3.7 HYDROLOGY AND WATER QUALITY

This section describes the potential impacts of the Avila Ranch Development Project (Project) – including the realignment of Tank Farm Creek – on flooding, water quality, and other drainage conditions in the Tank Farm Creek watershed. For a discussion of potential impacts to wetland and stream habitats, please refer to Section 3.4, *Biological Resources*.

Tank Farm Creek, an approximate 0.8-mile long channel bisects the 150-acre Project site diagonally and forms part of the San Luis Obispo Creek watershed.

The hydrologic analysis for this section is based on the Draft Drainage Report completed for the Project site in December 2015, Avila Ranch Vesting Tract Map (VTM), and Senate Bill (SB) 610 Water Supply Assessment (WSA) prepared by Cannon (Cannon 2015a, 2015b). The analysis built upon the watershed-wide hydrologic and hydraulic analysis that was completed for the San Luis Obispo Creek Watershed for the City of San Luis Obispo (City) and the San Luis Obispo County Flood Control District Zone 9 as part of the San Luis Obispo Creek Watershed Waterway Management Plan (WMP) (City of San Luis Obispo 2003). The analysis is also based on a review of information contained in the City's General Plan, the City's 2014 Land Use and Circulation Elements Update Environmental Impact Report (LUCE Update EIR), the Chevron Tank Farm Remediation and Development Project EIR (Tank Farm EIR), the Airport Area Specific Plan (AASP), and the Draft Avila Ranch Development Plan (December 2015; see Appendix D).

3.7.1 LUCE Update EIR

The 2014 LUCE Update EIR previously analyzed hydrology and water quality impacts at the Project site related to the adoption of the 2014 LUCE. The LUCE Update EIR noted that the Project would result in new development within the 100-year floodplain and could introduce structures in areas that could impede or redirect flood flows, would result in an increase in the amount of impervious surface throughout the Project site that could alter existing drainage patterns, would reduce groundwater percolation and recharge, would increase storm water runoff and the need for additional storm water infrastructure, and would result in an increase of point and non-point sources of contamination that could adversely affect water quality.

However, the LUCE Update EIR concluded that implementation of existing General Plan policies, LUCE Update policies, City Ordinance requirements, the City's Floodplain Management Regulations, the WMP, the Drainage Design Manual (DDM), Engineering Standards, the Stream Management and Maintenance Program, the City's Storm Water Management Plan (SWMP), the Central Coast Regional Water Quality Control Board (RWQCB) Post Construction Requirements, and state regulatory requirements would reduce impacts to a less than significant level. The LUCE Update EIR also stated that individual development, such as the Project, would be required to undergo separate environmental review, which might result in specific impacts that would require Project-specific mitigation consistent with these policies.

3.7.2 Environmental Setting

3.7.2.1 Regional Hydrology

According to the Central Coast RWQCB, the Project site is located within the San Luis Obispo Creek Hydrologic Subarea of the Estero Bay Hydrologic Unit, an area that corresponds to the coastal draining watersheds west of the Coastal Range. The Estero Bay Hydrologic Unit stretches roughly 80 miles between the Santa Maria River and the Monterey County line and includes numerous individual stream systems. Within the Estero Bay Hydrologic Unit, the San Luis Obispo Creek watershed drains approximately 84 square miles. Average seasonal precipitation in the City of San Luis Obispo is 22 inches and average seasonal precipitation throughout the County varies from 8.5 inches (at Simmler) to 25.6 inches (at San Simeon)(City of San Luis Obispo 2014).

The San Luis Obispo Creek watershed generally drains to the south-southwest via San Luis Obispo Creek where it meets the Pacific Ocean at Avila Beach. San Luis Obispo Creek originates in the Cuesta Grade area north of San Luis Obispo at an elevation of 2,200 feet above mean sea level (msl), in the western slopes of the Santa Lucia Range. The creek flows south through the City of San Luis Obispo adjacent to U.S. Highway 101 until it reaches the southern extent of the Irish Hills where it veers west to the ocean.

The Project site is located within the Tank Farm Creek watershed, which is a sub-basin of the San Luis Obispo Creek watershed. The Tank Farm Creek watershed is a two-mile long tributary that extends from the confluence of Tank Farm Creek and the East Fork of the San Luis Creek, north to the South Hills Open Space. It is bordered on the east and south by the East Fork of San Luis Obispo Creek and Acacia Creek watersheds, and on the west by the San Luis Obispo Creek watershed. The land use within the Tank Farm Creek watershed varies widely and includes undeveloped land, residential development,

commercial development, industrial development, agricultural land, and land that was part of the historic Tank Farm in the area (Cannon 2015a; for additional details on land use see Section 3.8, *Land Use and Planning*).

Flooding within the San Luis Obispo Creek system is generally caused by intense Pacific storm systems that occur during the months of December, January, February, and March. The great topographic variability of the watershed causes these systems to release large amounts of precipitation, especially along the higher ridgelines. The Irish Hills, located just southwest of the Project area and cresting at approximately 1,650 feet in elevation, can experience twice the rainfall observed in the lower portions of the watershed.

Flood Hazards

Flood zone mapping and drainage improvements are based on the probability of a certain amount of rain to fall within a particular time frame, usually 24 hours. From rainfall gauge records, the size of a storm that has a 1 percent probability of occurring in any one year within a particular watershed can be calculated. A storm with this probability is often referred to as the "100-year storm" since at least one such storm would be expected to occur in a 100-year period, and the associated overflow termed the "100-year flood." Similarly, a storm that has a 4 percent probability of occurring in any one year is referred to as the "25-year storm," and flows from this storm are called "Q25" flows or 25-year floods.

Flooding occurs in response to heavy rainfall, when creek and drainage channels overflow. Flooding may also occur in low-lying areas that have poor drainage, or when culverts become blocked, even during moderate storms. Flood severity can be increased by structures or fill placed in flood-prone areas, and increased runoff resulting from development of impervious surfaces (such as parking lots, roads, and roofs). Flooding within the San Luis Obispo Creek system is generally caused by intense Pacific storm systems that occur during the months of December, January, February, and March. The great topographic variability of the watershed causes these systems to release large amounts of precipitation, especially along the higher ridgelines.

San Luis Obispo Creek can respond very quickly to short high-intensity rainfall bursts. The San Luis Obispo Creek watershed is steep and is characterized by high magnitude, short duration floods. Floods have been a continuing problem along San Luis Obispo Creek. Significant flooding along the creek has been recorded in 1884, 1897, 1948, 1952, 1969, 1973, 1978, and 1995. In addition, many minor waterways, including Tank Farm Creek,

drain into one or more of the four major drainage features that create flood hazards in the City (i.e., San Luis Obispo Creek, Stenner Creek, Prefumo Creek, and Old Garden Creek). These minor waterways, although having relatively small drainage sheds, can also present flood hazards to lives and property, due to their steep slopes and high gradient that can lead to intense, fast moving flood events.

Water Quality

All storm drains within the City lead directly to creeks and ultimately to the Pacific Ocean. None of this storm water is treated in a municipal treatment plant before entering these water bodies. According to the Central Coast RWQCB, the two primary sources of pollutants to the watershed are uncontrolled sediment and agricultural runoff. The Central Coast RWQCB also notes that many other sources are also contributors, including pollutants from vehicles (e.g., oil, gasoline, and other fluids), trash, pharmaceuticals, and household chemicals. Infiltration and inflow in the wastewater collection system causes excessive wet weather flows and intermittent discharges to San Luis Obispo Creek of partially treated wastewater (Central Coast RWQCB 2016).

The City's Public Works, Utilities, and Community Development Departments are responsible for coordinating the implementation of the City's Storm Water Master Plan (SWMP). This comprehensive program is required under the Phase II Storm Water Regulations regulated by the State Water Resources Control Board (SWRCB), San Luis Obispo Region. The primary goal of the program is to minimize urban runoff that enters the municipal storm drain system, and carries bacteria and other pollutants into the local creeks, watershed, and to the ocean. As part of these requirements, the City has been mandated to establish a set of minimum designated Best Management Practices (BMPs) and Pollution Prevention Methods (PPMs). BMPs are steps taken to minimize or control the amount of pollutants and runoff. PPMs are strategies to eliminate the use of polluting materials, and/or not exposing potential pollutants to rainwater or other runoff.

Surface Water Quality

San Luis Obispo Creek has been designated by the Central Coast RWQCB as having present and potential beneficial uses for municipal supply; agricultural supply; groundwater recharge; recreation; wildlife habitat; warm and cold fresh water habitat; migration of aquatic organisms; spawning, reproduction, and/or early development of fish; and commercial and sport fishing. According to the Central Coast RWQCB, surface water quality in the San Luis Obispo Creek drainage system is generally considered to be good.

However, the water quality fluctuates along with seasonal changes in flow rates. In summer months, when the flows decrease, water quality decreases. Degradation of San Luis Obispo Creek water quality is generally due to municipal discharge and agricultural runoff as well as urban runoff. The San Luis Obispo Creek is on the 2010 Clean Water Act (CWA) Section 303(d) list of impaired waters for nutrients, where nitrate-nitrogen total maximum daily load (TMDL) levels exceed the Regional Water Board's Basin Plan target of 10 mg/L. As such, the use of National Pollutant Discharge Elimination System (NPDES) permits, MS4 permits, and Waste Discharge Requirements permits for irrigated lands are required (Central Coast RWQCB 2013).

Groundwater Quality

Groundwater beneath the Project site is within the San Luis Obispo Valley Sub-basin and flows toward the south/southwest, following the general gradient of surface topography. Although the recent drought condition has lowered the water table since 2001 borings, groundwater is still present at relatively shallow depths on the southwest section of the Project site. In addition, soils are generally wet at depth throughout the site (Cannon 2015a). Groundwater occurs within the alluvial sediments and the underlying weathered and fractured bedrock. Depth to groundwater in the San Luis Obispo Valley Sub-basin is estimated to be 15 to 25 feet below ground surface (bgs). The majority of recharge to the basin is from precipitation falling in the hills to the west, north, and east. Refer to Section 3.13, *Utilities*, for more discussion on groundwater supply. Groundwater quality is determined principally by the chemical nature of the sediments and rocks within which the groundwater is contained. Groundwater is typically evaluated for its chemical constituents to assess current conditions and potential beneficial uses, or to identify possible contamination sources. Chemical constituent sources can be natural (e.g., contact with mineralized rock) or human-related (e.g., pesticide or fertilizer contamination).

Groundwater within the San Luis Obispo area is considered suitable for agricultural water supply, municipal and domestic supply, and industrial use. Groundwater quality in the San Luis Obispo Groundwater Basin has been reduced in part due to the degradation of surface waters in San Luis Obispo Creek. Groundwater in the unconfined aquifers within the basin contains high levels of nitrates, iron, manganese, and organic compounds. There is no groundwater quality data available for the Project site; therefore, site-specific groundwater quality is unknown.

Wastewater Treatment and Water Quality

The City has separate sewer and storm drain systems, meaning each system of pipes in the ground is designed to accommodate either sewer or storm water flows. One set of pipes takes sanitary sewer waste to the Water Resource Recovery Facility (WRRF) while a second set carries storm water runoff from street drains directly into bioswales, detention basins, or creeks. The WRRF processes wastewater in accordance with standards set by the Regional Water Quality Control Board (RWQCB). The RWQCB issues a permit to the City under the National Pollution Discharge Elimination System (NPDES), setting standards for the discharge of treated wastewater. The standards are to protect beneficial uses of the receiving water including recreation, agricultural supply, and fish and wildlife habitat. The WRRF removes solids, reduces the amount of nutrients, and eliminates bacteria in the treated wastewater, which is then discharged into San Luis Obispo Creek and its tributaries. Solids are separated and treated to create biosolids, which are beneficially reused as compost, and/or soil amendment. The WRRF has been producing tertiary treated recycled water for non-potable reuse in the City since 2006.

Infiltration/inflow (I&I) overloads the collection system during heavy rains and can result in sanitary sewer overflows. Inflow is water that enters the collection system at points of direct connection (non-soil) such as around manhole covers or through illegal connection of roof drains, downspouts, or landscape drains. Infiltration is water that flows through the ground into the collection system usually through cracks in public sewer mains and/or private sewer laterals. During periods of significant rain events, the WRRF can become hydraulically overwhelmed, increasing the chance of effluent violations and the release of partially treated wastewater to San Luis Obispo Creek and its tributaries. See Section 3.13, *Utilities* for further details on wastewater treatment.

A 15- to 20-foot high berm separates the Chevron Tank Farm property from the northern boundary of the Project site.

3.7.2.2 Project Site Hydrology

Onsite Drainage

The 150-acre Project site is bisected by Tank Farm Creek, which flows from northeast to southwest for approximately 0.8 mile diagonally through the Project site, and is a seasonal creek and tributary to the East Fork of San Luis Obispo Creek (see Figure 3.7-1). The creek has several segments onsite and there is evidence of substantial past manipulation of drainage patterns, although exact alignment of all historic tributaries and drainages is unknown. The North-South Creek Segment, which drains into the site from properties located along Horizon Lane to the north is approximately 600 feet long, is an average of 31 feet wide (northern portion is approximately 20 feet wide), and has a total area of 17,647 square feet (sf). Based on soil conditions and surface indicators, this channel is thought to have been aligned to the east in the past, but may also represent some vestige of historic drainage. This channel runs from the northern boundary of the Project site to the confluence of the main stem of Tank Farm Creek and the East-West Chanel. The East-West Channel is a shallow agricultural ditch which is approximately 1,365 feet long, is an average of 17 feet wide, and has an area of 0.5 acres. This drainage channel runs from the eastern boundary of the Project site to join with the main stem of the Tank Farm Creek, which is the most natural channel onsite. The main stem Tank Farm Creek is an average of 28 feet wide, and has an area of 2.1 acres.

Within the Project site, Tank Farm Creek passes through an 84-inch culvert where an existing dirt road crosses Tank Farm Creek near the center of the Project site. Tank Farm Creek exits the Project site under a bridge at Buckley Road, approximately 280 feet east from the intersection of Vachell Lane and Buckley Road, and joins with the East Fork of

(Left) The 600-foot long North-South Creek Segment of Tank Farm Creek carries offsite flows entering the Project site from the northeast corner through to the natural segment of Tank Farm Creek. (Right) The 1,365-foot long East-West Channel drains offsite flows from the east and converges with Tank Farm Creek.

San Luis Obispo Creek approximately 550 feet downstream and to the southwest of the bridge (Cannon 2015a).

Overall site topography generally slopes toward the south. There is an existing berm of approximately 15 to 20 feet in height along approximately 825 feet of the northern Project site boundary with the Chevron Tank Farm property. A low ridge parallels the creek on the south side, in the southeast area of the Project site. The area north of the ridge generally slopes toward the creek and toward an existing drainage in the northeast corner of the site that connects to Tank Farm Creek via the East-West Channel. The area south of the ridge slopes toward a drainage that runs northeast to southwest toward a culvert that crosses under Buckley Road. There is a berm around the culvert outlet on the south side of Buckley Road.

Offsite Drainage

Tank Farm Creek drains approximately 630 acres north of the Project site, including the 278.5-acre Chevron Tank Farm property, and areas east of South Higuera Street, including industrial properties along Suburban Road, Earthwood Lane and Horizon Lane (see Figure 3.7-1).

Drainage from Chevron Tank Farm

To the north of the Project site is the Chevron Tank Farm property, which supports extensive areas of shallow wetlands, including approximately 140 acres of depressions that are hydrologically isolated areas that create pooling. These areas were created as a result of the historical oil storage structures and do not surface drain. All of the precipitation that falls onto these areas either evapotranspirates or infiltrates (Cannon 2015a).

To the west of the Chevron Tank Farm property is an operational gate valve, which regulates the flow of Tank Farm Creek.

Before entering the Project site, Tank Farm Creek passes through an existing headwall structure that is located approximately 950 feet upstream of the Project site on the Chevron Tank Farm property. The headwall was originally constructed as part of the oil storage operation to provide emergency containment for a catastrophic release of oil, and was constructed with two 36-inch-diameter gate valves. The channel downstream of the southern gate valve has been filled in, leaving only one of the valves operational for discharging the flows in Tank Farm Creek. Runoff from the Chevron Tank Farm property forms into drainage channels that merge into Tank Farm Creek before reaching this headwall. The headwall and operational gate valve effectively regulate much of the flow through Tank Farm Creek downstream of the structure, and cause ponding upstream of the structure in a series of three ponds on the Chevron Tank Farm property. The existing headwall and ponds can contain storms up to the 10-year event, but larger storms overtop the headwall (Cannon 2015a). After passing through the headwall, the creek flows through a concrete channel that passes under a bridge at Horizon Lane, then continues as an earthen channel until it meets the Project site at the North-South Creek Segment, approximately 210 feet southwest of Horizon Lane.

Drainage from the North/Northwest

A large portion of the area south of Tank Farm Road and east of South Higuera Street (to the north/northwest of the Project site) drains onto the Project site. The drainage in this area consists of an inlet on the south side of Tank Farm Road that discharges into three retention basins directly adjacent to the northern boundary of the Project site. These basins collect runoff from parts of Tank

Within the western portion of Chevron Tank Farm property is a retention basin and associated pump.

Farm Road, Suburban Road, and the properties that lie adjacent to them. The western-most basin includes a large water pump and lies directly south of Ernie Ball Inc. The middle basin lies directly south of Running and Tennis Warehouses. The eastern-most basin closest to Tank Farm Creek includes a culvert that drains into the Project site and is located approximately 80 feet to the northwest of the North-South Creek Segment of Tank Farm Creek.

Drainage from the West

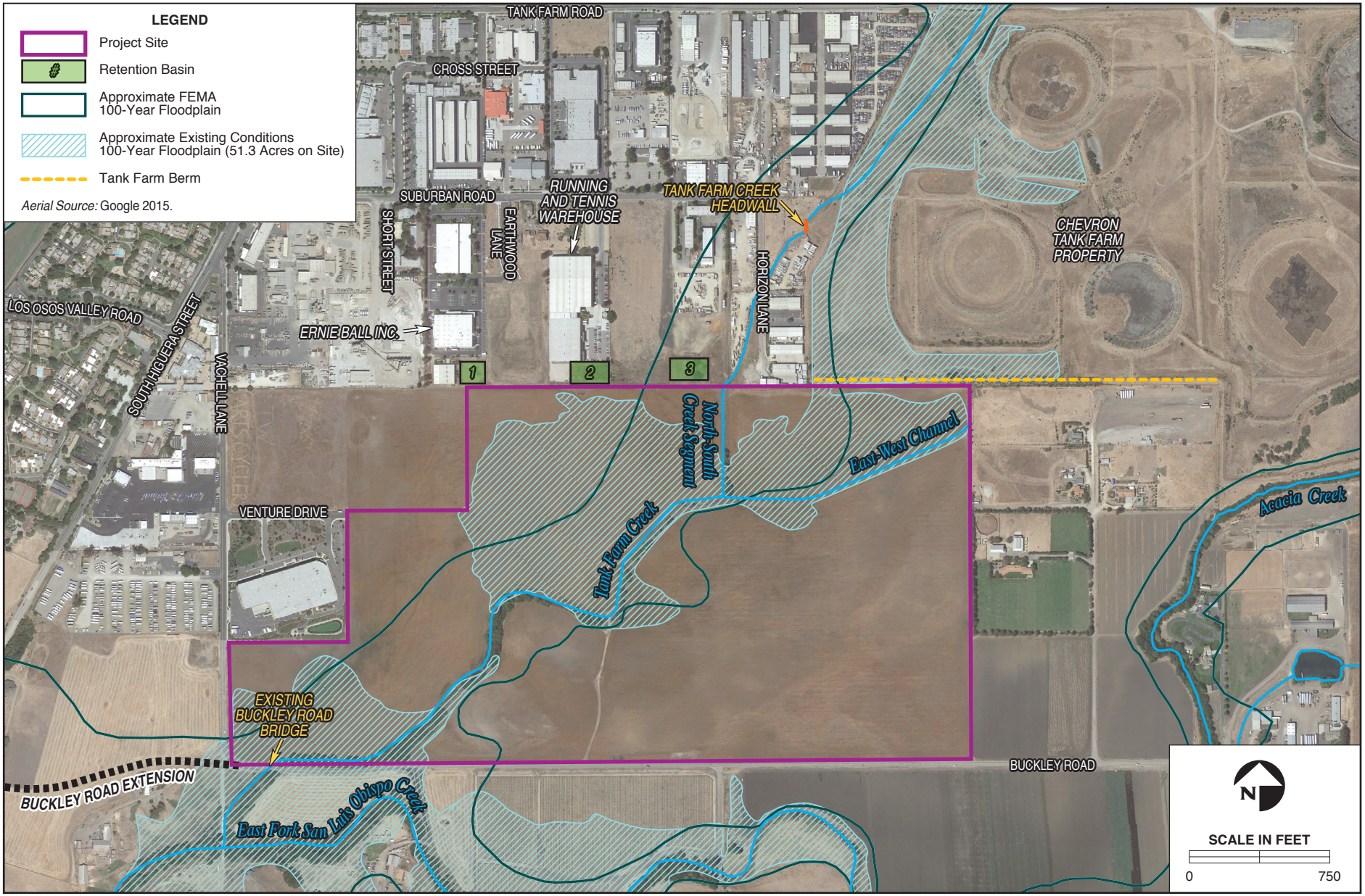
Properties adjacent to the west of the Project site, including agricultural land uses, also drain onto the site, through storm water detention ponds that discharge along the south property line of an office building.

Drainage from the East

Properties adjacent to the east of the Project site, including agricultural land uses, contribute runoff to the site as well, through the East-West Channel that enters the Project site at the northeast corner and connects to Tank Farm Creek. South of the low ridge line along Tank Farm Creek, runoff that enters the Project site flows toward Buckley Road and then along the north side of Buckley Road to Tank Farm Creek.

Buckley Road Extension Site Drainage

Approximately 200 feet of the Buckley Road Extension site falls within the 100-year floodplain. The existing site mostly consists of approximately 3 acres of permeable undeveloped surfaces such as agricultural land, with the exception of one residential structure and associated shed.



amec foster wheeler

Existing Drainage Conditions on the Project Site and Chevron Tank Farm Property and Vicinity

FIGURE 3.7-1

Peak Flows

An important component of the hydrologic analysis of a watershed is the timing of the peak flows that result from a rainfall-runoff event. Just as the precipitation event rises and falls in intensity over time, the resulting runoff, or discharge, also rises and falls over time. Climatic factors that influence the volume of runoff include: 1) rainfall intensity and pattern; 2) areal distribution of rainfall over the watershed; and 3) duration of the storm event. Physiographic factors of importance include: 1) size and shape of the drainage area; 2) nature of the stream network; 3) slope of the land and the main channel; and 4) storage detention in the watershed.

The timing of the peak flow at any given location is especially important where two streams join. Existing peak flows were estimated for Tank Farm Creek at its confluence with East Fork San Luis Obispo Creek to the south of the Project site. The hydrograph for the Tank Farm remediation area was added to the combined hydrograph for the area downstream of the Tank Farm remediation area. Existing peak flows for the Project site and its vicinity are summarized in Table 3.7-1 below (see Appendix E for hydrographs).

Table 3.7-1. Summary of Peak Flows in Project Site and Vicinity

Storm Event	Peak Flow Total (cubic feet per second [cfs])
2-year	215
10-year	460
25-year	595
50-year	689
100-year	874

Source: Cannon 2015a.

Local Flood Hazards

Approximately 50 percent of (75 acres) of the Project site includes low lying areas along Tank Farm Creek that are within Zone A of the 100-year floodplain of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06079C1331G.[1] However, the area affected by flooding for a 100-year storm under existing conditions has been modeled to be approximately 51.3 acres (Cannon 2015a; see Figure 3.7-1). Flooding has been observed in the southwest corner of the Project site during significant storm events. Figure WMP 3-2a in the City's WMP notes that there is a possibility San Luis Obispo Creek could overflow south of Prado Road and enter the Tank

[1] Zone A consists of areas of a floodplain where no base flood elevation has been determined.

Farm Creek watershed during a 50-year storm event (City of San Luis Obispo 2003). Because of site topography, flood flows that overtop the creek would pass through the Project site pond to the north of creek and East-West Channel.

Approximately 1,500 feet upstream of the confluence between Tank Farm Creek and the East Fork San Luis Obispo Creek within the Project site, 100-year base flood elevations exceed the defined banks of Tank Farm Creek. This appears to be the result of backwater conditions from peak flow through the East Fork San Luis Obispo Creek as the floodplain in this area matches the existing City HEC-RAS model results as shown in the City and County's WMP (Cannon 2015a). These flood flows reflect this backwater into and ponding on the southern portion of the Project site.

3.7.3 Regulatory Setting

3.7.3.1 Federal

Federal Clean Water Act (CWA), 33 U.S.C. 1251 et seq. (1977)

This law is the primary law regulating water pollution. Relevant sections include:

- Section 208, requiring that states develop programs to identify and control non-point sources of pollution, including runoff.
- Section 303, requiring states to establish and enforce water quality standards to protect and enhance beneficial uses of water for such purposes as recreation and fisheries.
- Section 304(a)(1), requiring the administrator of the U.S. Environmental Protection Agency (USEPA) to develop and publish water quality criteria that reflect the latest scientific knowledge regarding the effects of pollutants in any body of water.
- Section 313(a), requiring that federal agencies observe state and local water quality regulations.
- Section 405 of the Water Quality Act of 1987 added to Section 402(p) to the CWA. Pursuant to Section 402(p)(4) of the CWA, the EPA is required to promulgate regulations for NPDES permit applications for storm water discharges.
- Safe Drinking Water Act, 40 U.S.C. 100 et seq. This act sets limits on concentrations of pollutants in drinking water sources.

Federal Emergency Management Agency (FEMA)

FEMA is the federal agency that oversees floodplains and manages the National Flood Insurance Program (NFIP). FEMA also prepares the FIRMs for communities participating in the NFIP. The FIRMs indicate the regulatory floodplain to assist communities with land

use and floodplain management decisions, so that the requirements of the NFIP are met in the event of damaging floods. FIRMs guide location of housing development, the amount of grading/regulation necessary for housing placed on a floodplain, and a City's Uniform Building Code. However, FEMA studies and maps are not necessarily an accurate, up-to-date reflection of all physical flood risk or hazards. The City participates in the Community Rating System (CRS) of the NFIP. As such, the City is required to document and report annually on creditable activities related to the program. The City CRS Class of 7 provides for reduced insurance premiums for commercial and residential developments.

The San Luis Obispo County Flood Control and Irrigation District provides for control, disposition, and distribution of flood and storm waters of the district and of streams flowing into the district and for protection of the watersheds and watercourses in the district from such waters. Section 22.05.040 of the San Luis Obispo County Land Use Ordinance establishes the County's standards for the control of drainage to minimize the harmful effects of storm water runoff. However, incorporated cities within the County have their own responsibilities with regard to drainage and flood control. County restrictions on development in floodplains require that incorporated cities, at a minimum, enforce the current federal floodplain management regulations as defined in the FEMA NFIP.

U.S. Army Corps of Engineers (USACE)

The USACE is the federal agency that studies, constructs, and operates regional-scale flood protection systems in partnership with state and local agencies. Specific agreements between the USACE and its state and local partners on particular projects are used to define shared financial responsibilities and regulations that affect the local partners. Any work that is within USACE jurisdiction, which includes the creek bed below the ordinary high water mark for Tank Farm Creek, requires permitting through USACE.

3.7.3.2 State

California Department of Fish and Wildlife (CDFW)

Any work that is within CDFW jurisdiction, which includes the Tank Farm Creek riparian zone, requires permitting through CDFW. Section 1602 of the Fish and Game Code requires an entity notify the CDFW prior to commencing any activity that may substantially divert or obstruct the flow of any channel or bank.

California Department of Water Resources (DWR)

DWR is the state agency that studies, constructs, and operates regional-scale flood protection systems, in partnership with federal and local agencies. DWR also provides technical, financial, and emergency response assistances to local agencies related to flooding.

Several bills were signed by Governor Schwarzenegger in 2007, adding to and amending state flood and land use management laws. The laws contain requirements and considerations that outline a comprehensive approach to improving flood management at state and local levels.

FloodSAFE California is a strategic multifaceted program initiated by DWR in 2006. FloodSAFE is guiding the development of regional flood management plans, which encourage regional cooperation in identifying and addressing flood hazards. Regional flood plans include flood hazard identification, risk analyses, review of existing measures, and identification of potential projects and funding strategies. The plans emphasize multiple objectives, system resiliency, and compatibility with state goals and Integrated Regional Water Management Plans (IRWMP). DWR has the lead role to implement FloodSAFE, and will work closely with state, federal, tribal, and local partners to help improve integrated flood management systems statewide. DWR's role is to advise and provide assistance as a resource to local jurisdictions as they pursue compliance. Table 3.7-2 provides the state-mandated requirements for local agency (includes all cities and counties) flood planning.

Porter-Cologne Water Quality Control Act (1969)

This act mandates that waters of the state shall be protected such that activities that may affect waters of the state shall be regulated to attain the highest quality. The SWRCB is given authority to enforce Porter-Cologne Water Control Act as well as Section 401 of the Clean Water Act and has adopted a statewide general permit that applies to almost all storm water discharges. This general permit, which is implemented and enforced in the San Luis Obispo area, is implemented by the local Central Coast RWQCB and requires all owners of land where construction activity occurs to:

Table 3.7-2. Flood Risk Management Legislation and Local Responsibilities

Planning Document Tool	State-Wide Requirements
General Plan Land Use Element	Identify and annually review areas subject to flooding (identified by FEMA or DWR); consider the location of natural resources used for groundwater recharge and storm water management.
General Plan Conservation Element	Identify areas that may accommodate floodwater for groundwater recharge and storm water management; in coordination with agencies, develop a water resources section.
General Plan Safety Element	Identify and revise, per new flood hazard information; establish goals, policies (objectives), and mitigation measures to protect from the risk of flooding; allows information in floodplain management ordinances to be used.
Airport Area Specific Plan	Identify waterways and facilities downstream from Airport Area development that may need to be modified for adequate capacity. Limit storm water runoff from the Airport Area to pre-development levels, consistent with the requirement of the City's WMP. Each proposed development shall insure compliance with this water quality and flood control plan.
General Plan Housing Element and Regional Housing Needs Assessment	Consider and may exclude land that is not adequately protected, to avoid the risk of flooding.
Local Hazard Mitigation Plan	May adopt safety element in conjunction with local hazard mitigation plan (financial benefits).

Source: California Department of Water Resources 2010.

- Eliminate or reduce non-storm water discharges to storm water systems and other waters of the U.S.;
- Develop and implement a Storm water Pollution Control Plan emphasizing storm water BMPs; and
- Perform inspections of storm water pollution prevention measures to assess their effectiveness.

In addition, SWRCB regulations mandate a "non-degradation policy" for state waters, especially those of high quality. Under the authority of the SWRCB, the protection of water quality in San Luis Obispo Creek and its tributaries is under the jurisdiction of the Central Coast RWQCB. The RWQCB establishes requirements prescribing the quality of point sources of discharge and establishes water quality objectives. These objectives are established based on the designated beneficial uses for a particular surface water or groundwater. Beneficial uses of San Luis Obispo Creek include municipal, domestic, and

agricultural water supply, groundwater recharge, Class I and II recreation, wildlife habitat, warm and cold water habitats, migration of aquatic species, spawning, freshwater habitat, and sport fishing. Within city limits of San Luis Obispo, the jurisdiction for the water quality of the San Luis Obispo Creek Watershed overlaps with the city public works and utilities agencies.

In accordance with the California Water Code, the Central Coast RWQCB developed a Basin Plan (1994) designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Water quality objectives for the Central Coastal Basin satisfy state and federal requirements established to protect waters for beneficial uses, and are consistent with existing statewide plans and policies.

3.7.3.3 Local

The protection of water quality in San Luis Obispo Creek and its tributaries is under the jurisdiction of the RWQCB. The City also has the responsibility for regulating water quality under its NPDES Municipal Separate Storm Sewer System (MS4) permits program. This board establishes requirements prescribing the quality of point sources of discharge and establishes water quality objectives. These objectives are established based on the designated beneficial uses for a particular surface water or groundwater. Within the City limits, the jurisdiction for the water quality of the San Luis Obispo Creek Watershed overlaps with the City Public Works and Utilities agencies.

City of San Luis Obispo General Plan

The City addresses hydrology and water quality issues through implementation of adopted General Plan policies and programs. These policies are found in the Land Use, Conservation and Open Space (COS), and Safety Elements. The goals and policies from the existing General Plan relate to protecting water quality and minimizing flood hazard risk within the City. The City seeks to protect and enhance creek corridors to promote wildlife and water conservation. The City seeks to accomplish these goals by promoting responsible storm water management techniques including using porous paving, preventing creek bank encroachment, and ensuring new developments do not decrease flood capacity of waterways. Under the General Plan, any property within the FIRM defined 100-year flood zone is considered as having a hazard potential requiring specified controls or protective measures.

Land Use Element (2014)

The City has adopted a Land Use Element as part of their General Plan. This element contains the following policies relevant to hydrology and water quality:

Policy LU 6.6.1 Creek and Wetlands Management Objectives. The City shall manage its lake, creeks, wetlands, floodplains, and associated wetlands to achieve the multiple objectives of:

B. Preventing loss of life and minimizing property damage from flooding;

C. Providing recreational opportunities which are compatible with fish and wildlife habitat, flood protection, and use of adjacent private properties.

Policy LU 6.6.5 Runoff Reduction and Groundwater Recharge. The City shall require the use of methods to facilitate rainwater percolation for roof areas and outdoor hardscaped areas where practical to reduce surface water runoff and aid in groundwater recharge.

Policy 6.6.6 Development Requirements. The City shall require project designs that minimize drainage concentrations and impervious coverage. Floodplain areas should be avoided and, where feasible, any channelization shall be designed to provide the appearance of a natural water course.

Policy 6.6.7 Discharge of Urban Pollutants. The City shall require appropriate runoff control measure as part of future development proposals to minimize discharge of urban pollutants (such as oil and grease) into area drainages.

Policy 6.6.8 Erosion Control Measures. The City shall require adequate provision of erosion control measures as part of new development to minimize sedimentation of streams and drainage channels.

Policy 6.7.2 National Flood Program. The City shall administer the national Flood Insurance Program standards.

Policy 6.7.3 Creekside Care and Notification. In maintaining creek channels to accommodate flood waters, the City shall notify owners of creeks and adjacent properties in advance of work, and use care in any needed removal of vegetation.

Conservation and Open Space (COS) Element (2006)

The City has adopted a COS Element as part of their General Plan. This element contains the following goals and policies relevant to hydrology and water quality:

Program COS 7.7.9 Creek Setbacks. As further described in the Zoning Regulations, the City will maintain creek setbacks to include: an appropriate separation from the physical top of the bank, the appropriate floodway as identified in the Flood Management Policy, native riparian plants or wildlife habitat and space for paths called for by any City-adopted plan. In addition, creek setbacks should be consistent with the following:

A. The following items should be no closer to the wetland or creek than the setback line: buildings, streets, driveways, parking lots, above-ground utilities, and outdoor commercial storage or work areas.

B. Development approvals should respect the separation from creek banks and protection of floodways and natural features identified in part A above, whether or not the setback line has been established.

Policy COS 8.3.3 Open Space for Safety. Secure open space where development would be unsafe. Generally, the following locations are considered to be unsafe:

D. Areas subject to flooding, where the frequency, depth, or velocity of floodwaters poses an unacceptable risk to life, health, or property.

Goal COS 10.1.3 Water Quality. Protect and maintain water quality in aquifers, Laguna Lake, streams, and wetlands that supports all beneficial uses, agriculture, and wildlife habitat.

Policy COS 10.2.1 Water Quality. The City will employ the best available practices for pollution avoidance and control, and will encourage others to do likewise. "Best available practices" means behavior and technologies that result in the highest water quality, considering available equipment, life-cycle costs, social and environmental side effects, and the regulations of other agencies.

Policy COS 10.2.2 Ahwahnee Water Principles. In planning for its water operations, programs, and services, the City will be guided by the Ahwahnee Water Principles and will encourage individuals, agencies, and organizations to follow these policies:

A. Community design should be compact, mixed use, walkable and transit-oriented so that automobile-generated urban runoff pollutants are minimized and the open lands that absorb water are preserved to the maximum extent possible.

B. Natural resources such as wetlands, floodplains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as

valued assets for flood protection, water quality improvement, groundwater recharge, habitat, and overall long-term water resource sustainability.

C. Water holding areas such as creekbeds, recessed athletic fields, ponds, cisterns, and other features that serve to recharge groundwater, reduce runoff, improve water quality and decrease flooding should be incorporated into the urban landscape.

D. All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater.

E. Permeable surfaces should be used for hardscape. Impervious surfaces such as driveways, streets, and parking lots should be minimized so that land is available to absorb storm water, which reduces polluted urban runoff, recharges groundwater, and reduces flooding.

F. Dual plumbing that allows grey water from showers, sinks, and washers to be reused for landscape irrigation should be included in the infrastructure of new development, consistent with state guidelines.

G. Community design should maximize the use of recycled water for appropriate applications including outdoor irrigation, toilet flushing, and commercial and industrial processes. Purple pipe should be installed in all new construction and remodeled buildings in anticipation of future availability of recycled water.

H. Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment should be incorporated in all new construction and retrofitted in remodeled buildings.

I. Groundwater treatment and brackish water desalination should be pursued when necessary to maximize locally available, drought-proof water supplies.

Policy COS 10.3.2 Maintain Water Quality. The City will do the following to maintain a high level of water quality, and will encourage individuals, organizations, and other agencies to do likewise:

A. Design and operate its water supply, treatment, and distribution system to prevent adverse effects on water quality (potential point source of pollutants such as chlorine).

B. Design and operate its wastewater collection and treatment system to prevent adverse effects on water quality (potential point source of pollutants such as untreated sewage and chlorine).

C. Design, construct, and maintain its facilities such as parks, buildings and grounds, storm water facilities and parking to prevent adverse effects on water quality (potential point sources for pollutants such as petroleum and non-point sources of runoff contaminated with fertilizers, pesticides, litter, and vehicle residues).

D. Regulate the design, construction, and operation of private facilities over which the City has permit authority to ensure they will not have adverse effects on water quality (potential point sources for, as examples, sediment from construction and chemicals used in operations, and non-point sources for contaminated runoff).

E. Participate with other agencies, in particular the California Regional Water Quality Control Board, in watershed planning and management.

F. In locations subject to flooding, not allow activities, such as outdoor storage, that would be substantial sources of chemical or biological contamination during a flood, even though buildings associated with the activities would meet flood-protection standards.

G. Establish standards for non-point source water pollution in cooperation with the Regional Water Quality Control Board.

H. Establish a program of baseline water quality testing for City creeks.

I. Identify and protect groundwater recharge areas to maintain suitable groundwater levels and to protect groundwater quality for existing and potential municipal water sources.

Safety Element (2000)

The City has adopted a Safety Element as part of their General Plan. In April 2006, Resolution No. 9785 added amendments to the Safety Element with regard to Flood Hazard Avoidance and Reduction. This amendment contains the following relevant policies regarding flooding:

Policy S 2.1 Flood Hazard Avoidance and Reduction.

A. The City will develop and carry out environmentally sensitive programs to reduce or eliminate the potential for flooding in previously developed, flood-prone areas of the City.

B. The City should allow flood waters to move through natural channels. Flow should be accommodated by removing debris and man-made obstructions. The City recognizes that many natural channels cannot contain runoff from a storm greater than a 25-year event. Areas flooded by storms as large as a 100-year event will be mapped.

C. No new building or fill should encroach beyond, or extend over, the top-of-bank of any creek.

D. Within predominantly developed areas (such as downtown) infill, remodel, and replacement projects should not displace more flood water than previous structures on the site or in the vicinity. Commercial buildings may be flood-proofed where providing floor levels above the 100-year storm flow is not appropriate due to adjacent improvements. New infill buildings may be required to have greater setbacks than their older neighbors.

E. Within new development areas, substantial displacement of flood waters should be avoided by:

1. Keeping a substantial amount of flood-prone land in the vicinity as open space;

2. Enlarging man-made bottlenecks, such as culverts, which contribute to flood waters backing up from them;

3. Accommodating in such places uses which have relatively low ratios of building coverage to site area, for which shallow flooding of parking and landscape areas would cause minimum damage; and

4. Requiring new buildings to be construction above the 100-year flood level.

F. Creek alterations shall be considered only if there is no practical alternative, consistent with the Conservation and Open Space Element.

G. Development close to creeks shall be designed to avoid damage due to future creek bank erosion. Property owners shall be responsible for protecting their developments from damage caused by future bank loss due to flood flows.

Airport Area Specific Plan

Policy 3.2.11 Impacts from Runoff. Minimize the water-quality impacts associated with run-off from rooftops and paved areas, due to contaminants, temperature changes, velocity changes, and sediment by providing dispersed surface drainage across areas with suitable soil and vegetation whenever feasible, instead of piped or other concentrated drainage from roofs and paved areas directly to creeks.

Policy 7.1.1 Encourage BMPs. The City will encourage Best Management Practices for drainage when reviewing all development proposals. The use of bioswales for conveying storm water on-site through open channels is particularly encouraged for their efficacy and natural, aesthetic quality.

Policy 7.1.2 Creek Corridor Enhancement. As part of the development review process for sites that are crossed by one or more creek corridors, the City will require creek corridor enhancement consisting of:

- Removal of non-native vegetation.
- Removal of obstructions that impede storm flows and that are detrimental to aquatic species.
- Establish additional riparian vegetation.

Policy 7.1.3 Offsite Improvements Permissible. When detention requirements cannot be fully met onsite, offsite improvements of creek corridors is permissible, consistent with the requirements of the City's Waterways Management Plan and Drainage Design Manual.

Policy 7.1.4 Porous Paving Encouraged. The use of porous paving to facilitate rainwater percolation is encouraged. As a condition of project approval, the City will require parking lots and paved outdoor storage areas, where practical, to use one or more of the following measures to reduce surface water runoff and aid in groundwater recharge: porous paving; ample landscaped areas that receive surface drainage and that are maintained to facilitate percolation; drainage detention basins with soils that facilitate percolation.

Policy 7.1.5 Onsite Detention Basins and Creek Corridors. Detention basins will be owned by the subdivider, a property owners' association, or a major nonresidential parcel

owner, and will be maintained by an owners' association or a special district. Ownership and maintenance of minor waterways will be the same, with a City easement for open space and, where trails occur, public access.

Policy 7.1.6 Developer's Responsibility. Developers are responsible for drainage facilities serving their parcels, including needed facilities through adjoining properties. Where facilities serve more than one parcel, developers may form benefit districts or establish reimbursement agreements.

Policy 7.1.7 Design Review. The design of detention and conveyance facilities will be subject to City approval as subdivisions are reviewed, and will be based on runoff studies and recommendations by qualified professional engineers.

Policy 7.1.8 Design of Detention Facilities. Detention facilities will be compatible with natural features and the desired neighborhood character. Shallow basins with curvilinear sides, adjacent to waterways, are acceptable, while steep-sided, rectangular basins are not. Use of detention areas for habitat protection and enhancement, or for appropriate recreation, is encouraged. Additional design guidelines for drainage are found in Section 5.21 of this Specific Plan.

Policy 7.1.9 NPDES. All drainage facilities must comply with National Pollutant Discharge Elimination System (NPDES) Phase II permit requirements. The City of San Luis Obispo has a set of standards for Post Construction runoff control that must be implemented by property owners as they develop.

Policy 7.1.10 Developer's Costs. Developers will contribute to the cost of implementing the Storm Drain Master Plan and in some cases may be required to perform the work and then be reimbursed. Additional information on costs can be found in Section 8.4.7 of this Specific Plan.

Policy 7.1.11 Incentives. Exceptional implementation of drainage design policies makes a project eligible for development incentives as described in Section 4.4.7 of this Plan.

City of San Luis Obispo Municipal Code

12.08. Storm Water Quality Ordinance.

The purpose and intent of this ordinance is to ensure the health, safety, and general welfare of citizens. The ordinance also protects and enhances the quality of watercourses and water bodies in a manner pursuant to and consistent with the Clean Water Act by reducing

pollutants in storm water discharges to the maximum extent practicable, by prohibiting non-storm water discharges to the storm drain system, and improving storm water management.

13.08. Sewers.

The purpose and intent of this ordinance is to authorize the issuance of wastewater discharge permits to industrial users, provide for monitoring, compliance, and enforcement activities, and require significant industrial user reporting.

17.16.025. Creek Setbacks.

The City's Creek Setback requirement applies to all creeks that are shown on Figure 9 of the Conservation and Open Space Element in the General Plan, including Tank Farm Creek. A 20-foot setback is required for Tank Farm Creek "from the existing top of bank (or the future top of bank resulting from a creek alteration reflected in a plan approved by the City), or from the edge of the predominant pattern of riparian vegetation, whichever is farther from the creek flow line."

17.84. Floodplain Management Regulations.

Based on FEMA NFIP requirements, the City's Floodplain Management Regulations apply to areas of special flood hazard as identified by FEMA, which are areas that FEMA has identified as subject to inundation by the 100-year flood. The FEMA FIRM Number 06079C1331G shows a large portion of the site along the Tank Farm Creek corridor within the Zone A (areas where no base flood elevation has been determined) of the 100-year floodplain boundary. Per the code, the following apply to the Project:

- The proposed development is within a special floodplain management zone as defined by the City, so the requirements of the DDM for those zones must be met (refer to Section 17.84.050 of the Municipal Code).
- Base flood elevations for the Project site must be determined.
- An approved Letter of Map Revision (LOMR) is required prior to issuance of building permits.
- A development permit is required prior to any construction or other development within any area of special flood hazard (see Section 17.84.040(C) of the Municipal Code).

- All proposed nonresidential structures require certification from a registered civil engineer or architect that they are floodproofed in accordance with Section 17.84.050(A)(3) of the Municipal Code.
- All proposed residential structures require post-construction certification from a registered civil engineer or licensed land surveyor that their lowest floors are one foot above the base flood elevation.
- Public utilities and facilities such as sewer, gas, electrical, and water systems are to be located and constructed to minimize flood damage.

City of San Luis Obispo NPDES Phase II Program

The City has developed a draft SWMP that was submitted to the RWQCB in April 2007 under the NPDES Phase II program. Development is required to be undertaken in strict accordance with conditions and requirements of that program.

City of San Luis Obispo Waterway Management Plan (WMP) (2003)

The WMP incorporates three volumes: the WMP, the DDM, and the Stream Management and Maintenance Program. The WMP is a watershed-based management plan for San Luis Obispo Creek and its tributaries. The City's WMP serves as a basis for future project planning, decision-making, and permitting. Volume III of the WMP is a DDM, providing design guidance and criteria intended to meet surface water management objectives, which includes revised policies for floodplain and stream corridor management and new design flows for stream channels within the City. Procedures for hydrologic and hydraulic analysis, and guidelines and criteria for the design of channels, storm drain systems, storm water detention facilities, bank repair and stream restoration, and erosion control are described within this document. The floodplain management policies in the DDM generally require that fill placed on floodplains be managed so that there is no adverse impact in terms of flooding or bank stability. These are referred to as the "Managed Fill" and "No Adverse Impact" policies of the DDM. The DDM also requires applicants that create adverse hydrologic impacts to fully mitigate them.

Special Floodplain Management Zone Regulations (Managed Fill Criteria)

The City's Floodplain Management Regulations require that all building pads within a 100-year flood zone be raised at least 1 foot above the specified 100-year flood elevation. The regulations also state that, cumulatively, developments will not displace floodwater sufficient to raise the flood elevation more than one foot at any point, without causing

damage to any offsite properties. Development of vacant lands in Special Floodplain Management Zone areas have been determined to have a potentially significant effect on downstream flooding and bank stability. These potential impacts can be mitigated by incorporation of the specific floodplain management policies in project design. For any development or subdivision proposal within the 100-year FEMA floodplain, on individual parcels or developments larger than 2.5 acres, the development proposal shall include a Concept Grading Plan and Master Drainage Plan. These Plans shall be submitted to the City or County Public Works Director for approval and shall meet specific criteria, including:

- The project shall not cause the 100-year flood elevation to increase more than 2.5 inches.
- The project shall not cause stream velocities to increase more than 0.3 feet per second.
- The project shall not cause a significant net decrease in floodplain storage volume unless several exceptions are met.

City of San Luis Obispo Engineering Standards

The current Engineering Standards for the City include the following requirements relevant to water quality:

- All new development or redevelopment shall comply with the criteria and standards set forth in the Waterways Management Plan – Drainage Design Manual, applicable area specific plans, and the Post-Construction Stormwater Management Requirements for Development Projects in the Central Coast Region, adopted by the Central Coast Regional Water Quality Control Board, and included in the appendices. Where requirements conflict, the stricter shall apply. Stormwater Control Plan, and Operation and Maintenance Plan are required prior to final approvals.
- ***Source Control*** *(per 2013 State General Stormwater Permit Section E.12.d)***:**
    - Projects with pollution generating activities and sources must be designed to implement operation or source control measures consistent with recommendations from the California Stormwater Quality Association Handbook for New Development and Redevelopment or equivalent, including:
        - Accidental spills or leaks
        - Interior floor drains
        - Parking/storage areas and maintenance
        - Indoor and structural pest control
        - Landscape/outdoor pesticide use
        - Pools, spas, ponds, decorative fountains and other water features

        - Restaurants, grocery stores, and other food service operations
        - Refuse areas
        - Industrial processes
        - Outdoor storage of equipment or materials
        - Vehicle and equipment cleaning, repair, and maintenance
        - Fuel dispensing areas
        - Loading docks
        - Fire sprinkler test water
        - Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
        - Unauthorized non-storm water discharges
        - Building and grounds maintenance
    - Design should prevent water from contacting work areas, prevent pollutants from coming in contact with surfaces used by storm water runoff, or where contact is unavoidable, treat storm water to remove pollutants.
    - Operations and maintenance activities required to achieve Source Control are to be included in the Operation and Maintenance Plan submitted for approvals and recorded with the property as required by ordinance.
- Where a new development project results in the installation of 5,000 sf or more of impervious drive surfaces or when a redevelopment project results in the addition of impervious drive surfaces resulting in 5,000 sf or more of drive surfaces; all storm water runoff from drive surfaces shall be treated in accordance with the BMPs published in the most current addition of the California Storm Water Quality Association's Best Management Practice Handbook.
- Drive surfaces is defined as the parking stalls, loading bays, trash areas and drive aisles.
- For the purposes of water quality design, peak flow BMPs shall be designed to treat the runoff from 28 percent of the 2-year storm event and volumetric BMPs shall be designed to treat the runoff from a 1-inch per 24-hour storm event.

3.7.4 Environmental Impact Analysis

3.7.4.1 Thresholds of Significance

Thresholds of significance for impacts to hydrology and water quality were modified from Appendix G of the 2016 California Environmental Quality Act (CEQA) Guidelines and City standards. Impacts would be considered significant if the Project were to:

a) Violate any water quality standards or waste discharge requirements;

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

c) 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 which would result in substantial erosion or siltation onsite or offsite;

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding onsite or offsite;

e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;

f) Otherwise substantially degrade water quality or conflict with City standards for protection and enhancement of water quality;

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map (FIRM) or other flood hazard delineation map;

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

i) 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; or

j) Be subject to inundation by seiche, tsunami, or mudflow.

Pursuant to City standards:

- Flooding impacts would be considered potentially significant if shallow groundwater came in contact with building foundations and retaining walls, exposing people or structures to potentially adverse effects.
- Flooding impacts would be considered potentially significant if the development is proposed within an identified flood-prone area, as determined by the City of San

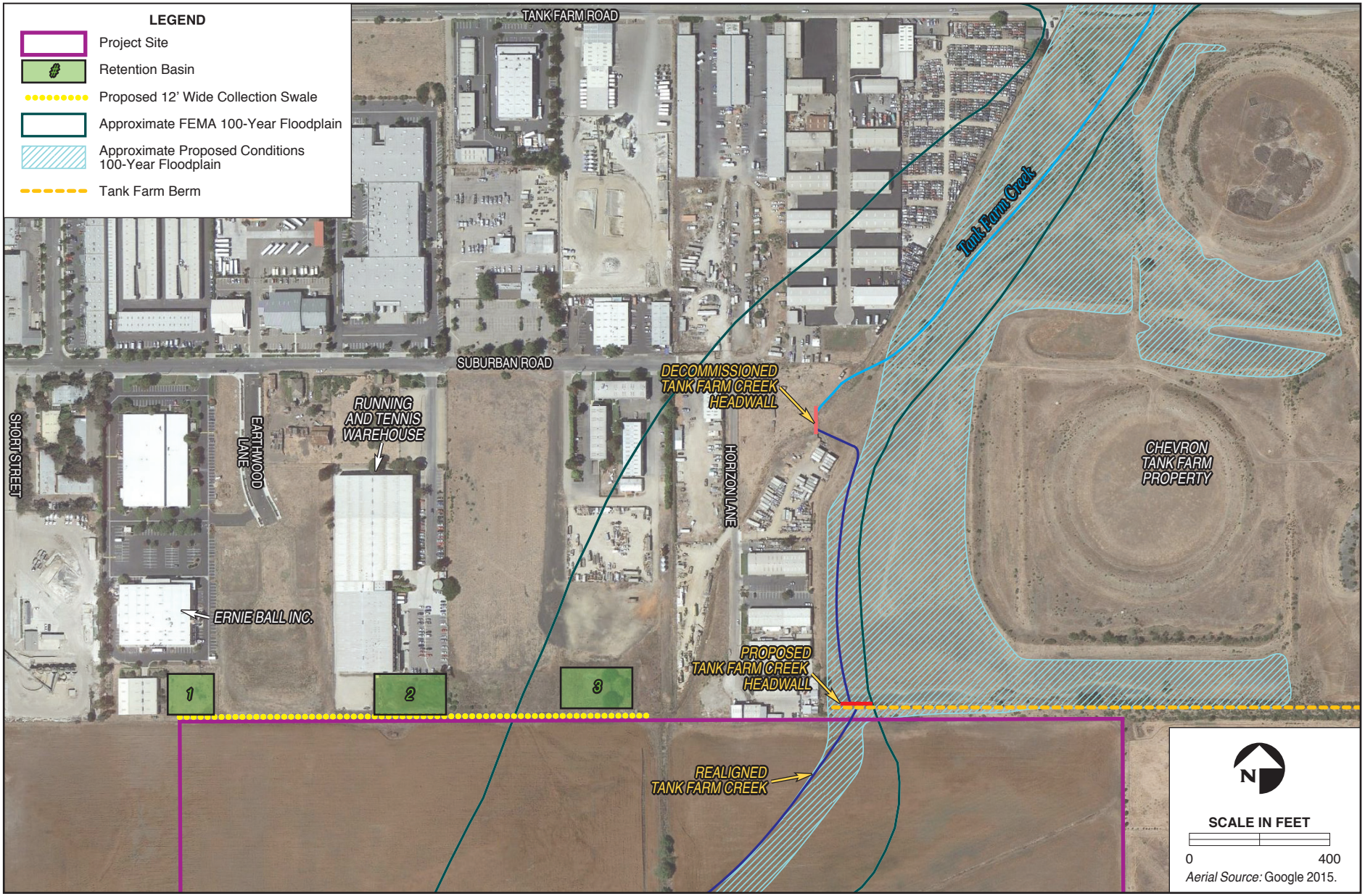
Luis Obispo FIRM, thereby increasing the number of buildings exposed to the existing flood hazard; or if the new development conflicted with Flood Hazard avoidance policies in the City's Safety Element.

- Water quality impacts would be considered potentially significant if development of the proposed project would result in the increased degradation of surface water quality, including indirect impacts to threatened and endangered species downstream of the Downtown area.

3.7.4.2 Impact Assessment Methodology

The analysis was based on a field reconnaissance survey (e.g., measurement culvert widths, creek bed slopes, offsite drainage observations, etc.) performed by Amec Foster Wheeler, most recently in April 2016, literature review, discussions with City and County staff, and an in-depth peer review of the Drainage Report and associated floodplain analysis conducted by Cannon (Appendix E), and other materials from the RWQCB and FEMA. This analysis considers impacts from both the construction and the operation of the proposed Project, including potential impacts to drainage, flooding, surface water quality, and erosion.

The analysis within this section also builds upon the analysis and conclusions identified in the LUCE Update EIR, which identified impacts to hydrology and water quality as less than significant with the implementation of regulatory policies, as well as information in the AASP. Mitigations provided below build upon these LUCE and AASP policies. The assessment of hydrology and water quality impacts for the Project include review and consideration of regulations that control the City's water resources. Construction impacts were assessed based on information provided within the preliminary VTM and Development Plan, which includes the size, location, and elevation of building pads, and location and size of drainage infrastructure. As some of this information is at the conceptual or preliminary stage, a conservative approach was taken to ensure that potential impacts are addressed. Operational impacts are based on the increase of development, impervious surfaces, and changes in drainage features throughout the site. Refer to Figure 3.7-2 for proposed hydraulic conditions under implementation of the Project.



amec foster wheeler

Proposed Drainage Conditions on the Chevron Tank Farm Property and Vicinity

FIGURE 3.7-2

3.7.4.3 Project Impacts and Mitigation Measures

This section discusses the potential hydrology and water quality impacts associated with the construction and operation of the Project. Hydrology and water quality impacts associated with the Project are summarized in Table 3.7-3 below.

Table 3.7-3. Summary of Project Impacts

Hydrology and Water Quality Impacts	Mitigation Measures	Residual Significance
HYD-1. The Project would result in potentially significant impacts to water quality due to polluted runoff during construction activities.	MM HYD-1a MM HYD-1b MM HYD-1c	Significant but Mitigable
HYD-2. Project development would substantially alter existing drainage patterns on the Project site and Buckley Road Extension property, including burial of two segments of Tank Farm Creek and realignment of restored upstream reaches of the creek, which could potentially result in substantial flooding, erosion, or siltation onsite and offsite.	MM BIO-2a MM HYD-2a MM HYD-2b MM HYD-2c	Significant but Mitigable
HYD-3. The Project could potentially result in flooding, including increased flood water surface elevations across the Project site, adjacent properties, and within Tank Farm Creek.	MM HYD-3a MM HYD-3b	Significant but Mitigable
HYD-4. Installation of at least two utility lines using horizontal directional drilling would bisect Tank Farm Creek and has the potential to impact water quality.	MM HYD-4a MM HYD-4b	Significant but Mitigable
HYD-5. Operation of the Project would result in potentially significant impacts to water quality of Tank Farm and San Luis Obispo Creeks due to polluted urban runoff and sedimentation.	MM HYD-2a MM HYD-5	Significant but Mitigable
HYD-6. The Project would potentially deplete groundwater supplies or interfere with groundwater recharge.	None required.	Less than Significant

Impact HYD-1 The Project would result in potentially significant impacts to water quality due to polluted runoff during construction activities (Significant but Mitigable).

Construction would include excavation, grading, and other earthwork that would occur across most of the 150-acre site as well as the 3-acre Buckley Road Extension site. This analysis considers the resulting major changes in drainage patterns. Potential for substantial increases in soil erosion and sediment transport into Tank Farm Creek could occur due to

runoff waters moving over exposed areas and newly created slopes entering the existing drainage system leading to the creek. Construction runoff flowing into Tank Farm Creek would also affect water quality in San Luis Obispo Creek, located 550 feet downstream of the Project site.

Project construction would be phased over an approximate 10-year period and would involve approximately 361,856 cubic yards (cy) of cut soil and approximately 365,306 cy of fill, planned to be balanced onsite. Soil would be redistributed across the site, particularly to fill over 40 acres of lower lying floodplain resulting in large areas of exposed soils within the Project site over an extended period of time. During storm events, runoff from most exposed construction areas across the Project site would flow into Tank Farm Creek, potentially carrying pollutants such as oils, chemicals, sediments, and construction debris. These construction activities could impact water quality by exposing disturbed ground to potential erosion or by introducing pollutants into the runoff. The types of pollutant discharges that could occur as a result of construction include accidental spillage of fuel and lubricants, discharge of excess concrete, and an increase in sediment runoff. In particular, Phases 1 through 5 would include construction activities in close proximity to, or within Tank Farm Creek. Grading, excavation, and placement of hundreds of thousands of cubic yards of fill near Tank Farm Creek would occur within proposed R-1 and R-2 residential areas in order to provide level housing pads. Grading for housing pads would occur within 50 feet of and adjacent to the creek. Such grading would occur during Phases 1, 2, and 5. In addition, installation of the 20-foot-wide Tank Farm Creek Class I bicycle path across Phases 1 would occur within 5 feet of the top of the east bank of Tank Farm Creek in some places (refer to Figure 2-12). The presence and use of large construction machinery within close proximity of the creek has the potential to result in a spill of fluids, such as oil, gasoline, and hydraulic fluids, which could be mobilized by storm water runoff. See Section 3.4, *Biological Resources*, for additional detail on impacts of runoff within the creek to biological resources.

In addition, soil erosion could result in the creation of onsite rills and gully systems, clog existing and planned drainage channels, breach erosion control measures, and transport soil into down-gradient areas on the Project site. Soil movement would occur in these exposed graded or excavated areas, as well as in unprotected drainage culverts or basins. Although such grading would be subject to storm water and erosion protection controls under existing regulations, large unanticipated storm events could accelerate erosion or cause breaches in such controls.

Installation of the Project's proposed storm water conveyance system would occur across all phases of the Project, and would include the construction of eight major culverts with associated drainage outlets within Tank Farm Creek. These outlets would include the use of excavators, backhoes and other heavy equipment to construct culverts and install headwalls and concrete aprons along the creek bank and within the invert to direct flows (refer to Figure 2-11 and Table 2-6). During excavation along the creek bank for culverts and headwalls and construction and installation of these outlets, potential exists for erosion and siltation to occur, which would have the potential to affect water quality, particularly during storm events.

An increase in point source and non-point source pollution could result from runoff due to these construction activities and resultant exposed soils, directly impacting water quality onsite within Tank Farm Creek. Construction activities could also result in the pollution of natural watercourses downstream or underground aquifers. This impact to water quality due to polluted runoff from construction activities is considered ***significant but mitigable*** with the incorporation of the following mitigation measures.

Mitigation Measures

MM HYD-1a *Prior to the issuance of any construction/grading permit and/or the commencement of any clearing, grading, or excavation, the Applicant shall submit a Notice of Intent (NOI) for discharge from the Project site to the California SWRCB Storm Water Permit Unit.*

Plan Requirements and Timing. Prior to issuance of grading permits for Phase 1 the Applicant shall submit a copy of the NOI to the City.

Monitoring. The City shall review noticing documentation prior to approval of the grading permit. City monitoring staff will inspect the site during construction for compliance.

MM HYD-1b *The Applicant shall require the building contractor to prepare and submit a Storm Water Pollution Prevention Plan (SWPPP) to the City 45 days prior to the start of work for approval. The contractor is responsible for understanding the State General Permit and instituting the SWPPP during construction. A SWPPP for site construction shall be developed prior to the initiation of grading and implemented for all construction activity on the Project site in excess of one (1) acre, or where the area of disturbance is less than one acre but is part of the Project's plan of development that in*

total disturbs one or more acres. The SWPPP shall identify potential pollutant sources that may affect the quality of discharges to storm water, and shall include specific BMPs to control the discharge of material from the site. The following BMP methods shall include, but would not be limited to:

- *Temporary detention basins, straw bales, sand bagging, mulching, erosion control blankets, silt fencing, and soil stabilizers shall be used.*
- *Soil stockpiles and graded slopes shall be covered after 14 days of inactivity and 24 hours prior to and during inclement weather conditions.*
- *Fiber rolls shall be placed along the top of exposed slopes and at the toes of graded areas to reduce surface soil movement, as necessary.*
- *A routine monitoring plan shall be implemented to ensure success of all onsite erosion and sedimentation control measures.*
- *Dust control measures shall be implemented to ensure success of all onsite activities to control fugitive dust.*
- *Streets surrounding the Project site shall be cleaned daily or as necessary.*
- *BMPs shall be strictly followed to prevent spills and discharges of pollutants onsite (material and container storage, proper trash disposal, construction entrances, etc.).*
- *Sandbags, or other equivalent techniques, shall be utilized along graded areas to prevent siltation transport to the surrounding areas.*

Additional BMPs shall be implemented for any fuel storage or fuel handling that could occur onsite during construction. The SWPPP must be prepared in accordance with the guidelines adopted by the SWRCB. The SWPPP shall be submitted to the City along with grading/development plans for review and approval. The Applicant shall file a Notice of Completion for construction of the development, identifying that pollution sources were controlled during the construction of the Project and implementing a closure SWPPP for the site.

Plan Requirements and Timing. The Applicant shall prepare a SWPPP that includes the above and any additional required BMPs. The SWPPP and notices shall be submitted for review and approval by the City prior to the issuance of grading permits for Phase 1 construction. The SWPPP shall be designed to address erosion and sediment control during all phases of development of the site until all disturbed areas are permanently stabilized.

Monitoring. City monitoring staff shall periodically inspect the site for compliance with the SWPPP during grading to monitor runoff and after conclusion of grading activities. The Applicant will keep a copy of the SWPPP on the Project site during grading and construction activities.

MM HYD-1c Installation of the eight drainage outlets within Tank Farm Creek shall occur within the dry season (May through October).

Plan Requirements and Timing. The Applicant shall demonstrate compliance within grading and construction plans subject to City review and approval prior to issuance of grading permits for each Project phase.

Monitoring. The City shall review grading and construction plans for all phases to ensure compliance. City grading monitors shall spot check for compliance.

Residual Impact

Implementation of the proposed mitigation measures above would reduce the potentially significant construction runoff and associated impacts to water quality to less than significant. Implementation of MM HYD-1c would prevent construction of the drainage outlets within Tank Farm Creek during the rainy season, thereby reducing the potential of erosion and construction runoff from installation of the drainage facilities.

Impact HYD-2 Project development would substantially alter existing drainage patterns on the Project site and Buckley Road Extension property, including burial of two segments of Tank Farm Creek and realignment of restored upstream reaches of the creek, which could potentially result in substantial flooding, erosion, or siltation onsite and offsite (Significant but Mitigable).

Project site

The Project would substantially alter drainage patterns within the Project site through burial of the North-South Creek Segment, removal of the East-West Channel, and excavation of the realigned 850-foot long segment of the creek to connect through the Tank Farm property (refer to Figure 3.7-2). In addition, drainage from north of the site would be intercepted by construction of a 12-foot-wide drainage collection swale along the northern Project boundary, which would divert surface flows into three subsurface culverts. Further, a retention basin would be installed within the southwest portion of the Project site and eight drainage culverts would collect runoff for discharge into Tank Farm Creek. These changes to the creek and proposed new storm water conveyance system would substantially alter surface water flows through the site as well as peak surface flows.

The direct effects of development of the Project would be from replacement of approximately 95 acres of undeveloped land with residential, commercial, and recreational development consisting of housing, parking lots, buildings, roads, walkways, and other impervious surfaces, as well as developed parkland. Substantial areas of new impervious surfaces would increase both the total volume of storm water runoff and the peak flow of runoff. Although Project design features such as the bioswale/park, 12-foot swale, parks, planted parkways and buffer areas, and the drainage conveyance system are intended to avoid flooding and retain runoff, Project implementation could increase the amount of surface flows, especially following major storm events. In addition, fill of over 40 acres of floodplain to raise development areas 1-10 feet above current surface elevations could displace floodwaters and raise offsite surface water flood elevations (see Impact HYD-3 below).

The Project would include substantial storm water retention and treatment facilities to accommodate runoff from the new impervious areas. Conceptual plans state that runoff from impervious surfaces would be directed to a system of vegetated retention areas or bioswales that are intended to retain, infiltrate and treat the runoff from events up to the 95th percentile 24-hour rainfall event. For larger events, these vegetated facilities would

overflow into standpipes that connect to drainage culverts that discharge to Tank Farm Creek at eight separate drainage outlets (see Figure 2-10). Additionally, every park area and parkway strips along the collector streets within the Project site would serve to retain and infiltrate runoff. As detailed in the Project Storm Water Control Plan, bio-infiltration with some retention would be provided along the frontage of residential units to emphasize source water quality treatment control. However, only concept level drainage retention and storm water treatment plans has yet been completed.

Buckley Road Extension Property

The Project would substantially alter drainage patterns within the Buckley Road Extension property with the installation of a ¼ mile long 54 foot wide paved road and adjacent 12 foot side paved Class I bike path with associated drainage infrastructure, planted "chokers" and vegetated parkway are intended to provide bioretention of storm water. These changes to the existing undeveloped land would alter water flow and conveyance through the property.

Project Phases 1 through 3

Project construction Phases 1 through 3 would occur prior to remediation and drainage improvements conducted on the Chevron Tank Farm property (refer to Section 2.6.7.1, *Offsite Improvements*). This would include development of R-2 and R-4 residential units, roadways and parks north and west of Tank Farm Creek and construction of the Buckley Road Extension. During this period, drainage within the Chevron Tank Farm property is assumed to remain unchanged. Surface runoff from development within Phases 1 through 3 is intended to pass through bioretention and filtration facilities and then discharge directly to the creek through several large drainage culverts.

In the northern portion of the Project site planned for construction of Project Phases 1-3, grading for housing pads would require raising building pads up to 10 feet above the existing elevations. This would affect existing drainage patterns within the site, including how offsite flows enter the Project site from the north. In order to address this, the Project includes the proposed 12-foot swale at the northern Project boundary. The swale would collect runoff from the north and direct flows into three subsurface culverts that would flow into Tank Farm Creek (refer to Figure 2-10).

Projected peak flows during Phases 1 through 3 are estimated for Tank Farm Creek at the confluence with East Fork San Luis Obispo Creek by adding the hydrograph for the Chevron Tank Farm property remediation area to the combined hydrograph for the area

downstream of the Chevron Tank Farm property remediation area (Cannon 2015a; see Table 3.7-4). Based on this analysis, the peak flows in Tank Farm Creek downstream after the construction of Phases 1 through 3 in the area north of Tank Farm Creek, including the pocket park/bio-swale, would be reduced from the existing condition for the design storms.

Table 3.7-4. Projected Peak Flow Increases in Tank Farm Creek (Phases 1-3)

Storm Recurrence Interval	Tank Farm Creek			
	Existing Conditions Peak Runoff Rate (cfs)	Proposed Conditions Peak Runoff Rate (cfs)	Change in Peak Runoff Rates	
			cfs	%
2-year	215	202	-13	-6.0
10-year	460	421	-39	-8.6
25-year	595	539	-56	-9.4
50-year	689	621	-68	-9.8
100-year	874	796	-78	-8.9

In Phase 1, the 1.67-acre bioswale within the southwest corner of the Project site would be constructed north of Tank Farm Creek and would capture the majority of the surface runoff from R-2 units and roadways constructed within Phase 1; other surface runoff would flow to the south towards Tank Farm Creek. For this swale, flows from a 100-year storm event were modeled to reach up to 794 cubic feet per second (cfs) at the basin outlet. Based on modeling results, the swale would contain a spillway crest elevation (maximum ponding depth) of 104 feet in depth and length of 105 feet.

In Phase 3, the Project would bury the existing North-South Creek Segment of Tank Farm Creek and construct a new 850-foot long channel that would punch through the existing berm to the north of the Project site and connect to the remediated portion of Tank Farm Creek on the Chevron Tank Farm property. These realignments and alterations would be completed in coordination with the Chevron Tank Farm property and assume that improved retention of flood flows on the Chevron Tank Farm property would occur as part of the remediation project. However, the construction, design, and timing of such offsite efforts is not defined, and it is unclear whether the North-South Creek Segment would be removed prior to the installation of the realigned creek segment. As such, the potential exists for major drainage impacts to occur within the northern portion of the Project site and in areas to the north of the Project site immediately following the removal of the North-South Creek Segment. This has the potential to result in flooding and erosion in the northeastern portion of the Project site and in offsite areas to the north.

Project Phases 4 through 6

Construction Phases 4 through 6 include buildout of the portion of the site to the south and east of Tank Farm Creek, including construction of R-1 and R-3 units, the 3.34-acre Town Center, and the 9.8-acre Neighborhood Park. The development of impervious surfaces within the Project site would reduce the amount of exposed, erodible dirt at the Project site, but would increase runoff within the site. Phases 4 through 6 would occur after drainage improvements within the Chevron Tank Farm property have been completed. Runoff from all impervious surfaces including public sidewalks and streets, would be directed towards Tank Farm Creek via a system of drainage culverts (see Figure 2-10). After completion of remediation within the Chevron Tank Farm property, flows would be reduced as the Chevron Tank Farm property would retain larger quantities of water within the site, thereby reducing peak flows entering the Project site. This would reduce the total flows through Tank Farm Creek.

Projected peak flows were estimated for Tank Farm Creek at the confluence with East Fork San Luis Obispo Creek by adding the hydrograph for the upstream portion of the Tank Farm Creek watershed (Chevron Tank Farm property remediation area) to the combined hydrograph for the area downstream of the Chevron Tank Farm property remediation area (Cannon 2015a; see Table 3.7-4). The resulting peak flows are summarized below in Table 3.7-5.

Table 3.7-5. Projected Peak Flow Increases in Tank Farm Creek (Full Buildout)

Storm Recurrence Interval	Tank Farm Creek			
	Existing Conditions Peak Runoff Rate (cfs)	Proposed Conditions Peak Runoff Rate (cfs)	Change in Peak Runoff Rates	
			cfs	%
2-year	215	219	+4	+2.0
10-year	460	449	-11	-2.4
25-year	595	581	-14	-2.4
50-year	689	674	-15	-2.2
100-year	874	766	-108	-12.3

Source: Cannon 2015a.

Based on this analysis, the peak flows in Tank Farm Creek after the construction of the entire Project (Phases 1-6) would not increase by more than 5 percent from the existing condition for the design storms, and 100-year peak flows in the Tank Farm Creek watershed would be reduced by approximately 12.3 percent.

Construction of Phase 4 would include removal of the East-West Channel. Construction of the R-3 housing units within Phase 4 would involve the fill of this channel, which drains runoff from adjacent properties to the east of the Project site. Currently, no drainage culverts appear to be proposed on conceptual drainage plans to convey flows entering the site from the east. These flows would be detained and/or retained in the wetland area in the northeast corner of the Project site. After fill of the East-West Channel, the eastern portion of the Project site and adjacent lands to the east could experience flooding and drainage issues due to flows entering the site from agricultural land uses to the east. This could also have the potential to affect R-3 development proposed within the eastern portion of the site. However, the wetland area described above and the planned Neighborhood Park onsite may have the capacity to retain the majority of rainfall that falls directly on it, which would prevent runoff into other portions of the Project site.

The Project would include installation of manufactured slopes along the south side of Tank Farm Creek in order to raise housing pads and roadways out of the floodplain. These slopes would vary from 3:1 to 4:1. This alteration would potentially result in substantial erosion or siltation onsite and downstream during major rainfall and flooding events as flood waters moving through the narrowed flood plain open space along Tank Farm Creek could erode such manufactured slopes.

Project Completion

Offsite drainage from the Chevron Tank Farm property would continue to flow through Tank Farm Creek after remediation via the realigned North-South Creek Segment. The restoration and wetland creation and increased runoff retention at the Chevron Tank Farm property would offset increases in runoff associated with the development of the Project. Given the reduction in flows entering the site from the Chevron Tank Farm property at Project buildout, flows within Tank Farm Creek across the site are estimated to be reduced by 12.3 percent to 766 cfs for a 100-year storm. However, flows from the 2-year storm were estimated to increase by 2 percent from existing conditions, to 219 cfs. This is due to the fact that 2-year storm flows are associated with Project development-related onsite impacts, whereas 100-year storm flows would be reduced by upstream detention offsite on the Chevron Tank Farm property. The post-development peak flows would be managed by a combination of the partial Chevron Tank Farm property remediation and the detention basin installed during Phase 1. Outlet structures would be designed to meet the City's WMP requirements, which allow up to 5 percent increases in the design storms events (refer to Table 3.7-5; see Appendix D).

At Project completion, runoff would be routed into drainage culverts that empty at eight drainage outlets varying in 24 to 54 inches in size into Tank Farm Creek (see Table 2-6). Increased runoff velocity could result in added erosion along drainages. While the flows within Tank Farm Creek would be reduced due to reduced flows entering the site from the Chevron Tank Farm property, flows from these drainage culverts entering Tank Farm Creek have the potential to increase flows with Tank Farm Creek, particularly during storm events. These flows also have the ability to cause minor erosion and siltation in the locations of pipe outfalls. However, drainage requirements of the Project would meet the Central Coast RWQCB's Post Construction Requirements.

Overall, given the extent of alterations to drainage within the site, impacts to drainage have the potential to be ***significant but mitigable***.

Mitigation Measures

MM BIO-2a shall apply.

MM HYD-2a The Applicant shall prepare and submit a Master Drainage Plan. The Master Drainage Plan shall address cumulative regional drainage and flooding impacts on the Project site, including construction and stream stability, and set forth measures to coordinate Project drainage with Chevron Tank Farm remediation and drainage improvements. The Master Drainage Plan shall be implemented pursuant to the City's SWMP submitted by the City to the RWQCB under the NPDES Phase II program and pursuant to the programs developed under the City of San Luis Obispo General Plan and the City of San Luis Obispo Waterways Management Plan. The Master Drainage Plan shall meet the following requirements:

- *Development of a Construction Drainage Plan that details the control and retention of runoff for each phase of construction, and clearly displays the location of bioretention facilities, their retention capacity and relationship to subsurface drainage culverts, alignment of creek and drainage channels for each phase.*

- *Ensure that onsite detention facilities, particularly the pocket park/bioswale, are designed to safely retain flood flows using either gently sloping exterior slopes (e.g., 4:1) or provide safety fencing around perimeters, consistent with applicable City standards.*

- *Characterization of drainage from the East-West Channel and conveyance of flows after removal of this channel.*
- *Demonstrate peak flows and runoff for each phase of construction.*
- *Be coordinated with habitat restoration efforts, including measures to minimize removal of riparian and wetland habitats, contouring of creek invert to create pools and removal of trash or debris as appropriate.*
- *Location and extent of vegetated Swales designed to reduce sediment and particulate forms of metals and other pollutants along corridors of planted grasses or native vegetation.*
- *Location and extent of vegetated Filter Strips, 15-foot wide vegetated buffer strips that also reduce sediment and particulate forms of metals and nutrients.*
- *The use, location and capacity of Hydrodynamic Separation Products to reduce suspended solids greater than 240 microns, trash and hydrocarbons. These hydrodynamic separators must be sized to handle peak flows from the Project site consistent with applicable regulatory standards.*

Plan Requirements and Timing. The Master Drainage Plan shall indicate the above measures and shall be submitted to the City Public Works Director and City Natural Resources Manager for approval prior to final Development Plan approval recordation of the final VTM. The Construction Drainage Plan shall be updated by the Applicant and resubmitted to the City prior to the issuance of grading permits for each Project phase.

Monitoring. The City shall review the Master Drainage Plan for compliance. The Environmental Monitor shall confirm installation of all drainage, retention, and treatment facilities and monitor their effectiveness during and post-storm events. The Environmental Monitor shall prepare a brief report for submittal to the City with findings regarding the effectiveness of detention and treatment facilities for each Phase after completion and any recommendations for corrective actions (if required).

MM HYD-2b The removal of North-South Creek Segment and East-West Channel and realigning the 850-foot segment of Tank Farm Creek shall not be completed

until after Chevron Tank Farm property remediation has been completed and only after the existing Tank Farm Creek headwall is decommissioned and a detention pond is created that would lead to the proposed Tank Farm Creek headwall at the northern boundary of the Project site. The Applicant shall complete these realignments and alteration in coordination with the Chevron Tank Farm property remediation.

Plan Requirements and Timing. The Master Drainage Plan shall set forth measures to coordinate Project drainage with Chevron Tank Farm remediation and drainage improvements, and shall be submitted to the City Public Works Director and City Natural Resources Manager for approval prior to issuance of grading permits for Phase 3.

Monitoring. The City shall confirm that Chevron Tank Farm property remediation is completed and review the Master Drainage Plan, grading and construction plans for compliance.

MM HYD-2c *Offsite drainage from the east that currently flows into the East-West Channel shall be routed into surface detention and treatment facilities and then into subsurface drainage facilities to connect to the proposed drainage outlets into Tank Farm Creek onsite. The Applicant shall include these plans in the VTM, Utilities Plan, Construction Drainage Plan, and Master Drainage Plan.*

Plan Requirements and Timing. The Applicant shall demonstrate compliance of the above measure on the VTM, Utilities Plan, and Master Drainage Plan, which shall be submitted for review and approval by the City prior to final Development Plan approval and recordation of the final VTM.

Monitoring. The City shall review and approve these plans prior to Development Plan approval. The Construction Drainage Plan shall be updated by the Applicant and resubmitted to the City prior to the onset of development for each phase.

Residual Impact

Implementation of the proposed mitigation measures above would reduce the potentially significant drainage alteration impact to less than significant. Preparation of the Master Drainage Plan would ensure coordination of drainage improvements with the Chevron

Tank Farm property to the north, and establish the schedule and timing of onsite improvements. Further, inclusion of drainage conveyances to direct runoff entering the site from the east on the VTM and Utilities Plan would ensure that drainage impacts related to the burial of the East-West Channel would be minimized.

Impact HYD-3 The Project could potentially result in flooding, including increased flood water surface elevations across the Project site, adjacent properties, and within Tank Farm Creek (Significant but Mitigable).

Flooding impacts could occur due to a combination of factors, including: 1) the increase in the amount of impervious surfaces and runoff within the Project site (refer to Impact HYD-2); and 2) the loss of floodplain storage resulting from the import of fill to construct the Project.

Floodplains provide storage capacity for flood flows that overtop the banks of the creek. This storage area attenuates flood peaks. When such areas are reduced, peak flows both up and downstream can be impacted. The movement of extensive amounts of fill into the floodplain to construct the Project could effect on and offsite flood water surface elevations by substantially reducing the amount of existing floodplain storage available in the Tank Farm Creek basin. Floodwaters that currently are spread out and retained temporarily in the floodplain would be displaced by fill placement. Such displacement potentially increase downstream peak flows and water velocities and flood water surface elevations both up and downstream.

Property on either side of Tank Farm Creek within the Project site is identified by FEMA as being within the 100-year floodplain (refer to Figure 3.7-1). As part of the Project, the FEMA floodplain would be re-delineated to account for the Chevron Tank Farm property remediation and onsite improvements (refer to Figure 3.7-2). Part of the Project would include petitioning FEMA to match their maps to the modeled proposed 100-year floodplain conditions (see Appendix E). Project development would reduce existing floodplain storage area onsite by 85 percent from approximately 51.3 acres (existing) to 7.7 acres (proposed), confining the floodplain to the Tank Farm Creek channel and adjacent open space areas bordered by fill slopes and the southwestern-most corner of the Project site where the floodplain would broaden out again (Figure 2-10). Grading activities and the installation of manufactured slopes along Tank Farm Creek would narrow the 100-year floodplain within the Project site from roughly 1,500 feet in width to an average of 80 to 120 feet in width throughout the Tank Farm Creek floodplain. In order to receive approval

for such changes, a Conditional Letter of Map Revision (CLOMR) and a LOMR would need to be obtained from FEMA to demonstrate that onsite flooding potential would not be adversely affected and that offsite flood elevations would not change by more than 1.5 inches.

Since Phases 1 and 2 of Project construction would occur prior to remediation at the Chevron Tank Farm property being completed, the flows from the Chevron Tank Farm property would be unchanged at this stage. A 1.67-acre pocket park/bioswale and retention basin is planned at the southwest corner of the Project site to manage the release of peak flows to avoid adverse effects on downstream uses (see Figure 2-10). This basin would detain some of the runoff from Phases 1 and 2; the remainder would discharge directly to Tank Farm Creek. According to the Drainage Report, Project grading and drainage plan design measures of a combination of raised finished floor elevations and onsite floodwater retention, combined with upstream changes in retention on the Tank Farm Property would avoid onsite flooding damage and any substantial changes in offsite flood water elevations. The effectiveness of these measures would need to be verified through City review of the final VTM and grading and drainage plan as well as FEMA approval of the CLOMR and LOMR.

After completion of remediation within the Chevron Tank Farm property assumed to be completed in Phase 3, and construction of all phases of the Project, building pads and proposed roads, would be elevated to at least 2 feet above the FEMA floodplain consistent with standards in the Special Floodplain Management Zone Regulations. This would ensure that no development areas would occur within the 100-year floodplain.

The approximate 200-foot segment of the Buckley Road Extension that would fall within the 100-year floodplain may be subject to occasional flooding, however no structures are proposed and no persons would be put at risk.

With the implementation of the following mitigation measures, flooding impacts would be ***significant but mitigable***.

Mitigation Measures

MM HYD-3a The Applicant shall prepare a Master Drainage Plan which shall consider cumulative regional drainage and flooding impacts of the Project, and shall be submitted to the City Public Works Director for approval and shall meet the following requirements:

- *There shall be no significant net increase in upstream or downstream floodwater surface elevations for the 100-year floodplain as a result of changes in floodplain configuration and building construction. A significant threshold of a 2.5-inch increase in floodwater surface elevations or 0.3 feet per second increase in stream velocities shall be used. This shall be demonstrated to the satisfaction of the City Engineer or County Public Works Director based on an Applicant furnished hydraulic analysis.*

- *There shall be no significant net decrease in floodplain storage volume as a result of a new development or redevelopment projects. This can be achieved by a zero-net fill grading plan, which balances all fill placed on the 100-year floodplain with cut taken from other portions of the floodplain within the Project site of the application, or with cut exported offsite. Specifically, all fill placed in a floodplain shall be balanced with an equal amount of soil material removal (cut) and shall not decrease floodplain storage capacity at any stage of a flood (2, 10, 50, or 100-year event).*

- *A net increase in fill in any floodplain is allowed only when <u>all</u> the conditions listed in the Managed Fill Criteria of the DDM are also met.*

<u>Plan Requirements and Timing.</u> The Applicant shall demonstrate compliance on the Master Drainage Plan and shall be submitted for review and approval by the City Public Works Director prior to final Development Plan approval and recordation of the final VTM.

<u>Monitoring.</u> The City shall review and approve the Master Drainage Plan. The Environmental Monitor shall review field compliance and report any flooding and drainage issues to the City over the 10-year Project construction period.

MM HYD-3b *All bridges, culverts, outfalls, and modifications to the existing creek channels must be designed and constructed in compliance with the City's Drainage Design Manual and approved by the City Engineer, USACE, CDFW, and Central Coast RWQCB, and must meet city standards and policies.*

Plan Requirements and Timing. The Applicant shall prepare the Master Drainage Plan, VTM, and Utilities Plan, demonstrating compliance with the above mitigation, which shall be submitted for review to USACE, CDFW, and Central Coast RWQCB before approval by the City prior to final Development Plan approval and recordation of the final VTM.

Monitoring. The City, USACE, CDFW, and Central Coast RWQCB shall check for compliance on plans. The Environmental Monitor shall review field compliance and report any issues associated with construction of drainage improvements to the City over the 10-year Project construction period.

Residual Impact

Implementation of the proposed mitigation measures above would reduce the potentially significant flooding impact to less than significant by ensure floodplain storage within the Project site is not substantially decreased.

Impact HYD-4 Installation of at least two utility lines using horizontal directional drilling would bisect Tank Farm Creek and has the potential to impact water quality (Significant but Mitigable).

Project development would include use of horizontal directional drilling (HDD) beneath Tank Farm Creek for at least two utility lines. The use of HDD would reduce potential direct biological impacts to the creek and reduce potential water quality impacts resulting from erosion and incidental equipment-related petroleum spills to the creek. However, a major concern associated with the HDD is frac-outs, which are generally defined as an inadvertent return of drilling fluids to the ground surface. Drilling muds typically consist of a mixture of bentonite and water. Bentonite is an inert clay material and is considered essentially nontoxic to aquatic organisms, although it can have adverse physical effects on organisms that become coated (e.g., smothering). Nevertheless, drilling mud losses could cause temporary and localized increases in turbidity and suspended solids concentrations and promote siltation within the creeks and the underlying shallow alluvial aquifers.

Frac-outs generally occur in very coarse-grained, pebbly to cobble sands, such as those that occur within the alluvial-filled canyon bottoms and terrace (i.e., older alluvium) deposits, or in fractured bedrock. HDD drilling in clay, silt, and fine-grained sand, which is also present in local alluvial deposits, generally does not result in frac-outs, as these types of sediments allow a cohesive mudpack, or filter-pack, to form on the walls of the borehole.

The integrity of the mudpack in these types of sediments prevents the drilling mud from permeating the surrounding strata and migrating to the ground surface or into groundwater. The potential for frac-outs also increases with increasing length of the HDD borehole. Longer drilling reaches require increased hydraulic head for effective drilling at increased distances from the drill rig. This increased hydraulic head increases the pressure on the surrounding strata, thus increasing the potential for frac-outs. Due to the proximity of surface water and shallow groundwater to proposed HDD operations, HDD-related water quality impacts would be potentially ***significant but mitigable***.

Mitigation Measures

MM HYD-4a *A site-specific, geotechnical investigation shall be completed in areas proposed for HDD. Preliminary geotechnical borings shall be drilled to verify that the proposed depth of HDD is appropriate to avoid frac-outs (i.e., the depth of finest grained sediments and least fractures) and to determine appropriate HDD methods (i.e., appropriate drilling mud mixtures for specific types of sediments). The investigation shall include results from at least three borings, a geologic cross section, a discussion of drilling conditions, and a history and recommendations to prevent frac-outs.*

Plan Requirements and Timing. Geotechnical investigations shall be made, and a report of findings submitted to the City for approval. The findings shall be incorporated into the final Utilities Plan prior to approval of the final Development Plan and recordation of the final VTM.

Monitoring. The City shall review the findings of the geotechnical investigations and final Utilities Plan.

MM HYD-4b *A Frac-out Contingency Plan shall be completed and shall include measures for training, monitoring, worst case scenario evaluation, equipment and materials, agency notification and prevention, containment, clean up, and disposal of released drilling muds. Preventative measures would include incorporation of the recommendations of the geotechnical investigation to determine the most appropriate HDD depth and drilling mud mixture. In accordance with the RWQCB, HDD operations shall occur for non-perennial streams such as Tank Farm Creek only when the stream is dry, and only during daylight hours. In addition, drilling pressures shall*

be closely monitored so that they do not exceed those needed to penetrate the formation. Monitoring by a minimum of two City-approved monitors (located both upstream and downstream, who will move enough to monitor the entire area of operations) shall occur throughout drilling operations to ensure swift response in the event of a frac-out, while containment shall be accomplished through construction of temporary berms/dikes and use of silt fences, straw bales, absorbent pads, straw wattles, and plastic sheeting. Clean up shall be accomplished with plastic pails, shovels, portable pumps, and vacuum trucks. The Frac-out Contingency Plan shall be submitted to the City, and the RWQCB shall review the plan.

Plan Requirements and Timing. The Applicant shall prepare a Frac-out Contingency Plan and submit to the RWQCB for review and the City for approval prior to approval of the final Development Plan and recordation of the final VTM.

Monitoring. Two City-approved monitors shall be onsite during HDD drilling activities to monitor construction.

Residual Impact

Implementation of mitigation measures MM HYD-4a and b would ensure that water quality within Tank Farm Creek is not adversely impacted by HDD drilling activities. As such, residual impacts would be less than significant.

Impact HYD-5 Operation of the Project would result in potentially significant impacts to water quality of Tank Farm and San Luis Obispo Creeks due to polluted urban runoff and sedimentation (Significant but Mitigable).

Project development would replace approximately 94 acres of land undergoing regular agricultural cultivation with a roughly equivalent area of urban development with 720 new residential units, a commercial center, and 16 acres of developed parks, with associated changes in pollutant runoff. Current agricultural operations result in regular plowing of the soil and the use chemicals such as pesticides and fertilizers which may currently enter Tank Farm Creek and affect water quality. Replacement of agricultural uses with urban residential and commercial uses would change the volume and quality of runoff that may enter the creek with urban pollutants, oil, and grease replacing agricultural runoff. New impervious surfaces, including roads and parking lots, collect automobile derived

pollutants such as oils, greases, heavy metals, and rubber. During storm events, these pollutants would be transported into the drainage systems by surface runoff. An increase in point source and non-point source pollution could result from increases in development intensity which may directly impact water quality specific to site drainage patterns. The Project would increase pollutants in surface runoff due to the increase of new impervious surface area it would create and increase in population within the site. Accordingly, disturbed soils, sedimentation, and contaminants that are mobilized by water flow through Tank Farm Creek may ultimately be conveyed to the East Fork of the San Luis Obispo Creek located 550 feet downstream.

Given the size of the Project, the Project would be subject to the Central Coast RWQCB's Post Construction Requirements and NPDES discharge permits. Upon compliance with the City's SWMP, Engineering Standards, General Plan, and City Ordinance requirements, as well as mitigation measures below, impacts related to water quality would be ***significant but mitigable***.

Mitigation Measures

MM HYD-2a shall apply.

MM HYD-5 *A Development Maintenance Manual for the Project shall include detailed procedures for maintenance and operations of any storm water facilities to ensure long-term operation and maintenance of post-construction storm water controls. The maintenance manual shall require that storm water BMP devices be inspected, cleaned and maintained in accordance with the manufacturer's maintenance specifications. The manual shall require that devices be cleaned prior to the onset of the rainy season (i.e., October 15th) and immediately after the end of the rainy season (i.e., May 15th). The manual shall also require that all devices be checked after major storm events. The Development Maintenance Manual shall include the following:*

- *All loading docks and trash storage areas shall be setback a minimum of 150 feet from the top of the creek bank. No outdoor storage or larger trash receptacles shall be permitted within this setback area. All trash and outdoor storage areas shall be operated to reduce potential impacts to riparian areas;*
- *Runoff shall be directed away from trash and loading dock areas;*

- *Trash and loading dock areas shall be screened or walled to minimize offsite transport of trash;*
- *Bins shall be lined or otherwise constructed to reduce leaking of liquid wastes;*
- *Trash and loading dock areas shall be paved;*
- *Impermeable berms, drop inlets, trench catch basin, or overflow containment structures around docks and trash areas shall be installed to minimize the potential for leaks, spills or wash down water to enter the drainage system and Tank Farm Creek; and,*
- *The developer or acceptable maintenance organization shall complete inspections of the site to ensure compliance with BMPs and water quality requirements on a semi-annual basis (May 15 and October 15 of each year). A detailed summary report prepared by a licensed Civil Engineer shall be submitted to the City of San Luis Obispo Public Works Department. The requirements for inspection and report submittal shall be recorded against the property.*

Plan Requirements and Timing. The Applicant shall prepare and update the Development Maintenance Manual for each phase of the Project. The City shall review and approve prior to the issuance of the certificate of occupancy for the first unit of each phase.

Monitoring. The City shall review for compliance.

Residual Impact

Implementation of the water quality protection measures listed above would reduce runoff entering Tank Farm Creek and make Project impacts less than significant.

Impact HYD-6 The Project would potentially deplete groundwater supplies or interfere with groundwater recharge (Less than Significant).

The Project could result in a decrease in percolation to the groundwater basin, due to the increase in amount of impervious surface it would create. However, since the City stopped its reliance on groundwater for drinking water in April 2015, and the San Luis Obispo Groundwater Basin is not in overdraft and recharges quickly following normal rainfall years (Cannon 2015b), the Project would not substantially deplete groundwater supplies or

interfere substantially with groundwater recharge. Further, the use of groundwater within the site would be reduced from current groundwater usages (approximately 90 to 95 acre-feet per year [AFY]). There would be an incremental loss of groundwater recharge due to the increase in paved and impervious surfaces. However, Project impacts related to decreased percolation would be partially offset by a new bioswale within the southwest portion of the Project site. See Section 3.13, *Utilities* for more detail. Therefore, impacts related to groundwater are considered ***less than significant***.

3.7.4.4 Cumulative Impacts

The Project, in combination with approved, pending, and proposed development within the City, would further contribute to the increase in development and associated water quality impacts, as well as alter the existing hydrologic environment, thereby altering the abundance and natural flow of water resources of the area. As analyzed in the LUCE Update EIR, cumulative impacts of the LUCE Update, which includes the Project site, to hydrology and water quality would be reduced to a less than significant level with the implementation of and adherence to the policies and requirements discussed above.

Water Quality

Cumulative development would result in a change from agricultural to urban pollutant discharge to surface and groundwater. Construction activities could also result in the pollution of natural watercourses or underground aquifers. The types of pollutant discharges that could occur as a result of construction include accidental spillage of fuel and lubricants, discharge of excess concrete, and an increase in sediment runoff. Storm runoff concentrations of oil, grease, heavy metals, and debris increases as the amount of urban development increases in the watershed. However, when properly implemented, water quality requirements of the Central Coast RWQCB and the City and County of San Luis Obispo would be expected to mitigate any adverse impacts resulting from new development. Therefore, the proposed Project, in conjunction with pending cumulative development would not significantly increase the concentration of urban pollutants such as oil, grease, and vehicular heavy metals in surface run-off. Polluted runoff which may be generated during construction activities of cumulative development and projects considered in this analysis would be regulated by the SWRCB under General Construction, NPDES permits, and would be minimized through the use of standard construction BMPs. Cumulative impacts would therefore be less than significant for water quality.

However, with the adherence to regulatory standards and the incorporation of mitigation measures detailed above, the cumulative contribution from the Project would be less than significant.

Flooding

With regard to flooding, several projects included on the cumulative projects list are located within the 100-year floodplain associated with San Luis Obispo Creek; this includes the Chevron Tank Farm Restoration and Remediation Project with up to 800,000 sf of business park development, and the Homeless Services Center. Cumulative development in the City and the San Luis Obispo Creek Watershed is anticipated to contribute to an incremental increase in runoff and peak flood flows. Development of planned or pending commercial and industrial Projects upstream of the Project site would contribute to the risk of flooding at the Project site. Each cumulative project would be expected to provide its own facilities or other mitigations, where feasible, to mitigate increased peak flows and exacerbated downstream flooding. Project-specific mitigation measures would reduce cumulative impacts associated with the proposed Project to the extent feasible.

Overall, cumulative impacts to hydrology and water quality would be ***less than significant***.