

3.10 HYDROLOGY AND WATER QUALITY

This section evaluates the potential hydrology and water quality impacts associated with the adoption and implementation of the proposed Project. This section describes the regulatory framework and existing conditions; identifies criteria used to determine impact significance; provides an analysis of the potential hydrology and water quality impacts; and identifies proposed General Plan 2045 goals and policies that would minimize potentially significant impacts. Groundwater supply and management is discussed in Section 3.17, *Utilities and Service Systems*.

This analysis is based in part on the Livermore General Plan Update Existing Conditions Report prepared in March 2022 (City of Livermore 2022b). Where more recent data is available at the time of preparation of this Draft EIR, the analysis provided herein reflects such updated information.

As detailed in Chapter 3, *Environmental Analysis*, no concerns related to hydrology and water quality were received during the EIR scoping period.

3.10.1 Regulatory Framework

FEDERAL

Clean Water Act

The United States Environmental Protection Agency (USEPA) is the lead federal agency responsible for water quality management. The Clean Water Act of 1972 (CWA; 33 United States Code Sections 1251 to 1376) is the primary federal law that governs and authorizes water quality control activities by the USEPA, as well as the states. Various elements of the CWA, which address water quality, are discussed as follows.

Permits to dredge or fill waters of the United States are administered by the United States Army Corps of Engineers (USACE) under Section 404 of the CWA. “Waters of the United States” are defined as territorial seas and traditional navigable waters, perennial and intermittent tributaries to those waters, lakes and ponds and impoundments of jurisdictional waters, and wetlands adjacent to jurisdictional waters. The regulatory branch of the USACE is responsible for implementing and enforcing Section 404 of the CWA and issuing permits. Any activity that discharges fill material and/or requires excavation in waters of the United States must obtain a Section 404 permit. Before issuing the permit, the USACE requires that an analysis be conducted to demonstrate that a proposed project is the least environmentally damaging practicable alternative. Also, the USACE is required to comply with the National Environmental Policy Act before it may issue an individual Section 404 permit.

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Under Section 401 of the CWA, every applicant for a Section 404 permit that may result in a discharge to a water body must first obtain State Water Quality Certification that the proposed activity will comply with State water quality standards. Certifications are issued in conjunction with USACE Section 404 permits for dredge and fill discharges. In addition, an application for Individual Water Quality Certification and/or Waste Discharge Requirements must be submitted for any activity that would result in the placement of dredged or fill material in waters of the State that are not jurisdictional to the USACE, such as isolated wetlands, to ensure that the proposed activity complies with State water quality standards. 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 its nine Regional Water Quality Control Boards (RWQCBs). The EIR Study Area lies in the jurisdiction of San Francisco Bay RWQCB (Region 2).

Under federal law, the USEPA 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 the USEPA 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. In California, the USEPA has delegated authority to the SWRCB and its RWQCBs to identify beneficial uses and adopt applicable water quality objectives.

When water quality does not meet CWA standards and compromises designated beneficial uses of a receiving water body, Section 303(d) of the CWA requires that water body be identified and listed as “impaired”. Once a water body has been designated as impaired, a total maximum daily load (TMDL) must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, nonpoint, and natural sources that a water body may receive without exceeding applicable water quality standards, with a factor of safety included. Once established, the TMDL allocates the loads among current and future pollutant sources to the water body.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States, including discharges from municipal separate storm sewer systems (MS4). 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 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 Program, all facilities that discharge pollutants into waters of the United States are required to obtain a NPDES permit. Requirements for stormwater discharges are also regulated under this program. In California, the NPDES permit program is administered by the SWRCB through the nine RWQCBs. The EIR Study Area lies in the jurisdiction of San Francisco Bay RWQCB (Region 2) and is subject to the waste discharge requirements for the Municipal Regional Permit (Order No. R2-2022-0018, NPDES Permit No. CAS612008, issued in May 2022).

Under Section C.3 of the NPDES Permit, the co-permittees use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is accomplished primarily through the implementation of low-impact development (LID) techniques. In addition, projects that create and/or replace one acre or more of impervious surfaces and are in a susceptible area must comply with the hydromodification requirements specified in the C.3.g provisions of the NPDES Permit. This requires that stormwater discharges shall not cause an increase in the erosion potential of the receiving stream as compared to pre-existing conditions. This typically requires flow duration control to ensure that post-project runoff does not exceed 10 percent of the pre-project flow rate for the 2-year up to the 10-year storm event. The EIR Study Area is in the hydromodification susceptibility zone.

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 limiting 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 is established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event, also described as a flood that has a 1-in-100 chance of occurring in any given year.

As required by the FEMA regulations, all development in the Special Flood Hazard Zone (as delineated on the FIRM) must be constructed so that the lowest floor is at or above the base flood elevation level. The term "development" is defined by FEMA as any human-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials. Pursuant to these regulations, if development in these areas occurs, a hydrologic and hydraulic analysis must be performed prior to the start of development and

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must demonstrate that the development does not cause any rise in base flood elevation levels, because no rise is permitted in regulatory floodways. Upon completion of any development that changes existing Special Flood Hazard Area boundaries, the National Flood Insurance Program directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision, as soon as practicable, but not later than six months after such data becomes available.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act provides the basic authority for the United States Fish and Wildlife Service (USFWS) to evaluate impacts to fish and wildlife from proposed water resource development projects. This act requires that all federal agencies consult with the USFWS, the National Marine Fisheries Service, and State wildlife agencies (i.e., the California Department of Fish and Wildlife [CDFW]) for activities that affect, control, or modify waters of any stream or bodies of water. Under this act, the USFWS has responsibility for reviewing and commenting on all water resources projects. For example, it would provide consultation to the USACE prior to issuance of a Section 404 permit.

If a project may result in the “incidental take” of a listed species, an incidental take permit is required. An incidental take permit allows a developer to proceed with an activity that is legal in all other respects but that results in the incidental taking of a listed species. A habitat conservation plan must also accompany an application for an incidental take permit. The purpose of a habitat conservation plan is to ensure that the effects of the permitted action on listed species are adequately minimized and mitigated.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq.) is the basic water quality control law for California. This act established the SWRCB and divided the State into nine regional basins, each under the jurisdiction of an RWQCB. The SWRCB is the primary State agency responsible for the protection of California’s water quality and groundwater supplies. The RWQCBs carry out the regulation, protection, and administration of water quality in each region. Each regional board is required to adopt a water quality control plan or basin plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region’s ground and surface water, and local water quality conditions and problems. As stated previously, the EIR Study Area is in the jurisdiction of the San Francisco Bay RWQCB (Region 2).

The Porter-Cologne Act also authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements, NPDES permits, Section 401 water quality certifications, or other approvals. Other State agencies with jurisdiction over water quality regulation in California include the California Department of Health Services for drinking water regulations, the CDFW, and the Office of Environmental Health and Hazard Assessment.

Construction General Permit

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.

Construction activities that disturb one or more acres of land that could impact hydrologic resources must comply with the requirements of the SWRCB Construction General Permit (CGP) (Order WQ 2022-0057-DWQ). Under the terms of the permit, applicants must file Permit Registration Documents (PRD) with the SWRCB before the start of construction. The PRDs include a Notice of Intent, risk assessment, site map, Stormwater Pollution Prevention Plan (SWPPP), annual fee, and a signed certification statement. The PRDs are submitted electronically to the SWRCB via the Stormwater Multiple Application and Report Tracking System (SMARTS) website.

Applicants must also demonstrate conformance with applicable best management practices (BMPs) and prepare a SWPPP containing a site map that shows the construction site perimeter; existing and proposed buildings, lots, roadways, stormwater collection and discharge points; general topography both before and after construction and drainage patterns across the project site. The SWPPP must list BMPs that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Additionally, the SWPPP must contain a visual monitoring program, a sampling program to ensure compliance with water quality standards, and on-site collection of samples and inspection of BMPs during a qualifying precipitation event.

Industrial General Permit

The Statewide General Permit for Stormwater Discharges Associated with Industrial Activities, Order No. 2014-0057-DWQ and amended by 2015-0122-DWQ (2018), implements the federally required stormwater regulations in California for stormwater associated with industrial activities that discharge to waters of the United States. This regulation covers facilities that are required by federal regulations or by the RWQCBs to obtain an NPDES permit. Dischargers are required to eliminate non-stormwater discharges, develop SWPPPs that include BMPs, conduct monitoring of stormwater runoff, and submit all compliance documents via the SWRCB's SMARTS program.

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California Fish and Game Code

The CDFW protects streams, water bodies, and riparian corridors through the streambed alteration agreement process under Sections 1601 to 1606 of the California Fish and Game Code. The Fish and Game Code stipulates that it is “unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake” without notifying the CDFW, incorporating necessary mitigation, and obtaining a streambed alteration agreement. CDFW’s jurisdiction extends to the top of banks and often includes the outer edge of riparian vegetation.

Water Conservation in Landscaping Act

The Water Conservation in Landscaping Act includes the State of California’s Model Water Efficient Landscape Ordinance (MWELO), which requires cities and counties to adopt landscape water conservation ordinances. The MWELO was revised in July 2015 via Executive Order B-29-15 to address the ongoing drought and build resiliency for future droughts. State law requires all land use agencies, which includes cities and counties, to adopt a WELO that is at least as efficient as the MWELO prepared by the California Department of Water Resources (DWR). The 2015 revisions to the MWELO improve water conservation in the landscaping sector by promoting efficient landscapes in new developments and retrofitted landscapes. The revisions increase water efficiency by requiring more efficient irrigation systems, incentives for grey water usage, improvements in on-site stormwater capture, and limiting the portion of landscapes that can be covered in high-water-use plants and turf. New development projects that include landscape areas of 500 square feet or more are subject to the MWELO. This applies to residential, commercial, industrial, and institutional projects that require a permit, plan check, or design review. The previous landscape size threshold for new development projects ranged from 2,500 square feet to 5,000 square feet (DWR 2025). The size threshold for rehabilitated landscapes has not changed and remains at 2,500 square feet.

California Building Code: CALGreen

The California Building Standards Commission adopted the nation’s first green building standards in July 2008, the California Green Building Standards Code, also known as CALGreen. CALGreen applies to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure in California. The code establishes planning and design standards for sustainable site development, including source control measures and water efficiency and conservation measures that typically reduce water consumption by 20 percent.

CALGreen is updated every three years to allow for consideration and possible incorporation of new low flow plumbing fixtures and water efficient appliances. The mandatory provisions of CALGreen became effective January 1, 2011, and the latest version, the 2025 California Green Building Standards Code, became effective on January 1, 2026. The building efficiency standards are enforced through the local building permit process.

California Plumbing Code

The latest version of the California Plumbing Code was issued in 2025 and became effective on January 1, 2026. The California Plumbing Code is updated on a three-year cycle. It specifies technical standards for the design, materials, workmanship, and maintenance of plumbing systems. One of the purposes of the plumbing code is to prevent conflicting plumbing codes within local jurisdictions. Water fixtures, potable and non-potable water systems, and recycled water systems are among many topics covered in the code.

Sustainable Groundwater Management Act

The historic passage of the Sustainable Groundwater Management Act (SGMA) in 2014 outlined a statewide framework to help protect groundwater resources over the long term. SGMA consists of a three-bill legislative package, including Assembly Bill 1739, Senate Bill 1168, and Senate Bill 1319, and subsequent statewide regulations. The Governor’s signing message states that “groundwater management in California is best accomplished locally.” Under SGMA, in groundwater basins that are designated as medium and high priority, local public agencies and groundwater sustainability agencies (GSAs) must assess conditions in their local groundwater basins and then prepare groundwater sustainability plans (GSPs) or alternatives to GSPs to avoid undesirable results and mitigate overdraft in 20 years. DWR serves two roles to support local SGMA implementation, 1) regulatory oversight through the evaluation and assessment of GSPs and 2) providing ongoing assistance to locals through the development of BMPs and guidance, planning assistance, technical assistance, and financial assistance.

Zone 7 of the Alameda County Flood Control and Water Conservation District (Zone 7 Water Agency) is the exclusive GSA for the Livermore Valley Groundwater Basin. Zone 7 Water Agency was designated as the GSA and has managed the basin for over 50 years. On June 27, 2024, DWR announced that it approved the update to Zone 7 Water Agency’s groundwater management plan (Alternative GSP). DWR determined that Livermore Valley Groundwater basin continues to be managed sustainably to meet the requirements of SGMA (Zone 7 Water Agency 2025).

REGIONAL

San Francisco Bay Regional Water Quality Control Board Basin Plan

The EIR Study Area is in the jurisdiction of the San Francisco Bay RWQCB (Region 2). The San Francisco Bay RWQCB addresses regionwide water quality issues through the creation and triennial update of the San Francisco Bay Basin Water Quality Control Plan (Basin Plan). The Basin Plan was adopted in 1995 and most recently amended on July 22, 2024. This Basin Plan designates beneficial uses of the State waters in Region 2; describes the water quality that must be maintained to support such uses; and provides programs, projects, and other actions necessary to achieve the standards established in the Basin Plan (San Francisco Bay RWQCB

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2025). The San Francisco Bay RWQCB also administers the Municipal Regional Permit for the municipalities in Alameda County, including the EIR Study Area. Additional information regarding this permit was outlined previously under the “National Pollutant Discharge Elimination System” subheading.

Alameda Countywide Clean Water Program

The Alameda Countywide Clean Water Program (ACCWP) provides technical assistance to member agencies and the public to ensure compliance with the federal CWA and also coordinates its activities with other programs, such as wastewater treatment, hazardous waste disposal, and water recycling (ACCWP 2025). The City of Livermore (City) is a co-permittee under the ACCWP with 17 other cities and local agencies. As a part of the program, the City implements an inspection program requiring local businesses to implement BMPs to minimize stormwater pollution (City of Livermore 2019).

The ACCWP monitors pollutants in surface waters (i.e., creeks, lakes, and San Francisco Bay) and implements an outreach and education program. The ACCWP C.3 Stormwater Technical Guidance Manual provides post-construction requirements and resources, including BMPs for stormwater pollution prevention, erosion control, low impact development (LID) treatment measures, and hydromodification requirements. Site design measures are required for small construction projects that create or replace between 2,500 and 5,000 square feet of impervious surface or individual single-family home projects that create and/or replace between 2,500 to less than 10,000 square feet of impervious area. Also, regulated projects that create or replace 5,000 square feet or more of impervious surface would be required to implement site design, source control, and stormwater treatment and runoff measures using specific numeric sizing criteria based on the volume and flow rate of stormwater that is generated. Additional resources are provided at ACCWP’s website, including post-construction stormwater requirements, sizing calculations for drainage management areas, and general water quality information (ACCWP 2024).

Zone 7 Water Agency

Zone 7 Water Agency provides regional flood protection for 427 square miles of eastern Alameda County and currently owns and maintains approximately 37 miles of natural streams and flood control channels (City of Livermore 2019). Additionally, Zone 7 Water Agency is a wholesale water purveyor and is the designated GSA for the Livermore-Amador Valley Groundwater Basin. Zone 7 Water Agency collaborates with the DWR in their role to provide State Water Project water supplies to the region and to manage Lake Del Valle for water storage, flood control, and recreational uses.

Zone 7 Water Agency maintains approximately one-third of the creeks in the Livermore-Amador Valley. This includes portions of the Arroyo Las Positas, relocated Arroyo Las Positas, Altamont Creek, a portion of Arroyo Mocho, Arroyo Seco, and Collier Canyon Creek.

Tri-Valley Local Hazard Mitigation Plan

The purpose of hazard mitigation planning is to reduce the loss of life and property by minimizing the impact of disasters. The *Tri-Valley Local Hazard Mitigation Plan* (LHMP) was adopted in March 2024 for the purpose of identifying, assessing, and reducing the long-term risk to life and property from hazard events (City of Livermore 2024). The LHMP includes an assessment of hazards and vulnerabilities and a set of mitigation actions for the Tri-Valley area, including the EIR Study Area. In the context of an LHMP, mitigation is an action that reduces or eliminates long-term risk to people and property from hazards, including flooding and dam failure.

LOCAL

Livermore Municipal Code

The Livermore Municipal Code (LMC) includes various directives to minimize adverse impacts to hydrology and water quality. The LMC is organized by title, chapter, section, and in some cases, articles. Most provisions related to hydrology and water quality are in Title 13, *Public Services*; and Title 16, *Environment*, as follows:

- **Chapter 13.25, *Water Efficient Landscape***, enacted under the State Model Water Efficient Landscape Ordinance, is a “water efficient landscape ordinance” adopted to establish standards for designing, installing, and maintaining water efficient landscapes that avoid runoff and other water waste in landscape projects.
- **Chapter 13.26, *Water Conservation***, establishes voluntary and mandatory water conservation measures, BMPs, and use penalties to encourage wise water use and to minimize the effect of shortages on the City’s customers.
- **Chapter 13.44, *Storm Drainage Facilities***, establishes stormwater drainage fees and credits and construction requirements for storm drainage facilities.
- **Chapter 13.45, *Stormwater Management and Control Program***, is intended to protect and enhance the water quality of watercourses, water bodies and wetlands in a manner pursuant to and consistent with the Federal Clean Water Act.
- **Chapter 13.46, *Stormwater System Enterprise Fund***, provides funding for stormwater management and discharge control program.
- **Chapter 16.08, *Watercourses***, prohibits obstructing watercourses or degrading water quality of water flowing through watercourses not within right-of-way under Zone 7 Water Agency and City of Livermore ownership.
- **Chapter 16.12, *Flood Control Regulations***, includes regulations to minimize public and private losses due to flood conditions in specific areas.

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Livermore Storm Drain Master Plan

The Storm Drain Master Plan (SDMP) includes priority rankings for future improvement projects to be implemented through the current Capital Improvement Program (CIP) (City of Livermore 2022a). The SDMP details how the prioritized CIP is established based on hydrologic and hydraulic modeling of the existing storm drainage system and provides estimates of the revenue stream needed to complete the CIP over 20 years. Example CIP projects include upsizing storm drains adjacent to numerous streets in the City Limit.

Livermore Stream Maintenance Program

In 2015, the City developed a programmatic Stream Maintenance Program for routine creek and channel maintenance in coordination with the RWQCB, CDFW, USACE, and USFWS. The Stream Maintenance Program serves as a permitting framework for routine maintenance work in and around channels. It also defines BMPs to minimize the impacts of routine maintenance to listed species and sensitive habitat and to mitigate for these impacts (City of Livermore 2023).

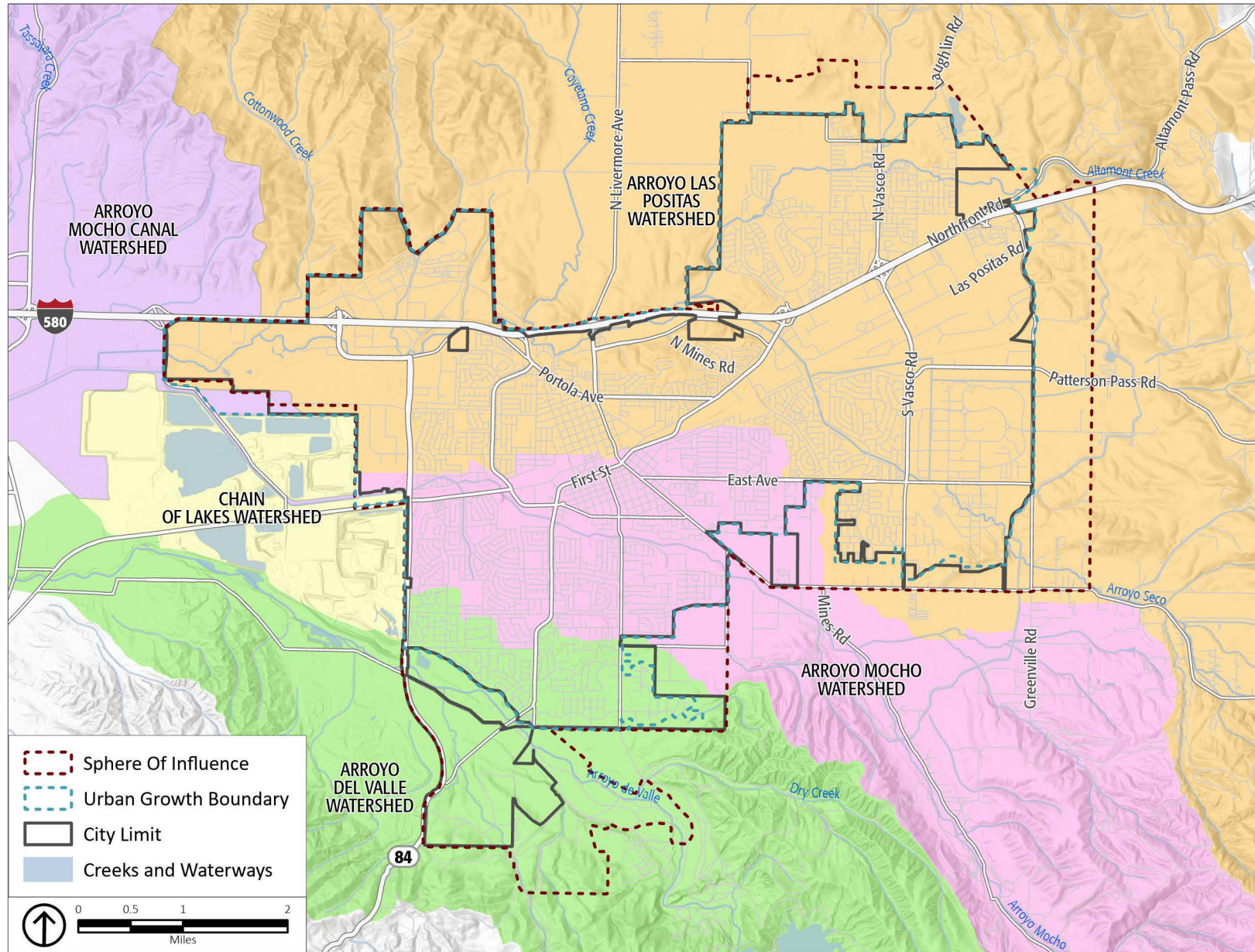
3.10.2 Existing Conditions

CLIMATE AND TOPOGRAPHY

Climate in the EIR Study Area is characterized as Mediterranean, with mild to cool winters and hot, dry summers. However, it is close to being characterized as a semi-arid climate due to its relatively low annual precipitation of 15 inches per year. Most of the rainfall occurs between November and April. The average maximum temperature of 89 degrees Fahrenheit (°F) occurs in August, and the average minimum temperature of 36°F occurs in January. The EIR Study Area is in the Livermore Valley in eastern Alameda County, which is bordered to the north, south, and east by rolling hills. The central portion of the EIR Study Area, including the downtown area, is relatively flat with elevations ranging from 350 feet above mean sea level (msl) in the west to about 600 feet above msl in the east. The upland areas of the EIR Study Area consist of moderate to steeply sloping hills with elevations ranging from approximately 500 feet to more than 1,200 feet above msl (City of Livermore 2022b).

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Approximately two-thirds of the East Bay is in the 660-square-mile Alameda Creek Watershed, which is broken into sections and subwatersheds. The EIR Study Area is in four subwatersheds of the Upper Alameda Creek Watershed: Arroyo Mocho Subwatershed, Arroyo Las Positas Subwatershed, Arroyo Del Valle Subwatershed, and Chains of Lakes Subwatershed, as depicted on Figure 3.10-1, *Regional Subwatersheds*. Overall, the EIR Study Area subwatersheds flow in a westerly direction to Arroyo de la Laguna, which drains to Alameda Creek near Sunol (City of Livermore 2022b). The four subwatersheds are described herein:



Source: Alameda County Flood Control & Water Conservation District, 2021; City of Livermore, 2022.

Figure 3.10-1
Regional Subwatersheds

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- **Arroyo Mocho Subwatershed.** The Arroyo Mocho Subwatershed encompasses 54 square miles and drains a narrow-rugged canyon that extends approximately 20 miles southeast of the EIR Study Area, to its headwaters in northern Santa Clara County. The Arroyo Mocho flows northwest along Mines Road in the EIR Study Area, through Pleasanton, and eventually joins Alamo Canal to become Arroyo de la Laguna, which flows into Alameda Creek. Arroyo Mocho flows through the southern portion of the EIR Study Area. Much of Livermore’s Downtown area drains into the Arroyo Mocho. The subwatershed includes Arroyo Mocho Creek, Tunnel Creek, and Mendenhall Springs.
- **Arroyo Las Positas Subwatershed.** Arroyo Las Positas encompasses 81 square miles and drains the Altamont pass and areas just north and east of the EIR Study Area. Arroyo Las Positas is a 7.4-mile-long westward-flowing watercourse that originates from the east of the EIR Study Area and empties into Arroyo Mocho in the EIR Study Area. It is mostly composed of intermittent creeks, with some perennial water, and sparse riparian cover. The subwatershed includes Altamont Creek, Arroyo Seco, Cayetano Creek, Collier Canyon Creek, Cottonwood Creek, and Frick Lake.
- **Arroyo Del Valle Subwatershed.** Arroyo Del Valle Subwatershed encompasses 168 square miles and begins in the rugged mountains of the Diablo Range and flows northwest toward Livermore Valley. Before reaching the valley, it is impounded to create Lake Del Valle. Arroyo Del Valle flows through the southwestern portion of the EIR Study Area, with peak flows controlled by releases from Lake Del Valle. The subwatershed includes Arroyo Del Valle, Dry Creek, Shafer Creek, Trout Creek, Sycamore Creek, Colorado Creek, Arroyo Bayo, San Antonio Creek, Jumpoff Creek, Sulphur Springs Creek, Sweetwater Creek, Beauregard Creek, and Lake Del Valle.
- **Chain of Lakes Subwatershed.** Chain of Lakes is a 4.6-square-mile subwatershed that is a series of former quarry lakes, including Cope Lake and Shadow Cliffs Lake. The lakes were created by excavating sands and gravels that make up the groundwater aquifers. After mining was complete, the former quarry pits fill with groundwater. Because they are connected to the groundwater aquifer, surface water added to the lakes drains into the ground, slowly filling the aquifers of the Livermore-Amador Valley groundwater basin.

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Zone 7 Water Agency owns and maintains approximately one-third of the creeks and channels in the Livermore-Amador Valley, including portions of Arroyo Las Positas, relocated Arroyo Las Positas, Altamont Creek, a portion of Arroyo Mocho, Arroyo Seco, and Collier Creek. The City of Livermore owns approximately seven miles of channels and creeks and maintains approximately 13 miles channels and creeks in the City Limit. Of the City-maintained creeks, approximately one third are improved concrete-lined or engineered earth channels with little or no vegetation. The remaining City-maintained creeks are natural arroyos with shallow banks and dense vegetation or are incised, sparsely vegetated with steep banks.

The City's Water Resource Division operates and maintains the storm drain system in the City Limit. The storm drain system covers an area of approximately 26 square miles and contains over 207 miles of pipe and three pump stations. The storm drain piping is generally concrete, with some corrugated metal pipes. The average age of the storm drain pipelines is around 40 years compared to an estimated service life of 100 years. There are several ditches or open channels in the existing developed areas, such as the Granada Channel, which flow to Arroyo Mocho. The City also has an ongoing maintenance program for storm drainpipes and inlets, which includes catch basin cleaning, line repairs, and maintenance of the two pump stations. Improvements to the storm drain system listed in the SDMP are implemented through the City's CIP and include projects designed to upsize storm drains adjacent to streets in the City Limit and the installation of new pump stations to mitigate flooding at street intersections (City of Livermore 2022b).

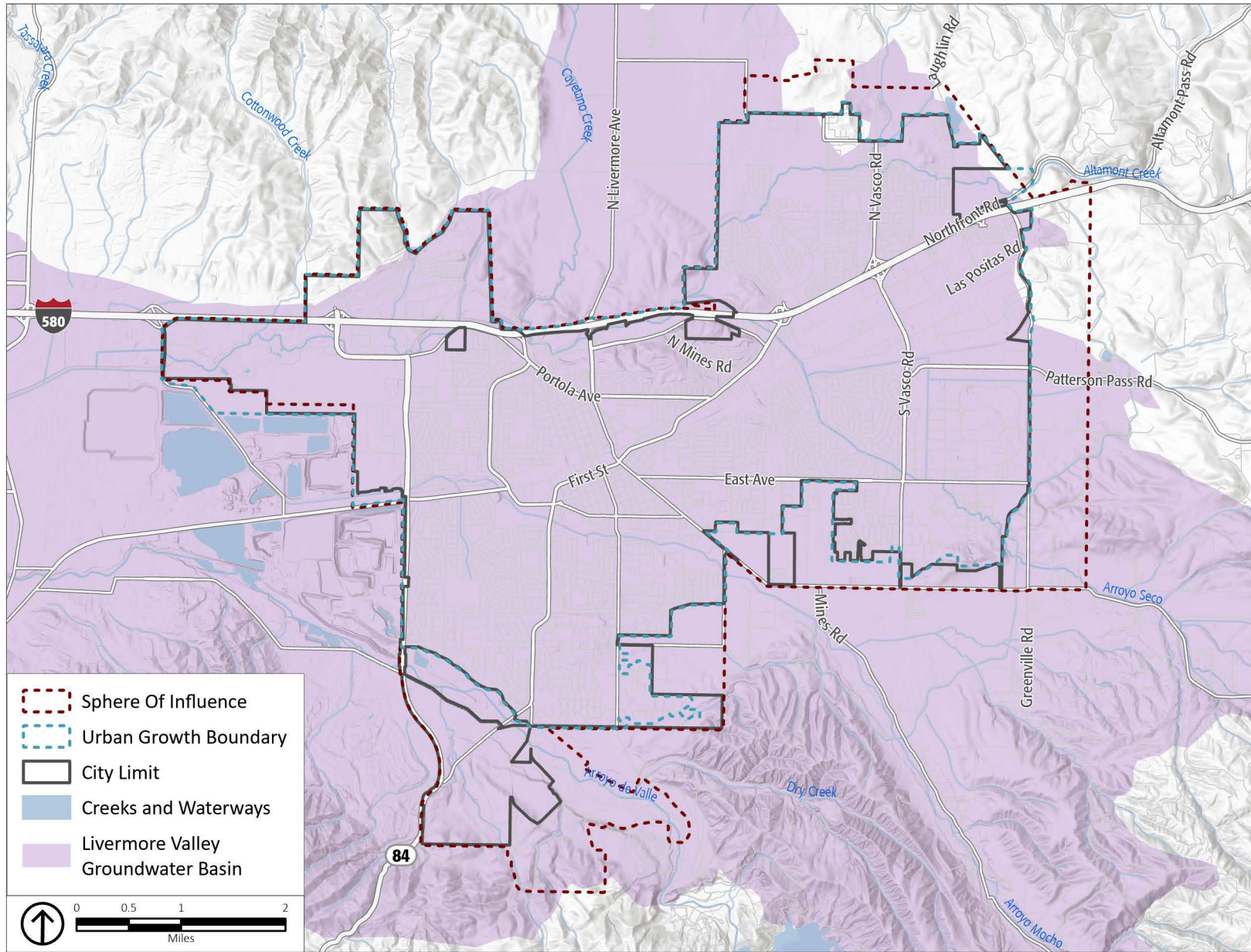
GROUNDWATER

The Livermore Valley Groundwater Basin is an important water supply source for Zone 7 Water Agency. The basin is shown on Figure 3.10-2, *Groundwater Basin*, and is replenished by natural and artificial recharge. Zone 7 Water Agency, the City of Pleasanton, and the California Water Service Company (Cal Water) own wells that extract groundwater to supplement their surface water supplies. Zone 7 Water Agency currently has seven production wells in Pleasanton and three wells near the Chain of Lakes. The peak total capacity of these production wells is approximately 42 million gallons per day, and the normal operating capacity of these wells is approximately 32 million gallons per day. Although the basin groundwater meets the State water quality standards, Zone 7 Water Agency operates the Mocho Groundwater Demineralization Plant to remove salts from the groundwater basin and improve delivered water quality.

Shallow groundwater is present beneath the EIR Study Area, ranging in depths from 4 feet to 60 feet below ground surface. Shallow groundwater depths vary with large rainfall events and periods of drought and are at the highest levels (i.e., closest to the ground surface) during the rainy season and decreasing during the drier months.

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Surface water quality is affected by point-source and nonpoint-source pollutants. Point-source pollutants are emitted at a specific point, such as a pipe, and nonpoint-source pollutants are typically generated by surface runoff from diffuse sources, such as streets, paved areas, and landscaped areas. Point-source pollutants are controlled with pollutant discharge regulations or water discharge requirements. Nonpoint-source pollutants are more difficult to monitor and control, although they are important contributors to surface water quality in urban areas.



Source: California Department of Water Resources, 2016; City of Livermore, 2022.

Figure 3.10-2
Groundwater Basin

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Stormwater runoff pollutants vary based on land use, topography, the amount of impervious surface, the amount and frequency of rainfall, and irrigation practices. Runoff in developed areas typically contains oil, grease, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas. The highest pollutant concentrations usually occur at the beginning of the wet season during the “first flush,” when early rainfall flushes out pollutants that have accumulated on hardscape surfaces during the preceding dry months.

The San Francisco Bay RWQCB monitors surface water quality through implementation of the Basin Plan and designates beneficial uses for surface water bodies and groundwater in Alameda County and Livermore. The beneficial uses for surface water bodies and groundwater in the EIR Study Area are listed in Table 3.10-1, *Designated Beneficial Uses of Water Bodies*.

Table 3.10-1 Designated Beneficial Uses of Water Bodies

Waterbody	Designated Beneficial Uses
Surface Water	
Arroyo Del Valle	MUN, GWR, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Shadow Cliffs Reservoir	GWR, COMM, COLD, SPWN, WARM, WILD, REC-1, REC-2
Del Valle Reservoir	MUN, COMM, COLD, SPWN, WARM, WILD, REC-1, REC-2
Arroyo Mocho	GWR, COLD, MIGR, SPWN, WARM, WILD, REC-1, REC-2
Tassajara Creek	GWR, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Arroyo Las Positas	GWR, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Cottonwood Creek	RARE, WARM, WILD, REC-1, REC-2
Collier Canyon Creek	RARE, WARM, WILD, REC-1, REC-2
Cayetano Creek	RARE, WARM, WILD, REC-1, REC-2
Arroyo Seco	GWR, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Altamont Creek	GWR, COLD, RARE, WARM, WILD, REC-1, REC-2
Groundwater	
Livermore Valley	MUN, PROC, IND, AGR

Source: San Francisco Bay RWQCB 2025.

Notes: MUN = Municipal and Domestic Water Supply; GWR = Groundwater Recharge; COLD = Cold Freshwater Habitat; MIGR = Fish Migration; RARE = Preservation of Rare and Endangered Species; SPWN = Fish Spawning; WARM = Warm Freshwater Habitat; WILD = Wildlife Habitat; REC-1 = Water Contact Recreation; REC-2 = Noncontact Water Recreation; PRC = Industrial Process Water Supply; IND = Industrial Service Water Supply; AGR = Agricultural Supply.

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In addition to the establishment of beneficial uses and water quality objectives, another approach to improve water quality is a watershed-based methodology that focuses on all potential pollution sources and not just those associated with point sources. If a body of water does not meet established water quality standards under traditional point-source controls, it is listed as an impaired water body under Section 303(d) of the CWA. For Section 303(d) listed water bodies, a limit is established that defines the maximum amount of pollutants that can be received by that water body. Impaired water bodies in the EIR Study Area and their associated pollutants of concern are presented as follows (SWRCB 2025):

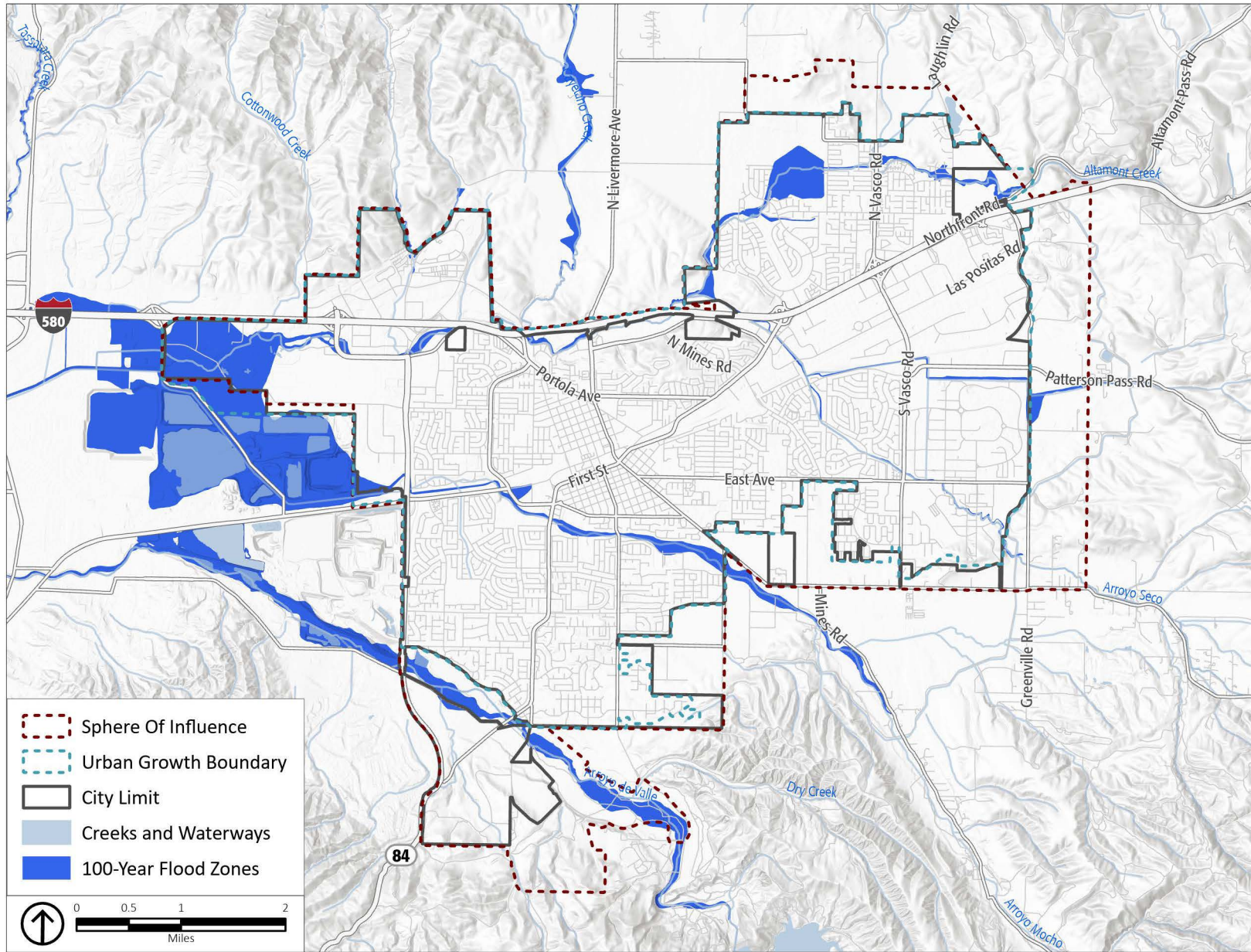
- Arroyo Del Valle: diazinon (pesticide)
- Arroyo Mocho: diazinon, pH, toxicity, eutrophication
- Arroyo Las Positas: diazinon, chloride, pH, ammonia, eutrophication

Once a water body has been placed on the Section 303(d) list of impaired waters, the State is required to develop a TMDL threshold to address each pollutant causing impairment. A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. A TMDL has been approved by the USEPA for diazinon in Arroyo Del Valle, Arroyo Mocho, and Arroyo Las Positas in 2007 (SWRCB 2026a, 2026b, 2026c). No other TMDLs have been approved for the other pollutants.

FLOOD ZONES

FEMA determines floodplain zones to assist mitigating flooding hazards through land use planning. FEMA also outlines specific regulations for any construction in a 100-year floodplain. The 100-year floodplain is defined as an area that has a 1 percent chance of being inundated during a 12-month period. FEMA also prepares maps for 500-year floods, which means that in any given year, the risk of flooding in the designated area is 0.2 percent. The portions of the EIR Study Area that are in the 100-year floodplain are shown on Figure 3.10-3, *Flood Zones*.

In some locations, FEMA also provides measurements of base flood elevations for the 100-year flood, which is the minimum height of the flood waters during a 100-year event. Base flood elevation is reported in feet above sea level. Depth of flooding is determined by subtracting the land's height above sea level from the base flood elevation. Areas in the 100-year flood hazard area that are financed by federally backed mortgages are subject to mandatory federal insurance requirements and building standards to reduce flood damage.



Source: Federal Emergency Management Agency, 2021; City of Livermore, 2022.

Figure 3.10-3
Flood Zones

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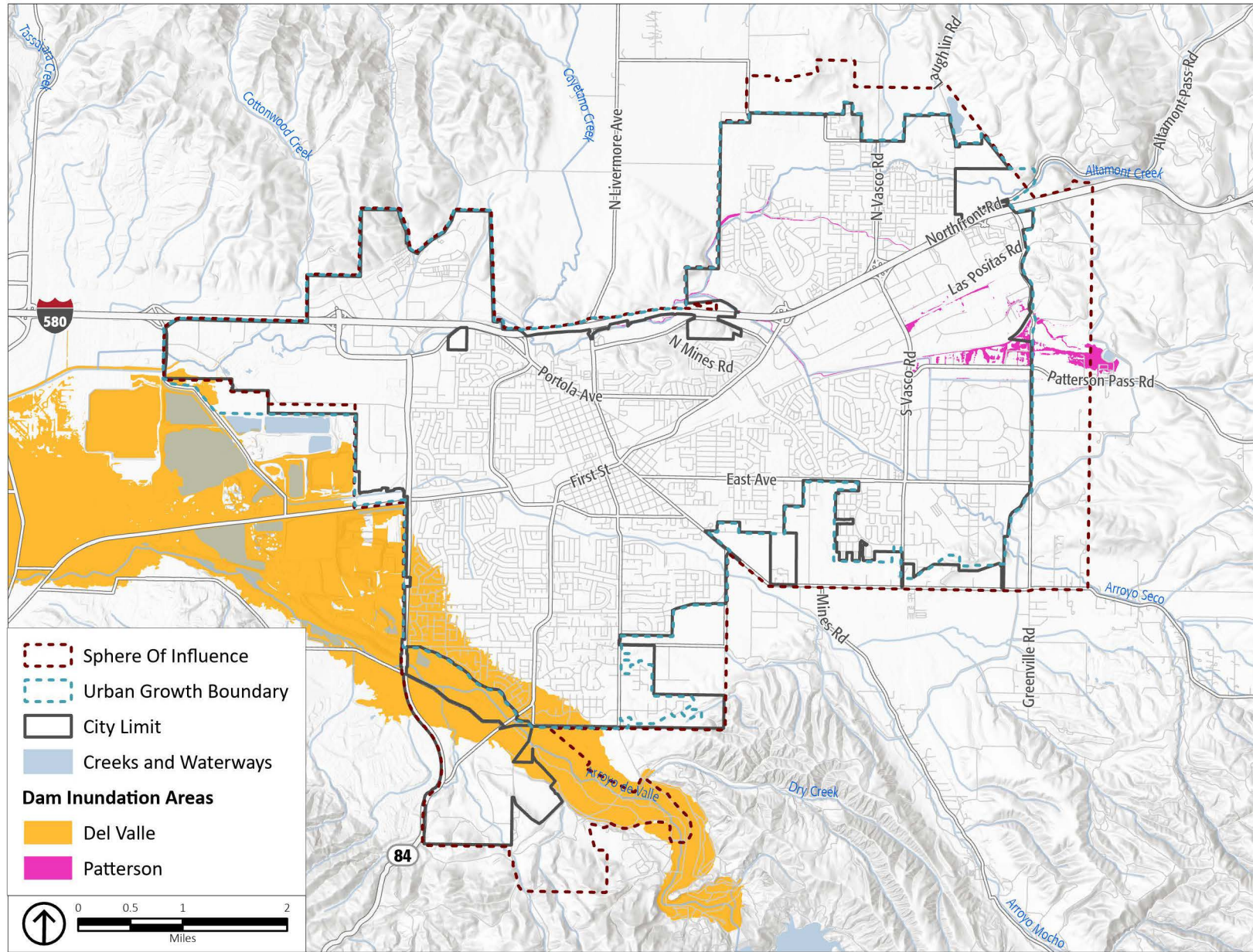
On the current digital FIRM for the EIR Study Area, large portions of the EIR Study Area are labeled Zone X (unshaded) – outside the 500-year floodplain, and only small portions are in the 100-year floodplain. According to the effective 2009 FEMA Flood Insurance Study for Alameda County, the principal flooding problems in the EIR Study Area occur during the winter (FEMA 2018). Storm runoff is concentrated rapidly by the network of tributaries that discharge through the hills into the major streams. The tributaries have carved well-defined courses through the hills, but upon reaching the flat Livermore Valley, the channels become shallow and inadequate at various stream reaches for containing the flow from infrequent but high-volume storms. Constriction of Arroyo Seco flows at the Western Pacific and Southern Pacific Railroad crossing of the creek forces lower-frequency flood flows to spread out from these points. Another constricting hydraulic factor is a length of the channel along Arroyo Las Positas downstream from Airway Boulevard. Rapid runoff rates, inadequate channels, and constricting structures combined with the development in some floodplain areas, make the EIR Study Area susceptible to damage when large rainstorms occur (City of Livermore 2022b).

DAM INUNDATION ZONES

Some areas of the EIR Study Area are in the dam inundation zones for Del Valle Dam and Patterson Dam. The dam inundation zones are shown on Figure 3.10-4, *Dam Inundation Areas*. Patterson Dam is east of Greenville Road and north of Patterson Pass Road. The Del Valle Dam is approximately 2.5 miles south of the EIR Study Area. Both dams are owned and operated by DWR and used for water storage. The dams are regulated by DWR's Division of Safety of Dams (DSOD). Del Valle Dam is classified as an extremely high hazard dam due to the DSOD Downstream Hazard Classification guidelines (DWR 2021). Patterson Dam is classified as a high hazard dam, which is expected to cause loss of at least one human life. There are no State or local restrictions for development in dam inundation zones. However, each dam owner is required to prepare an Emergency Action Plan (EAP) and coordinate its response to a dam break with local authorities. The EAP is required to include warning and notification procedures that typically involve the Standard Emergency Management System, the Alameda County Sheriff's Office, county, and Livermore's Emergency Operations Center (City of Livermore 2022b).

TSUNAMI AND SEICHES

A tsunami is a series of traveling ocean waves generated by a rare, catastrophic event, including earthquakes, submarine landslides, and submarine or shoreline volcanic eruptions. Tsunamis can travel over the ocean surface at speeds of 400 to 500 miles per hour or more, and wave heights at the shore can range from inches to 50 feet. Factors influencing the size and speed of a tsunami include the source and magnitude of the triggering event, as well as off-shore and on-shore topography. The EIR Study Area is approximately 18 miles from San Francisco Bay and is not susceptible to inundation by tsunamis or other coastal hazards such as sea level rise.



Source: Department of Water Resources, 2021; City of Livermore, 2022.

Figure 3.10-4
Dam Inundation Areas

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A seiche is an oscillation wave generated in a closed or partially closed body of water, which can be compared to the back-and-forth sloshing in a bathtub. Seiches can be caused by winds, changes in atmospheric pressure, underwater earthquakes, tsunamis, or landslides into the water body. Bodies of water such as bays, harbors, reservoirs, ponds, and swimming pools can experience seiche waves up to several feet in height during a strong earthquake. There are no large bodies of water in the EIR Study Area that could trigger a seiche. Seismic activity at either Patterson Reservoir or Del Valle Reservoir could result in a wave that overtops the dams without causing dam failure. However, it is unlikely that flooding resulting from a seiche at either dam would reach the EIR Study Area (City of Livermore 2022b).

3.10.3 Standards for Analysis

Significance Criteria

Appendix G, *Environmental Checklist Form*, of the CEQA Guidelines states that the proposed Project would result in a significant impact related to hydrology if it would:

- a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - i) Result in a substantial erosion or siltation on- or off-site.
 - ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.
 - iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
 - iv) Impede or redirect flood flows.
- d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

3.10.4 Project Impact Analysis

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less than significant. Future activities would be required to comply with the SWRCB CGP (Order WQ-2022-0057-DWQ). The SWRCB mandates that projects that disturb one or more acres of land must obtain coverage under the CGP. The CGP also requires that prior to the start of construction activities, the project applicant must file PRDs with the SWRCB, which includes notice of intent, risk assessment, site map, annual fee, signed certification statement, and SWPPP. A SWPPP requires the incorporation of BMPs to control sediment, erosion, and hazardous materials contamination of runoff during construction and prevent contaminants from reaching receiving water bodies. The construction contractor is always required to maintain a copy of the SWPPP at the site and implement all construction BMPs identified in the SWPPP during construction activities. Prior to the issuance of a grading permit, the project applicant is required to provide proof of filing of the PRDs with the SWRCB, which includes preparation of a SWPPP. Categories of potential BMPs that would be implemented are described in Table 3.10-2, *Construction Best Management Practices to Prevent Erosion*.

Table 3.10-2 Construction Best Management Practices to Prevent Erosion

Category	Purpose	Examples
Erosion Controls and Wind Controls	<ul style="list-style-type: none"> ▪ Use project scheduling and planning to reduce soil or vegetation disturbance (particularly during the rainy season) ▪ Prevent or reduce erosion potential by diverting or controlling drainage ▪ Prepare and stabilize disturbed soil areas 	Scheduling, preservation of existing vegetation, hydraulic mulch, hydroseeding, soil binders, straw mulch, geotextile and mats, wood mulching, earth dikes and drainage swales, velocity dissipation devices, slope drains, streambank stabilization, compost blankets, soil preparation/roughening, and non-vegetative stabilization
Sediment Controls	<ul style="list-style-type: none"> ▪ Filter out soil particles that have been detached and transported in water 	Silt fence, sediment basin, sediment trap, check dam, fiber rolls, gravel bag berm, street sweeping and vacuuming, sandbag barrier, straw bale barrier, storm drain inlet protection, manufactured linear sediment controls, compost socks and berms, and biofilter bags

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Table 3.10-2 Construction Best Management Practices to Prevent Erosion

Category	Purpose	Examples
Wind Erosion Controls	<ul style="list-style-type: none"> ▪ Apply water or other dust palliatives to prevent or minimize dust nuisance 	Dust control soil binders, chemical dust suppressants, covering stockpiles, permanent vegetation, mulching, watering, temporary gravel construction, synthetic covers, and minimization of disturbed area
Tracking Controls	<ul style="list-style-type: none"> ▪ Minimize the tracking of soil off site by vehicles 	Stabilized construction roadways and construction entrances/exits, and entrance/outlet tire wash
Non-Stormwater Management Controls	<ul style="list-style-type: none"> ▪ Prohibit discharge of materials other than stormwater such as discharges from the cleaning, maintenance, and fueling of vehicles and equipment ▪ Conduct various construction operations, including paving, grinding, and concrete curing and finishing, in ways that minimize non-stormwater discharges and contamination of any such discharges 	Water conservation practices, temporary stream crossings, clear water diversions, illicit connection/discharge, potable and irrigation water management, and the proper management of the following operations: paving and grinding, dewatering, vehicle and equipment cleaning, fueling and maintenance, pile driving, concrete curing, concrete finishing, demolition adjacent to water, material over water, and temporary batch plants
Waste Management and Controls (i.e., good housekeeping practices)	<ul style="list-style-type: none"> ▪ Manage materials and wastes to avoid contamination of stormwater 	Stockpile management, spill prevention and control, solid waste management, hazardous waste management, contaminated soil management, concrete waste management, sanitary/septic waste management, liquid waste management, and management of material delivery storage and use

Source: Compiled by PlaceWorks from information provided in the California Stormwater Quality Association's Construction Best Management Practices Handbook.

Submittal of the PRDs and implementation of the SWPPP throughout the construction phase of development would reduce pollutants of concern from construction activities from entering waterbodies.

The ACCWP C.3 Stormwater Technical Guidance Manual provides guidance to applicants for new development and redevelopment projects to ensure compliance with stormwater management regulations established by the State of California and the San Francisco Bay RWQCB and includes post-construction requirements and resources, including BMPs for stormwater pollution prevention, erosion control, LID treatment measures, and hydromodification requirements. Future projects would be subject to the City's inspection program, as part of ACCWP, to ensure local businesses implement BMPs to minimize stormwater pollution. BMPs consist of simple, cost-effective operational and maintenance measures designed to reduce pollutants such as litter, grease, oil, and sediment from entering the storm drain system (City of Livermore 2025). All businesses can adopt routine practices to minimize runoff contamination, while certain industries require tailored approaches. Automotive and industrial facilities must properly handle waste and may be subject to the State's Industrial General Permit. Mobile businesses, such as car detailers and carpet cleaners, must ensure that wash water is properly contained and not discharged into storm drains, and schools can help protect water quality by implementing BMPs for cleaning, landscaping, and construction activities and by avoiding car wash fundraisers that allow dirty wash water to enter storm drains. In addition, CALGreen requires source controls for outdoor material storage areas, outdoor trash storage/waste handling areas, outdoor loading/unloading dock areas, and building materials areas to improve water quality. Source controls would also include storm drain messages and signage and beneficial landscape irrigation practices. Collectively, these practices help reduce pollutants that flow into waterbodies.

Future projects would also be required to comply with the provisions of LMC Chapter 13.45, which prohibits pollutants from entering storm drains, regulates activities that can cause pollution, and requires adherence to State and federal regulations. Key aspects include prohibitions on dumping refuse; a requirement for construction sites to have a SWPPP; and an emphasis on pollution prevention through source control, site design, and public education. The program is part of California's broader efforts to comply with federal and State mandates to protect water quality through the NPDES. Compliance with NPDES and MS4 permits for future development, as well as successful implementation of site-specific SWPPP features, would reduce the potential for pollution from incidental spills of vehicle oils and other chemicals that can be conveyed by storm and landscape irrigation flows during operation. LMC Section 13.45.090, *Construction*, states that any construction contractor performing work in the city shall provide filter materials at the catch basin to retain any debris and dirt flowing into the City's storm sewer system. The City Engineer and/or Water Resources Manager may establish controls on the volume and rate of stormwater runoff from new developments and redevelopments as may be appropriate to minimize the discharge and transport of pollutants.

Furthermore, the Infrastructure (INF) Element, Open Space and Conservation (OS) Element, and Implementation Plan of the proposed General Plan 2045 contain the following goals and policies that are designed to protect water quality:

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- **Goal INF-4:** Collect and convey stormwater in ways that are safe, sanitary, environmentally acceptable, and financially sustainable.
 - **Policy INF-4.2: Storm Drainage Studies.** Require new development and major redevelopment projects to evaluate how stormwater runoff will affect local and regional drainage and flood systems. Projects must include plans for detention and drainage facilities to prevent increased flood risk.
 - **Policy INF-4.3: Impervious Surfaces.** Minimize impervious surfaces in new development and integrate green infrastructure to assist in stormwater management.
 - **Policy INF-4.4: Green Stormwater Infrastructure on City Property.** Install green infrastructure and other natural stormwater management infrastructure on City property and at City facilities, as appropriate.
- **Goal OS-3:** Protect Livermore’s groundwater resources, waterways, tributaries, and associated riparian habitats.
 - **Policy OS-3.1: Water Quality.** Maintain and improve the quality and quantity of Livermore’s surface water, groundwater, and groundwater recharge areas.
 - **Policy OS-3.2: Waterway Maintenance and Improvement.** Maintain and enhance Livermore’s creeks, arroyos, and wetlands in as natural a state as possible to reduce erosion, improve water quality, preserve habitat, and increase resilience to climate change. Coordinate with Zone 7 Water Agency and other partners to implement nature-based solutions that support flood protection and stormwater management, ecological function, and public safety.
 - **Policy OS-3.3: Runoff Regulation.** Regulate runoff from urban uses to protect the quality of surface water and groundwater.
 - **Policy OS-3.4: Groundwater Management and Protection.** Continue to work with the Zone 7 Water Agency and other regional partners to support the sustainable management, protection, and recharge of the Livermore Valley Groundwater Basin, addressing aquifer nutrient loading, monitoring groundwater quality, and contributing to the implementation of regional groundwater management.

Specifically, proposed Policies INF-4.3 and INF-4.4 encourage minimizing impervious surfaces and installation of green stormwater infrastructure and other natural stormwater management infrastructure. Proposed Policies OS-3.1 and OS-3.3 would require the City to maintain and improve water quality by regulating runoff from urban uses. Proposed Actions INF-A-4.1 and OS-A-3.1 would further support these policies by installing green stormwater infrastructure to reduce runoff and improve water quality and coordinating with other agencies to study areas potentially suitable for groundwater recharge.

Compliance with State and local regulations, including the SWRCB CGP, the City’s BMPs, CALGreen, the LMC, and the proposed General Plan 2045 goals and policies would ensure that future development does not violate water quality standards or waste discharge requirements.

Implementation of a SWPPP and construction BMPs would minimize pollutant discharges from soil disturbance and construction activities, while operational BMPs would reduce long-term pollutant loading from urban runoff. As such, the proposed project would result in a **less-than-significant** impact relative to water quality.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than significant. As described in Section 3.10.2, *Existing Conditions*, the EIR Study Area uses groundwater from the Livermore Valley Groundwater Basin for its public water supply. As detailed in Section 3.17, *Utilities and Service Systems*, there are sufficient water supplies available to meet all future demands, including the projected buildout allowed under the proposed Project. Additional information on water demand and supply is provided in Section 3.17, *Utilities and Service Systems*.

Should construction dewatering be required during the excavation or grading phases of future development, the extracted groundwater can be reused on site for dust control, soil compaction, or irrigation, or it can be retained on site in a temporary sediment pond for infiltration and evaporation. If dewatering wells are required, a permit must be obtained from the Zone 7 Water Agency. Discharge of extracted groundwater to the sanitary sewer would require a permit from the City's Water Resources Division (Sewer Section) and may require sampling and monitoring. Discharge of the extracted groundwater to the storm drain may require a site-specific NPDES permit from the San Francisco Bay RWQCB or it may be covered under the general NPDES permit. However, both the discharged groundwater and receiving water body would require sampling and monitoring with the results routinely reported to the RWQCB (City of Livermore 2022b).

Pursuant to the regional MS4 Permit, future development would be required to comply with stormwater permit requirements under Provision C.3, which regulates the use of infiltration-based stormwater treatment systems to maintain appropriate groundwater recharge without causing adverse effects. These measures would minimize the impact of impervious areas and increase the potential for groundwater recharge by including pervious pavements and drainage to landscaped areas and retention/detention areas in new development projects.

Future development would be required to comply with LMC Chapter 13.25 and implement the water-efficient requirements specified in the CALGreen and California Plumbing Codes and the MWELO requirements for water-efficient landscaping outlined in LMC Chapter 13.25. Residential, commercial, and industrial water usage can be expected to decrease in the future because of the implementation of water conservation practices through the extensive programs offered by the local water agencies. Future development that meets the criteria under California Water Code Section 10912 would be required to prepare a Water Supply Assessment that

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demonstrates that project water demands would not exceed water supplies, which would include an evaluation of potential impacts to groundwater supplies, as applicable.

Additionally, the same proposed General Plan 2045 goals and policies from the Open Space and Conservation (OS) Element identified under impact discussion (a) would also serve to maximize infiltration and rainwater retention and minimize impacts to groundwater recharge. Specifically, proposed Policy OS-3.1 would require the City to maintain and improve the quality and quantity of groundwater and groundwater recharge areas. Proposed Policy OS-3.4 would require the City to coordinate with relevant agencies to support the sustainable management, protection, and recharge of the Livermore Valley Groundwater Basin and study areas potentially suitable for groundwater recharge to inform planning and land use development decisions.

In summary, the proposed Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge, such that it may impede sustainable groundwater management of the basin. Compliance with the LMC, requirements for new construction and water-efficient landscaping, and the proposed General Plan 2045 goals and policies would result in a **less-than-significant** impact on groundwater recharge.

-
- c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i) result in a substantial erosion or siltation on- or off-site; ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows.**
-

Less than significant.

Erosion and Siltation

Future development would be required to implement construction- and post-construction BMPs consistent with the SWRCB CGP and the regional MS4 Permit. Projects that disturb one acre or more would be required to prepare and implement a SWPPP that identifies erosion control and pollution prevention measures to protect water quality. The implementation of the BMPs during the construction phase would include the following measures to minimize erosion and siltation:

- Minimize disturbed areas of the site.
- Install on-site sediment basins to prevent off-site migration of erodible materials.
- Implement dust control measures such as silt fences and regular watering of open areas.
- Stabilize construction entrances/exits.

- Install storm drain inlet protection measures.
- Install sediment control measures around the site, including silt fences or gravel bag barriers.

LMC Chapter 13.45 includes additional provisions to minimize erosion and maintain the integrity of watercourses. Section 13.45.120, *Watercourse Protection*, requires property owners to maintain watercourses in a manner that prevents erosion, blockages, and loss of flow capacity. Activities that could alter natural flows, modify channels, or introduce materials near banks are prohibited without written authorization from the Water Resources Manager. In addition, LMC Section 13.45.090 requires contractors to install filter materials at catch basins to prevent debris and sediment from entering the storm drain system and authorizes the City Engineer or Water Resources Manager to establish controls on stormwater runoff volume and rate as necessary to minimize pollutant discharges.

Furthermore, the proposed General Plan 2045 goals and policies identified under impact discussion (a), in addition to the following goal and policies from the Safety (S) Element, are designed to reduce erosion and siltation:

- **Goal S-6:** Reduce impacts from geologic and seismic hazards.
 - **Policy S-6.7: Erosion and Slope Failure.** Prohibit construction in areas with severe erosion (slopes over 10 percent), as mapped by the US Department of Agriculture's Natural Resources Conservation Service, and in areas susceptible to slope failure, unless it can be clearly demonstrated through geotechnical engineering analysis that the project will not contribute to increased erosion, sedimentation, or runoff.
 - **Policy S-6.8: Erosion Prevention.** Require developers to implement control site preparation procedures and construction phasing to reduce erosion and exposure of soils to the maximum extent possible.
 - **Policy S-6.9: Development on Expansive Soils.** Require geotechnical evaluations for development in areas with expansive soils. Where such soils are present, require appropriate mitigation measures, such as specialized site grading, foundation design, and construction techniques (erosion and sediment-control best management practices [BMPs]) to minimize risk of structural damage. In foothill areas, require additional site-specific design measures to address topographic and soil movement concerns.

Specifically, proposed Policy S-6.8 would require developers to implement control site preparation procedures and construction phasing that would reduce erosion and exposure of soils to the maximum extent possible. Proposed Policy S-6.7 and S-6.9 would require geotechnical engineering analysis to ensure that projects in areas with severe erosion or expansive soils would not contribute to increased erosion, sedimentation, or runoff.

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Flooding On or Off Site

Future development would be required to comply with the requirements of the regional MS4 Permit. Specifically, future development would be required to implement LID BMPs and site design BMPs in accordance with ACCWP C.3 Stormwater Technical Guidance Manual. These measures would effectively minimize imperviousness, retain or detain stormwater on site, decrease surface water flows, and slow runoff rates. Future development would also be subject to LMC Chapter 16.12, which minimizes public and private losses due to flood conditions in specific areas, and LMC Chapters 13.25 and 13.26, which establishes water efficient design standards and water conservation measures. By incorporating these measures, the proposed Project would not substantially alter existing drainage patterns or increase the rate or amount of surface runoff in a manner that would result in flooding on or off site. Projects that create and/or replace one acre of impervious surface must also adhere to the hydromodification requirements of the MS4 Permit and the ACCWP document to ensure that post-project runoff does not exceed pre-project runoff for 10 percent of the 2-year to 10-year peak flow rates. Adherence to these regulatory requirements would minimize the amount of stormwater runoff from new development and redevelopment in the EIR Study Area.

Furthermore, the proposed General Plan 2045 goals and policies identified under impact discussion (a), in addition to the following goal and policies from the Infrastructure (INF) Element, are designed to minimize stormwater runoff:

- **Goal INF-4:** Collect and convey stormwater in ways that are safe, sanitary, environmentally acceptable, and financially sustainable.
 - **Policy INF-4.1: Storm Drainage Design.** Design public storm drainage improvements to carry appropriate design-year flows to accommodate large storm events, including those exacerbated by climate change, and plan for future buildout.
 - **Policy INF-4.5: Stream Modification.** Allow stream modifications when necessary to contain flood flows. Modifications shall enhance and/or restore creek natural habitat while providing stormwater management.
 - **Policy INF-4.6: Regional Flood Protection and Stormwater Maintenance Coordination.** Collaborate with Zone 7 and other responsible agencies to maintain and improve the regional flood protection system, including the upkeep of creeks, arroyos, and other stormwater infrastructure under their jurisdiction.

Specifically, proposed Policy INF-4.1 and INF-4.6 requires the City to design public storm drainage improvements to carry appropriate design-year flows and coordinate with Zone 7 and other responsible agencies to maintain and improve the regional flood protection system. Proposed Policies INF-4.3 and INF-4.4 encourage minimizing impervious surfaces and installation of green stormwater infrastructure to reduce runoff. Proposed Policy INF-4.2 would require future development to evaluate how stormwater runoff would affect local and regional

flood systems and requires projects to include plans for detention and drainage facilities to prevent increased flood risk.

Stormwater Drainage System Capacity

Future development that includes the creation and/or replacement of 2,500 square feet or more of impervious surfaces would trigger the implementation of site design measures to reduce stormwater runoff, pursuant to the regional MS4 Permit requirements. Further, as previously stated, future development would be required to incorporate ACCWP's LID measures and hydromodification requirements, which would minimize the amount of stormwater runoff from new development and redevelopment sites in the EIR Study Area. During the construction phase, projects would be required to prepare SWPPPs, thus limiting the discharge of pollutants from the site. During operation, projects would implement BMPs and LID measures that would minimize the amount of stormwater runoff and associated pollutants.

In addition, LMC Chapter 13.46 establishes a dedicated fund to support the City's stormwater management and discharge control program, including system operation, maintenance, NPDES compliance, and capital improvements. The fund is financed through grants, reimbursements, and service charges assessed to property owners based on parcel size, land use, and runoff potential, with exemptions for parcels generating no runoff. Charges are collected by Alameda County, with penalties and interest applied to delinquent payments, ensuring stable funding for ongoing stormwater management and flood control activities. This would minimize the amount of stormwater runoff from new development and redevelopment sites in the EIR Study Area.

Furthermore, the same proposed General Plan 2045 goals and policies from the Infrastructure (INF) Element, Open Space and Conservation (OS) Element, and Implementation Plan identified under impact discussion (a) and previously in this impact discussion would ensure adequate stormwater management avoiding exceedances of the drainage system capacity by maximizing the on-site infiltration capacity for new development and minimizing off-site water runoff. Specifically, proposed Policy INF-4.2 would require future development to evaluate how stormwater runoff will affect local and regional drainage systems. Proposed Policies INF-4.3 and INF-4.4 encourage minimizing impervious surfaces and installation of green stormwater infrastructure to reduce runoff.

Redirecting Flood Flows

As shown in Figure 3.10-3, there are areas of the EIR Study Area that are in 100-year flood zones. The previous discussion regarding on- and off-site flooding is also applicable to the analysis of impeding or redirecting flood flows. Because new development projects are required to comply with existing regulations, including the provisions of the regional MS4 Permit, which requires the retention of stormwater on site via the use of retention/detention facilities, peak stormwater flow rates would be attenuated, which would minimize the potential for flooding

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impacts. Impact discussion (d) describes the potential for impeding or redirecting flood flows related to development in areas in the 100-year floodplain and/or dam inundation zone.

Summary

Through compliance with existing State and local regulations and BMPs, as well as implementation of the proposed General Plan 2045 goals and policies, development would not result in substantial erosion, siltation, or flooding on or off site; create or contribute runoff water which would exceed capacity of stormwater drainage systems; or impede or redirect flood flows. Therefore, this impact would be **less than significant**.

d) In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

Less than significant.

Tsunami and Seiche Zones

The EIR Study Area is approximately 18 miles from San Francisco Bay and is not susceptible to inundation by tsunamis or other coastal hazards such as sea level rise. There are no large bodies of water with the EIR Study Area that could trigger a seiche. Seismic activity at either Patterson Reservoir or Del Valle Reservoir could result in a wave that overtops the dams without causing dam failure. However, it is unlikely that flooding resulting from a seiche at either dam would reach the EIR Study Area (City of Livermore 2022b).

Flood Hazard Zones

As shown in Figure 3.10-3, a small portion of the western portion of the EIR Study Area is in the 100-year floodplain. There are also other areas throughout the EIR Study Area in the 100-year floodplain that have land use designations, which could result in future construction and new buildings in these areas.

Future development in 100-year flood zones would be subject to the floodplain requirements listed in LMC Chapter 16.12, which minimizes public and private losses due to flood conditions in specific areas. Section 16.12.090, *Development permit – Required*, states that a development permit shall be required and shall be obtained before construction or development begins in any area of special flood hazard. In addition, it shall be the responsibility of the developer to apply for and receive all necessary approvals from FEMA and any other agency to remove a project from a floodway or special flood hazard area. The developer shall pay all fees and undertake all the necessary studies to satisfy FEMA requirements. The City will consider the developer's obligations complete when the City has received a revised map or letter from FEMA. The City shall not issue any permit or occupancy certificate until such obligations are complete. Compliance with LMC requirements would reduce potential flood hazards and ensure

that pollutants are not released during flood inundation. Additionally, the Tri-Valley LHMP includes hazard mitigation alternatives to help reduce the risk of damage or injury from floods. These actions include building new homes above base flood elevation, providing floodproofing when new critical infrastructure must be located in floodplains, and hardening infrastructure and a bridge replacement program.

In addition to compliance with existing regulations, the Safety (S) Element of the proposed General Plan 2045 contains the following goal and policies that are designed to address potential impacts related to flood hazards:

- **Goal S-7:** Minimize flood risks to people, property, and critical infrastructure.
 - **Policy S-7.1: Climate Resilience to Flooding.** Strengthen community resilience to flooding by integrating climate adaptation strategies into stormwater management, land use planning, infrastructure investment, and emergency preparedness to reduce risks to people, property, and infrastructure.
 - **Policy S-7.2: Floodway Protection.** Limit modifications to designated floodways for the purpose of accommodating new development unless modification restores creek capacity, stabilizes banks, or improves habitat and water quality.
 - **Policy S-7.3: Development in Flood Zones.** New development in the 100-year flood zone must avoid obstructing flood flows, increasing erosion, flood risks, pollutant loads, or degrading water quality. Design development to improve community safety, flood protection, and stormwater management, ensuring clear and reliable emergency access, and minimizing public costs associated with emergency response and infrastructure maintenance.
 - **Policy S-7.4: Critical Facilities in Flood Zones.** Prohibit the construction of new critical facilities in the 100-year flood zone, except for flood-control infrastructure.
 - **Policy S-7.5: Flood-Resilient Infrastructure.** Require new public and private service facilities in flood zones to be floodproofed to or above the base flood elevation, including required freeboard, as determined on a project-specific basis.
 - **Policy S-7.6: Essential Facility Integrity.** Ensure essential public facilities maintain structural and operational integrity during and after flood events.
 - **Policy S-7.7: Climate Informed Design.** Incorporate the best-available climate science into flood risk assessments, infrastructure design, and land use decisions such as projections for increased rainfall, storm frequency, floodplain shifts, and long-term impacts on erosion and groundwater.
 - **Policy S-7.8: Regional Flood Coordination.** Coordinate with Alameda County and Tri-Valley jurisdictions to identify regional flood risks, implement mitigation strategies, and expand participation in programs such as Living Arroyos.
 - **Policy S-7.9: Emergency Flood Preparedness.** Collaborate with regional partners to coordinate shelter logistics, emergency supplies, and post-flood recovery resources.

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- **Policy S-7.10: Storm Drain Risk Mitigation.** Consider the risk of storm drain blockage when reviewing development proposals in flood-prone areas.
- **Policy S-7.11: Creek Restoration.** Pursue opportunities for creek restoration and flood resilience projects to support long-term risk reduction and ecosystem health.

Specifically, proposed Policy S-7.3 would require new development in the 100-year flood zone to avoid obstructing flood flows, increasing erosion, flood risks, pollutant loads, or degrading water quality, and proposed Policy S-7.2 would limit modifications to designated floodways for the purpose of accommodating new development. Proposed Policies S-7.4 and S-7.5 would prohibit the construction of new critical facilities in the 100-year flood zone and require new public and private service facilities in flood zones to be floodproofed to or above the base flood elevation. Proposed Policies S-7.8 and S-7.9 would require collaboration with regional partners to identify and mitigate regional flood risks and coordination for post-flood recovery resources.

Dam Inundation Zones

The inundation zones for the Del Valle Dam and Patterson Dam include a small portion of the EIR Study area to the southwest and scattered areas in the northeast of the EIR Study Area. Del Valle Dam is classified as an extremely high hazard dam due to the DSOD Downstream Hazard Classification guidelines (DWR 2021). Patterson Dam is classified as a high hazard dam, which is expected to cause loss of at least one human life. However, dam owners are required to maintain EAPs that include procedures for damage assessment and emergency warnings. An EAP identifies potential emergency conditions at a dam and specifies preplanned actions to help minimize property damage and loss of life should those conditions occur. EAPs contain procedures and information that instruct dam owners to issue early warning and notification messages to downstream emergency management authorities such as the Livermore Emergency Management and local fire departments. The County's emergency notification procedures are included in the Tri-Valley LHMP. The Tri-Valley LHMP also includes hazard mitigation alternatives to help reduce the risk of damage or injury from dam failure hazards. These actions include elevating homes to appropriate levels, flood-proofing facilities in dam failure inundation areas, and retrofitting critical facilities in dam failure inundation areas.

In addition to compliance with existing regulations, the Safety (S) Element of the proposed General Plan 2045 contains the following goal and policies that are designed to address potential impacts related to dam inundation hazards:

- **Goal S-8:** Minimize risks associated with potential failure of Del Valle and Patterson Dams.
 - **Policy S-8.1: Evacuation Plan for Inundation Areas.** Review the evacuation plan for dam inundation areas in the local hazard mitigation plan and emergency operations plan, as periodically amended, to ensure it is accurate and up to date.

- **Policy S-8.2: Funding for Dam Inspections.** Work with the California Department of Water Resources to ensure that adequate funding is allocated for inspections of Del Valle and Patterson Dams, and that inspections and required maintenance are being carried out.
- **Policy S-8.3: Disaster Relief for Inundation.** Partner with Alameda County to prepare and maintain a disaster relief plan that addresses potential flood inundation from dam failure in the areas below the Del Valle Reservoir and the Patterson Dam (shown on Figure S-9 [of the General Plan]).

Specifically, proposed Policy S-8.1 would ensure that the evacuation plan or dam inundation areas are accurate and up to date. Proposed Policy S-8.2 would ensure there is adequate funding for the inspections of Del Valle and Patterson dams and ensure that required maintenance is being carried out.

Summary

Future development would be subject to the requirements of the LMC and the Tri-Valley LHMP, among other existing, applicable regulations, which would reduce the risks of inundation. Furthermore, as previously described, in coordination with the city, DWR is responsible for maintaining flood protection features in the EIR Study Area. Additionally, all future development would be evaluated on a project-by-project basis to assess impacts related to risk of pollutant release associated with flooding and inundation and would be required to address those impacts through compliance with applicable regulations. Furthermore, future projects would be required to comply with the proposed General Plan 2045 policies described previously. Therefore, the risk of release of pollutants during inundation would be **less than significant**.

e) **Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?**

Less than significant. Groundwater in the EIR Study Area is primarily sourced from the Livermore Valley Groundwater Basin. On June 27, 2024, DWR announced that it approved the update to Zone 7 Water Agency's groundwater management plan (Alternative GSP). DWR determined that Livermore Valley Groundwater basin continues to be managed sustainably to meet the requirements of SGMA.

Section 3.17, *Utilities and Service Systems*, evaluates the increase in water demand associated with implementation of the proposed Project and determines that there are sufficient water supplies available to meet all current and future demands. Therefore, the proposed Project would not conflict with or obstruct the groundwater management plans.

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Adherence to existing regulatory frameworks, including the SWRCB CGP, regional MS4 Permit, and LMC, would ensure that both surface and groundwater quality are protected during construction and ongoing development of future projects. The CGP requires preparation of a SWPPP, which incorporates BMPs to control sediment, erosion, and hazardous materials contamination of runoff during construction. Pursuant to the regional MS4 Permit, future development would be required to comply with stormwater permit requirements under Provision C.3, which regulates the use of infiltration-based stormwater treatment systems to maintain appropriate groundwater recharge without causing adverse effects. Future development would be required to comply with LMC Chapter 13.25 and implement the water-efficient requirements specified in the CALGreen and California Plumbing Codes and the MWEL requirements for water-efficient landscaping outlined in LMC Chapter 13.25.

In addition, the same proposed General Plan 2045 goals and policies from Open Space and Conservation (OS) Element identified under impact discussion (a) would also support sustainable groundwater management and water quality protection. Specifically, proposed Policy OS-3.1 would require the City to maintain and improve the quality and quantity of groundwater and groundwater recharge areas. Proposed Policy OS-3.4 would require the City to coordinate with relevant agencies to support the sustainable management, protection, and recharge of the Livermore Valley Groundwater Basin and study areas potentially suitable for groundwater recharge to inform planning and land use development decisions.

As such, implementation of the proposed Project is consistent with and supports the objectives of both the San Francisco Bay RWQCB Basin Plan and the Alternative GSP. Therefore, the proposed Project would not obstruct or conflict with applicable water quality plans or GSPs, and impacts would be **less than significant**.

3.10.5 Cumulative Impact Analysis

The following discussion considers the proposed Project's potential cumulative impacts to the regional watersheds, including the Arroyo Las Positas Watershed, Arroyo Mocho Watershed, Arroyo del Valle Watershed, and Chain of Lakes Watershed (see Figure 3.10-1).

Would the project have a cumulative effect related to hydrology and water quality?

Less than significant.

Surface and Groundwater Quality

Like the proposed Project, all projects in the regional watersheds would be required to comply with local, State, and federal permit requirements and would be required to comply with City and County ordinances and policies, as well as numerous water quality regulations that control construction-related and operational discharge of pollutants into stormwater. Water quality

regulations implemented by the San Francisco Bay RWQCB take a basin-wide approach and consider water quality impairment in a regional context. For example, the SWRCB CGP establishes requirements to receiving water limitations and Basin Plan objectives, whereas the regional MS4 Permit requires all the surrounding municipalities to manage stormwater systems and be collectively protective of water quality. Future development would be required to comply with the CGP and prepare and implement a SWPPP, adhere to the regional MS4 permit, and implement appropriate BMPs. In addition, local ordinances, such as the LMC, would prohibit the discharge of pollutants from entering storm drains and regulate activities that could degrade water quality. Compliance with these overlapping regulatory requirements would minimize the potential for cumulative degradation of surface and groundwater quality.

Groundwater Recharge and Sustainable Groundwater Management

Stormwater permit requirements under Provision C.3 of the regional MS4 Permit are intended to promote groundwater recharge and limit adverse effects from increased impervious surfaces through LID design features such as infiltration measures and pervious pavements. In addition, future development would be required to comply with CALGreen and California Plumbing Code requirements, which promote water conservation and reduced potable water demand. Collectively, these measures would reduce long-term demands on groundwater resources and support sustainable groundwater management objectives.

Drainage Patterns, Runoff, and Flooding

Projects in the regional watersheds would implement structural and nonstructural source-control BMPs that reduce the potential for pollutants to enter runoff, and treatment control BMPs that would remove pollutants from stormwater. In addition, erosion and sedimentation would be minimized through implementation of construction BMPs, including grading controls, sediment basins and dust control practices. Compliance with these requirements would reduce the potential for cumulative changes in drainage patterns, increased runoff rates, erosion, or downstream flooding.

Flood Hazard, Tsunami, and Seiche Zones

Projects in the regional watersheds that may be constructed in 100-year flood zones or dam inundation zones would be mandated to comply with FEMA's National Flood Insurance Program requirements. In addition, other jurisdictions in these subwatersheds regulate development in flood zones in compliance with FEMA standards to limit cumulative flood hazard impacts. With respect to tsunami hazards, the regional watersheds are located inland and outside of mapped coastal tsunami inundation zones. Seiche hazards are typically associated with enclosed or semi-enclosed water bodies and are driven by seismic events rather than land development. Future development would not modify water bodies in a manner that would increase the potential for seiche occurrence or related impacts, and compliance with applicable building and seismic codes would further reduce risk.

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Water Quality Control Plan or Sustainable Groundwater Management Plan

Implementation of the proposed Project, along with other foreseeable development in the EIR Study Area and surrounding areas in the regional watersheds, would occur under the same established regulatory framework, as these areas are subject to similar federal, State, regional, and local water quality and groundwater management requirements. This framework includes compliance with the SWRCB CGP, the regional MS4 Permit, and applicable local ordinances (e.g., the LMC), which are designed to protect surface water and groundwater quality during both construction and long-term operation.

The CGP requires preparation and implementation of a SWPPP to control erosion, sedimentation, and potential pollutant discharges during construction. The regional MS4 Permit, including Provision C.3, regulates stormwater treatment and infiltration to protect water quality and support groundwater recharge. In addition, local regulations, CALGreen standards, California Plumbing Code provisions, and MWELo requirements promote water conservation and efficient landscape design.

Summary

Because future development in both the EIR Study Area and regional watersheds would be required to comply with similar regulatory requirements, cumulative development would be consistent with and support the objectives of the San Francisco Bay RWQCB Basin Plan and the applicable GSP. Accordingly, cumulative impacts related to hydrology and water quality would be **less than significant** and not cumulatively considerable.

3.10.6 References

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