3.10 HYDROLOGY AND WATER QUALITY

3.10.1 INTRODUCTION

This section describes existing surface and groundwater hydrology in the project area, including floodplain and stormwater issues and water quality and summarizes the regulations that govern hydrologic modification, protect water quality, and control floodplain development and stormwater management. It also analyzes the potential effects to hydrology and water quality that could result from the implementation of the Proposed Action and the alternatives.

Sources of information used in this analysis include:

- Sierra Vista Specific Plan EIR prepared by the City of Roseville (City of Roseville 2010a);
- Westbrook Specific Plan Amendment Initial Study, prepared by the City of Roseville (City of Roseville 2012);
- West Roseville Specific Plan EIR prepared by the City of Roseville (City of Roseville 2004);
- Sierra Vista Specific Plan Drainage and Stormwater Master Plan Westbrook Amendment (Civil Engineering Solutions 2011);
- Geomorphic Assessment of the Sierra Vista Specific Plan Phase 1 (cbec, Inc. 2009); and
- California Department of Water Resources and Central Valley Regional Water Quality Control Board publications relevant to the project area.

Specific reference citations are provided in the text.

3.10.2 AFFECTED ENVIRONMENT

3.10.2.1 Regional Surface Water Hydrology

The project site is located in the Curry Creek watershed, a subwatershed of the Natomas Cross Canal watershed (HUC 180201610402), which in turn is a part of the Sacramento River Basin (HUC 18020109) (City of Roseville 2010a).

The Sacramento River Basin—the area drained by the Sacramento River—covers approximately 27,210 square miles (70,474 square kilometers), extending from the Cascade and Trinity Ranges in the north to the Sacramento–San Joaquin Delta in the south, and from the Coast Ranges in the west to the Sierra Nevada in the east. It includes all watersheds draining to the Sacramento River north of the Cosumnes River watershed, as well as the closed (interior drainage) Goose Lake Basin and the Cache and Putah Creek subwatersheds (Central Valley RWQCB 2009, City of Roseville 2009). Besides the Sacramento River, principal streams within the watershed include the Pit, Feather, Yuba, Bear, and American Rivers, tributary from the east; and Cottonwood, Stony, Cache, and Putah Creeks, tributary from the west. Important reservoirs and lakes include Shasta, Oroville, Folsom, Clear Lake, and Lake Berryessa (Central Valley RWQCB 2009).

The City receives its water supply from Folsom Lake, which in turn receives water diverted from the American River. For the project's water supply effects, see **Section 3.15, Utilities and Service Systems.** The

indirect effects of the project on fisheries from diverting American River water are addressed in **Section 3.4, Biological Resources.**

3.10.2.2 Regional Groundwater Hydrology

Overview

The project site is located in the North American subbasin of the Sacramento Valley groundwater basin. The North American subbasin has an area of almost 550 square miles (1,424 square kilometers) and is bounded on the north by the Bear River, on the south by the Sacramento River, on the west by the Feather River, and on the east by an artificial north-south line extending from the Bear River south to Folsom Lake, passing about 2 miles (3.2 kilometers) east of the City of Lincoln and approximately corresponding to the edge of the Sacramento Valley alluvial basin. The western portion of the subbasin comprises the flood basin of the Bear, Feather, Sacramento, and American Rivers and tributary drainages (City of Roseville 2004).

Groundwater in the North American subbasin is produced from two aquifer systems. The upper aquifer system consists of the Quaternary Victor, Fair Oaks, and Laguna Formations and is typically unconfined. The lower aquifer is primarily within the Mehrten Formation of Miocene age and is semi-confined (City of Roseville 2004). Average well yields are on the order of 800 gallons per minute (gpm) (3,028 liters per minute [lpm]) (California Department of Water Resources 2003). Total storage capacity in the North American subbasin is estimated at approximately 4.9 million acre-feet (maf) (0.6 million hectare-meter [mhm]), and recent data suggest that withdrawals of up to 95,000–97,000 acre-feet per year (afy) (11,718-11,965 hectare-meter per year [hmy]) are within the basin's safe yield. The majority of groundwater production occurs in the northern portion of the subbasin (City of Roseville 2004).

Groundwater Use

The upper aquifer has historically been pumped for agricultural use, while urban water providers have relied on the lower, semi-confined aquifer. There are no existing legal constraints that limit groundwater pumping (City of Roseville 2010a). The City and other participants in the West Placer Groundwater Management Plan (see **Subsection 3.10.3 Regulatory Framework**) have publically stated their intent to manage their groundwater use consistent with the plan's objectives.

The City relies primarily on surface water for potable supply (see related discussion in **Section 3.15 Utilities and Service Systems**), but groundwater provides additional short-term emergency or backup supply during dry years. The most recent use of groundwater in the City was under drought conditions in 1991. Several private domestic supply wells and a number of agricultural irrigation wells are also located in unincorporated areas in the project vicinity. The City currently operates four groundwater supply wells. The City has plans to construct up to nine more wells to improve overall system reliability during drought and emergency conditions (City of Roseville 2010a).

The recent removal of the 1,754-acre (710 hectare) Reason Farms property from rice production has resulted in a sharp decrease in groundwater use in the project area. Prior to its 2003 acquisition by the City, 1,080 acres (437 hectares) of the Reason Farms property was in rice production, using an estimated 6,483 afy (800 hmy) of groundwater. The majority of the water applied for irrigation is presumed to have been lost via

evapotranspiration with only about 2,632 afy (325 hmy) returning to the aquifer through infiltration. The Reason Farms property is now dry-farmed and planned for use as a storm water retention and flood control facility**.** The facility is needed for peak flows corresponding with upstream flows on the Sacramento River. Construction is dependent on building permit activity, so it could be another 10 years before the basin is constructed. With rice farming and associated groundwater withdrawals halted, approximately 3,151 afy (389 hmy) of groundwater is being conserved, and is considered as banked by the City, to meet future needs consistent with designated beneficial uses (City of Roseville 2010a).

3.10.2.3 Regional Water Quality

As discussed in **Section 3.10.3 Regulatory Framework**, each Regional Water Quality Control Board (RWQCB) is required to develop and periodically update a water quality control plan (basin plan) that designates beneficial uses for the major water bodies under its jurisdiction. Water quality standards must be adopted to protect the designated beneficial uses, and for water bodies that are impaired (affected by the presence of pollutants or contaminants), total maximum daily load (TMDL) programs are developed to limit pollutant input and ensure a return to standards. To identify water bodies in which TMDLs may be needed, each RWQCB maintains a list of impaired water bodies, as required by Section 303(d) of the Clean Water Act (40 CFR 130.7). The Section 303(d) lists are periodically reviewed and updated so they reflect prevailing water quality conditions.

Table 3.10-1 shows the currently designated beneficial uses and listed impairments for water bodies in the project region. The U.S. EPA approved California's 2008-2010 Section 303(d) list of impaired waters requiring TMDLs, including this list, on November 12, 2010.

Table 3.10-1
Designated Beneficial Uses and Listed Water Quality Impairments in Project Area

Water Body	Beneficial Uses	Listed Impairments
Curry Creek	None designated[1]	Placer and Sutter Counties: pyrethoids (urban runoff/storm sewers)
Pleasant Grove Canal	None designated[1]	None identified
Natomas Cross Canal	None designated[1]	Sutter County: mercury (resource extraction)
Sacramento River *Below Chico*	Irrigation, stock watering, water contact recreation, canoeing and rafting, warm freshwater habitat, cold freshwater habitat, cold-water migration, warm-water spawning, wildlife habitat	Knights Landing to Delta reach: mercury (resource extraction), unknown toxicity (source unknown), chlordane (agriculture), DDT (agriculture), dieldrin (agriculture), Polychlorinated biphenyls (PCBs) (source unknown)
Sacramento River *Colusa Basin Drain to I Street Bridge (Sacramento)*	Municipal and domestic supply, irrigation, water contact recreation, canoeing and rafting, other noncontact recreation, warm freshwater habitat, cold freshwater habitat, warm-water spawning, cold-water spawning, wildlife habitat, navigation	

Water Body	Beneficial Uses	Listed Impairments
Sacramento – San Joaquin Delta	Municipal and domestic supply, irrigation, stock watering, industry (process supply, service supply), water contact recreation, other noncontact recreation, warm and cold freshwater habitat, warm-water migration, cold-water migration, warm-water spawning, wildlife habitat, navigation	*Northern portion:* chlordane (agriculture), chlorpyrifos (agriculture, urban runoff/storm sewers), DDT (agriculture), diazinon (agriculture, urban runoff/storm sewers), dieldrin (agriculture), exotic species (source unknown), Group A pesticides (agriculture), mercury (resource extraction), PCBs (source unknown), unknown toxicity (source unknown) *Central portion:* chlorpyrifos (agriculture, urban runoff/storm sewers), DDT (agriculture), diazinon (agriculture, urban runoff/storm sewers), invasive species (source unknown), Group A pesticides (agriculture), mercury (resource extraction), unknown toxicity (source unknown) *Export area:* chlorpyrifos (agriculture, urban runoff/storm sewers), DDT (agriculture), diazinon (agriculture, urban runoff/storm sewers), electrical conductivity (agriculture), invasive species (source unknown), Group A pesticides (agriculture), mercury (resource extraction), unknown toxicity (source unknown)
Sacramento Valley groundwater	Municipal and domestic supply, agricultural supply (irrigation and stock watering), industry (process supply, service supply), unless specifically designated otherwise by the RWQCB	None identified

Sources: Central Valley RWQCB 2006, 2009a

[1] *The Central Valley RWQCB will evaluate the beneficial uses of these water bodies on a case-by-case basis. Water bodies that do not have beneficial uses designated are assigned the designation of municipal and domestic supply in accordance with the provisions of State Water Board Resolution No. 88-63. Exceptions listed in Resolution No. 88-63 may apply to these water bodies.*

3.10.2.4 Regional Flood Hazards

Flooding is the result of water flow that cannot be contained within the banks of natural or artificial drainage courses. Flooding can be caused by an excessive storm event, snow melt, blockage of watercourses by human as well as wildlife activity (e.g., beavers), dam failure, or a combination of these or other events. A flood event can cause injury or loss of property such as the flooding of structures, including homes and businesses; uplift vehicles and other objects; damage roadways, bridges, infrastructure, and public services; and cause soil instability, erosion, and land sliding.

Flooding presently occurs in the project region in the sump area upstream of the Natomas Cross Canal–Pleasant Grove Canal confluence when the Sacramento River rises above a flood stage of 37.0 feet at the Verona Gauge, and additional runoff could increase the depth of flooding during this type of event (Civil Engineering Solutions 2011).

3.10.2.5 Project Site – Surface Water Hydrology

The major drainage features on the project site are the West Plan tributary of Curry Creek and an intermittent tributary of Curry Creek located in the northwestern portion of the project site (refer to **Figure 3.4-1**) (City of Roseville 2010a). There are no other permanent water features, although vernal pools and swales which pond seasonally are present on the site.

The surface runoff within the project site flows to the north and west with the majority of the site draining to the north into an existing storm drain system that is located within Pleasant Grove Boulevard. The surface runoff on the eastern three-quarters of the site flows through a series of swales to the north. The surface runoff on the western one-quarter of the site flows through a series of swales and an intermittent stream to the west. All of the site runoff ultimately discharges into the West Plan tributary.

The West Plan tributary and the intermittent tributary flow west across the northwestern portion of the project site, and do not join Curry Creek on the site but farther downstream of the Federico and Curry confluence at a point west of the project site. Curry Creek is a small seasonal stream that drains an area of approximately 16.5 square miles (43 square kilometers), originating at an elevation of about 120 feet (37 meters) in Placer County, and ultimately draining into the Pleasant Grove Canal. The Pleasant Grove Canal receives input from streams in both Placer and Sutter Counties, and drains to the Natomas Cross Canal, which in turn drains into the Sacramento River immediately south of its confluence with the Feather River, about 14 miles (23 kilometers) west of the City (City of Roseville 2010a).

3.10.2.6 Project Site - Flood Hazards

The northwestern corner of the project site is within a 100-year floodplain for Curry Creek, as shown in **Figure 3.10-1, Pre-Project 100-Year Floodplain** (Civil Engineering Solutions 2011). The project site is not in the City's Regulatory Floodplain.

The project site is within an area that could be affected by flooding in the event that the western dikes along Folsom Lake fail (Dikes Nos. 4, 5, and 6). The most likely disaster-related causes of dam failure in Placer County and the Roseville vicinity are earthquakes, excessive rainfall, and landslides (City of Roseville 2011). The National Inventory of Dams database considers these high-hazard structures (County of Placer 2005), meaning that loss of human life is considered likely in the event of a failure.

3.10.2.7 Project Site – Groundwater Levels and Groundwater Recharge

The California Department of Water Resources has monitored groundwater levels in the project region for the last several decades and has three monitoring wells in the project vicinity, which range in depth between 303 and 450 feet (92 and 137 meters). One is located adjacent to Pleasant Grove Creek immediately west of Fiddyment Road, the second is on Kaseberg Creek southeast of the intersection of Fiddyment Road and Phillip Road, and the third is on City property north of the project area (City of Roseville 2010a). According to exploratory boreholes at well sites north of the project site, the aquifer zone (Mehrten Formation) for drinking water was found at depths ranging from approximately 300 to 525 feet (91 to 160 meters) below ground surface (bgs) with thicknesses ranging from approximately 100 to 200 feet (30 to 61 meters) (MWH 2007). Monitoring data suggest that groundwater levels in the vicinity have been generally stable

since about 1980, with local increases reported in the first well (MWH 2007). Groundwater elevations tend to be significantly higher on the eastern edge of the sub-basin near the Sierra Nevada foothills and lower on the western edge of the groundwater sub-basin (MWH 2007).

The project site is not within a significant recharge area for the Sacramento Valley groundwater basin (City of Roseville 2004). Hardpan and claypan soils in the project area may further limit recharge in this portion of the basin (City of Roseville 2004).

3.10.2.8 Alternative Site – Surface Water Hydrology, Flood Hazards, and Groundwater Conditions

The principal water body on the alternative site is the seasonal Pleasant Grove Creek drainage, which crosses the southeast corner of the alternative site. Similar to the project site, this site also does not contain any other permanent water features but does contain some areas with concentrations of vernal pools that pond seasonally. The alternative site is not within any potential dam inundation area (City of Roseville, 2011). Although, the site is not within the FEMA-designated 100-year floodplain, it is within the City's Regulatory Floodplain (City of Roseville 2011). Groundwater conditions in the area of the alternative site are substantially the same as in the area of the project site.

3.10.3 REGULATORY FRAMEWORK – APPLICABLE LAWS, REGULATIONS, PLANS, AND POLICIES

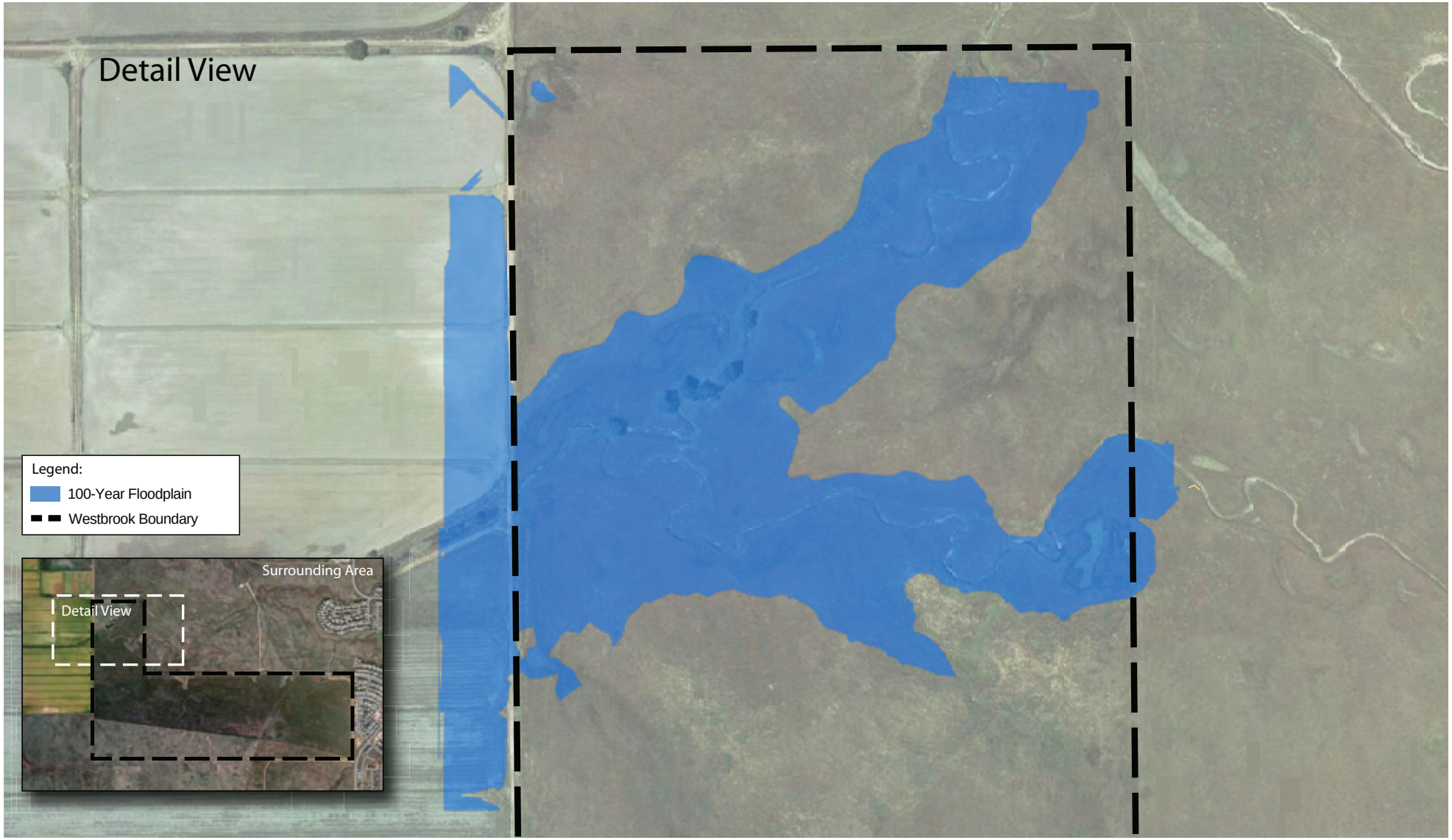
3.10.3.1 Federal Laws, Regulations, Plans, and Policies

Clean Water Act

The Clean Water Act (CWA) (33 USC 1251 et seq.) is the principal federal law protecting the quality and integrity of the nation's surface waters. The CWA offers a range of mechanisms to reduce pollutant input to waterways, manage polluted runoff, and finance municipal wastewater treatment facilities. Permit review serves as the CWA's principal regulatory tool; the CWA provides that discharges to jurisdictional waters are unlawful unless authorized by a permit. The following CWA sections are particularly relevant to the proposed project.

- Section 303 – water quality standards and implementation plans
- Section 401 – State Water Quality Certification or waiver
- Section 402 – National Pollutant Discharge Elimination System (NDPES)
- Section 404 – Discharge of dredged or fill materials into waters of the U.S.

In California, Sections 303, 401, and 402 are the responsibility of the State Water Resources Control Board (SWRCB), which in turn delegates authority to the individual RWQCBs. The CWA Section 404 program is administered by the U.S. Army Corps of Engineers (USACE) in California. The following paragraphs discuss Section 404 in more detail; additional information on Sections 401 through 402 and Section 303 is provided under **State Regulations**, since these sections are administered by state agencies.



SOURCE: Civil Engineering Solutions, Inc. – September 2011

FIGURE **3.10-1**

Pre-Project 100-Year Floodplain

Section 404 Discharge into Waters of the U.S.

CWA Section 404 regulates the discharge (placement) of dredged and fill materials into waters of the United States. Project proponents must obtain a permit from the USACE for any such discharge before proceeding with the proposed activity. This generally requires the preparation of a delineation of jurisdictional waters of the United States consistent with USACE protocols, in order to define the boundaries of the jurisdictional waters potentially affected by the project.

Jurisdictional waters include areas within the ordinary high water mark of a stream, including non-perennial streams that have a defined bed and bank, as well as any stream channel that conveys natural runoff, even if it has been realigned.[1] They also include seasonal and perennial wetlands, including coastal wetlands. Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 CFR 230.3).

Section 404 permits may be issued only for the "least environmentally damaging practicable alternative" (LEDPA). That is, authorization of a proposed discharge is prohibited if there is a practicable alternative that would have less adverse impacts on wetlands and other waters and lacks other significant consequences. Applicants for a Section 404 permit must also obtain certification from the state that the activity will not adversely affect water quality, as required by CWA Section 401.

Safe Drinking Water Act

The Safe Drinking Water Act of 1974, amended in 1986 and again in 1996, is the cornerstone federal law protecting drinking water quality. It gives the U.S. Environmental Protection Agency (USEPA) authority to establish drinking water standards and to oversee the water providers (cities, counties, water districts, and agencies) who implement those standards, and also includes provisions for the protection of surface waters and wetlands in support of drinking water quality.

In California, the USEPA delegates some of its Safe Drinking Water Act implementation authority to the California Department of Public Health's Division of Drinking Water and Environmental Management (DPH), which administers a wide range of regulatory programs relevant to potable water supply quality and safety.

Floodplain Management

The National Flood Insurance Act and the Flood Disaster Protection Act were passed in response to the rising cost of disaster relief, in 1968 and 1973 respectively (42 USC 4001 et seq.). Together, these acts reduce the need for large publicly funded flood control structures and disaster relief by restricting development on floodplains. FEMA administers the National Flood Insurance Program (NFIP) and issues flood insurance rate maps (FIRMs) delineating flood hazard zones for the areas participating in the program.

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1 Jurisdictional waters also include all tidal waters, interstate waters, ponds, lakes, etc. If a stream is tidal, the Section 404 jurisdiction is the high tide line instead of the ordinary high water mark.

Executive Order 11988 (Floodplain Management), issued in 1977, addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding projects to avoid incompatible floodplain development, be consistent with the standards and criteria of the NFIP, and restore and preserve natural and beneficial floodplain values.

3.10.3.2 State Laws, Regulations, Plans, and Policies

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Cal. Water Code, Division 7) established the SWRCB; divided the state into nine regions, each overseen by a RWQCB; and gave the SWRCB and RWQCBs statutory authority to regulate water quality. Originally passed in 1969, the Porter-Cologne Act was amended in 1972 to extend the federal CWA authority to the SWRCB and RWQCBs (see **Clean Water Act** above). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of the daily implementation of water quality regulations is carried out by the nine RWQCBs. The following paragraphs summarize their principal responsibilities. The project area is within Region 5 and is under the jurisdiction of the Central Valley RWQCB.

Basin Plans and Water Quality Standards

The Porter-Cologne Act provides for the development and periodic review of water quality control plans (basin plans) that designate beneficial uses and water quality objectives for the state's principal water bodies and include programs to achieve water quality objectives. Each RWQCB prepares a basin plan for the waters under its jurisdiction in order to protect and enhance existing and potential beneficial uses. CWA Section 303 requires the states to adopt water quality standards for water bodies and have those standards approved by the USEPA. Water quality standards consist of designated beneficial uses (e.g., wildlife habitat, agricultural supply, fishing, etc.) for a particular water body, along with water quality criteria necessary to support those uses. Specific objectives are provided for the larger water bodies within the region as well as general objectives for surface and groundwater. Basin plans are primarily implemented by using the CWA Section 402 National Pollutant Discharge Elimination System (NPDES) permitting system to regulate waste discharges so that water quality objectives are met.

Water bodies that fail to meet water quality standards are considered impaired and, under CWA Section 303(d), are placed on a list of impaired waters for which a TMDL program must be developed to control input of the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards. Once established, the TMDL is allocated among current and future pollutant sources to the water body. Contributions toward the TMDL limit are controlled through the issuance of waste discharge requirements under CWA Section 402.

Section 401 Water Quality Certification

CWA Section 401 requires all applicants for other CWA permitting to meet requirements such that the RWQCB with jurisdiction can certify that the proposed activity will comply with specific sections of the CWA and will not adversely affect water quality. This is accomplished by implementing effluent limitations

(waste discharge requirements or WDRs) and establishing a monitoring program to ensure that the limitations are met.

NPDES Program

Amendments to the CWA in 1972 created the National Pollutant Discharge Elimination System (NPDES) and rendered point-source discharge of pollutants to waters of the United States unlawful unless authorized under an NPDES permit. Further amendments in 1987 added Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. The NPDES program provides for general permits that cover a number of similar or related activities, as well as individual permits covering a single project or activity. Each permit includes WDRs limiting the concentration of specific contaminants likely to be contained in the permitted discharge.

The SWRCB has elected to adopt a single statewide General Permit that applies to all storm water discharges associated with construction activity, except those on Tribal Lands, those in the Lake Tahoe Hydrologic Unit, and those from activities performed by the California Department of Transportation (Caltrans). The Construction General Permit requires all dischargers where construction activity disturbs 1 acre or more to develop and implement a Storm Water Pollution Prevention Plan (SWPPP) that specifies Best Management Practices (BMPs) to prevent construction pollutants from contacting storm water and control off-site delivery of sediment and other construction-related pollutants, eliminate or reduce non-storm water discharges to storm sewer systems and other jurisdictional waters, and inspect and monitor the success of all BMPs.

Effective July 1, 2010, all dischargers are required to obtain coverage under the Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009. The new Construction General Permit includes augmented requirements for the SWPPP, including a visual monitoring program, a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs, and a sediment-monitoring plan if the site discharges directly to a water body that is 303(d)–listed for sediment.

In addition, all new undertakings that are over 1 acre in size and that are not already covered by the current stormwater permit must identify (1) the project as a Risk Level 1, 2, or 3 project, based on the project sediment risk (the relative amount of sediment that can be discharged, given the project and location details); and (2) receiving water risk (the risk sediment discharges pose to the receiving waters). Risk Level 2 and 3 projects must prepare a Rain Event Action Plan (REAP) applicable to every event where there is a forecast of 50 percent or greater probability of measurable precipitation (0.01 inch or more).

The previous Construction General Permit (99-08-DWQ) required the SWPPP to include a description of all post-construction BMPs on a site and a maintenance schedule. The new Construction General Permit requires dischargers to replicate the pre-project runoff water balance for the smallest storms up to the 85th percentile storm event, or the smallest storm event that generates runoff, whichever is larger. The permit emphasizes runoff reduction through on-site storm water reuse, interception, evapotranspiration and infiltration using a combination of non-structural controls and conservation design measures (e.g., downspout disconnection, soil quality preservation/enhancement, interceptor trees). The new Construction General Permit also requires dischargers to maintain pre-development drainage densities and concentration

times in order to protect channels, and encourages dischargers to implement setbacks to reduce channel slope and velocity changes that can lead to aquatic habitat degradation.

Senate Bill 1938

Senate Bill (SB) 1938 (Cal. Water Code Chapter 603), signed into law in 2002, requires public agencies seeking state funding for groundwater projects to develop and implement a groundwater management plan. SB 1938 is intended to ensure planning for the state's larger groundwater basins as well as those not specifically discussed in the California Department of Water Resources' official summary, Bulletin 118 (*California's Groundwater*) (California Department of Water Resources 2003).

Required components of the groundwater management plan include an inventory of water supplies and uses in the region, Basin Management Objectives (BMOs) to protect and enhance the groundwater basin, a plan to involve other local agencies and stakeholders in cooperative planning, along with a public information plan, and monitoring protocols to ensure that BMOs are being met.

3.10.3.3 Local Plans, Policies, and Ordinances

City of Roseville

City General Plan

Floodplain Designation Policy

Flood safety is a primary concern in the City of Roseville. The current General Plan accordingly requires the 100-year floodplain to be designated on the City land use map, based on the best available floodplain information. Within the 100-year floodplain, the floodway fringe is defined as the area along the boundary of the floodplain where complete obstruction would not result in more than a 1-foot rise in the water surface elevation. The remainder of the floodplain is considered to constitute the floodway, where floodwaters typically have the highest velocity. Development within the 100-year floodplain is regulated as follows (City of Roseville 2010b).

- **Infill areas** – No development is permitted within the 100-year floodway. Development may be permitted within the floodway fringe.
- **Remainder of the City (specific plan areas and North Industrial Area)** – In general, development is not permitted anywhere within the future floodplain (floodway and floodway fringe). Exceptions may be considered by the City on a case-by-case basis if encroachment is limited to the floodway fringe and would not result in *any* off-site increase in the water surface elevation.

Subject to the approval of the City's Public Works Director, designation of the floodplain can be terminated where the 100-year floodplain narrows to a width of 200 feet (61 meters) or less and where the associated drainage area is less than 300 acres (121 hectares) (City of Roseville 2010b). Additional discussion of the City's Regulatory Floodplain is provided in the **City Design Standards** section below.

Flood Safety and Water Resources Goals

The City General Plan includes the following goals related to flood hazards:

Goal 1: Minimize the potential for loss of life and property due to flooding.

Goal 2: Pursue flood control solutions that are cost effective and minimize environmental impacts.

The General Plan also includes policies and implementation measures for these goals.

Additional General Plan guidance applies to water resources, including water quality and groundwater recharge, as stated in the following goals.

Goal 1: Continue to improve surface water quality and accommodate water flow increases.

Goal 2: Enhance the quantity and quality of groundwater resources.

City Ordinances

The City's Urban Stormwater Quality Management and Discharge Control Ordinance (Chapter 14.20 of Title 14 of the Roseville Municipal Code) establishes a regulatory framework for construction and post-construction stormwater management. Pursuant to the ordinance, the City adopted its *Stormwater BMP Guidance Manual for Construction* (City of Roseville Department of Public Works) in March 2007, followed by its *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* (Sacramento Stormwater Quality Partnership and the City of Roseville 2007) in May 2007. The City's Flood Damage Prevention Ordinance (Chapter 9.80 of the Roseville Municipal Code) establishes a regulatory framework to promote public health and safety, and to minimize public and private losses due to flood conditions in specific areas of Roseville. The Grading Ordinance (Chapter 16.20 of the Roseville Municipal Code) contains standards for erosion control during construction. It also prohibits grading during wet weather and generally protects drainageways from disturbance, as well as requiring prompt revegetation of areas disturbed by grading.

City of Roseville Stormwater Management Program

The City's Stormwater Management Program (SWMP) establishes priorities and sets forth a comprehensive suite of activities and strategies that represent the City's minimum control measures and BMPs intended to address NPDES Phase II requirements for stormwater management. The goal of the SWMP is to reduce pollutant levels in stormwater to the maximum extent practicable. To that end, it identifies approaches, measures, and standards for the following types of controls identified in the General Permit (City of Roseville 2010a).

- Public outreach and involvement
- Detection and elimination of illicit discharges
- Construction runoff management
- Runoff control and quality for new development and redevelopment
- Municipal operations stormwater control

The SWRCB granted the City its permit coverage on July 2004.

City of Roseville Design Standards

The City's Design Standards were developed to provide direction for the design and construction of improvements that will be transferred to the City for maintenance and/or operation. These include but are not limited to drainage and water supply facilities. The intent is to ensure that facilities used by the public (including facilities such as storm drain systems that protect public safety) are developed in a consistent and coordinated manner.

Of particular relevance to the analyses in this section, the Design Standards stipulate methods for the hydraulic modeling required to design stormwater drainage infrastructure as well as design and performance standards for various types of facilities. Key provisions are identified below.

- In general, all residential lots must have a minimum pad elevation of 1 foot (0.3 meter) above the 100-year water surface elevation, and all commercial sites must have minimum finished floor elevations of 1 foot above the 100-year surface elevation. The 100-year surface elevation level is determined based on the assumption that all storm drains are inoperative and all upstream areas are fully developed. This requires the Design Engineer to provide an overland release for all projects or provide storage for the 100-year storm frequency. Parking lots and storage areas may be no more than 1.5 feet (0.5 meter) below the 100-year water surface elevation.
- The City's Regulatory Floodplain, defined in the General Plan Safety Element (see **City General Plan** above) is distinguished from the FEMA flood 100-year flood hazard area. For watersheds larger than 300 acres (121 hectares), the City's Regulatory Floodplain is generally equivalent to the area inundated by the 100-year flood event assuming buildout of the drainage basin. Residential lots developed within or adjacent to the City's Regulatory Floodplain must have pad elevations a minimum of 2 feet (0.6 meter) above the City's 100-year flood elevation. Non-residential projects within the Regulatory Floodplain must have finished floor elevations a minimum of 2 feet (0.6 meter) above the City's 100-year flood elevation. In areas where the 100-year flood depths are less than 8 feet (2.4 meters), these minimum freeboard requirements are increased to 3 feet (0.9 meter).
- If a project proposes fill or other significant improvements within the City's Regulatory Floodplain, a hydraulic study is required to determine the effect of the encroachment. Encroachments cannot be approved if they would result in any off-site increase in water surface elevation.
- Drainage systems must be designed to accommodate the ultimate development of the entire upstream watershed under the 10-year peak storm discharge. For other facilities, such as streets, bridges, open channels, and buildings, additional requirements that relate to the 25-year and 100-year peak storm discharges apply.
- The design of stormwater detention and retention basins must conform to the latest edition of the Placer County Flood Control and Water Conservation District (PCFCD) Stormwater Management Manual (Placer County 1994), and must allow 2-year storm event flows to bypass the basin. Basin layout and design must minimize maintenance effort and costs.

Placer County Flood Control and Water Conservation District (PCFCD)

The PCFCD was formed in 1984. Its primary purpose is to protect lives and property from flood effects through comprehensive, coordinated flood prevention planning. In support of this goal, the PCFCD implements regional flood control projects, conducts hydrologic and hydraulic modeling to better

understand County watersheds, and develops and implements master plans for County watersheds. It also provides information and technical support relevant to flood control to the County, cities, and developers. The PCFCD operates and maintains the County flood warning system, reviews proposed development projects for compliance with PCFCD standards, and provides technical support for Office of Emergency Services activities.

The PCFCD Stormwater Management Manual (SWMM) (Placer County 1994) contains policies, guidance, and specific standards for evaluating hydrologic and hydraulic impacts of new development in the context of regional stormwater issues. When stormwater detention or retention facilities are used to mitigate downstream increases in stormwater flows due to development, the SWMM requires that post-project peak flows be reduced by comparison with pre-project peak flows. The objective flow is determined by estimating the predevelopment peak flow rate and subtracting 10 percent of the difference between the estimated pre- and post-development peak flow rates. The objective flow shall never be less than 90 percent of the estimated predevelopment flow.

Western Placer Groundwater Management Plan

The Western Placer Groundwater Management Plan (WPCGMP) (MWH 2007) was developed by the Cities of Roseville and Lincoln in partnership with the Placer County Water Agency and the California American Water Company in response to Senate Bill (SB) 1938 requirements. The goal of the plan is to "maintain the quality and ensure the long term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area."

3.10.4 SIGNIFICANCE THRESHOLDS AND ANALYSIS METHODOLOGY

3.10.4.1 Significance Thresholds

Council on Environmental Quality (CEQ) guidance requires an evaluation of a proposed action's effect on the human environment. The USACE has determined that the Proposed Action or its alternatives would result in significant effects related to hydrology and water quality if the Proposed Action or an alternative would:

- substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site;
- place housing or structures within a 100-year floodplain or place structures that would impede or redirect flood flows;
- 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;
- during and post construction, create substantial additional sources of polluted runoff that could affect water quality;
- cause an exceedance of applicable effluent discharge standards;
- interfere substantially with groundwater recharge or substantially deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level; or

- substantially increase runoff such that the geomorphology of creeks is altered.

The cumulative impacts of the Proposed Action and its alternatives would be considered significant if the Proposed Action or an alternative would:

- cumulatively contribute runoff to facilities susceptible to flooding;
- release sediment and other pollutants such that cumulatively downstream water quality is affected;
- require groundwater withdrawal which, cumulatively exceeds the safe yield of the aquifer; or
- interfere cumulatively substantial groundwater recharge.

3.10.4.2 Analysis Methodology

Analysis of effects of the Proposed Action related to surface hydrology, flooding, and water quality is based on the Drainage and Stormwater Master Plan prepared for the Westbrook project (Civil Engineering Solutions 2011, dated October 3, 2011). Provisions related to hydrology and water quality in the Westbrook project and the main features of the Proposed Action's Drainage and Stormwater Master Plan are briefly summarized below as these are relevant to the evaluation of the Proposed Action's hydrology and water quality impacts.

Among its provisions relevant to hydrology and water quality, the Applicant for the Westbrook project is proposing to designate the northwest corner of the project site as open space with created wetlands and a floodplain expansion area along the West Plan tributary to control peak 100-year storm flows. The Applicant has also proposed to develop all storm drainage facilities in accordance with the City's Improvement Standards, the City's Stormwater Quality Design Manual, the PCFCD Stormwater Management Manual, and the terms of federal permitting under the Clean Water Act. The Westbrook project would direct drainage away from vernal pool habitat. The Westbrook project would also incorporate a wide range of low-impact development (LID) options, including the following.

- Disconnected roof drains
- Reduction of impervious surfaces; disconnected and separated pavement, permeable pavement, and porous pavement
- Soil amendments in landscaped areas and planters
- Tree planting and canopy preservation
- Stream buffers
- Vegetated swales
- Stormwater detention

The Drainage and Stormwater Master Plan (Civil Engineering Solutions 2011) includes the hydraulic analyses required by the City's Design Standards and the PCFCD SWMM, as well as design specifications for drainage infrastructure and for the larger flood management improvements that would serve the community as a whole. These include the following.

- Preservation of the West Plan tributary (including the south fork of the tributary) floodplains (including floodway and floodway fringe areas) as open space.

- Creation of increased floodplain storage in wetland areas within the West Plan tributary corridor.

Impacts on groundwater reserves are evaluated based on water demand analyses in the City's Sierra Vista Specific Plan EIR (City of Roseville 2010a).

To evaluate the effects of the Proposed Action and alternatives on surface water hydrology, this EIS uses the increase in impervious surfaces (as reflected by the development footprint) under the Proposed Action and each alternative. **Table 3.10-2** presents the development footprint under each alternative.

Table 3.10-2
Development Footprint

Alternative	Development Footprint (in acres)	Percent greater or less than Proposed Action
Proposed Action	361	--
No Action	272	-25%
Alternative 1 (Reduced Footprint, Increased Density)	270	-25%
Alternative 2 (Reduced Footprint, Same Density)	270	-25%
Alternative 3 (Central Preserve Alternative)	281	-22%
Alternative 4 (One Acre Fill Alternative)	236	-35%
Alternative 5 (Half Acre Fill Alternative)	223	-38%
Off-Site Alternative	317	-12%

3.10.5 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

Impact HYDRO-1 Effect related to On- or Off-Site Flood Hazards

No Action Alt.

The No Action Alternative would avoid significant effects related to on-site flood risks. These **direct** and **indirect** effects are considered **less than significant**. Mitigation is not required. The No Action Alternative could contribute to off-site flooding in the sump area upstream from the Natomas Cross Canal–Pleasant Grove Canal confluence. This would be a **significant indirect** effect. Mitigation would reduce this **indirect** effect to **less than significant**.

The project site is currently undeveloped. Development under the No Action Alternative would modify existing topography and drainage on the project site by grading to create pads for construction of residences and commercial development and to construct roadways. The No Action Alternative would construct a mixed-use development on the project site. Assuming the use of conventional hardscape, buildout under the No Action Alternative would add approximately 272 acres (110 hectares) of impervious surface to the site, with approximately 125 acres (81 hectares) preserved as open space.

Flood flows from the increased impervious surfaces on the project site were not separately calculated for the No Action Alternative. As shown in **Table 3.10-3**, the Proposed Action

would have the potential to increase peak flood flows in the West Plan tributary. The No Action Alternative would result in lower peak flows due to the smaller development footprint and lower amount of impervious surfaces. In compliance with the City's Design Guidelines, and the PCFCD SWMM, as part of the project, the No Action Alternative would also incorporate a number of features to provide safe conveyance of increased peak flows within the project site. In addition, as part of the project the No Action Alternative would include LID measures and preservation of the West Plan tributary floodplain as open space, which would ensure that it would not increase flood hazards to downstream areas.

Water elevations were not separately calculated for the No Action Alternative. **Table 3.10-4** below compares pre-Proposed Action water surface elevations at selected locations along West Plan tributary during the 100-year flood with post-project 100-year water surface elevations at the same sites. Since post-project flows would increase, the reduction in water surface elevation in most locations reflects the effect of the increased flood storage provided by the Proposed Action. The No Action Alternative would create similar flood storage features. Consequently, although at buildout, the No Action Alternative would modify site topography and add impervious surface, it would not result in significant effects related to on-site flood risks. These **indirect** effects would be **less than significant**. Mitigation is not required. There would be **no direct** effects.

On the more regional scale, with the peak flow management features described above in place, the No Action Alternative would satisfy the PCFCD SWMM requirement to avoid increasing the water surface elevation off-site. However, the increase in impervious surface associated with development of the currently undeveloped project site would increase the total volume of runoff that would be contributed to the Natomas Cross Canal in any given flood event. Flooding presently occurs in the sump area upstream from the Natomas Cross Canal–Pleasant Grove Canal confluence when the Sacramento River rises above a stage of 37.0 feet at the Verona Gauge, and additional runoff could increase the depth of flooding during this type of event (Civil Engineering Solutions 2011). The No Action Alternative would contribute to flooding in the sump area upstream of the Natomas Cross Canal–Pleasant Grove Canal confluence, this **indirect** effect is considered **significant**.

The City is currently developing flood protection improvements to address flooding in the Natomas Cross Canal–Pleasant Grove Canal sump area through its Reason Farms flood storage project, which would construct a 2,530 acre-foot (312 hectare-meter) flood storage basin at Reason Farms to manage increased runoff from existing and planned (entitled) development in portions of the City that drain to the Natomas Cross Canal. This includes projects within the Curry Creek watershed. Construction of the Reason Farms basin could begin as early as 2014 and is expected to continue at the same rate of new development in the City.

Mitigation Measure HYDRO-1 would be implemented to address the downstream flooding effect. It requires the payment of the City's Pleasant Grove Watershed Mitigation Fee, which

would provide a fair-share contribution toward the cost of the Reason Farms flood control project (City of Roseville 2010a). This measure is the same as Mitigation Measure WMM 4.12-2 in the Sierra Vista Specific Plan EIR. By contributing funds toward the construction of the Reason Farms flood storage project, the Sierra Vista Specific Plan EIR concluded that this mitigation measure would reduce the effect to a less than significant level (City of Roseville 2010a). The City of Roseville has a process in place to monitor the need for the flood storage project which will determine when the detention facility will be built. The start date for construction of the flood storage facility has not been decided. The USACE assumes that the City of Roseville would impose the same mitigation measure on the No Action Alternative to address this effect. The USACE agrees with the conclusion in the Sierra Vista Specific Plan EIR and finds that this **indirect** effect would be reduced to **less than significant**. **No direct** effects would occur.

Proposed Action

The Proposed Action would also avoid significant effects related to on-site flood risks. These **direct** and **indirect** effects are considered **less than significant**. Mitigation is not required. The Proposed Action could contribute to off-site flooding in the sump area upstream from the Natomas Cross Canal–Pleasant Grove Canal confluence. This would be a **significant indirect** effect. Mitigation would reduce this **indirect** effect to a **less than significant** level.

As noted above, the project site is currently undeveloped. Development under the Proposed Action would modify existing topography and drainage on the project site and, assuming the use of conventional hardscape, buildout under the Proposed Action would add approximately 361 acres (146 hectares) of impervious surface to the site, with approximately 37 acres (15 hectares) preserved as open space. This increase in impervious surface would potentially increase peak storm flows, as summarized in **Table 3.10-3** below.

Table 3.10-3
Pre- and Post-Project (Buildout) Peak Storm Flows, With and Without Stormwater Measures

Stream Station	Location	10-Year Peak Flow (cfs)				100-Year Peak Flow (cfs)			
		Pre-Project	Buildout no LID Measures	Buildout with LID Measures	Net Change *	Pre-Project	Buildout no LID Measures	Buildout with LID Measures	Net Change*
Curry Creek - West Plan Tributary									
69	West Plan Tributary Enters Project Area	220	402	198	-22	562	838	543	-19
73.3	South Fork Enters Project Area	127	121	121	-6	256	255	255	-1
65	At Confluence, Upstream of Existing Culvert	280	472	241	-39	574	932	534	-40
61	Downstream of Project Boundary	237	310	211	-26	457	527	402	-55

Source: Civil Engineering Solutions, Inc. 2011
* *Net change refers to the difference between buildout with stormwater detention and floodplain storage in place and pre-project conditions.*
cfs = cubic feet per second

As shown in **Table 3.10-3**, the Proposed Action would have the potential to increase peak flood flows over much of the site length of the drainages. However, consistent with the requirements of the City's Design Guidelines, the Sierra Vista Specific Plan, and the PCFCD SWMM, the Proposed Action would incorporate a number of features as part of the project to provide safe conveyance of increased peak flows within the project site. The Proposed Action would include LID measures and the preservation of the West Plan tributary floodplain as open space, which would ensure that it would not increase flood hazards to downstream areas. **Table 3.10-3** also compares pre-project peak flows with (1) post-project flows at buildout without implementing LID measures or preserving open space for floodplain storage and (2) post-project flows at buildout with the proposed stormwater detention and floodplain storage in place. **Table 3.10-4** below compares pre-project water surface elevations at selected locations along West Plan tributary during the 100-year flood with post-project 100-year water surface elevations at the same sites. Since post-project flows would increase, the reduction in water surface elevation in most locations reflects the effect of the increased flood storage provided by the Proposed Action.

Table 3.10-4
Pre- and Post-Project Water Surface Elevations

Station	Location	Pre-Project 100-Year Water Surface (HGL)	Post-Project 100-Year Water Surface (HGL)	Change in Water Surface (feet)
Curry Creek - West Plan Tributary				
69.0	Upstream Boundary	82.20	81.84	- 0.36
73.3	Upstream Limit of South Fork (on-site)	82.11	82.06	- 0.05
63	Downstream of Project Boundary	82.01	81.74	- 0.27

Source: Civil Engineering Solutions, Inc. 2011
HGL = Hydraulic Grade Line

With the added floodplain storage features in place, peak 2-year, 10-year, and 100-year storm flows on the project site, and peak flows delivered off-site in these events, would decrease in comparison to existing conditions. The project plan would create 18 acre-feet of additional storage within the 100-year floodplain. Consequently, although at buildout, the Proposed Action would modify site topography and add impervious surface, it would not result in significant effects related to on-site flood risks. These **direct** and **indirect** effects would be **less than significant**. Mitigation is not required.

The Westbrook project envisions that the development on the project site would take place in a phased manner, and provides for backbone infrastructure, including storm water management, to be phased along with residential and commercial development. As development proceeds, residential or commercial improvements on individual parcels would be identified in more detail as Small Lot Tentative Maps or subsequent entitlements are approved. The approvals process at the parcel level will require further evaluation of peak flow discharges and storm water management requirements in light of the parcel-specific proposals, and if additional mitigation is identified as necessary, it will be implemented through the City approval process. Additional mitigation at the parcel-specific or phase level cannot feasibly be designed at this time, and may not be needed, but if needed, will be enforced by the City under its existing permit review process.

The Proposed Action would reduce peak flows, but would generate substantially more runoff from the project site which would contribute to flooding in the sump area upstream of the Natomas Cross Canal–Pleasant Grove Canal confluence and based on the significance criteria regarding on- and off-site flood hazards and for the same reasons detailed under the No Action Alternative listed above, this **indirect** effect is considered **significant**. **Mitigation Measure HYDRO-1** would address this effect. As noted above, this measure is the same as Mitigation Measure WMM 4.12-2 in the Sierra Vista Specific Plan EIR and was incorporated into the project at the time that the City approved the

Westbrook project. Implementation of this mitigation measure would reduce the **indirect** effect to **less than significant**. **No direct** effect would occur.

Alts. 1 through 5

All of the on-site alternatives would construct a moderate scale, mixed-use project on the project site. As the total amount of development on the site and resultant impervious surfaces would be approximately 22 to 38 percent fewer than the Proposed Action under all five on-site alternatives, the alternatives would have the potential to increase peak flows along the drainages by a smaller amount than the Proposed Action. Similar flood flow storage features would be included in each alternative and, therefore, Alternatives 1 through 5 would also result in a **less than significant direct** and **indirect** effect related to on-site flooding. No mitigation is required.

The five on-site alternatives would contribute to flooding in the sump area upstream of the Natomas Cross Canal–Pleasant Grove Canal confluence and based on the significance criteria listed above regarding on- and off-site flood hazards and for the same reasons presented above for the No Action Alternative, this **indirect** effect is considered **significant**. **Mitigation Measure HYDRO-1** would address this effect. As noted above, this measure is the same as Mitigation Measure WMM 4.12-2 in the Sierra Vista Specific Plan EIR. The USACE assumes that the City of Roseville would impose the same mitigation measure on the on-site alternatives to address this effect, and for the reasons presented above, the implementation of this mitigation measure would reduce the **indirect** effect to **less than significant**. **No direct** effect would occur.

Off-Site Alt.

The Off-Site Alternative would construct a moderate scale, mixed-use project on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines, and roadway improvements. The total amount of impervious surfaces that would be developed on the alternative site would be less than under the Proposed Action. Flood flow detention basins would be built off-site to handle the increase in storm water and reduce peak flows. As a result, the Off-Site Alternative would not result in significant effects related to on-site flooding and these **direct** and **indirect** effects would be **less than significant.** No mitigation is required.

Similar to the No Action Alternative, Proposed Action, and other alternatives listed above, storm water from the Off-Site Alternative site would discharge into the Natomas Cross Canal and would contribute to flooding events in the sump area upstream of the Natomas Cross Canal–Pleasant Grove Canal confluence. Based on the significance criteria listed above regarding on- and off-site flood hazards and for the same reasons presented above for the Proposed Action, this **indirect** effect would be **significant**. The USACE assumes that the City would impose a mitigation measure similar to **Mitigation Measure HYDRO-1** on this alternative and that the measure would reduce the **indirect** effect to a **less than significant** level. **No direct** effect would occur.

Mitigation Measure HYDRO-1: Payment of Drainage Impact Fees
(Applicability – No Action, Proposed Action and All Alternatives)

The City shall collect the Pleasant Grove Drainage Fee from the Applicant prior to the approval of each building permit, which would cover the cost of retention for that development's portion of the Roseville regional retention basin at Reason Farms.

Impact HYDRO-2 Effects from Construction within a Floodplain

No Action Alt. Construction within a floodplain area can be of concern because it has the potential to impede flood conveyance and/or redirect flood flows, and can exacerbate existing flood hazards or create new hazards in areas not presently subject to flooding.

As discussed in the **Affected Environment** above, no portion of the project site is within the City's Regulatory Floodplain. As shown in **Figure 3.10-1**, a portion of the project site is within a 100-year floodplain. This comprises the West Plan tributary corridor that crosses the northwestern corner of the project site. Under the No Action Alternative, the entire 100-year floodplain would be included in an area that is designated open space on the No Action Alternative land use diagram. As a result, no major structures would be placed within this area although minor localized construction, such the construction of a trail, could take place within the open space area. Because flood flows would not be impeded or redirected in a hazardous manner by this limited construction, this **direct** effect would be **less than significant**. Mitigation is not required. **No indirect** effect would occur.

Proposed Action Compared to the No Action Alternative, the Proposed Action would construct a larger mixed-use development on the project site. However, no structures would be constructed within the 100-year floodplain and a trail is constructed in the open space area, the Proposed Action would also not substantially impede or redirect flood flows. The Proposed Project would modify the boundaries of the 10- and 100-year floodplains by building a floodplain expansion area to accommodate additional stormwater flows but this change would help reduce flooding and would not redirect flood flows. Based on the significance criteria listed above regarding construction in a floodplain that could impede or redirect floodwaters and for the same reasons presented above for the No Action Alternative, this **direct** effect would be **less than significant.** Mitigation is not required. **No indirect** effect would occur.

Alts. 1 through 5 Under each on-site alternative, no major structures would be constructed within the 100-year floodplain and no project feature would substantially impede or redirect flood flows. Based on the significance criteria listed above regarding construction in a floodplain that could impede or redirect floodwaters and for the same reasons presented above for the No Action Alternative, this **direct** effect would be **less than significant** for all of the on-

site alternatives**.** Mitigation is not required. **No indirect** effect would occur.

Off-Site Alt. A 100-year floodplain is not present on the alternative site. No major structures would be constructed within the City's Regulatory Floodplain and no project feature would substantially impede or redirect flood flows. Based on the significance criteria listed above regarding construction in a floodplain that could impede or redirect floodwaters and for the same reasons presented above for the No Action Alternative, this **direct** effect would be **less than significant** for the Off-Site Alternative. Mitigation is not required. **No indirect** effect would occur.

Impact HYDRO-3 Exposure to Flood Hazards related to Dam or Levee Failure

No Action Alt. The No Action Alternative would not expose people or structures to flood hazards related to a dam or levee failure. This **indirect** effect would be **less than significant**. Mitigation is not required.

The project site, like the rest of the City, is within the area that could experience flooding in the event Folsom Lake Dikes Nos. 4, 5, and 6 fail. The National Inventory of Dams considers the Folsom Lake Dikes high hazard structures, reflecting a potential for loss of human life in the event of a failure. According to the Folsom Dam Safety and Flood Damage Reduction Joint Federal Project, Dikes 4, 5, and 6 could fail due to overtopping during a major storm event. However, the likelihood of reservoir inflows that could cause overtopping is extremely low, and would be reduced upon completion of the new Folsom Dam spillway that is currently under construction and scheduled for completion by 2015. Failure from piping could occur at any water surface elevation within the reservoir. In addition, the increased precipitation as a result of climate change could result in a significant effect on the hydrograph used for the dikes. If the hydrograph changes then some or all of the designed margin of safety, referred to as freeboard, could be lost. With reduced freeboard, dam operators may be forced to release increased volumes earlier in a storm cycle to retain the margins of safety. Early releases or spillway overflow events could increase flooding downstream (City of Roseville 2011). However, the project site is near an area where the potential hazards from inundation of the Folsom Dam would be low. Therefore, there would be minimal damage to property and no potential for loss of human life (City of Roseville 2011). **No direct** effect would occur.

Proposed Action The Proposed Action would construct a moderate scale, mixed-use development on the project site. Based on the significance criteria listed above regarding exposure to flood hazards related to dam or levee failure and for the same reasons presented above for the No Action Alternative, the **indirect** effect related to dike failure would be **less than significant** under the Proposed Action. Mitigation is not required. **No direct** effect would occur.

Alts. 1 through 5 All of the on-site alternatives would construct a moderate scale, mixed-use development on the project site. Based on the significance criteria listed above regarding exposure to flood hazards related to dam or levee failure and for the same reasons presented above for the No Action Alternative, the **indirect** effect related to dike failure would be **less than significant** for all of the on-site alternatives. Mitigation is not required. **No direct** effect would occur.

Off-Site Alt. The Off-Site Alternative would construct a moderate scale, mixed-use development on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines, and roadway improvements. The Off-Site Alternative site and the alignments of the off-site improvements are north of the dam inundation areas and would not experience flooding in the event Folsom Lake Dikes Nos. 4, 5, and 6 fail. Based on the significance criteria listed above regarding exposure to flood hazards related to dam or levee failure, the effect related to dike failure would be **less than significant.** Mitigation is not required. **No direct** effect would occur.

Impact HYDRO-4 Water Quality Effects during Construction

No Action Alt. The No Action Alternative would avoid significant effects related to water quality during construction. This **direct** effect would be **less than significant.** Mitigation is not required.

The project site is generally flat with mild slopes that slope from east to west and soils have slight to moderate potential for soil erosion. Construction under the No Action Alternative would nonetheless entail ground disturbance, with the potential to result in accelerated erosion and delivery of increased sediment loads to surface waters in the project area. Construction and site finishing would also use a variety of substances with the potential to degrade water quality in the event they are spilled or released (such as vehicle fuels and lubricants, paints, paving media, adhesives, paints, fertilizers, etc.). However, a variety of mechanisms and policies are in place to require erosion and sediment control measures and appropriate handling of the various substances used in construction. The most important and enforceable protections are afforded through the NPDES permitting system. Because each construction phase is expected to exceed the 1-acre (0.4 hectare) threshold, development under the No Action Alternative would be required to obtain coverage under the current Construction General Permit (Order 2009-0009-DWQ), which is substantially more stringent than previous requirements and requires:

- implementation of a SWPPP stipulating BMPs to prevent construction pollutants from contacting storm water and control off-site delivery of sediment and other construction related pollutants,
- elimination or reduction of non-storm water discharges to storm sewer systems

and other jurisdictional waters, and

- inspection and monitoring to ensure that BMPs are functioning properly.

With NPDES compliance, which as stated in Chapter 2 is part of the development under the No Action Alternative, significant effects on water quality as a result of construction under the No Action Alternative are not anticipated. This **direct** effect would be **less than significant**. Mitigation is not required. **No indirect** effect would occur.

Proposed Action

The Proposed Action would construct a moderate scale, mixed use development on the project site. The total amount of development under the Proposed Action would be greater than the No Action Alternative. Therefore, construction activities would have a greater potential to result in short-term water quality effects. However, these effects would be minimized by compliance with the NPDES program and the Construction General Permit which is a part of the project. Based on the significance criteria listed above regarding water quality effects during construction and for the same reasons presented above for the No Action Alternative, the **direct** effects related to water quality during construction would be **less than significant**. Mitigation is not required. **No indirect** effect would occur.

Alts. 1 through 5

All of the on-site alternatives would construct a moderate scale, mixed use development on the project site. Construction activities under each alternative would have the potential to result in short-term water quality effects. However, these effects would be minimized by compliance with the NPDES program and the Construction General Permit which is part of the development under Alternatives 1 through 5. Based on the significance criteria listed above regarding water quality effects during construction and for the same reasons presented above for the No Action Alternative, the **direct** effects related to water quality during construction would be **less than significant** under all of the on-site alternatives. Mitigation is not required. **No indirect** effect would occur.

Off-Site Alt.

The Off-Site Alternative would construct a moderate scale, mixed use development on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines, and roadway improvements. As the slopes and soils on this site and along the route of the off-site infrastructure are similar to the soils and slopes on the project site, the potential for erosion at this site and along the routes of the off-site infrastructure is also slight to moderate. Construction activities would nonetheless have the potential to result in short-term water quality effects. These effects would be minimized by compliance with the NPDES program and the Construction General Permit which is part of the development under the Off-Site Alternative. Based on the significance criteria listed above regarding water quality effects during construction and for the same reasons presented above for the No Action Alternative, the **direct** effects related to water quality during construction would be **less than significant** under the Off-Site Alternative. Mitigation is not required. **No indirect** effect would occur.

Impact HYDRO-5 Water Quality Effects from Project Occupancy and Operation

No Action Alt. Development under the No Action Alternative would have the potential to generate urban runoff that could affect water quality. This **indirect** effect would be **significant**. However with mitigation, the **indirect** effect would be reduced to a **less than significant** level. **No direct** effect would occur.

The No Action Alternative would convert currently undeveloped lands to urban/suburban uses, including residential areas, commercial areas, roadways, parking areas, and developed recreational areas. The introduction of extensive impervious surfaces would have the potential to increase runoff from the site, and because of the introduction of developed uses, would also have the potential to decrease the quality of runoff. Runoff from the project site would be typical of developed urban areas, where a variety of activities contribute pollutants such as petroleum products, coliform bacteria, nitrogen, phosphorus, heavy metals, pesticides, herbicides, and byproducts of pavement wear to the runoff. If this input is uncontrolled, the long-term potential for degradation of receiving waters would be a **significant indirect** effect.

Consistent with NPDES requirements, the City's General Plan, and Stormwater Management Plan, the Sierra Vista Specific Plan (which applies to the project site) incorporates implementation of LID measures to reduce impervious surface and ensure runoff quality. The Sierra Vista Drainage and Stormwater Master Plan Amendment for Westbrook identifies the following types of LID strategies.

- **Disconnected roof drains** allow runoff from roof systems to be treated by biological filtration while providing opportunities for infiltration.
- **Various types of permeable or porous pavements** decrease the area of impervious surface and reduce runoff generation while supporting uses similar to conventional hardscape.
- **Separated sidewalks** allow runoff to be treated before it enters the storm drain system.
- **Tree planting and canopy preservation** would increase uptake of runoff and decrease the volume of runoff entering the storm drain system.
- **Addition of soil amendments** in landscaped areas and stormwater features can create voids that detain runoff, reducing runoff delivery to surface waters and fostering infiltration. In residential areas, this could entail amending landscape strips adjacent to roadways or other paved areas. In commercial areas, soil amendments are likely to be limited to "stormwater planter" areas. Along roadways, soil amendments can be used where roadway runoff is diverted into landscaped areas.
- **Stream buffers** provide opportunities for sheet flow runoff to be captured and bio-treated before it enters jurisdictional waters.

- **Vegetated swales**, which will be required at all storm drain outfalls, provide opportunities for infiltration, as well as additional treatment.
- **Stormwater retention** allows filtering and trapping of particulate before runoff enters the storm drainage system.

The Drainage and Stormwater Master Plan identifies proposed locations for water quality treatment measures based on the current understanding of likely development patterns. These locations will be refined at the vesting tentative map and site development stage when more detailed plans are prepared. Although these measures are identified in the Sierra Vista Stormwater Master Plan, the City in its evaluation of water quality impacts concluded that the effect would still be significant. The USACE also finds that the potential effects of urban runoff would be **significant**.

Mitigation Measure HYDRO-5 would address this effect. This measure is the same as Mitigation Measure 4.13-2 in the Sierra Vista Specific Plan EIR and requires the City to condition development approval on the inclusion of source and treatment control measures consistent with City and NPDES standards current at the time of approval. By ensuring that all development incorporates adequate measures to prevent urban runoff from the project site from significantly degrading the quality of surface waters, the Sierra Vista Specific Plan EIR concluded that this mitigation measure, in conjunction with compliance with NPDES regulations and low impact development (LID) measures, would reduce the effect to a less than significant level (City of Roseville 2010a). The USACE assumes that the City of Roseville would impose the same mitigation measure on the No Action Alternative to address this effect. The USACE agrees with the conclusion in the Sierra Vista Specific Plan EIR and also finds that this **indirect** effect would be reduced to **less than significant** with mitigation. **No direct** effect would occur.

Proposed Action

Development under the Proposed Action would have the potential to generate urban runoff that could affect water quality. As with the No Action Alternative, the Proposed Action would comply with NPDES requirements and implement the provisions of the Sierra Vista Drainage and Stormwater Master Plan. However, for the same reasons presented above, the **indirect** effect would still be **significant**. Mitigation would be implemented to address this effect. **Mitigation Measure HYDRO-5** would require the City to condition development approval on the inclusion of source and treatment control measures consistent with City and NPDES standards current at the time of approval. As noted above, this measure is the same as Mitigation Measure 4.13-2 in the Sierra Vista Specific Plan EIR and was incorporated into the Proposed Action at the time of project approval. Based on the significance criteria listed above regarding water quality effects during operation, the implementation of this mitigation measure would reduce the **indirect** effect to **less than significant**. **No direct** effect would occur.

Alts. 1 through 5

All of the on-site alternatives would construct a moderate-scale mixed-use development on the project site. Impervious surfaces under all five alternatives would be reduced compared to the Proposed Action by 22 to 38 percent. As all of the on-site alternatives would have a smaller footprint of development and a smaller number of dwelling units than the Proposed Action, all alternatives would have a lower potential to affect surface water quality than the Proposed Action. Of the on-site alternatives, the Half Acre Fill Alternative would have the greatest amount of open space, smallest development footprint, and the fewest residential units. Therefore, the Half Acre Fill Alternative would have the smallest effect on surface water quality. Of the on-site alternatives, the Central Preserve Alternative has the least amount of open space, and the Reduced Footprint/Increased Density Alternative has the greatest number of dwelling units. Therefore, those two alternatives would have a greater potential to degrade surface water quality than the other on-site alternatives. However, compared to existing conditions, urban land uses that would be developed on the project site under all on-site alternatives would have the potential to degrade surface water quality. Based on the significance criteria listed above regarding water quality effects during operation and for the same reasons presented above for the No Action Alternative, this represents a **significant indirect** effect. However, as with the No Action Alternative, **Mitigation Measure HYDRO-5** would ensure that all development minimizes its effect on surface water quality. As noted above, this measure is the same as Mitigation Measure 4.13-2 in the Sierra Vista Specific Plan EIR. The USACE assumes that the City of Roseville would impose the same mitigation measure on the on-site alternatives to address this effect, and for the reasons presented above, the implementation of this mitigation measure would reduce the **indirect** effect to **less than significant**. **No direct** effect would occur.

Off-Site Alt.

The Off-Site Alternative would construct a moderate scale mixed-use project on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines, and roadway improvements. Increased impervious surfaces and urban uses on that site would also have the potential to degrade surface water quality. Based on the significance criteria listed above regarding water quality effects during operation and for the same reasons presented above for the No Action Alternative, this represents a **significant indirect** effect. However, **Mitigation Measure HYDRO-5** would ensure that all development minimizes its effect on surface water quality. The USACE assumes that the City would impose **Mitigation Measure HYDRO-5** on the Off-Site Alternative. With implementation of **Mitigation Measure HYDRO-5**, the USACE finds that the measure would reduce the **indirect** effect to **less than significant**. **No direct** effect would occur.

Mitigation Measure HYDRO-5: Stormwater Management Standards
(Applicability – No Action, Proposed Action, and All Alternatives)

At the tentative map or site development stage, development shall be conditioned to include source control and treatment control measures to include LID strategies and BMP treatment as required by the City's then current design standards and the City's then current General Phase II NPDES Permit issued by the state. The measures would include, but are not limited to the measures identified above, and in Table IV.B.2 Applicable LID Measures by Development Type, found in the Sierra Vista Drainage and Stormwater Master Plan found in Appendix O of the Sierra Vista Specific Plan EIR prepared by the City of Roseville.

Impact HYDRO-6 Effect of Tertiary Treated Effluent on Pleasant Grove Creek

No Action Alt. Development under the No Action Alternative would not result in wastewater flows that would cause an exceedance of applicable effluent discharge standards or limits and, therefore, the **indirect** effect on water quality would be **less than significant**. No mitigation is required. **No direct** effect would occur.

As discussed in more detail in **Section 3.15 Utilities and Service Systems,** of this EIS, the Pleasant Grove Wastewater Treatment Plant (WWTP), which would serve the development under the No Action Alternative, discharges treated effluent into Pleasant Grove Creek under NPDES Permit No. CA0084573, adopted June 12, 2008. This permit currently authorizes discharge of an average dry weather flow (ADWF) of up to 12 million gallons per day (mgd) (45 million liters per day [mld]), with the permitted limit increasing to an ADWF discharge of 15 mgd (57 mld) when planned new treatment facilities are added (City of Roseville 2010a).

Water quality effects associated with further increases in treatment capacity at the WWTP have been analyzed in two previous environmental documents: the EIR prepared for the Roseville Regional Wastewater Treatment Service Area Master Plan (City of Roseville 1996) (Wastewater Master Plan [WWMP] EIR), which analyzed an increase of up to 29.5 mgd (111.7 mld) ADWF, and the West Roseville Specific Plan EIR (City of Roseville 2004), which analyzed an increase of up to 24.7 mgd (93.5 mld) ADWF. An additional analysis was completed in 2006 by the City to evaluate the cumulative effects associated with treatment and discharge of all foreseeable wastewater flows from future urban growth areas (UGAs)[2], including those outside the then-current service area (Merritt Smith Consulting 2006). The Merritt Smith analysis calculated the estimated future ADWF from the treatment plant's service area as of 2005 plus flow from the UGAs located outside the 2005 service area as 23.4 mgd (88.6 mld) (City of Roseville 2010a).

The Merritt Smith analysis confirmed the WWMP EIR finding that significant effects on

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2 The UGAs included the project site. The Merritt Smith analysis took wastewater flows from the project site into account. The flows analyzed equaled the flows associated with project site buildout under the Proposed Action.

several aspects of water quality (thermal loading, trace metals/organic pollutants, and dissolved oxygen levels) would occur as a result of increased discharge of treated effluent to Pleasant Grove Creek but concluded that mitigation identified in the WWMP EIR, which would apply to the WWTP expansion project, would be adequate to reduce effects to a less than significant level.

As development under the No Action Alternative would generate less wastewater than was analyzed for the project site in the WWMP EIR, development under the No Action Alternative would not result in wastewater flows that would cause the WWTP to exceed applicable effluent discharge standards or limits. The **indirect** effect of the No Action Alternative on water quality would be **less than significant**. No mitigation is required. **No direct** effect would occur.

Proposed Action

The Proposed Action would construct a mixed-use development on the project site. As the development under the Proposed Action would be larger than under the No Action Alternative, this alternative would have increased effects related to discharge of wastewater to the WWTP. As explained above, the analysis in the WWMP EIR and the subsequent analysis by Merritt Smith took into account the buildout of the project site under the Proposed Action, and the analysis concluded that increased discharge of treated effluent from the expanded WWTP would not result in significant water quality impacts. Therefore, development under the Proposed Action would not result in wastewater flows that would cause the WWTP to exceed applicable effluent discharge standards or limits. The **indirect** effect of the No Action Alternative on water quality would be **less than significant**. No mitigation is required. **No direct** effect would occur.

Alts. 1 through 5

All of the on-site alternatives would construct a moderate scale, mixed use project on the project site that would be smaller than the Proposed Action in terms of the number of housing units and other land development. Therefore, the effects related to discharge of wastewater to the WWTP would be similar to those of the No Action Alternative and the Proposed Action. Therefore, development under Alternatives 1 through 5 would not result in wastewater flows that would cause the WWTP to exceed applicable effluent discharge standards or limits. The **indirect** effect of the No Action Alternative on water quality would be **less than significant**. Mitigation is not required. **No direct** effect would occur.

Off-Site Alt.

The Off-Site Alternative would construct a moderate scale, mixed-use project on the alternative site. Wastewater would be pumped from the alternative site to the same WWTP that would serve the No Action Alternative and the Proposed Action. As the volume of discharge to the WWTP from that site would be similar to that from the development of the project site, development under the Off-Site Alternative would not result in wastewater flows that would cause the WWTP to exceed applicable effluent discharge standards or limits. The **indirect** effect of the Off-Site Alternative on water quality would be **less than significant**. Mitigation is not required. **No direct** effect would occur.

Impact HYDRO-7 Effect on Groundwater Recharge

No Action Alt. The No Action Alternative would have a **less than significant indirect** effect on groundwater recharge, as the project site is not important for groundwater recharge, and project site development would require implementation of LID measures with tempering effects on infiltration. Mitigation is not required. **No direct** effect would occur.

As discussed in **Groundwater Hydrology**, the project site is in the North American subbasin of the Sacramento Valley groundwater basin. The No Action Alternative would add about 275 acres (111 hectares) of development footprint and increased hardscape to a currently undeveloped site, which will increase the impervious surfaces thereby reducing the potential for infiltration. However, the entire area in the vicinity of the project site, including the Placer County and Bear River subareas are estimated to contribute only about 5 percent of the 830,000 acre-feet per year (102,379 hectare-meter) of total recharge to the Sacramento Valley groundwater basin (California Department of Water Resources 1978). The Placer County subarea alone contributes 1.6 percent of the total recharge in the Sacramento Valley, and hardpan and claypan soils in the project area likely further limit recharge in this vicinity (City of Roseville 2004). As a result, the project site is not a significant recharge area. The **indirect** effect on groundwater recharge from increased impervious surfaces would be **less than significant**. Moreover, under the No Action Alternative, implementation of **Mitigation Measure HYDRO-5** (City of Roseville 2010a; see discussion in **Impact HYDRO-5** above), would incorporate a number of LID features that would increase infiltration by comparison with conventional hardscape, including disconnected roof drains; permeable and porous pavements; vegetated swales and other types of stormwater retention and runoff treatment features; and mandatory use of soil amendments in some settings. **Mitigation Measure HYDRO-5** would further reduce the effect. **No direct** effect would occur.

Proposed Action The Proposed Action would construct a larger mixed-use development on the project site compared to the No Action Alternative. Due to a larger development footprint (361 acres [146 hectares]) and increased hardscape, the Proposed Action would have a greater effect on groundwater recharge than the No Action Alternative. However, based on the significance criteria listed above regarding the effect on groundwater levels due to reduced recharge and for the same reasons presented above for the No Action Alternative, the **indirect** effect on groundwater recharge would be **less than significant** under the Proposed Action. **Mitigation Measure HYDRO-5** would further reduce the effect. **No direct** effect would occur.

Alts. 1 through 5 All of the on-site alternatives would construct a moderate scale, mixed-use project on the project site. The development footprint and hardscape for three of the on-site alternatives, the Reduced Footprint/Increased Density, Reduced Footprint/Same Density, and Central Preserve Alternatives, would be 271 acres (109 hectares) which would be similar to the No Action Alternative. Therefore the effects related to groundwater recharge would be similar. The other two alternatives, One Acre Fill and Half Acre Fill would have smaller development footprints, 236 acres (95 hectares) and 223 acres (90 hectares) respectively. Therefore, the effects related to groundwater recharge would be smaller. Based on the significance criteria listed above regarding the effect on groundwater levels due to reduced groundwater recharge and for the same reasons presented above for the No Action Alternative, the **indirect** effect on groundwater recharge would be **less than significant** under all of the on-site alternatives. **Mitigation Measure HYDRO-5** would further reduce the effect. **No direct** effect would occur.

Off-Site Alt. The Off-Site Alternative would construct a moderate scale, mixed-use project on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines and roadway improvements. The alternative site does not contain hardpan soils that are not amenable to infiltration; therefore, there are more areas on this site where soils allow for better infiltration. The development footprint and hardscape at this site and along the off-site infrastructure routes would be slightly less than under the Proposed Action but greater than the No Action Alternative and on-site alternatives. Therefore, development of the proposed project at the alternate site would have an effect on groundwater recharge that would be less than the effect of the Proposed Action but greater than the No Action Alternative. Based on the significance criteria listed above regarding the effect on groundwater levels due to reduced groundwater recharge and for the same reasons presented above for the No Action Alternative, the **indirect** effect would still be **less than significant. Mitigation Measure HYDRO-5** would further reduce the effect. **No direct** effect would occur.

Impact HYDRO-8 Effects on Groundwater Basin from Groundwater Withdrawal

No Action Alt. The No Action Alternative would have a **less than significant indirect** effect on the groundwater basin, as development proposed under the No Action Alternative would not require the withdrawal of groundwater in quantities that could result in an exceedance of the basin's safe yield. Mitigation is not required. **No direct** effect would occur.

Water supply impacts are analyzed comprehensively in **Section 3.15 Utilities and Service Systems** of this EIS. This analysis focuses specifically on the potential for project-related

use of groundwater to result in withdrawals in excess of the basin's safe yield.

Development under the No Action Alternative would substantially increase water demand by adding population to the City of Roseville. During wet and normal water years, the City plans to continue its current practice of using a combination of surface and recycled water supply, with groundwater used only for emergency backup if recycled water supply is insufficient. During dry years, the City would continue to incorporate groundwater use as well as instituting mandatory water conservation; this is also consistent with current practices (City of Roseville 2010a). The City has used the following two approaches to estimate groundwater demand during dry years:

1. The Water Forum, a multi-agency regional stakeholder group focused on protection of the Lower American River and related water supply issues, in which the City is a participant, estimates that groundwater would need to be used in 15 years out of every 100 to achieve sufficient supply, with a 20 percent conservation effort in place. Citywide groundwater need in such years—reflecting demand generated by existing and planned development, inclusive of development under the Proposed Action (which is a greater amount of development than under the No Action Alternative) —was estimated to range up to 7,320 acre-feet per year (afy) (903 hectare-meter per year [hmy]) and a total of 32,224 acre-feet (3,975 hectare-meters) for the 100-year analysis period. The Citywide demand for groundwater was not separately calculated for the No Action Alternative. Over the same period, a total of 267,835 acre-feet (33,037 hectare-meters) of groundwater is expected to be banked as a result of fallowing Reason Farms, assuming that banking occurs in all but dry and driest years (85 years X 3,151 afy [389 hmy] = 267,835 acre-feet [33,037 hectare-meters]) (City of Roseville 2012). Use of groundwater to supplement recycled water supply under the No Action Alternative would result in less of a demand than the Proposed Action. The No Action Alternative would construct fewer homes with a smaller development footprint. Therefore, the demand would be less than the total projected volume of groundwater banked at Reason Farms over the 100-year period.
2. An alternate approach to assessing groundwater demand was based on projections in the federal Central Valley Project/State Water Project Operations Criteria and Plan (OCAP) (U.S. Bureau of Reclamation 2004). OCAP anticipates 14 years out of 100 would require groundwater pumping to achieve sufficient supply. Estimates of Citywide groundwater demand, including that needed to supply the Proposed Action at buildout, range up to 7,320 afy (903 hmy) and total to 60,812 acre-feet (7,501 hectare-meters) over the 100-year analysis period (City of Roseville 2012). The Citywide demand for groundwater was not separately calculated for the No Action Alternative. Over the same period, a total of 270,986 acre-feet (33,426 hectare-meters) of groundwater is expected to be banked as a result of fallowing Reason Farms, assuming that banking occurs in all but dry and driest years (86 years X 3,151 afy [389 hmy] = 270,986 acre-feet [33,426 hectare-meters) (City of Roseville 2012). The No Action Alternative would result in less demand for groundwater than the Proposed Action. Therefore, even with this expanded (more conservative) estimate, Citywide demand for groundwater

would be below the amount banked at Reason Farms.

Therefore, under either scenario, Citywide groundwater demand, including the demand associated with the No Action Alternative, would be accommodated relying only on groundwater saved by removing Reason Farms from rice production, and the development proposed under the No Action Alternative would not result in groundwater withdrawal that would cause an exceedance of the basin's safe yield. This **indirect** effect on the groundwater basin is considered **less than significant**. Mitigation is not required. **No direct** effect would occur.

Proposed Action

The Proposed Action would construct a larger mixed-use development on the project site. Use of groundwater to supplement recycled water supply under the Proposed Action would result in an additional demand of 220 acre-feet (27 hectare-meters) over a 100-year period, assuming withdrawal of 1.8 mgd (6.8 mld) over a period of two days once every five years. Under Water Forum conditions, total groundwater demand in the City of Roseville would equate to 32,224 acre-feet (3,975 hectare-meters) of groundwater demand plus 220 acre-feet (27 hectare-meters) for a total of 32,444 acre-feet (4,002 hectare-meters). Under OCAP conditions, total groundwater demand in the City of Roseville would equate to 60,812 acre-feet (7,501 hectare-meters) of groundwater demand plus 220 acre-feet (27 hectare-meters) for a total of 61,032 acre-feet (7,528 hectare-meters). These groundwater usage projections would be substantially less than the total projected amount banked at Reason Farms under Water Forum conditions 267,835 acre-feet (33,037 hectare-meters) or OCAP conditions 270,986 acre-feet (33,426 hectare-meters) over the 100-year period. Therefore, the development proposed under the Proposed Action would not involve groundwater withdrawal that would cause an exceedance of the basin's safe yield and the **indirect** effect on the groundwater basin would be **less than significant** under the Proposed Action. Mitigation is not required. **No direct** effect would occur.

Alts. 1 through 5

All of the on-site alternatives would construct a project broadly similar to No Action Alternative. Use of groundwater to supplement recycled water supply under all of the on-site alternatives would result in additional demand. The on-site alternatives would construct significantly fewer residential units and have a smaller development footprint. Therefore, the groundwater need would be less than that of the Proposed Project and would not exceed the amount of groundwater banked at Reason Farms. Therefore, the development proposed under the on-site alternatives would not involve groundwater withdrawal that would cause an exceedance of the basin's safe yield and the **indirect** effect on the groundwater basin would be **less than significant**. Mitigation is not required. **No direct** effect would occur.

Off-Site Alt.

The Off-Site Alternative would construct a project broadly similar to the No Action Alternative on the alternative site. In addition, the Off-Site Alternative would require the installation of off-site infrastructure consisting of water, recycled water and sewer lines

and roadway improvements. Water supply at the alternative site would be pumped from the City of Roseville water supply system. Use of groundwater to supplement recycled water supply under the Off-Site Alternative would result in additional demand for groundwater. The Off-Site Alternative would construct a project with a similar development footprint, but fewer residential units. Therefore, the groundwater need would be similar to or less than that of the Proposed Project and would not exceed the amount of groundwater banked at Reason Farms. Therefore, the development proposed under the Off-Site Alternative would not involve groundwater withdrawal that would cause an exceedance of the basin's safe yield and the **indirect** effect on the groundwater basin would be **less than significant**. Mitigation is not required. **No direct** effect would occur.

3.10.6 RESIDUAL SIGNIFICANT IMPACTS

All of the **direct** and **indirect** effects would either be **less than significant** or would be reduced to a **less than significant** level with mitigation. There would be no residual significant effects for the Proposed Action and any of the alternatives.

3.10.7 CUMULATIVE IMPACTS

Cumulative Impact HYDRO-1 Flooding, Water Quality, and Groundwater

No Action Alt., Proposed Action, Alts. 1 through 5

Cumulative development in the study area, including the No Action Alternative, Proposed Action, and Alternatives 1 through 5, would increase the amount of impervious surfaces, which would in turn generate increased storm water runoff and would have the potential to result in downstream flooding and water quality impacts in the Curry Creek watershed. Cumulative urban development would also have the potential to affect groundwater levels through potential reduction in recharge and from withdrawal of groundwater for consumptive use. For reasons presented below, the contribution from the No Action Alternative, Proposed Action, and Alternatives 1 through 5 to these cumulative impacts would be **less than significant**.

Flooding

Storm water runoff produced by the No Action Alternative, Proposed Action, Alternatives 1 through 5 would drain into the West Plan tributaries and eventually into the Pleasant Grove Canal via Curry Creek. Projects upstream and east of State Route 65 in Lincoln and Rocklin have constructed or have planned regional detention storage basins along Pleasant Grove Creek and its tributaries. City of Roseville General Plan Policy 6 and Placer County General Plan Policy 4.E.11 require that individual projects mitigate their direct contribution of increased surface water flows to minimize the potential for increased on- and off-site flooding (City of Roseville 2010a; Placer County 1994b). As described above, the City is

planning a regional stormwater retention basin at Reason Farms which is intended to detain flows until the waters in the Natomas Cross Canal recede. The regional retention basin will serve existing and future development in the Pleasant Grove Creek and Curry Creek watersheds. The regional retention facility, which is approved for construction, is anticipated to be constructed in year 2015 or after. The No Action Alternatives, Proposed Action, and Alternatives 1 through 5 would contribute storm water mitigation fees that would go towards the construction of this regional storm water detention capacity at Reason Farms. Although storm water from the project site would not be pumped up to this detention basin in Reason Farms, the facility has been designed to detain an equivalent volume of water that would be generated at the project site. The detention facility would detain the equivalent volume of storm water (generated primarily by existing development in the watershed) and would allow the Proposed Action or any of the alternatives to discharge that volume into Pleasant Grove Canal and eventually Natomas Cross Canal. The regional facility may be used by not just projects in the City's jurisdiction but also projects in Lincoln, Rocklin, or unincorporated Placer County.

To the extent that future projects in these watersheds elect not to participate in the City's fee program for flood control via the regional detention facility, Placer County will require each project to provide on-site detention to avoid contributing flows that would exasperate the downstream flooding problem as described in the Stormwater Management Manual (Placer County 1994a). Three projects in unincorporated Placer County (Placer Vineyards, Regional University, and Placer Parkway) incorporate on-site detention capacity and other measures to avoid downstream flooding (Placer County 2006; Placer County 2008; Placer County 2007). Therefore, increased runoff from cumulative development in the Curry Creek and Pleasant Grove Creek watersheds is not expected to result in adverse downstream flooding impacts. The contribution of the No Action Alternative, Proposed Action, and Alternatives 1 through 5 would be **less than significant.**

Water Quality

Development on the project site would drain into the West Plan tributaries of Curry Creek. Changes in water quality could occur as a result of project construction activities. Similarly, other urban development would also involve soil disturbing construction activities, such as vegetation removal, grading, and excavation. These soil disturbances would expose soil to wind and water-generated erosion. As previously described, sediment from erosion can have long and short-term water quality effects, including increased turbidity, which could result in adverse impacts on fish and wildlife habitat and the physical integrity of stream channels.

The City requires that erosion control plans be prepared and approved by the City to reduce water quality impacts during construction activities (Roseville Municipal Code Section 16.20.040 Grading plans). In addition, all construction projects that would disturb 1 acre or

more would be required to comply with the applicable State General Permit (2009-0009-DWQ Construction General Permit) requirements for storm water runoff during construction which would reduce potential degradation of receiving water quality attributable to the Proposed Action (or any of the alternatives) as well as other development in the Curry Creek watershed.

With respect to post-construction storm water runoff, all new development in the study area would be required to comply with National Pollutant Discharge Elimination System (NPDES) requirements related to post-construction runoff. In addition, the City's General Plan and Storm Water Quality Design Manual require that urban runoff measures, including Best Management Practices (BMPs), LID measures and buffer areas, be implemented as part of individual project development to protect water quality from pollutants in urban runoff. Similarly, new development located in unincorporated Placer County is subject to the County's Storm Water Management Plan requirements and is required to include storm water quality improvements and LID measures to reduce the volumetric increase in flows as well as improve water quality (Placer County 1994a). As a result of existing regulations and local requirements, the contribution of the No Action Alternative, Proposed Action, and Alternatives 1 through 5 to a cumulative impact on water quality from urban runoff would be **less than significant**.

Groundwater Use

The cumulative context for groundwater impacts is the North American River groundwater sub-basin that generally underlies western Placer County and northern Sacramento County. The sub basin is located within the Sacramento Valley Groundwater Basin. It includes a surface area of 548 square miles (1,429 square kilometers) (City of Roseville 2010a).

Urban growth in northern Sacramento County beginning in the 1950s increased the demand on groundwater such that the groundwater elevation trend along the Sacramento/Placer County line began to show a steady decline of 1 to 1.5 feet (0.3 to 0.46 meter) per year (City of Roseville 2010a). Groundwater elevations continued to decline at a relatively steady rate through the droughts of 1976 to 1977 and 1987 to 1992. The effect of the 1987 to 1992 droughts on groundwater elevations in most of the basin was however relatively minor; with the 1990 groundwater levels about 5 to 10 feet (1.52 to 3.05 meters) lower than the 1985 conditions (City of Roseville 2010a).

The regional groundwater management efforts are focused on controlling the fluctuations in groundwater levels to keep them within an acceptable range. The City of Roseville, the City of Lincoln, the Placer County Water Agency (PCWA), and the California American Water Company have cooperatively developed the Western Placer County Groundwater Management Plan (WPCGMP). The overarching goal of the WPCGMP is to maintain the quality and ensure the long-term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the

WPCGMP area. The Water Forum Agreement currently represents the most likely long-term plan for development of groundwater and surface water supplies in Placer and Sacramento counties, and it reflects projected land use and water demand throughout the two counties in year 2030 as envisioned in current approved general plans (City of Roseville 2010a).

Groundwater is not used for consumptive uses in the City of Roseville under normal water conditions. It is used in dry years to supplement surface and recycled water supplies, and during peak times, to supplement pumping constraints. If recycled or surface water is not available to serve the need of the No Action Alternative, Proposed Action, and Alternatives 1 through 5, groundwater would be used to supplement supplies. The supplemental groundwater supply needed for the Proposed Action would be up to 220 acre-feet (27 hectare-meters) over a 100-year period. The No Action Alternative and Alternatives 1 through 5 would demand lower amount of supplemental groundwater because they would involve mixed use communities that would be smaller than the community under the Proposed Action. In addition, nearby Placer County projects could use groundwater in the short-term. However, because of the sustained recoveries of groundwater elevation since 1997 and the significant efforts to protect groundwater resources in the region, the cumulative impact on groundwater resources would not be substantial. The use of aquifer storage and recovery, which is an element of the groundwater management plan, would ensure that surplus water is injected in the groundwater basin to ensure no net decrease in groundwater levels. The contribution of the No Action Alternative, Proposed Action, and Alternatives 1 through 5 to a long-term net effect on groundwater resources is expected to be **less than significant**.

Groundwater Recharge

Development in the City of Roseville would result in new impervious surfaces by converting primarily undeveloped grazing land to urban uses. As discussed in **Section 3.10**, recharge occurs primarily along stream channels and through applied irrigation water. Furthermore, less than 5 percent of total recharge into the Sacramento Valley groundwater basin under natural conditions is attributable to Placer County (City of Roseville 2010a). This is because much of western Placer County consists of hydrologic group "d" soils, which are characterized by high runoff and low infiltration potential. Other areas of the City of Roseville and western Placer County are situated on soil and rock units similar to the project site, and do not have water intensive irrigation uses (City of Roseville 2010a). Given the low levels of recharge that occurs under existing conditions, the fact that the Proposed Action (and other foreseeable development in the area) would protect and maintain creek corridors where infiltration would continue to occur, and the fact that the Proposed Action (and all future development) would include LID measures to infiltrate runoff to the extent feasible, the contribution of the Proposed Action or any of the on-site alternatives to a cumulative effect on recharge would be **less than significant**.

Off-Site Alt. The contribution of the Off-Site Alternative to cumulative effects related to hydrology and water quality would be similar to that of the No Action Alternative, Proposed Action, and Alternatives 1 through 5, but at the alternative location to the northeast of the project site. The principal water body at the alternative site is the seasonal Pleasant Grove Creek tributary, which crosses the southeast corner of the alternative site. Similar to the project site, this site also does not contain any other permanent water features but does contain some areas with concentrations of vernal pools that pond seasonally. Based on the significance criteria listed above and for the same reasons presented for the No Action Alternative, Proposed Action, and Alternatives 1 through 5, of the contribution of the Off-Site Alternative to the cumulative effects described above would be **less than significant**.

3.10.8 REFERENCES

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