the infiltration capacity of soils and increase the potential for runoff and erosion. Non-stormwater discharges could also result from activities such as construction dewatering procedures, and discharge or accidental spills of hazardous substances, such as fuels, oils, concrete, paints, solvents, cleaners, or other construction materials.

As described in the "Regulatory Setting," section above, ongoing NPDES Phase I and II stormwater permitting programs regulate municipal storm drain systems, industrial facilities, and construction sites. NPDES permits generally identify effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities. Under the NPDES permitting program, the preparation and implementation of SWPPPs is required for construction activities.

A SWPPP must include site maps and a description of construction activities, and must identify the BMPs that will be employed to prevent soil erosion and discharge of other construction-related pollutants, such as petroleum products, solvents, paints, and cement, that could contaminate nearby water resources. All NPDES permits also have inspection, monitoring, and reporting requirements to ensure that BMPs are implemented according to the SWPPP and are effective at controlling discharges of stormwater-related pollutants. Source controls, treatment controls, and site planning measures are typical types of BMPs.

Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of post-construction permanent BMPs that will remain in service to protect water quality throughout the life of the project.

Relevant Goals, Policies, and Programs of the Draft General Plan

See Impact 4.5-1 above.

Conclusion

Adoption and implementation of the proposed policies and programs in the 2030 General Plan, combined with enforcement of current permitting requirements would reduce this impact to a **less than significant**. Measures required during construction and operation will be required in order to conform with the SWRCB statewide NPDES stormwater permit for general construction activity, and any other necessary site-specific WDRs or waivers under the Porter-Cologne Act (see "State Plans, Policies, Regulations, and Laws" above), as well as Sutter County Department of Public Works Design Standards and Codes and Ordinances, and City of Live Oak Public Works Improvement Standards that regulate construction discharges (see "Regional And Local Plans, Policies, Regulations, And Ordinances" above).

Mitigation Measure

No mitigation beyond the 2030 General Plan policies and programs is required.

IMPACT 4.5-4 **Interference with Groundwater Recharge or Substantial Depletion of Groundwater Supplies.** *Development and land use changes consistent with the 2030 General Plan would result in additional impervious surfaces and the diversion of groundwater to surface water. Resulting reductions in groundwater recharge in the groundwater basins underlying the Planning Area could affect groundwater levels and the yield of hydrologically connected wells. However, with implementation of the proposed goal, policies, and programs in the 2030 General Plan, this impact would be* ***less than significant****.*

Development and land use changes consistent with the 2030 General Plan would result in additional impervious surfaces, and the diversion of groundwater to surface water through subsurface drainage features or localized dewatering measures. As a result, levels of groundwater recharge in the underlying groundwater basin would decline. Reductions in groundwater recharge in a given area could affect groundwater levels and the yield of hydrologically connected wells. However, as the Feather River is an important recharge area for the underlying groundwater basin as described in "Groundwater Hydrology" above, and no additional impervious surfaces are proposed near the Feather River under the 2030 General Plan, reduction of groundwater recharge in this area would not occur.

Groundwater Use Provisions

Amendments to SB 318 (see the "Regulatory Setting" section above) address drought contingency planning, water demand management, reclamation, and groundwater resources. Under the current law, all urban water suppliers with more than 3,000 service connections or water use of more than 3,000 acre feet per year (afy) are required to submit an UWMP to DWR every 5 years, designed to ensure that groundwater is used at a sustainable rate. The City of Live Oak is preparing an UWMP as of the writing of this document. The most recently prepared draft version of this document was completed in July 2009, and is described in Section 4.10 "Public Utilities" as part of the analysis of the proposed water supply and demand for the 2030 General Plan.

Sutter County Groundwater Management Plan

Sutter County is initiating a Groundwater Management Plan in accordance with the California Water Code, Article 10750. The overall goal is to ensure that the quantity and quality of groundwater in the County is sustained. According to the County, this planning effort will be coordinated with both local (including Live Oak) and state agencies, plus local agricultural and municipal water purveyors. The plan will implement conjunctive use (i.e., utilization of more groundwater in dry years when less surface water is available, and more surface water in wet years when supplies are plentiful and aquifers recharge); Perennial yield (i.e., the sustainable rate at which groundwater can be withdrawn from a basin by pumping without lowering water levels); and avoidance of overdraft (i.e., pumping groundwater from a basin at a rate that exceeds recharge and perennial yield, thereby lowering water levels). Implementation of Sutter County's Groundwater Management Plan will help to ensure reliable groundwater levels in the area surrounding Live Oak.

Relevant Goals, Policies, and Programs of the Draft General Plan

Conservation and Open Space

The Conservation and Open Space chapter of the 2008 Draft General Plan provides the following policies addressing groundwater infiltration and recharge.

- **Policy Water-1.1:** New development shall incorporate drainage system design that emphasizes infiltration and decentralized treatment (rather than traditional piped approaches that quickly convey stormwater to large centralized treatment facilities), to the greatest extent feasible.

- **Policy Water-1.2:** Existing swales and sloughs should be preserved, restored, and used for stormwater drainage whenever possible.

- **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.

- **Policy Water-1.4:** The City will require development projects to incorporate appropriately scaled stormwater facilities. The City will place emphasis on making these holding areas serve multiple functions, such as soccer fields or passive recreation areas.

- **Policy Water-2.7:** The City will participate in regional groundwater basin planning and regional water-management planning efforts to ensure that future demand for water does not overdraft the groundwater supply.

- **Implementation Program Water-1:** The City will revise the Public Works Improvement Standards, as necessary, to encourage use of natural drainage systems and low impact development principles in order to reduce stormwater infrastructure costs and improve water quality. The City will make revisions required to emphasize the slowing down and dispersing of stormwater by using existing landscaped swales and constructing new swales to convey stormwater runoff, encouraging sheet flow and the use of landscaped infiltration basins in planter strips along roadways, and employing other best management practices, as appropriate. The City will establish standards and fee programs to require and/or provide incentives for methods to slow down and filter stormwater, as outlined in this Element. These measures include, but are not limited to, reduced pavement, permeable pavement, vegetation that retains and filters stormwater, and the use of drainage sheet flow and filtration.

Public Utilities, Services, and Facilities

- **Policy PUBLIC-2.1:** The City will ensure that new groundwater well sites are located where the aquifer is stable enough to avoid long-term drawdown.

- **Implementation Program PUBLIC-1.1:** The City will adopt a water master plan that is consistent with the 2030 General Plan, to provide for phased improvements to meet future needs. The master plan will include an inventory of existing development, estimates of future demand within the existing city, and estimates of future growth within areas planned for annexation, consistent with the General Plan. The City will incorporate analysis from the water master plan into its capital and ongoing fee programs. The master plan will identify improvements to serve the needs of new development and will also identify any deficiencies in the existing developed city. The master plan will provide a plan to address any such deficiencies. The master plan will identify potential locations for new well sites where a stable and reliable supply should be available, and where City use would not cause long-term drawdown. The City will also prepare and adopt an Urban Water Management Plan for water conservation in the City, consistent with state law requirements. The City will implement the Urban Water Management Plan through enforcement of standards for new growth. The City will identify improvements that should be made to the existing City to conserve water and will phase in these improvements, as feasible. The City will explore opportunities in the water master plan, as well as the Urban Water Management Plan, to encourage water conservation measures not required by state law. The City will, if feasible, provide incentives that are substantial enough to encourage new and existing development to install and use recycled water systems and other water-conserving improvements. Incentives could include lower up-front water hookup fees and lower ongoing water rates, depending on the extent of water conservation measures included. The City will update the water master plan, as necessary, to address growth needs, regulatory changes, and water quality issues.

- **Implementation Program Water-3.** The City will participate, as appropriate in the Sutter County Groundwater Management Plan to ensure perennial sustainable yield and avoidance of overdraft and long-term drawdown within and adjacent to the East Butte subbasin, while accommodating land use change as described in the 2030 General Plan.

Conclusion

Adoption and implementation of the proposed goals, policies, and programs in the 2030 General Plan would reduce the potential for impacts on groundwater levels resulting from increased impervious-surface coverage in areas that contribute to groundwater recharge. Policies Water-1.1 to 1.4 and Implementation Program Water-1 require that performance standards be implemented to improve groundwater infiltration. The master plan and urban water management plan as set forth in Implementation Program PUBLIC-1.1 would require identification of stable and reliable water supplies where City use would not cause long-term drawdown; implementation of water conservation measures, recycled water systems and other water-conserving improvements. No development would occur near the Feather River areas important for groundwater recharge. Measures included in the 2030 General Plan include maintaining areas for groundwater recharge and incorporating engineering and design standards for projects that would promote infiltration and maintain adequate levels of groundwater recharge. However, there is hydrological connectivity with the underlying groundwater basins surrounding the Planning Area and this connectivity can influence groundwater recharge or substantial depletion of groundwater supplies in the area. Regional coordination is necessary to address this hydrological connectivity, but is not specifically proposed in the 2030 General Plan. The 2030 General Plan commits the City to regional coordination related to participation in the Sutter County Groundwater Management Plan, the intent of which is to maintain groundwater recharge and avoid substantial depletion of the area's groundwater supplies. Implementation Program Water-3 would reduce the potential for interference with groundwater recharge or substantial depletion of groundwater supplies from the 2030 General Plan to a **less-than-significant** level because the 2030 General Plan Implementation Programs and Policies will be in coordination with the Sutter County Groundwater Management plan (GMP) on a regional level in the implementation of measures to ensure conjunctive use, perennial yield, and avoidance of groundwater overdraft within the 2030 General Plan Area and in surrounding areas that are hydrologically connected to it.

With incorporation of 2030 General Plan policies and programs, the impact is considered **less than significant**.

IMPACT 4.5-5 Exposure of People or Structures to Flood Hazards from Increased Stormwater Runoff. *Development and land use changes consistent with the 2030 General Plan could result in the development of residential or commercial structures in floodplains, thereby exposing people and structures to flood hazards. However, implementation of the proposed policies and programs in the 2030 General Plan, combined with enforcement of existing flood control regulations would reduce this impact to a less-than-significant level.*

The Live Oak Planning Area is vulnerable to four types of floods:

- localized flooding,
- riverine flooding,
- levee failure/overtopping (see Impact 4.5-6), and
- dam failure (see Impact 4.5-7).

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.

Implementation of the 2030 General Plan would increase the amount of impervious surface on the project site, thereby increasing surface runoff. This increase in surface runoff would result in an increase in both the total

volume and the peak discharge rate of stormwater runoff, and therefore could result in greater potential for on- and off-site flooding.

The Feather River, which flows to the east of the Planning Area, drains a large watershed that stretches to the crest of the Sierra Nevada. The City's location in the lower portions of the watershed exposes the community to substantial risk from riverine flooding.

Relevant Goals, Policies, and Programs of the Draft General Plan

Public Utilities, Services, and Facilities Element

The following Public Utilities, Services, and Facilities Element measures address flooding and development in the floodplain as a result of the 2030 General Plan.

- **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.

Public Safety

The following Public Safety measures address flooding and development in the floodplain as a result of the 2030 General Plan.

- **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-2.5:** 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.

Conclusion

Adoption and implementation of the proposed policies and programs in the 2030 General Plan would require enforcement of and compliance with existing State and federal flood control regulations, and would reduce the potential for impacts on localized flooding that would result from increased impervious-surfaces, minimizing the

exposure of people or structures to flood hazards resulting from development under the 2030 General Plan. These policies and programs include coordination and design that would ensure adequate drainage and detention of stormwater in the appropriate facilities. Therefore, this impact would be **less than significant**.

Mitigation Measure

No mitigation beyond the 2030 General Plan policies and programs is required.

IMPACT 4.5-6 **Potential for Failure of a Levee.** *When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property could result. The Feather River Levee system protects the Sutter Basin area, which includes much of eastern Sutter County, including the Planning Area, Yuba City to the south, and Gridley to the north (in Butte County). Levees can fail because of earthquake-induced slumping, landslides, liquefaction, overtopping, and high volume flows. Implementation of the proposed policies and programs in the 2030 General Plan, combined with other relevant state and local regulations, would reduce the potential for effects on the Planning Area from levee failure. The impact is considered* ***less than significant.***

The Feather River Levee system protects the Sutter Basin area, which includes much of eastern Sutter County including the Planning Area, Gridley to the north (in Butte County), and Yuba City to the south. As described in the "Regional Hydrology" section above, the Feather River levee system poses a flood hazard within the vicinity of Live Oak as determined by USACE have not been certified as meeting the current levee design criteria for protection against the 100-year flood. 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 Planning Area. When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property can result.

As described in the "Regulatory Setting" and "Regional Hydrology" sections above, the Sutter Butte Flood Control Agency (SBFCA) plans, designs and coordinates regional flood control improvements to protect lives and property in the Sutter Basin. The US Army Corps of Engineers Feasibility Study and SBFCA Early Implementation Project (EIP) address levee restoration and rehabilitation efforts to provide protection for the 100-year storm initially, and 200-year storm protection pursuant to SB 5 based on the 10,000 resident threshold as described in "State Plans, Policies, Regulations, And Laws" above, to residents of the Sutter Basin.

Public Utilities, Services, and Facilities Element

The following policies from the Public Utilities, Services, and Facilities Element of the 2030 General Plan reduce potential impacts related to the potential for levee failure:

- **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.

- **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.

Public Safety

The following policies from the Public Safety chapter of the 2030 General Plan reduce potential impacts related to the potential for levee failure:

- **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-2.5:** 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-3.1:** The City shall maintain and update the City's emergency response plan as needed and ensure ongoing consistency with the General Plan.

Conclusion

Adoption and implementation of the proposed policies in the 2030 General Plan, combined with other relevant state and local regulations, would reduce the potential for effects on the City Planning Area from levee failure.

The potential for failure of a levee would remain, but state law, state regulations, and federal regulations are designed to reduce flood risk to an acceptable level. As of the writing of this document, the USACE has not de-certified the levees protecting the Live Oak Planning Area. US Army Corps of Engineers Feasibility Study and SBFCA EIP levee restoration and rehabilitation efforts are ongoing, as described in the "Regulatory Setting" and "Regional Hydrology" sections above. The City has committed to participation in these ongoing efforts, as well as compliance with state law related to flood protection for urbanized areas in coordination with land use entitlements. Compliance with the City's proposed General Plan policies and programs, as well as existing laws and regulations would reduce risk for people and structures involving flooding that could result from failure of a levee. The City considers this impact to be **less than significant**.

Mitigation Measure

No mitigation beyond the 2030 Draft General Plan policies and programs is required.

IMPACT 4.5-7 Potential for Failure of a Dam. *The Sutter County Emergency Operations Plan has identified 10 dams where dam inundation has the potential to result in the loss of life and property in Sutter County. Two of these dams, Oroville and Thermalito Afterbay, would affect the Planning Area in the unlikely event of dam failure. Implementation of the proposed policies and programs in the 2030 General Plan, combined with other relevant state and local regulations, would minimize the potential for effects from dam failure. This impact would be less than significant.*

Flood inundation maps prepared by the DWR indicate that the Planning Area and much of the surrounding area are within the flood hazard zone for the Oroville and Thermalito Afterbay dams. A dam evacuation plan is integrated into the Sutter County Office of Emergency Services Flood Preparedness Plan (Sutter County 2009a).

Procedures for Protection against Threats of Dam Failure

Dam inundation mapping procedures (19 CCR Section 2575) are required by the State Office of Emergency Services (OES) for all dams where human life is potentially endangered by dam flooding inundation. As described in the "Regulatory Setting" section, 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 or human-caused 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 (from Sutter County 2009a):

- **Planning and Preparation Phase:** In this phase, the river has flowed over the banks of the main channel, and government assumes a readiness condition.

- **Ready for Action Phase:** All those in the affected area should be ready for an Advisory Evacuation Notice or Mandatory Evacuation Order to be given at any time. Any last-minute preparations should be made. (An Advisory Evacuation Notice is issued when conditions exist which indicate a Mandatory Evaluation order may be given in the near future. The threat to lives is not yet imminent but there is potential for rapidly changing conditions to develop into a serious threat. Residents are advised to leave the area. A Mandatory Evacuation is ordered when conditions exist that seriously endanger lives. The danger is imminent. All non-essential persons are ordered to immediately leave the area via the described evacuation routes.)

- **Emergency Phase:** At this point, the likelihood of a mandatory evacuation of the affected area becomes much greater. It will probably be called in the near future, and there will be little or no time for individuals or business owners to take further protective actions. It is crucial for persons to pay close attention to emergency information provided by the County and the Cities.

Public Safety

The following policy from the Public Safety Element of the 2030 General Plan would reduce potential impacts related to the potential for dam failure:

- **Policy PS-3.4:** The City will coordinate with the County Office of Emergency Services to identify and establish evacuation routes and operational 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.

Conclusion

The Oroville and Thermalito Afterbay dams have been constructed and are maintained consistent with California Water Code Division 3, which has regulatory jurisdiction over these 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). There is no substantial evidence to suggest that dam failure is likely, and implementation of the 2030 General Plan would do nothing to increase the potential for dam failure. Adoption and implementation of the proposed policies in the 2030 General Plan, combined with other relevant state and local regulations, would minimize the potential for effects on the Planning Area from inundation as a result of dam failure. Therefore, this impact would be **less than significant**.

Mitigation Measure

No mitigation beyond the 2030 Draft General Plan policies and programs is required.