3A.9 HYDROLOGY AND WATER QUALITY – LAND

3A.9.1 AFFECTED ENVIRONMENT

REGIONAL HYDROLOGY

The SPA is located at the eastern edge of the Sacramento River Hydrologic Region, and consists of gently rolling hills covered with grasslands, oak woodlands, and areas of riparian forest and scrub. The far eastern portion of the SPA, east of Empire Ranch Road, extends into San Joaquin Hydrologic Region. Alder Creek and its tributaries, and other natural seasonal drainages are present throughout the site. Shallow soils and little groundwater render the site incapable of supporting full-scale agricultural operations. As a result, the SPA has historically been (and is currently) used for cattle grazing purposes. The SPA is currently zoned for agricultural use by Sacramento County.

The topography of the SPA consists of gently rolling terrain located at the base of the Sierra Nevada foothills between Placerville Road on the east, U.S. Highway 50 (U.S. 50) on the north, White Rock Road on the south, and Prairie City Road on the west. Elevations vary from 440 feet above sea level in the western portion of the SPA to 800 feet in the eastern hillside. The majority of slopes within this region range between 0% and 15%, however, some isolated steeper slopes exist along the edges of Alder Creek and its associated tributaries.

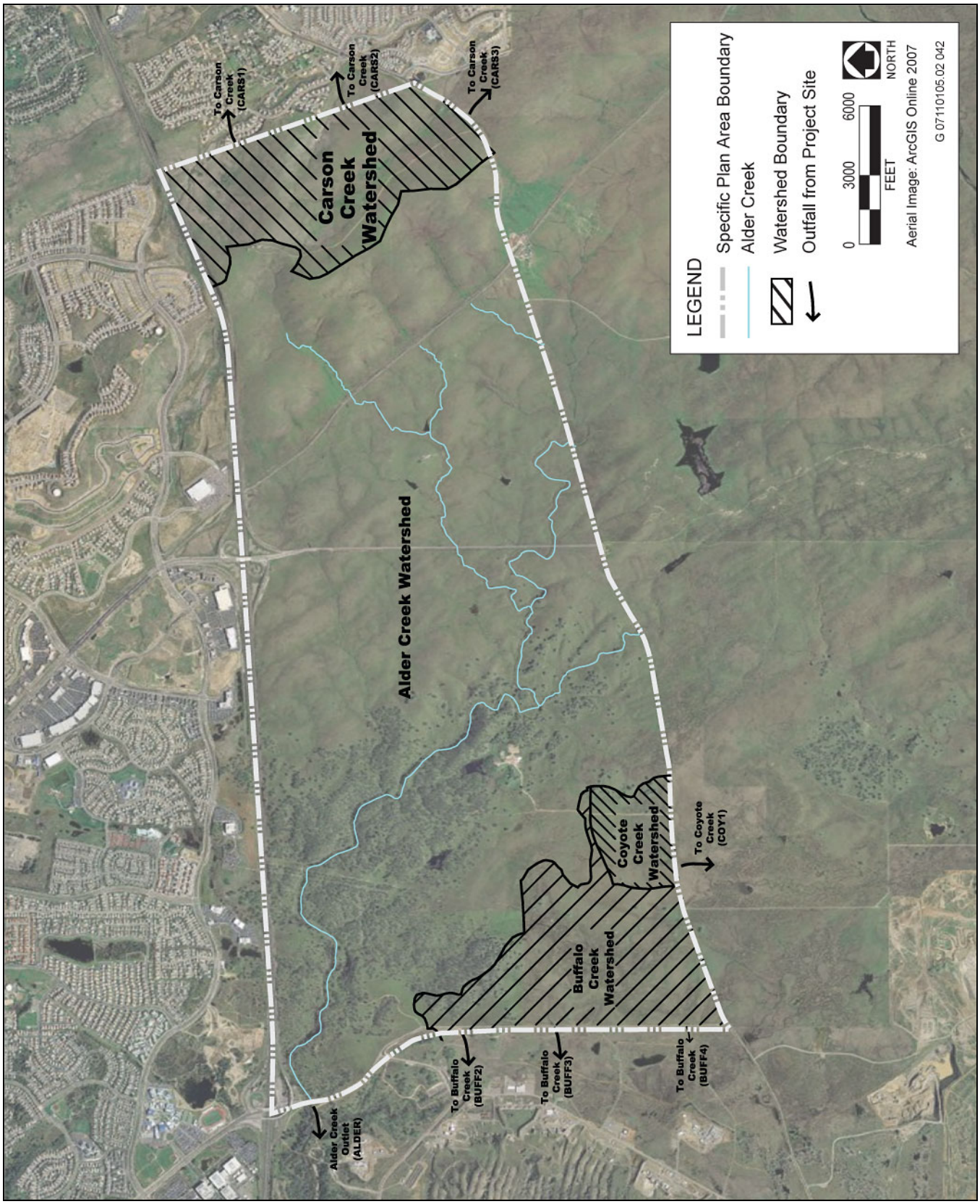
The climate in the region is Mediterranean, characterized by hot, dry summers, and cool, moist winters. Slightly over half of the total average annual precipitation of 23 to 26 inches occurs from November through February (City and County of Sacramento 1996:4-10). During this period, measurable quantities of precipitation occur about 10 days out of every month. Thunderstorms are rare, and when they do occur it is usually in the fall, late spring, or late summer. Temperatures in July vary from an approximate average daily high of 94 degrees Fahrenheit (°F) to an average daily low of 60°F, while temperatures in January vary from an approximate average daily high of 54°F to an average daily low of 40°F. Extreme temperatures in Sacramento County have been recorded as low as 17°F in December 1932 and as high as 114°F in July 1925 (Bevan and Cline 2005:1–5).

LOCAL SURFACE WATER HYDROLOGY

The SPA lies within four separate watersheds: Alder Creek, Buffalo Creek, Coyote Creek, and Carson Creek (Exhibit 3A.9-1). Alder Creek and Buffalo Creek are tributaries to the American River; Coyote Creek and Carson Creek are tributaries to the Cosumnes River. Several irrigation/cattle water ponds exist on the SPA. These ponds are generally on-stream impoundments and appear to contain water throughout the year.

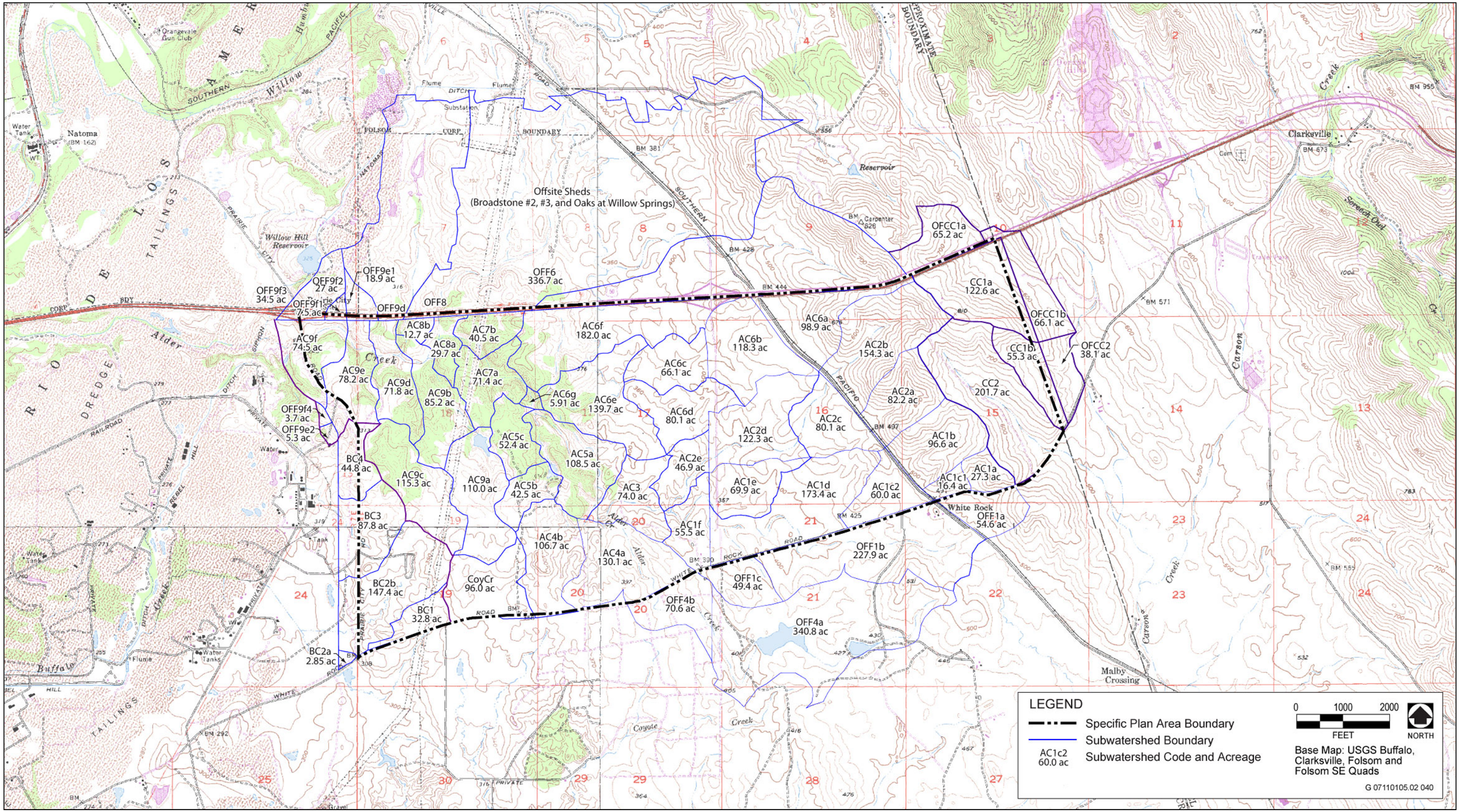
The majority of the runoff from the SPA originates within the Alder Creek watershed. Alder Creek and its tributaries generally flow east to west and eventually join the American River three miles west of Prairie City Road at Lake Natoma. The headwater tributaries of Alder Creek can generally be characterized as ephemeral and intermittent. Off-site tributary subwatersheds also contribute flow to Alder Creek, including areas where the recent Broadstone and Willow Springs developments are located north of U.S. 50. These tributaries are generally characterized as having perennial flows due to the developed nature of their respective subwatershed areas. As a result, flows in the Alder Creek mainstem within the SPA, transition from ephemeral to perennial with inputs from the tributaries originating in the developed areas north of U.S. 50.

In addition to the Alder Creek watershed, there are three small subbasins within the boundary of the SPA that contribute flow to neighboring creeks, as shown on Exhibit 3A.9-2. Runoff from the southwest corner of the SPA flows across Prairie City Road and eventually joins Buffalo Creek. An area along the southern boundary of the SPA drains off-site to Coyote Creek. Lastly, runoff from the east side of the SPA drains off-site to Carson Creek in El Dorado County (MacKay & Somps 2007:4).



Source: Domenichelli & Associates 2007

Project Site Watershed and Outfall Locations **Exhibit 3A.9-1**



Source: Domenichelli & Associates Civil Engineering, 2007

On- and Off-Site Subwatersheds

Exhibit 3A.9-2

Existing surface flow data is generally lacking for the creeks within the SPA due to the lack of flow gaging stations or other hydrologic data collection facilities. As a result, flows were modeled based on procedures outlined in the Sacramento City/County Drainage Manual (Sacramento County 1996; MacKay & Somps 2007). Methodology from this manual was used to develop a HEC-HMS (version 3.1.0) model for the project to determine the peak flows for the 2-year, 5-year, 10-year, and 100-year 24-hour design storms. For modeling purposes, the SPA was delineated into subwatershed basins with a total of eight associated outfall locations where water leaves the boundaries of the SPA (MacKay & Somps 2007 [Figure 7]). As discussed above, the Alder Creek watershed, with one main outfall location, is the primary watershed in the SPA. Upper Buffalo Creek is located along the west project boundary on the east side of Prairie City Road. There are two main and one minor outlet locations from the SPA into the Buffalo Creek watershed. Coyote Creek watershed begins within the southwest project boundary. Runoff leaves this watershed at one location. A portion of the Carson Creek watershed is located on the east side of the SPA. There are four onsite subbasins and two off-site subbasins of Carson Creek in the SPA model. The Carson Creek watershed has three outfall locations from the SPA. All outfall locations are shown on Exhibit 3.9-1. Existing flows were determined using the HEC-HMS model at these locations for comparison to proposed conditions results. A primary objective is to maintain proposed conditions flows at or below the existing peak flows at these locations (MacKay & Somps 2007:12). Hydrologic modeling and associated results are described in detail under the "Environmental Consequences and Mitigation Measures" section below.

The SPA, encompassing portions of the Federal Emergency Management Agency (FEMA; see additional discussion below) Flood Insurance Rate Maps (FIRM) number 060262 panels 0120D, 0150B, 0250C, and 0275D, has been designated as Zone X, areas that have been determined to be outside the 100- and 500-year floodplains; however, the SPA has not been studied for the purpose of drafting an effective Flood Insurance Study (FIS). The California Department of Water Resources (DWR), under the Awareness Flood Mapping Program, has recently prepared area floodplain maps. The area along Alder Creek flowing through the SPA has been designated by DWR as lying within a 100-year floodplain (see Exhibit 3.9-3). Waterways within the SPA have not been studied in order to define a 200-year floodplain by California Water Code Section 9610(a) (DWR 2008).

GROUNDWATER HYDROLOGY

Most of the SPA lies over the Sierra Nevada hydrogeologic province, an undefined groundwater basin, with the exception of the South American groundwater basin in the western portion of the SPA underlying the Buffalo Creek watershed (DWR 2003:156-158). Only a relatively small portion of the land area of Sacramento County and the southeastern edge of El Dorado County is underlain by geologic materials with sufficient area extent, depth, and infiltration capability to provide natural groundwater recharge. These areas occur mostly along active stream channels. Most of the stream channel deposits in Sacramento County and the southeastern edge El Dorado County occur along the courses of the Cosumnes and American Rivers. In the project vicinity, the low permeability of soils containing hardpan or organic clays inhibits infiltration and the area has a poor capacity for significant groundwater recharge (Sacramento County 2007b: 8-9). Groundwater volumes typically vary locally throughout the SPA. Seasonal perched groundwater may be present in the fractures of the weathered bedrock found beneath the SPA at varying times of the year, as evidenced by the presence of vernal pools (Youngdahl Consulting Group Ltd 2003:2–3).

The South American Subbasin aquifer system, part of the larger Sacramento Valley Groundwater Basin, comprises continental deposits of Late Tertiary to Quaternary age. These deposits include younger alluvium (consisting of flood basin deposits, dredge tailings, and Holocene stream channel deposits), older alluvium including the Laguna Formation, and Miocene/Pliocene volcanics consisting of the Mehrten Formation. The cumulative thickness of these deposits increases from a few hundred feet at the SPA to over 2,500 feet along the western margin of the subbasin. The subbasin is bounded on the east by the Sierra Nevada, on the west by the Sacramento River, on the north by the American River, and on the south by the Cosumnes and Mokelumne Rivers. These perennial rivers generally create a groundwater divide in the shallow subsurface, and the

groundwater of adjacent subbasins interacts at greater depths. The Mehrten and Laguna Formations are the principal water-bearing rock strata (DWR 2004:1).

WATER QUALITY

Surface Water

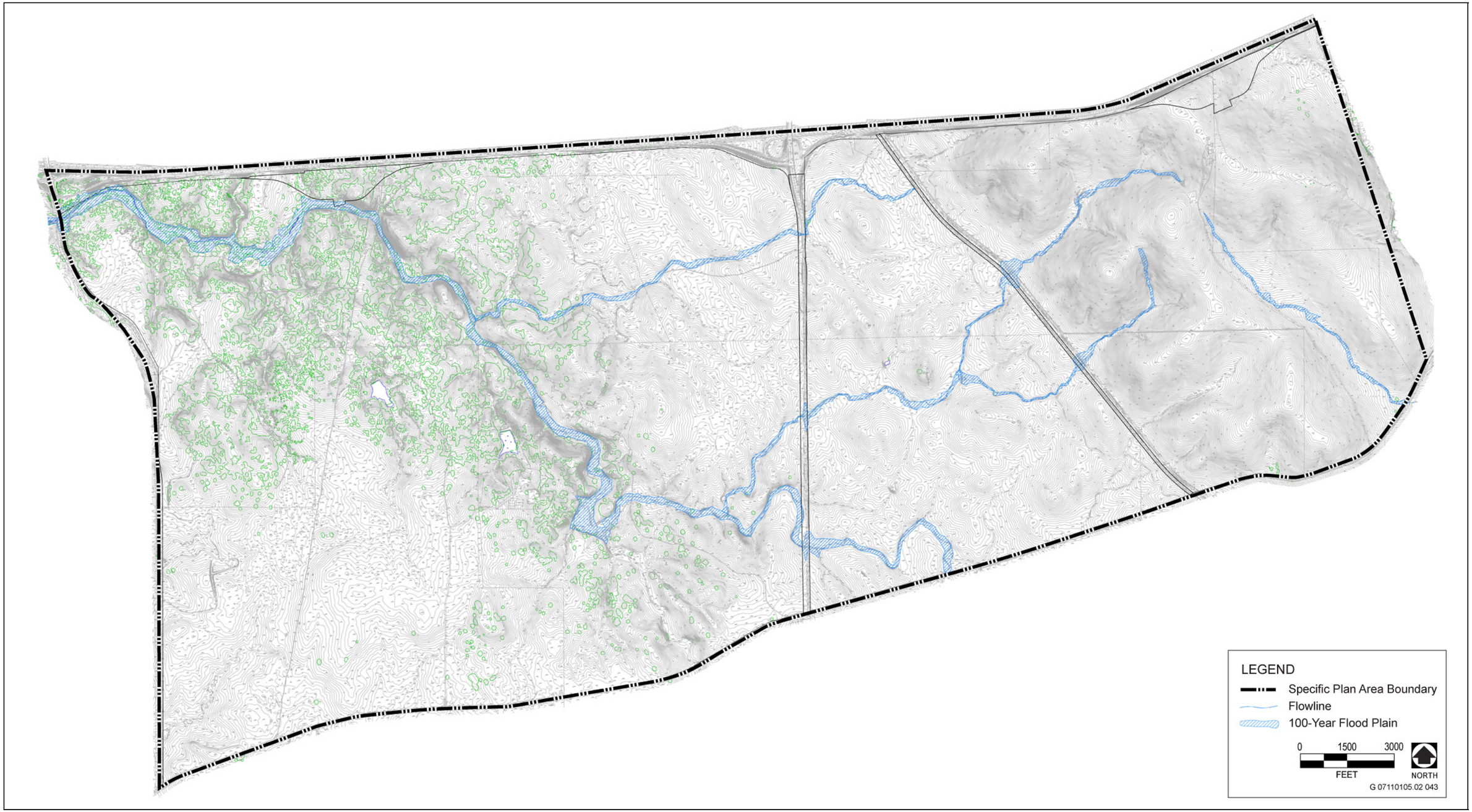
Alder Creek, Buffalo Creek, Coyote Creek, and Carson Creek do not currently have any specific designated beneficial uses attributed to them in the water-quality control plan (Basin Plan) adopted by the Central Valley Regional Water Quality Control Board (RWQCB) (described in the "Regulatory Framework" section below). Consequently, the Central Valley RWQCB applies the Basin Plan's "tributary rule" and assigns to these creeks the beneficial uses designated for the nearest downstream location. The Central Valley RWQCB also regulates waste discharges in undesignated streams to ensure that downstream water quality conditions and beneficial uses are not degraded. Thus, these creeks are subject to regulation for the existing designated uses in their receiving waterbodies. Designated beneficial uses for the American River, Lake Natoma, and Cosumnes River and their tributaries as defined by the Basin Plan (Central Valley RWQCB 2007) are:

- municipal, industrial, and agricultural supply;
- irrigation;
- contact and noncontact recreation;
- coldwater fish habitat, migration, and spawning;
- warmwater fish habitat, migration, and spawning;
- wildlife habitat;
- power generation; and
- navigation.

The segment of the American River that is the receiving water for the Alder Creek and Buffalo Creek watersheds is on the 303(d) list for mercury from resource extraction (Lake Natoma and Lower American River), and unknown toxicity (Lower American River). The segment of the Cosumnes River that is the receiving water for the Coyote Creek and Carson Creek watersheds is on the 303(d) list for Exotic Species (State Water Resource Control Board [SWRCB] 2007).

There is no comprehensive water quality monitoring station in the project vicinity, and water quality data are limited. Monitoring of water quality in the American River at Nimbus Dam is performed as part of the Sacramento Stormwater Quality Partnership (SSQP) Joint Program to comply with monitoring requirements specified in the Sacramento Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System (NPDES) Stormwater Permit, and as described in the SSQP's Stormwater Quality Improvement Plan (SQIP; see below for additional information) (SSQP 2009a). Monitoring activities required by the permit included urban runoff (discharge) characterization, receiving water, urban tributary (creek), bioassessment, and additional pesticide monitoring including Diazinon and Chlorpyrifos.

For the 2006/2007 monitoring years, the American River at Nimbus Dam station (a location below the confluence of Alder Creek that is influenced by other upstream sources) showed a low level of dissolved oxygen in the December 10, 2006 sampling event (6.3 milligrams per liter [mg/L]), that was below the water quality objective of 7 mg/L for coldwater spawning and a pH of 6.2, that was below the Basin Plan range of 6.5 to 7.5. No other exceedances of water quality objectives were reported (SSQP 2007c:vol. 1-9). For the 2007/2008 monitoring year, the American River at Nimbus Dam station showed exceedances for *E. coli* (800 mpn/100 ml, above objective of 235 mpn/100 ml), fecal coliform (800 mpn/100 ml, above objective of 400 mpn/100 ml), total aluminum (951 and 528 mg/L, above objective of 200 mg/L), and dissolved lead (815 mg/L, above objective of 300 mg/L). No other exceedances of water quality objectives were reported (SSQP 2008:vol. 1-9). For the 2008/2009 monitoring year, the latest year available, the American River at Nimbus Dam station showed a single



Source: ECORP Consultants 2009

Existing 100-Year Floodplain **Exhibit 3A.9-3**

exceedance for fecal coliform (500 mpn/100 ml, above objective of 400 mpn/ 100 ml). No other exceedances of water quality objectives were reported (SSQP 2009b:2-16).

A history of gold mining in the area, and the use of mercury to process gold-bearing ore appears to be the cause of mercury in the American River watershed. Gold-dredging operations and operators of floating dredgers coated the sluices with mercury to amalgamate the gold particles, occasionally spilling the mercury into the surrounding environment.

Mercury can exist in many forms, most of which are stable and unavailable for biological uptake. However, inorganic mercury can be methylated by microbes and fungi into an organic form known as methylmercury (Baudo et al 1990, Domagalski et al 2000). Fish take in some methylmercury through their gills, but most of their intake is through their food. Once consumed by fish, methylmercury is retained in the fatty tissue and bioaccumulates so that older and larger fish contain a higher concentration of methylmercury than younger or smaller fish. Fish that predate on other fish tend to have higher concentrations of methylmercury than fish feeding at lower levels of the food chain. Humans who consume these fish are vulnerable to bioaccumulating methylmercury at levels potentially harmful to health. Methylmercury mainly attacks the nervous system causing loss of sensation in the extremities, tiredness, and blurred vision (Office of Environmental Health Hazard Assessment [OEHHA] 2004). The California Department of Health Services (undated brochure) recommends that pregnant and breast-feeding women eat no more than 0.5 pound (uncooked weight) of fish per week from freshwater sources in California. Children less than 6 years old are recommended to eat no more than 3 ounces of freshwater fish per week.

The U.S. Geological Survey (USGS) and the University of California at Davis (UCD) conducted a reconnaissance survey of mercury contamination in edible fish tissue taken from several sites in Lake Natoma, including the vicinity of the mouth of Alder Creek. These data were evaluated by the Office of Environmental Health Hazard Assessment, together with fish samples previously collected from the lower American River by the Toxic Substances Monitoring Program (TSMP) and the Sacramento River Watershed Program (SRWP), in an effort to determine whether there may be potential adverse health effects associated with consuming sport fish from these water bodies. Results from the study showed that elevated concentrations of mercury were found in fish tissues samples at high enough levels to warrant the publishing of a health advisory and fish consumption guidelines for Lake Natoma (including nearby creeks and ponds) and the lower American River (OEHHA 2004).

Groundwater

Groundwater underlying Area 40 at the western boundary of the SPA is contaminated with volatile organic compounds (VOCs) as a result of activities associated with the aerospace industry, in particular trichloroethene (TCE) and tetrachloroethene (PCE). As a result of this contamination, groundwater at the SPA may not be employed for beneficial uses, and under Proposed Project plans buildings for human occupancy would be restricted from areas overlying groundwater VOC contamination. Additional detail regarding groundwater contamination at the SPA is provided in Section 3A.8, “Hazards and Hazardous Materials - Land.”

3A.9.2 REGULATORY FRAMEWORK

Numerous Federal, state, regional, and local laws, rules, regulations, plans, and policies define the framework for regulating hydrology and water quality in the SPA and surrounding area. The following discussion focuses on hydrology and water quality requirements applicable to the project.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Clean Water Act

The Environmental Protection Agency (EPA) is the lead Federal agency responsible for managing water quality. The Clean Water Act (CWA) of 1972 is the primary Federal law that governs and authorizes EPA and the states to implement activities to control water quality. The various elements of the CWA that address water quality and are applicable to the project are discussed below. Wetland protection elements administered by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA, including permits for the discharge of dredged and/or fill material into waters of the U.S., are discussed in Chapter 3A.4, "Biological Resources – Land."

Water Quality Criteria and Standards

Under Federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the U.S. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question and (2) criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. EPA is the Federal agency with primary authority for implementing regulations adopted under the CWA. EPA has delegated the State of California as the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), described below.

National Pollutant Discharge Elimination System Permit Program

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

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb 1 acre or more. Phase 2 of the municipal permit system (known as the NPDES General Permit for Small Municipal Separate Storm Sewer Systems [MS4s]) required small municipal areas of less than 100,000 persons to develop stormwater management programs. The nine RWQCBs in California are responsible for implementing the NPDES permit system (see additional information below).

Section 401 Water Quality Certification or Waiver

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

Alternative would require a Section 401 water quality certification because it would require a Section 404 permit and is under the jurisdiction of the Central Valley RWQCB.

Antidegradation Policy

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

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

Safe Drinking Water Act

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

EPA has delegated to the California Department of Public Health (CDPH) the responsibility for administering California's drinking-water program. CDPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations (CCR). Provisions of the Safe Drinking Water Act would apply to water supplies being sought for the project.

Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Alder Creek is not on the 303(d) list, but the receiving water bodies for Alder, Buffalo, Carson, and Coyote Creeks—Lower American River, Lake Natoma, and the Cosumnes River—are listed (see "Water Quality" section below). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows links between loading reductions and the attainment of water quality objectives. The EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the

TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

Federal Emergency Management Agency

FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations that limit development in floodplains. FEMA also issues FIRMs that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection covered by the FIRMs is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 (0.01 annual exceedance probability [AEP]) (i.e., the 100-year flood event). As developments are proposed and constructed FEMA is also responsible for issuing revisions to FIRMs, such as Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) through the local agencies that work with the National Flood Insurance Program. Requirements of California Senate Bill (SB) 5 regarding the 200-year flood (i.e. the 1-in-200 [0.005 AEP]) are discussed below.

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

The Sacramento and San Joaquin River Basins Comprehensive Study is a joint effort by the Central Valley Flood Protection Board (CVFPB) (formerly the State Reclamation Board) and USACE, in coordination with Federal, state, and local agencies, groups, and organizations in California's Central Valley, to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins. The study is a regionwide planning effort, rather than a regulatory program; however, consistency with its goals and objectives is important for any project affecting flood control in the Sacramento and San Joaquin River basins.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

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

Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. California water quality objectives (or "criteria" under the Clean Water Act) are found in the Basin Plans adopted by the SWRCB and each of the nine RWQCBs. The Central Valley RWQCB is responsible for the regional area in which the SPA is located. State regulations applicable to the demonstration of adequate water supply for the future water demands resulting from implementation of the Proposed Project Alternative are addressed in Section 3A.18, "Water Supply - Land."

TITLE 22 STANDARDS

Water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water and (2) criteria (i.e. numeric or narrative limits) to protect those beneficial uses. Municipal and domestic supply (MUN) is among the "beneficial uses" as defined in Section 13050(f) of the Porter-Cologne Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation. Maximum contaminant levels, MCLs, are components of the drinking water standards adopted by the CDPH pursuant to the California Safe Drinking Water Act. California MCLs may be found in Title 22 of the CCR, Division 4, Chapter 15, Domestic Water Quality and Monitoring. The CDPH is responsible for Title 22 of the CCR (Article 16, Section 64449) as well, which also defines secondary drinking water standards, established primarily for reasons of consumer acceptance (i.e., taste) rather than because of health issues. Table 3A.9-1 lists

Table 3A.9-1
Surface Water and Groundwater Quality Standards of Conventional Contaminants for the Proposed Project Alternative

Constituent	Minimum Level Required for Detection[1]	Water Quality Objective (WQO) Source	WQO Value
Conventional Pollutants	mg/L [2]		
Oil and Grease	5	Basin Plan	Narrative (3)
Cyanide	0.005	Primary MCL, DPH Title 22 of CCR	150
pH	0–14	Basin Plan	6.5 to 8.5 (range)
Temperature	None	Basin Plan	Narrative (4)
Dissolved Oxygen	Sensitivity to 5 mg/L	Basin Plan	7.0
Bacteria			
Total coliform	<20 mpn/100ml	Basin Plan	Narrative (6)
Fecal coliform	<20 mpn/100ml	Basin Plan	Narrative (6)
E. coli (fresh waters)	<20 mpn/100ml	Basin Plan	Narrative (6)
General	mg/L [2]		
Total Phosphorus	0.05	--	--
Turbidity	0.1NTU	Basin Plan	Narrative (7)
Suspended Sediments	2	Basin Plan	Narrative (10)
Total Dissolved Solids	2	Secondary MCL, DPH Title 22 of CCR	500 mg/L
Total Petroleum Hydrocarbon	5	Basin Plan	Narrative (8)
Nitrate	0.1	Primary MCL, DPH Title 22 of CCR	45 mg/L (or 10 mg/L as N)
Nitrite	0.1	Primary MCL, DPH Title 22 of CCR	1 mg/L
Specific Conductance	1umho/cm	Secondary MCL, DPH Title 22 of CCR	900 µmhos/cm
Chloride	2	Secondary MCL, DPH Title 22 of CCR	250 mg/L
Fluoride	0.1	Primary MCL, DPH Title 22 of CCR	2 mg/L
Methyl tertiary butyl ether (MTBE)	1	Primary MCL, DPH Title 22 of CCR	13 µg/L
Metals	µg/L		
Aluminum	100	Primary MCL, DPH Title 22 of CCR	1000
Antimony	0.5	Primary MCL, DPH Title 22 of CCR	6
Arsenic	1	EPA Section 304(a)	10 (EPA MCL) 50 (DPH MCL)
Beryllium	0.5	Primary MCL, DPH Title 22 of CCR	4
Cadmium	0.25	Primary MCL, DPH Title 22 of CCR	5
Chromium (total)	0.5	Primary MCL, DPH Title 22 of CCR	50
Copper	0.5	Primary MCL, DPH Title 22 of CCR	1300
Iron	NA	Secondary MCL, DPH Title 22 of CCR	300
Lead	0.5	Primary MCL, DPH Title 22 of CCR	15
Manganese	NA	Secondary MCL, DPH Title 22 of CCR	50
Magnesium		EPA Section 304(a)	10 (EPA MCL) 50 (DPH MCL)

Table 3A.9-1
Surface Water and Groundwater Quality Standards of Conventional Contaminants for the Proposed Project Alternative

Constituent	Minimum Level Required for Detection(1)	Water Quality Objective (WQO) Source	WQO Value
Mercury	0.5	Primary MCL, DPH Title 22 of CCR	2
Nickel	1	Primary MCL, DPH Title 22 of CCR	100
Selenium	1	Primary MCL, DPH Title 22 of CCR	50
Silver	0.25	Secondary MCL, DPH Title 22 of CCR	100
Thallium	1	Primary MCL, DPH Title 22 of CCR	2
Zinc	1	Secondary MCL, DPH Title 22 of CCR	5000
Organophosphate Pesticides	Ng/L		
Chlorpyrifos	10.0	DFG	83 (9)
Diazinon	50.0	DFG	17 (9)
Molinate	2	Primary MCL, DPH Title 22 of CCR	20
Carbofuran	2	Primary MCL, DPH Title 22 of CCR	18
Herbicides	µg/L		
Glyphosate	5	Primary MCL, DPH Title 22 of CCR	700
2,4-D	0.02	Primary MCL, DPH Title 22 of CCR	70
2,4,5-TP-SILVEX	0.2	Primary MCL, DPH Title 22 of CCR	50

Notes:
MCL = Maximum Contaminant Level
DPH = California Department of Public Health
CCR = California Code of Regulations
DPH = California Department of Public Health
EPA = U.S. Environmental Protection Agency
WDR = Waste Discharge Requirements
mg/L = milligrams per liter (parts per million)
µg/L = micrograms per liter (parts per billion)
ng/L = nanograms per liter (parts per trillion)
NA = not applicable

[1] From the State Implementation Plan of the California Toxics Rule (SIP CTR), Appendix 4. Note that some Water Quality Objective values are lower than the Minimum Level values.
[2] Unless otherwise noted.
[3] Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
[4] The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Central Valley RWQCB that such alteration in temperature does not adversely affect beneficial uses.
[5] Placeholder.
[6] The most probable number of coliform organisms over any seven-day period shall be less than 2.2MPN/100 ml. This limit would only be applicable for groundwater used for domestic or municipal supply.
[7] The 30-day average for turbidity shall not exceed the following limits:
- More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.
- More than 20% where natural turbidity is between 5 and 50 NTUs.
- More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
- More than 10% where natural turbidity is greater than 100 NTUs.

[8] The Central Valley RWQCB has prohibited the discharge of oil or any residuary product of petroleum to the waters of the State, except in accordance with waste discharge requirements or other provisions of Division 7, California Water Code.
[9] Aquatic Life guidance Value for 4-Day Average Concentration.
[10] Central Valley RWQCB Basin Plan Narrative Objective: Water shall not contain constituent concentrations that would cause nuisance or adversely affect beneficial uses.

Source: Central Valley RWQCB 2007a, 2007b

the Title 22 constituent standards, as well as those for the Central Valley Basin Plan above and the California Toxics Rule described below.

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

Porter-Cologne Water Quality Control Act

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

California State Nondegradation Policy

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

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

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

California Toxics Rule and State Implementation Plan

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

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

NPDES Permit System and Waste Discharge Requirements for Construction

The SWRCB and Central Valley RWQCB have adopted specific NPDES permits for a variety of activities that have potential to discharge wastes to waters of the state. The SWRCB's statewide stormwater general permit for construction activity (Order 99-08-DWQ, to be replaced by Order 2009-0009-DWQ in July 2010) is applicable to all land-disturbing construction activities that would disturb 1 acre or more. The Central Valley RWQCB's general NPDES permit for construction dewatering activity (Order 5-00-175) authorizes direct discharges to surface waters up to 250,000 gallons per day for no more than a 4-month period each year. All of the NPDES permits involve similar processes, including submittal to the Central Valley RWQCB of notices of intent (NOI) to discharge, and implementation of storm water pollution prevention plans (SWPPPs) that include best management practices (BMPs) to minimize those discharges. As mentioned above, the Central Valley RWQCB may also issue site-specific WDRs, or waivers to WDRs, for certain waste discharges to land or waters of the state. In particular, Central Valley RWQCB Resolution R5-2003-0008 identifies activities subject to waivers of RWDs and/or WDRs, including minor dredging activities and construction dewatering activities that discharge to land.

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

Discharges subject to the SWRCB NPDES general permit for construction activity are subject to development and implementation of a SWPPP. The SWPPP includes a site map and description of construction activities and identifies the BMPs that would be employed to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources.

On September 2, 2009 the SWRCB approved a new construction general permit (Order 2009-0009-DWQ), which will become effective and replace Order 99-08-DWQ on July 1, 2010. The new permit differs from Order 99-08-DWQ in the following important ways:

- Risk-Based Permitting Approach: the new general permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: 1) Project Sediment Risk, and 2) Receiving Water Risk. Risk Level 1 is considered the lowest risk, and Level 3 is considered the highest.

- Rainfall Erosivity Waiver: the new general permit includes the option allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (R value) for their project's given location and time frame compute to be less than or equal to 5.

- Project Site Soil Characteristics Monitoring and Reporting: the new general permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

- Minimum Requirements Specified: the new general permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

- Technology-Based Numeric Action Levels (NAL): the new general permit includes daily average NALs for pH and turbidity, applicable to projects in Risk Level 2.

- Technology-Based Numeric Effluent Limitations (NEL): the new general permit contains daily average NELs for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 NTU to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/ Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.

- Effluent Monitoring and Reporting: the new general permit requires effluent monitoring and reporting for pH and turbidity in storm water discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether NALs included in the General Permit are exceeded.

- Receiving Water Monitoring and Reporting: the new general permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bio assessments.

- Post-Construction Storm Water Performance Standards: the new general permit specifies runoff reduction requirements for all sites not covered by a Phase I or Phase II MS4 NPDES permit, to avoid, minimize and/or mitigate post-construction storm water runoff impacts. These requirements would not apply to the project alternatives due to Phase 1 NPDES MS4 permit described below.

- Rain Event Action Plan: the new general permit requires certain sites to develop and implement a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.

- Annual Reporting: the new general permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information.

- Certification/Training Requirements for Key Project Personnel: the new general permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific qualifications or certifications as well as attend state-approved training by September 2, 2011 to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.

- Linear Underground/Overhead Projects: the new general permit includes requirements for all Linear Underground/Overhead Projects (LUPs).

NPDES Municipal Stormwater Permit Program

The SWRCB Municipal Storm Water Permitting Program regulates storm water discharges from MS4s. MS4 permits are issued in two phases. Under Phase I, which started in 1990, the RWQCBs have adopted NPDES storm water permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities. The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the CWA. The management programs specify what best management practices (BMPs) will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination; construction and post construction; and municipal operations. In general, medium and large municipalities are required to conduct water quality monitoring, though small municipalities are not.

Two NPDES MS4 permits exist which regulate urban runoff discharges and development activities in the project area. Sacramento County and the City of Folsom are co-permittees (along with other municipal entities) for a regional NPDES MS4 (Phase I) permit that would apply to the Proposed Project Alternative site. El Dorado County is a permittee for its own NPDES MS4 (Phase II) permit for the western portion of El Dorado County, including the area where the proposed off-site roadways would be constructed under the Proposed Project Alternative. Each of these permits is described separately below.

Sacramento County and City of Folsom Phase I National Pollutant Discharge Elimination System MS4 Permit

Sacramento County and the Cities of Folsom, Rancho Cordova, Elk Grove, Citrus Heights, Galt, and Sacramento are co-permittees to the Sacramento Areawide NPDES MS4 permit (Sacramento MS4 permit) issued and enforced by the Central Valley RWQCB. First issued in 1990, the latest permit was adopted on 11 September, 2008 (NPDES Permit No. CAS082597, WDR Order No. R5-2008-0142). The permittees formed the SSQP, described in more detail in the next section, to coordinate and implement permit compliance activities. A SQIP developed for compliance with the NPDES permit is the guiding document for the permittees (SSQP 2009a) and describes the activities that will be implemented to reduce pollutant discharges in urban runoff to the MEP. The SSQP, in association with the City of Roseville, published the "Stormwater Quality Design Manual for the Sacramento and South Placer Regions" in May 2007, which is currently the guiding technical design document for development and major redevelopment in the unincorporated County of Sacramento and City of Folsom (SSQP 2007b).

An important component of the Sacramento MS4 permit requires each permittee (including the City) to update and continue to implement the planning and new development element of its SQIP to minimize the short and long-term impacts on receiving water quality from new development and redevelopment. The permit requires the continued implementation of the permittees' development standards during the entitlement and CEQA process and the development plan review process. Specifically, the Sacramento MS4 permit identifies the need to address changes in the hydrograph, defined as hydrograph modification or hydromodification, which could result from urbanization of a watershed, and to require low impact development (LID) controls to more closely mimic the pre-developed hydrologic condition. To address hydromodification, the permit requires the permittees to prepare and implement a Hydromodification Management Plan (HMP), which will entail revising development standards and associated technical guidance (aka Stormwater Quality Design Manual). Technical guidance will also be updated to incorporate new LID requirements.

El Dorado County Phase II National Pollutant Discharge Elimination System MS4 Permit

El Dorado County has been covered under the SWRCB's own NPDES Phase II MS4 general permit since April 30, 2003. A Storm Water Management Plan (SWMP) was developed by El Dorado County for the purpose of describing the minimum procedures and practices to reduce the discharge of pollutants in effluent from storm drainage systems and for compliance with the NPDES permit (El Dorado County 2004). The SWMP addresses storm water pollution control related to project planning, design, construction, and maintenance activities throughout the unincorporated area of western El Dorado County (that portion of El Dorado County within the jurisdiction of the Central Valley RWQCB, excluding the Tahoe Basin). In addition, the SWMP addresses assignment of responsibilities for implementing storm water management procedures and practices as well as training, public education and outreach, monitoring and research, program evaluation, and reporting activities.

Recycled Wastewater Requirements

A reclaimed (i.e., recycled) water distribution system would be implemented as part of the Proposed Project Alternative. Wastewater recycling in California is regulated under Title 22, Division 4, of the CCRs under the jurisdiction of CDPH. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. Because the Proposed Project Alternative includes a reclaimed water distribution system, also known as a "purple pipe" system, these regulations would apply (purple is the color commonly used to identify reclaimed water conveyance facilities). The regulations establish acceptable levels of constituents in recycled water for a range of uses and prescribe means for ensuring reliability in the production of recycled water. Using recycled water for nonpotable uses is common throughout the state and is an effective means of maximizing use of water resources. The Central Valley RWQCB establishes water reclamation requirements under the Title 22 regulations and is responsible for implementing wastewater recycling projects.

Senate Bill 5

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

- To prepare and adopt a Central Valley Flood Protection Plan (the Plan) (described below) by 2012.
- To establish 200-year (0.005 AEP) protection as the minimum urban level of flood protection, effective with respect to specific development projects as of 2015 or 2025, as explained below.
    - The DWR is directed to produce preliminary (i.e. Best Available) maps for 100-year (0.01 AEP) and 200-year (0.005 AEP) floodplains protected by project levees, and to make them available to cities and counties in the Sacramento-San Joaquin Valley ("Central Valley"). (California Water Code Section 9610[a]) These best available maps were made available on September 8, 2008, and can be found at the California Department of Water Resources http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/. The 200-year floodplain (0.005 AEP) as defined by California Water Code Section 9610[a], pursuant to SB 5 has not been delineated for the SPA.
- Sets deadlines for cities and counties in the Central Valley to amend their general plans and their zoning ordinances to conform to the Plan within 24 months and 36 months (i.e., approximately 2014 and 2015), respectively, of its adoption.
- Obligates Central Valley counties to develop flood emergency plans within 24 months of adoption of the Plan.

DWR must propose amendments to the California Building Standards Code (Building Code) to protect areas with flood depths anticipated to exceed three feet for the 200-year flood (0.005 AEP) event. SB 5 requires that the Building Code amendments are designed to reduce the risk of flood damage and increase safety.

No later than 2015, but potentially sooner depending on when the Central Valley Flood Protection Plan takes effect, SB 5 prohibits local governments from entering development agreements or approving entitlements or permits, including ministerial permits resulting in construction of a new residence in a flood hazard zone, which result in construction of a new residence in a flood zone unless one of three conditions are met:

- flood management facilities provide level of protection necessary to withstand 200-year flood event (0.005 AEP);
- the development agreement or other entitlements include conditions that provide protections necessary to withstand 200-year flood event (0.005 AEP); or
- the local flood management agency has made adequate progress on construction of a flood protection system that shall result in protections necessary to withstand 200-year flood event (0.005 AEP) by 2025.

Central Valley Flood Protection Plan

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

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

California Water Code – Dam Safety Program

The California Water Code designates the regulatory Dam Safety Program to DWR, Division of Safety of Dams (DSOD). The principal goal of this program is to avoid dam failure and thus prevent loss of life and destruction of property. The DSOD reviews plans and specifications for the construction of new dams and for the enlargement, alteration, repair, or removal of existing dams, and must grant written approval before the owner can proceed with construction. Professional engineers and geologists from the DSOD evaluate each project, investigate proposed sites, and check available construction materials. Dams under DSOD jurisdiction include artificial barriers (together with appurtenant works) that are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more. Any artificial barrier not in excess of 6 feet in height, regardless of storage capacity, or that has a storage capacity not in excess of 15 acre-feet, regardless of height, is not considered jurisdictional (DWR 2009). There is one impoundment located on a tributary to Alder Creek that may be considered under DSOD jurisdiction.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sacramento County General Plan

The following goals and policies of the *Sacramento County General Plan* (Sacramento County 2007a) are applicable only to the No Project Alternative.

Conservation Element

- **Policy CO-9:** Community and specific plans shall specify urban runoff control strategies and requirements, consistent with Master Drainage Plans and Public Work's urban runoff management program, for development in newly urbanizing areas and identify sites where retention and treatment are warranted consistent with discharge permit requirement and county-wide runoff measures.

- **Policy CO-11:** Hazardous materials shall not be stored in the 100-year (0.01 AEP) floodplain in such a manner as to pose a significant potential for surface water contamination.

- **Policy CO-13:** Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.

- **Policy CO-16:** Encourage the County and Cities of Folsom, Sacramento, and Galt to jointly participate in a long-term water quality monitoring program for receiving waters within the county.

- **Policy CO-17:** Inform the community on laws governing the proper handling of hazardous materials.

El Dorado County General Plan

The following goals and policies of the *El Dorado County General Plan* (2004) are applicable only to the two local roadway connections from the Folsom Heights property off-site into El Dorado Hills under the Proposed Project Alternative. There are no El Dorado County goals and policies that are applicable to the No Project Alternative or the other four action alternatives.

Transportation and Circulation Element

- **Policy TC-1q:** The County shall utilize road construction methods that seek to reduce air, water, and noise pollution associated with road and highway development.

Public Services and Utilities Element

- **Policy 5.4.1.1:** The County shall require storm drainage systems for discretionary development that protect public health and safety, preserve natural resources, prevent erosion of adjacent and downstream lands, prevent the increase in potential for flood hazard or damage on either adjacent, upstream or downstream properties, minimize impacts to existing facilities, meet the National Pollution Discharge Elimination System (NPDES) requirements, and preserve natural resources such as wetlands and riparian areas.

- **Policy 5.4.1.2:** Discretionary development shall protect natural drainage patterns, minimize erosion, and ensure existing facilities are not adversely impacted while retaining the aesthetic qualities of the drainage way.

Public Health, Safety, and Noise Element

- **Policy 6.4.1.2:** The County shall identify and delineate flood prone study areas discovered during the completion of the master drainage studies or plans.

City of Folsom General Plan

The following goals and policies of the *City of Folsom General Plan* (1993) are applicable to the Proposed Project and the other four action alternatives under consideration. There are no City of Folsom goals and policies that are applicable to the No Project Alternative.

Open Space and Conservation Element

- **Policy 25.1:** The surface and groundwater quality of Folsom shall not be degraded from City standards.
- **Policy 28.2:** The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality or shall comply with City standards.

Health and Safety Element

- **Policy 28.2:** The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality or shall comply with City standards for off-site drainage. The City shall implement a surface runoff water quality monitoring program to insure compliance with City standards.

Land Use Element

- **Policy 1.9:** Development proposed along streams shall be in conformance with a comprehensive development and management plan to be prepared for stream waterbeds prior to project approval.

City of Folsom Hillside Development Guidelines

On February 14, 1995, the Folsom Planning Department adopted Resolution No. 4604—Hillside Development Guidelines—the purpose of which is to illustrate key design principles and issues that City staff will use in evaluating applications for development of any site within hillside areas of the City. The guidelines address street design, grading, site design, parking, drainage, architecture, landscaping, visual impact, and preservation of natural features, and are based on the City's Hillside Development Procedures and Standards Ordinance (Ordinance No. 798).

Sacramento Stormwater Quality Partnership

The permittees of the NPDES Municipal Stormwater Permit described above, i.e. the Sacramento County and the Cities of Folsom, Sacramento, Citrus Heights, Elk Grove, Galt, and Rancho Cordova, have joined together to form SSQP. The SSQP is a collaborative partnership that protects and improves water quality in local waterways for the benefit of the community and the environment. The goals of the SSQP are to:

- improve the quality of urban runoff;
- increase public awareness about water quality and encourage pollution prevention behavior;
- strive for countywide consistency between permittee agency programs;
- improve internal communication and coordination to facilitate agency wide compliance;
- use public funds efficiently and effectively; and
- keep apprised of new and evolving regulations that may affect the Program in the future.

The permittees cooperatively participate in decision-making and goal-setting for the monitoring program, are involved in consultant selection and review, and comment on compliance reports and other work products. Annual Reports are produced that describe the activities conducted to comply with the NPDES permit.

The stormwater pollution prevention efforts needed to satisfy the NPDES permit requirements are implemented by the SSQP through its SQIP, either jointly or by the individual permittees. The major categories of SQIP activities, conducted jointly by the SSQP, are:

- program management – including legal authority and funding, inter- and intra-agency coordination, effectiveness assessment;
- target pollutant program (including implementation of plans to target mercury and pesticides);
- monitoring program to satisfy monitoring requirements specified in the monitoring and reporting program (MRP) portion of the NPDES permit;
- special studies; and
- regional public outreach.

Additionally, the permittees may share resources related to selected program element activities, such as commercial and/or industrial inspections. Program activities implemented by individual permittees (e.g., the City of Folsom) primarily involve activities related to program management (e.g., legal authority, funding, regulatory liaison, compliance reporting, training and coordination within and outside of the organization), construction, commercial/industrial inspections, municipal operations, illicit discharges, public outreach, and new development.

3A.9.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to hydrology and water quality if they would do any of the following:

- violate any water quality standards or waste discharge requirements, including NPDES waste discharge or stormwater runoff requirements, state or Federal antidegradation policies, enforceable water quality standards contained in the Central Valley RWQCB Basin Plan or statewide water quality control plans, or Federal rulemakings to establish water quality standards in California;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a substantial lowering of the level of the local groundwater table;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site;
- create or contribute runoff water that would exceed the capacity (peak flow) of existing or planned stormwater drainage systems;
- substantially degrade water quality;
- place within a 100-year (0.01 AEP) flood hazard area structures that would impede or redirect flood flows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

ANALYSIS METHODOLOGY

This analysis relies on information provided by various public agencies, as well as site-specific technical planning studies generated to support proposed development. Hydrology and drainage–related studies reviewed in support of this analysis include the following documents:

- *Folsom Sphere of Influence Storm Drainage Master Plan.* Draft. (MacKay & Somps 2007, Appendix H1);
- *Sacramento City/County Drainage Manual Volume 2: Hydrology Standards*. County of Sacramento Department of Water Resources, December 1996 (Sacramento County 1996); and
- *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* (SSQP 2007b).

Impacts associated with drainage, hydrology, and water quality that could result from construction and operational activities related to buildout of the SPA were evaluated based on expected construction practice, the materials used, and the locations and duration of the activities. The effects of the proposed development were compared to environmental baseline conditions (i.e., existing conditions) to determine the duration and magnitude of impacts.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE Permit), PP (Proposed Project/Action), RIM (Resource Impact Minimization), CD (Centralized Development), and RHD (Reduced Hillside Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3A.9-1 **Potential Temporary, Short-Term Construction-Related Drainage and Water Quality Effects.** *Construction activities during project implementation would involve extensive grading and movement of earth, which would substantially alter on-site drainage patterns and could generate sediment, erosion, and other nonpoint source pollutants in on-site stormwater that could drain to off-site areas and degrade local water quality.*

On-Site and Off-Site Elements

NP

Under the No Project Alternative, no project-related construction disturbances would occur. However, development would continue to occur under the existing Sacramento County agricultural zoning classification, AG-80, and no off-site water facilities would be constructed. With a minimum lot size of 80 acres allowed under this classification, up to 44 rural residences would be possible in the SPA, with associated agricultural activities that could include on-site wells, grazing, and pesticide applications. These residences would be required to comply with appropriate Sacramento County erosion-control policies, Sacramento County and Section 13801 (California Water Code) well installation standards addressing aquifer contamination from surface water, and regulatory agency standards designed to avoid contaminated runoff and other waste discharges. Thus, **direct** and **indirect** construction-related drainage and water quality impacts would be **less than significant**. ***[Lesser]***

NCP, RIM

Under the No USACE Permit Alternative, because project components would be reconfigured to avoid the placement of dredged or fill material into wetlands and other waters of the U.S., approximately 450 fewer acres would be disturbed and developed. Impacts under the Resource Impact Minimization Alternative would also be less than those of the Proposed Project Alternative because an additional 375 acres of land across the SPA would

be designated as open space. This would result in fewer acres of development and associated disturbance than the Proposed Project Alternative. However, an infrastructure backbone and drainage system would be installed throughout the SPA under both alternatives and substantial temporary, construction-related alteration of the existing drainages would still occur. Temporary, short-term construction-related disturbances at the SPA would still have the potential to result in the discharge of polluted and/or contaminated stormwater or sedimentation. Therefore, the **direct** and **indirect** project-related erosion and water quality impacts would be **significant**. ***[Lesser]***

Mitigation Measure 3A.9-1: Acquire Appropriate Regulatory Permits and Prepare and Implement SWPPP and BMPs.

Prior to the issuance of grading permits, the project applicant(s) of all projects disturbing one or more acres (including phased construction of smaller areas which are part of a larger project) shall obtain coverage under the SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ), including preparation and submittal of a project-specific SWPPP at the time the NOI is filed. The project applicant(s) shall also prepare and submit any other necessary erosion and sediment control and engineering plans and specifications for pollution prevention and control to Sacramento County, City of Folsom, El Dorado County (for the off-site roadways into El Dorado Hills under the Proposed Project Alternative). The SWPPP and other appropriate plans shall identify and specify:

- the use of an effective combination of robust erosion and sediment control BMPs and construction techniques accepted by the local jurisdictions for use in the project area at the time of construction, that shall reduce the potential for runoff and the release, mobilization, and exposure of pollutants, including legacy sources of mercury from project-related construction sites. These may include but would not be limited to temporary erosion control and soil stabilization measures, sedimentation ponds, inlet protection, perforated riser pipes, check dams, and silt fences

- the implementation of approved local plans, non-stormwater management controls, permanent post-construction BMPs, and inspection and maintenance responsibilities;

- the pollutants that are likely to be used during construction that could be present in stormwater drainage and nonstormwater discharges, including fuels, lubricants, and other types of materials used for equipment operation;

- spill prevention and contingency measures, including measures to prevent or clean up spills of hazardous waste and of hazardous materials used for equipment operation, and emergency procedures for responding to spills;

- personnel training requirements and procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP; and

- the appropriate personnel responsible for supervisory duties related to implementation of the SWPPP.

Where applicable, BMPs identified in the SWPPP shall be in place throughout all site work and construction/demolition activities and shall be used in all subsequent site development activities. BMPs may include, but are not limited to, such measures as those listed below.

- Implementing temporary erosion and sediment control measures in disturbed areas to minimize discharge of sediment into nearby drainage conveyances, in compliance with state and local standards in effect at the time of construction. These measures may include silt fences, staked straw bales or wattles, sediment/silt basins and traps, geofabric, sandbag dikes, and temporary vegetation.

- Establishing permanent vegetative cover to reduce erosion in areas disturbed by construction by slowing runoff velocities, trapping sediment, and enhancing filtration and transpiration.

- Using drainage swales, ditches, and earth dikes to control erosion and runoff by conveying surface runoff down sloping land, intercepting and diverting runoff to a watercourse or channel, preventing sheet flow over sloped surfaces, preventing runoff accumulation at the base of a grade, and avoiding flood damage along roadways and facility infrastructure.

A copy of the approved SWPPP shall be maintained and available at all times on the construction site.

For those areas that would be disturbed as part of the U.S. 50 interchange improvements, Caltrans shall coordinate with the development and implementation of the overall project SWPPP, or develop and implement its own SWPPP specific to the interchange improvements, to ensure that water quality degradation would be avoided or minimized to the maximum extent practicable.

Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).

Implementation: Project applicant(s) during all project phases and on-site and off-site elements.

Timing: Submittal of the State Construction General Permit NOI and SWPPP (where applicable) and development and submittal of any other locally required plans and specifications before the issuance of grading permits for all on-site project phases and off-site elements and implementation throughout project construction.

Enforcement:

1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department.

2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation.

3. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.

4. For the U.S. 50 interchange improvements: Caltrans.

5. For all construction activities subject to the state's Construction General Permit and violators of local ordinances referred to the state for enforcement: Central Valley Regional Water Quality Control Board.

PP, RHD

Implementation of the Proposed Project and Reduced Hillside Development Alternative would include substantial construction activity over more than 2,500 acres, including soil removal, trenching and pipe installation, fabrication of concrete channels, grading, and revegetation. An infrastructure backbone and drainage system would be installed throughout the SPA, as shown in Chapter 2, "Alternatives." Construction activities associated with development of the SPA would create the potential for soil erosion and sedimentation both within and downstream of the SPA. The construction process could also result in the accidental release of other pollutants to surface waters, including oil and grease, petroleum hydrocarbons, chemical substances used during construction, waste concrete, and wash water.

The substantial construction-related alteration of on-site drainages could result in soil erosion and stormwater discharges of suspended solids, increased turbidity, and potential release, mobilization, and exposure of other pollutants, including legacy sources of mercury from project-related construction sites. This contaminated runoff could enter Alder Creek, Buffalo Creek, Coyote Creek, Carson Creek, or other on-site drainage channels and ultimately drain off-site to downstream water bodies including Lake Natoma and the lower American River. Many construction-related wastes have the potential to degrade existing water quality and beneficial uses by altering the dissolved-oxygen content, temperature, pH, suspended-sediment and turbidity levels, or nutrient content, or by causing toxic effects in the aquatic environment. The presence and distribution of legacy mercury in upland areas and/or drainages is currently unknown; however, if it is present in the sediments where construction activities disturb soils, it could become mobilized and become exposed to the environment downstream. Therefore, project-related construction activities could violate water quality standards or cause direct harm to aquatic organisms.

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

Although construction on areas of steep topography would be somewhat reduced under the Reduced Hillside Development Alternative, thereby reducing the potential for localized erosion from this source, the total acreage of development subjected to construction activities would be reduced by only approximately 64 acres, with an additional 19 acres of commercial and industrial development, resulting in a nearly identical area subject to construction activities as compared to the Proposed Project Alternative.

Because the Proposed Project and Reduced Hillside Development Alternatives would disturb large areas of land, substantially alter on-site drainage patterns, and could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels as a result of temporary, short-term construction activities, the **direct** and **indirect** project-related erosion and water quality impacts would be **significant**. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3A.9-1.

CD

Impacts under the Centralized Development Alternative would be less than those of the Proposed Project Alternative because there would be approximately 387 fewer acres of residential development and approximately 487 additional acres of the SPA (including areas of steep topography) would remain in its current undeveloped state and not be subject to construction activities. A large-scale infrastructure backbone and drainage system would be still installed throughout the SPA under this alternative and substantial temporary, construction-related alteration of the existing drainages would still occur. Temporary, short-term construction-related disturbances at the SPA would still have the potential to result in the discharge of polluted and/or contaminated stormwater or sedimentation. Therefore, project-related **direct** and **indirect** erosion and water quality impacts would be **significant**. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3A.9-1.

Implementation of Mitigation Measure 3A.9-1 would reduce the significant temporary, short-term construction-related drainage and water quality effects under the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives to **a less-than-significant level** by requiring preparation and implementation of a SWPPP with appropriate BMPs such as source

control, revegetation, and erosion control, to maintain surface water quality conditions in adjacent receiving waters. However, some of the off-site elements fall under the jurisdiction of El Dorado and Sacramento Counties, or Caltrans; therefore, neither the City nor the project applicant(s) would have control over their timing or implementation.

Several technical studies have been conducted regarding the impacts of water quality control features on groundwater (e.g., City of Fresno Nationwide Urban Runoff Project [as summarized in EPA 1983] and *California Storm Water Best Management Practices Handbook* prepared by the California Stormwater Quality Association [CASQA] [CASQA 2003]) and surface water (e.g., *Preliminary Data Summary of Urban Storm Water Best Management Practices* [EPA 1999] and *Cumulative Water Quality Analysis Report for the Lahontan Development 1996–2002* [County of Placer 2007]). These studies have identified that water quality control features such as revegetation, erosion control measures detention/sedimentation, and infiltration basins have been successful in controlling water quality and avoiding water quality impacts (metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater). Further, technical studies associated with the Lahontan Development demonstrated that the use of a variety BMPs such as source control, detention/sedimentation basins, revegetation, and erosion control, have been able to maintain surface water quality conditions in adjacent receiving waters.

IMPACT 3A.9-2 Potential Increased Risk of Flooding and Hydromodification from Increased Stormwater Runoff. *Project implementation would increase the amount of impervious surfaces on the SPA, thereby increasing surface runoff. This increase in surface runoff would result in an increase in both the total volume and the peak discharge rate of stormwater runoff, and therefore could result in greater potential for on- and off-site flooding.*

On-Site and Off-Site Elements

NP

Under the No Project Alternative, the existing hydrology and drainage conditions at the SPA would not be altered except at a localized level with potential construction of up to 44 rural residences under the existing AG-80 Sacramento County zoning, and no off-site water facilities would be constructed. The existing land use classification would not change, overall drainage patterns in the SPA would not be substantially altered, no substantial increase in impervious surfaces would occur, and any construction activities would be required to comply with Sacramento County erosion control policies; thus, **direct** and **indirect** impacts would be **less than significant**. ***[Lesser]***

NCP, RIM

The amount of stormwater runoff would likely be lower under the No USACE Permit and Resource Impact Minimization Alternatives than under the Proposed Project Alternative because of the decreased development areas (approximately 375 and 450 acres, respectively) and associated decreases in impervious surfaces of residential, commercial, and industrial land uses, as shown in Exhibits 2-10 (RIM), and 2-17 (NCP) in Chapter 2, "Alternatives."

To eliminate any flow increase or unacceptable hydromodification caused by project development, stormwater detention facilities and other improvements (e.g., source controls, biotechnical stream stabilization) would be constructed to maintain peak storm flows at no greater than the level existing before development, as illustrated in Exhibits 2-11 (RIM) and 2-18 (NCP) in Chapter 2, "Alternatives." However, since final designs and specifications have not been submitted to or approved by the City, implementation of the No USACE Permit and Resource Impact Minimization Alternatives could result in **potentially significant, direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding. ***[Lesser]***

Mitigation Measure 3A.9-2: Prepare and Submit Final Drainage Plans and Implement Requirements Contained in Those Plans.

Before the approval of grading plans and building permits, the project applicant(s) of all project phases shall submit final drainage plans to the City, and to El Dorado County for the off-site roadway connections into El Dorado Hills, demonstrating that off-site upstream runoff would be appropriately conveyed through the SPA, and that project-related on-site runoff would be appropriately contained in detention basins or managed with through other improvements (e.g., source controls, biotechnical stream stabilization) to reduce flooding and hydromodfication impacts.

The plans shall include, but not be limited to, the following items:

- an accurate calculation of pre-project and post-project runoff scenarios, obtained using appropriate engineering methods, that accurately evaluates potential changes to runoff, including increased surface runoff;
- runoff calculations for the 10-year and 100-year (0.01 AEP) storm events (and other, smaller storm events as required) shall be performed and the trunk drainage pipeline sizes confirmed based on alignments and detention facility locations finalized in the design phase;
- a description of the proposed maintenance program for the on-site drainage system;
- project-specific standards for installing drainage systems;
- City and El Dorado County flood control design requirements and measures designed to comply with them;

  Implementation of stormwater management BMPs that avoid increases in the erosive force of flows beyond a specific range of conditions needed to limit hydromodification and maintain current stream geomorphology. These BMPs will be designed and constructed in accordance with the forthcoming SSQP Hydromodification Management Plan (to be adopted by the RWQCB) and may include, but are not limited to, the following:

  - use of Low Impact Development (LID) techniques to limit increases in stormwater runoff at the point of origination (these may include, but are not limited to: surface swales; replacement of conventional impervious surfaces with pervious surfaces [e.g., porous pavement]; impervious surfaces disconnection; and trees planted to intercept stormwater);
  - enlarged detention basins to minimize flow changes and changes to flow duration characteristics;
  - bioengineered stream stabilization to minimize bank erosion, utilizing vegetative and rock stabilization, and inset floodplain restoration features that provide for enhancement of riparian habitat and maintenance of natural hydrologic and channel to floodplain interactions;
  - minimize slope differences between any stormwater or detention facility outfall channel with the existing receiving channel gradient to reduce flow velocity; and
  - minimize to the extent possible detention basin, bridge embankment, and other encroachments into the channel and floodplain corridor, and utilize open bottom box culverts to allow sediment passage on smaller drainage courses.

- The final drainage plan shall demonstrate to the satisfaction of the City of Folsom Community Development and Public Works Departments and El Dorado County Department of Transportation that 100-year (0.01 AEP) flood flows would be appropriately channeled and contained, such that the risk to people or damage to structures within or down gradient of the SPA would not occur, and that hydromodification would not be increased from pre-development levels such that existing stream geomorphology would be changed (the range of conditions should be calculated for each receiving water if feasible, or a conservative estimate should be used, e.g., an Ep of 1 ±10% or other as approved by the Sacramento Stormwater Quality Partnership and/or City of Folsom Public Works Department).

Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with El Dorado County.

Implementation: Project applicant(s) during all on-site project phases and off-site elements.

Timing: Before approval of grading plans and building permits of all project phases.

Enforcement:
1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Public Works Department.
2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation.

PP, RHD

Project implementation would include development on approximately 2,500 acres of land, most of which has not been previously developed. The Proposed Project Alternative includes residential and commercial development, and supporting facilities and services, including parks, schools, and major circulation and roadway infrastructure. The various types of proposed land uses would each contribute different relative amounts of stormwater runoff corresponding to the percentage of impervious surface associated with each land use category, which ranges from 2% (wetlands/open space) to 95% (major roads, parking, and stormwater detention) (City and County of Sacramento 1996: 5-7). This increase in impervious surface would increase the peak discharge rate of stormwater runoff generated on the SPA and from areas upstream (e.g., contribution of flow from off-site watersheds to Alder Creek within the SPA).

The Proposed Project Alternative would use an on-site conveyance and detention/water quality treatment system and the conveyance of off-site flows through the property. A Draft Storm Drainage Masterplan (Drainage Plan) has been prepared that details the proposed drainage system (MacKay & Somps 2007). The proposed stormwater drainage system has been designed to satisfy the design criteria of the SSQP, FEMA National Flood Insurance Program requirements, and the 2002-2008 NPDES requirements. As illustrated in Exhibit 2-4 (see Chapter 2, "Alternatives"), the Proposed Project Alternative has been designed to provide facilities that would maintain stormwater flows originating on the SPA during and after buildout, at a level equal to or less than predevelopment flows.

The hydrologic analysis in this study is based on procedures outlined in the Sacramento City/County Drainage Manual, Volume 2 Hydrology Standards (City and County of Sacramento 1996). Methodology from this Manual was used to develop a HEC-HMS (version 3.1.0) model for the Proposed Project Alternative, which contained project area subbasin properties, rainfall data, and pipe/channel routing information to determine the peak flows for the 2-year, 5-year, 10-year, and 100-year 24-hour design storms. Within the models, the following three scenarios were created:

1. Existing Conditions: This scenario establishes existing base flow conditions.

2. Proposed Conditions without Detention: This scenario includes the developed area without on-site detention basins.

3. Proposed Conditions with Detention: The scenario includes the developed area with the addition of on-site detention basins to mitigate for increased flows.

The subwatersheds in the SPA and immediate surrounding area were further delineated into 61 subbasins based on aerial topography for those within the Proposed Project Alternative site and USGS topographic maps for those outside of the limits of the aerial topography (MacKay & Somps 2007:10). See Exhibit 3A.9-2 and Table 3A.9-6 for subbasin locations and areas. The existing on-site and off-site subwatersheds used in the Drainage Plan hydrologic modeling are shown on Exhibit 3A.9-2.

Three off-site developments north of U.S. 50 contribute flow to the Alder Creek watershed within the SPA: Broadstone Unit #2, Broadstone Unit #3, and The Oaks at Willow Springs (see Exhibit 3A.9-2). These developments currently have detention basins that were designed to detain flows back to pre-project conditions pursuant to SSQP, FEMA, and NPDES requirements. The design outflow volumes from these detention basins that contribute flow to the watershed in the SPA were used in the Drainage Plan (see MacKay & Somps 2007 for additional detail). Additionally, off-site watersheds to the south of the SPA also contribute flow to the Alder Creek system. These watersheds would remain undeveloped under the Proposed Project Alternative. Physical parameters for these watersheds were estimated using USGS topographic maps. Data for areas north and south of the SPA, along with information on the overall watersheds, were used to simulate runoff through these areas/basins under the above three scenarios. The total estimated peak flow from these off-site watersheds are shown in Table 3A.9-2.

Table 3A.9-2
Modeled Peak 100-Year (0.01 AEP) Flow Rate Contributions from Off-Site Basins (Existing Conditions)

Off-site Watershed ID	Watershed Area (acres)	Peak Flow Rate (cfs)
OFF1A	55	100
OFF1B	228	190
OFF1C	49	74
OFF4A	341	236
OFF4B	71	69
OFF6	337	476
OFF8	1,030	1,160
OFF9D	371	444
OFF9E1	19	43
OFF9E2	5	14
OFF9F1	7	20
OFF9F2	27	51
OFF9F3	34	65
OFF9F4	4	8

Note: cfs = cubic feet per second
Source: MacKay & Somps 2007

Under current conditions, runoff leaves the boundaries of the SPA at eight main outfall locations (see Exhibit 3A.9-1). The Alder Creek watershed, the primary watershed in the SPA, has one main outfall location on the west side of Prairie City Road. The upper Buffalo Creek portion of that watershed, located along the west project boundary, has three outfall locations on the east side of Prairie City Road. The Coyote Creek watershed begins within the southwest project boundary. Runoff leaves this watershed at one location. Four on-site sub basins and

two off-site sub basins of the Carson Creek watershed are incorporated in the hydrologic analysis. The Carson Creek watershed, on the east side of the SPA, has three outfall locations.

Modeling results of peak flows at these main outfall locations from the SPA under the three Proposed Project Alternative scenarios described above were compared for the 100-year (0.01 AEP), 10-year, 5-year, and 2-year storm events, as shown in Table 3A.9-3.

The results in Table 3A.9-4 show that with the detention basin facilities as proposed, the 100-year (0.01 AEP) and 10-year storm events under the Proposed Project Alternative development conditions would remain at or below existing conditions. During the 5-year and 2-year events, flow rates would increase at some locations under the Proposed Project Alternative. Although these increases in peak flow rates are minor and are not anticipated to affect downstream facilities, modified outlet facilities would be provided to reduce the flow to pre-project conditions of these 5-year and 2-year events if it was determined during detailed design studies that downstream facilities would be affected.

The proposed locations of the detention basins required to mitigate flow rate increases due to project development for the 100-year (0.01 AEP) storm event are shown on Exhibit 3A.9-4. Three basins would be located in the Buffalo Creek watershed, one in the Coyote Creek watershed, three in the Carson Creek watershed, and nine in the Alder Creek watershed. The applicants have stated that the basins were sized conservatively and may be refined during the design phase. The 100-year (0.01 AEP) storm detention capacities for the basins are shown in Table 3A.9-4.

The storm drain pipe alignments (see Exhibit 2-4 in Chapter 2, "Alternatives") were sized to convey the 10-year peak flow rate under gravity flow conditions (flowing full with no pressure flow). The 10-year flow volumes used to calculate pipe size were taken from the "with detention" analysis. Major trunk lines were assumed to have a slope of 1%, which was considered a conservative assumption based on the generally steep slopes in the project area, and generally resulted in oversized pipes. During a 100-year (0.01 AEP) storm event the storm drain pipes would flow under pressure, and flow not conveyed in the pipes would be allowed to flow in the streets. Because the design phase is not yet completed, alignments and detention facility locations have not been finalized.

Potential changes to the hydrologic and geomorphic processes in a watershed as a result of impervious surfaces and drainage infrastructure from urbanization include increased runoff volumes and dry weather flows, increased frequency and number of runoff events, increased long-term cumulative duration of flows, as well as increased peak flows. These changes are referred to as "hydromodification." Hydromodification intensifies the erosion and sediment transport process, and often leads to changes in stream channel geometry, streambed and streambank properties, which can result in degradation and loss of riparian habitat, and downgradient sediment deposition causing flooding problems (Geosyntec 2007:4-1). Studies have preliminarily evaluated the hydrologic and geomorphic impacts of hydromodification in the Alder Creek watershed and surrounding areas within the region (Geosyntec 2007; Northwest Hydraulics Consultants [NHC] 2009). The Alder Creek Watershed Management Action Plan (Alder Creek WMAP) (City of Folsom 2010), provides a more general assessment of the watershed, and indicates that shallow soils and prevalence of exposed bedrock limits the channel susceptibility to degradation (e.g., down cutting) within much of the presently undeveloped watershed (including areas within the SPA), and channel instability resulting from hydromodification in these areas would be generally anticipated to be restricted to bank erosion (City of Folsom 2010:4-6, NHC 2009:22-24).

One measurement used to evaluate the amounts of hydromodification in pre- and post-development scenarios is the erosion potential (Ep). The Ep measures the relative change in the amount of erosive force applied to the channel boundary under a given flow scenario, as well as sediment transport capacity, between any two watershed scenarios. An Ep of 1 would indicate no change in erosion potential due to hydromodification between two watershed scenarios, i.e. the pre-development erosion and sediment carrying capacity is maintained. A study based on 49 stream channel sites in four San Francisco Bay Area watersheds showed that as the Ep begins to exceed 1.2 (i.e., a 20 % increase) the probability of stream channel instabilities dramatically increases. The study

Source: MacKay & Somps 2007

Proposed 100-Year (0.01 AEP) Floodplain and Proposed Basin Locations **Exhibit 3A.9-4**

Table 3A.9-3
Modeled Peak Flow Results at Project Outfall Locations

Outfall Location	Existing Conditions (cfs)	Proposed Conditions Without Detention (cfs)	Proposed Conditions With Detention (cfs)	Outfall Description
100-Year (0.01 AEP) Peak Flow Results				
ALDER	4,321	4,854	3,866	Alder Creek flow leaving the study area
BUFF 2	185	299	140	Runoff leaving subbasin BCD2 to Buffalo Creek
BUFF 3	120	152	85	Runoff leaving subbasin BCD3 to Buffalo Creek
BUFF 4	58	86	43	Runoff leaving subbasin BCD4 to Buffalo Creek
COY 1	122	139	67	Runoff leaving subbasin CoyCrD to Coyote Creek
CARS 1	276	327	185	Runoff leaving Carson Creek subbasin CCD1
CARS 2	113	132	51	Runoff leaving Carson Creek subbasin CCD1b
CARS 3	205	317	104	Runoff leaving subbasin CCD2 to Carson Creek
10-Year Peak Flow Results				
ALDER	2,579	2,835	2,532	Alder Creek flow leaving the study area
BUFF 2	100	160	94	Runoff leaving subbasin BCD2 to Buffalo Creek
BUFF 3	63	82	61	Runoff leaving subbasin BCD3 to Buffalo Creek
BUFF 4	30	45	26	Runoff leaving subbasin BCD4 to Buffalo Creek
COY 1	65	74	41	Runoff leaving subbasin CoyCrD to Coyote Creek
CARS 1	150	177	135	Runoff leaving Carson Creek subbasin CCD1
CARS 2	59	69	40	Runoff leaving Carson Creek subbasin CCD1b
CARS 3	113	172	96	Runoff leaving subbasin CCD2 to Carson Creek
5-Year Peak Flow Results				
ALDER	2,073	2,265	2,096	Alder Creek flow leaving the study area
BUFF 2	78	124	82	Runoff leaving subbasin BCD2 to Buffalo Creek
BUFF 3	48	64	54	Runoff leaving subbasin BCD3 to Buffalo Creek
BUFF 4	23	34	21	Runoff leaving subbasin BCD4 to Buffalo Creek
COY 1	50	57	34	Runoff leaving subbasin CoyCrD to Coyote Creek
CARS 1	116	137	126	Runoff leaving Carson Creek subbasin CCD1
CARS 2	45	53	35	Runoff leaving Carson Creek subbasin CCD1b
CARS 3				Runoff leaving subbasin CCD2 to Carson Creek
2-Year Peak Flow Results				
ALDER	1,332	1,455	1,395	Alder Creek flow leaving the study area
BUFF 2	46	74	53	Runoff leaving subbasin BCD2 to Buffalo Creek
BUFF 3	28	38	35	Runoff leaving subbasin BCD3 to Buffalo Creek
BUFF 4	12	19	13	Runoff leaving subbasin BCD4 to Buffalo Creek
COY 1	30	34	25	Runoff leaving subbasin CoyCrD to Coyote Creek
CARS 1	69	83	82	Runoff leaving Carson Creek subbasin CCD1
CARS 2	26	31	25	Runoff leaving Carson Creek subbasin CCD1b
CARS 3	53	81	63	Runoff leaving subbasin CCD2 to Carson Creek

Note: cfs = cubic feet per second
Source: MacKay & Somps 2007

Table 3A.9-4
Modeled Peak 100-Year (0.01 AEP) Storm Detention Capacity

Detention Basin ID	Peak Discharge (cfs)	Peak Volume (acre-feet)
ALDER 1	88	4.31
ALDER 2	718	8.62
ALDER 3	463	7.39
ALDER 4	1156	20.6
ALDER 5	254	34.4
ALDER 6	116	1.57
ALDER 7	94	0.2
BUFF 2	140	8.22
BUFF 3	85	7.5
BUFF 4	43	4.5
COY 1	67	3.8
CARS 1	185	5.72
CARS 2	51	2.28
CARS 3	104	11.8
DEAC2A	87	2.79
DEAC2B	253	2.74

Notes: ID = Identification; cfs = cubic feet per second
Source: MacKay & Somps 2007

suggests that the effectiveness of BMPs can be evaluated by their ability to maintain a target Ep of 1 ±20%. A U.S. Army Corps of Engineers study suggests a more conservative Ep target of 1 ±10% (Geosyntec 2007:5-13). The Alder Creek WMAP provides additional guidance and recommendations related to assessment and protection of hydrologic and geomorphic processes and functions for Alder Creek (City of Folsom 2010:5-17).

The total acreage of development subjected to construction activities under the Reduced Hillside Development Alternative would be reduced by only approximately 64 acres, with an additional 19 acres of commercial and industrial development, resulting in a nearly identical area subject to construction activities as compared to the Proposed Project Alternative. Therefore, impacts under the Reduced Hillside Development Alternative would be similar to that of the Proposed Project Alternative because a similar number of acres would be developed under both scenarios, with a similar area of associated impervious surfaces, as shown in Exhibit 2-14 in Chapter 2, "Alternatives."

While it appears that the applicants' proposed Storm Drainage Masterplan (MacKay & Somps 2007) could appropriately convey upstream off-site runoff and would appropriately detain project-related on-site runoff in a manner that effectively meets current stormwater management criteria to acceptable levels, hydromodification is not addressed in the Storm Drainage Master Plan and final designs and specifications have not been submitted or approved by the City. Without the necessary information to demonstrate that all stormwater criteria and standards, including hydromodifcation management, are being met, it cannot be assumed that potentially significant impacts would not occur. Therefore, implementation of the Proposed Project or the Reduced Hillside Development Alternatives could result in **potentially significant**, **direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding and/or hydromodification. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3A.9-2.

CD

The amount of stormwater runoff would likely be lower under the Centralized Development Alternative than under the Proposed Project Alternative because there would be approximately 387 fewer acres of residential development and approximately 487 additional acres of the SPA (including most of the areas of steep topography in the eastern foothills) would remain in its current undeveloped state. This would result in associated decreases in impervious surfaces as shown in Exhibit 2-12 in Chapter 2, "Alternatives." In addition, because steep slopes are in general more erodible, have higher runoff coefficients, and cannot have detention basin placement due to instability (SSQP 2007b: DB-2), reducing or eliminating development on these areas would reduce the potential for increases in stormwater runoff quantity or contaminants.

To eliminate any flow increase caused by project development under the Centralized Development Alternative, stormwater detention facilities and other improvements (e.g., source controls, biotechnical stream stabilization) would be constructed to maintain peak storm flows at no greater than the level existing before development, as illustrated in Exhibit 2-13 in Chapter 2, "Alternatives." However, since final designs and specifications have not been submitted to or approved by the City, implementation of the Centralized Development Alternative could result in **potentially significant, direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3A.9-2.

Implementation of Mitigation Measure 3A.9-2 would reduce the potentially significant impact associated with the potential increased risk of flooding from increased stormwater runoff under the No USACE Permit, Proposed Project Alternative, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives to a **less-than-significant** level because the project applicant(s) would demonstrate to the appropriate regulatory agency that the project would conform with applicable state and local regulations regulating surface water runoff, including the procedures outlined in the Sacramento City/County Drainage Manual (City and County of Sacramento 1996) and the El Dorado County SWMP (El Dorado County 2004), which are designed to meet or exceed applicable state and local regulations pertaining to stormwater runoff. Specific project design standards as required in this mitigation measure would, when implemented, provide flood protection to meet FEMA 100-year (0.01 AEP) flood protection criteria, would safely convey on-site and off-site flows through the SPA, would reduce the effects of hydromodification on stream channel geomorphology, and would prevent substantial increased flood hazard on downstream areas by limiting peak discharges of flood flows to below pre-project levels. However, some of the off-site elements (two roadway connections in El Dorado County) fall under the jurisdiction of El Dorado County; therefore, neither the City nor the project applicant(s) would have control over their timing or implementation.

IMPACT 3A.9-3 Long-Term Water Quality and Hydrology Effects from Urban Runoff. *Project implementation would convert a large area of undeveloped land to residential and commercial uses, thereby changing the amount and timing of potential long-term pollutant discharges in stormwater and other urban runoff to Alder Creek, Buffalo Creek, Coyote Creek, Carson Creek, and other on- and off-site drainages.*

On-Site and Off-Site Elements

NP

Under the No Project Alternative, development of up to 44 rural residence could occur under the existing Sacramento County agricultural zoning classification AG-80, and no off-site water facilities would be constructed. Agricultural activities could include new on-site wells, grazing, and pesticide applications, with associated contaminant discharges. These residences would be required to comply with appropriate Sacramento

County erosion-control policies, Sacramento County and Section 13801 (California Water Code) well installation standards addressing aquifer contamination from surface water, Sacramento County on-site wastewater treatment system installation standards if septic systems are installed, and regulatory agency standards designed to avoid contaminated runoff and groundwater, and other waste discharges. Thus, **direct** and **indirect** impacts under the No Project Alternative would be **less than significant**. ***[Lesser]***

NCP, RIM, CD, RHD

The amount of contaminants discharged in stormwater drainage would likely be lower under the No USACE Permit, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives than under the Proposed Project Alternative because of the decreased density and areas of residential, commercial, and industrial land uses, as shown in Exhibits 2-10 (RIM) and 2-17 (NCP) in Chapter 2, "Alternatives." Further, the contaminant amounts would likely be lower in the eastern portion of the SPA because of the reduced amount of residential, commercial, and industrial land uses under both of these alternatives.

Water quality BMPs, including those to be used for the Proposed Project Alternative and shown in Table 3A.9-7, such as revegetation, erosion control measures, and detention basins, have been shown to be successful in controlling water quality and avoiding water quality impacts (metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater [EPA 1983:7-24]). Pollutants are removed from stormwater in detention basins through gravitational settling and biological processes depending on the type of basin. Permanent ponds (i.e., micropools) in dry weather may enhance pollutant removal through biological and chemical processes (SSQP 2007b:DB-2). To eliminate any flow increase caused by project development, and any erosion related to this increase, stormwater detention facilities would be constructed to maintain peak storm flows at the level existing before development, as illustrated in Exhibits 2-11 (RIM), 2-13 (CD), 2-15 (RHD), and 2-18 (NCP) in Chapter 2, "Alternatives."

However, because final design plans and specifications have not been submitted to or approved by the City, implementation of the No USACE Permit, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives could result in **potentially significant, direct** and **indirect** impacts related to the potential for contaminants to enter receiving waters, thus resulting in adverse effects from long-term urban runoff. ***[Lesser]***

Mitigation Measure 3A.9-3: Develop and Implement a BMP and Water Quality Maintenance Plan.

Before approval of the final small-lot subdivision map for all project phases, a detailed BMP and water quality maintenance plan shall be prepared by a qualified engineer retained by the project applicant(s) of all project phases. Drafts of the plan shall be submitted to the City of Folsom and El Dorado County for the off-site roadway connections into El Dorado Hills, for review and approval concurrently with development of tentative subdivision maps for all project phases. The plan shall finalize the water quality improvements and further detail the structural and nonstructural BMPs proposed for the project. The plan shall include the elements described below.

- A quantitative hydrologic and water quality analysis of proposed conditions incorporating the proposed drainage design features.
- Predevelopment and postdevelopment calculations demonstrating that the proposed water quality BMPs meet or exceed requirements established by the City of Folsom and including details regarding the size, geometry, and functional timing of storage and release pursuant to the '"Stormwater Quality Design Manual for Sacramento and South Placer Regions" ([SSQP 2007b] per NPDES Permit No. CAS082597 WDR Order No. R5-2008-0142, page 46) and El Dorado County's NPDES SWMP (County of El Dorado 2004).

- Source control programs to control water quality pollutants on the SPA, which may include but are limited to recycling, street sweeping, storm drain cleaning, household hazardous waste collection, waste minimization, prevention of spills and illegal dumping, and effective management of public trash collection areas.

- A pond management component for the proposed basins that shall include management and maintenance requirements for the design features and BMPs, and responsible parties for maintenance and funding.

- LID control measures shall be integrated into the BMP and water quality maintenance plan. These may include, but are not limited to:

    - surface swales;
    - replacement of conventional impervious surfaces with pervious surfaces (e.g., porous pavement);
    - impervious surfaces disconnection; and
    - trees planted to intercept stormwater.

- New stormwater facilities shall be placed along the natural drainage courses within the SPA to the extent practicable so as to mimic the natural drainage patterns. The reduction in runoff as a result of the LID configurations shall be quantified based on the runoff reduction credit system methodology described in "Stormwater Quality Design Manual for the Sacramento and South Placer Regions, Chapter 5 and Appendix D4" (SSQP 2007b) and proposed detention basins and other water quality BMPs shall be sized to handle these runoff volumes.

For those areas that would be disturbed as part of the U.S. 50 interchange improvements, it is anticipated that Caltrans would coordinate with the development and implementation of the overall project SWPPP, or develop and implement its own SWPPP specific to the interchange improvements, to ensure that water quality degradation would be avoided or minimized to the maximum extent practicable.

Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with El Dorado County and Caltrans.

Implementation: Project applicant(s) during all on-site project phases and off-site elements.

Timing: Prepare plans before the issuance of grading permits for all project phases and off-site elements and implementation throughout project construction.

Enforcement:

1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department and Public Works Department.

2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation.

3. For the U.S. 50 interchange improvements: Caltrans.

PP

The conversion of undeveloped land to urban land uses would alter the types, quantities, and timing of contaminant discharges in stormwater runoff. Overall, the potential for the Proposed Project Alternative to cause or contribute to long-term discharges of urban contaminants (e.g., oil and grease, fuel, trash) into the stormwater drainage system and ultimate receiving waters would increase compared to existing conditions. Some

contaminants associated with existing on-site agricultural activities (e.g., sediment, nutrients, pathogens, agricultural chemicals) would decrease as these uses are phased out during project development. The potential discharges of contaminated urban runoff from paved and landscaped areas could increase or could cause or contribute to adverse effects on aquatic organisms in receiving waters. Urban contaminants typically accumulate during the dry season and may be washed off when adequate rainfall returns in the fall to produce a "first flush" of runoff. The amount of contaminants discharged in stormwater drainage from developed areas varies based on a variety of factors, including the intensity of urban uses such as vehicle traffic, types of activities occurring on-site (e.g., office, commercial, industrial), types of contaminants used on-site (e.g., pesticides, herbicides, cleaning agents, petroleum byproducts), contaminants deposited on paved surfaces, and the amount of rainfall.

The storm drainage system for the Proposed Project Alternative, as described in the Folsom Plan Area Specific Plan (City of Folsom 2009) and Storm Drainage Masterplan (MacKay & Somps 2007), would be designed to direct runoff flows into on-site detention basins (and one off-site basin west of Prairie City Road), and would incorporate water quality treatment. The stormwater quality treatment configurations would use treatment methodologies as described in the Stormwater Quality Design Manual (SSQP 2007b) and approved by the City. The Sacramento NPDES MS4 Permit (described in above in the "Regulatory Framework" section), which applies to this project area, requires that "priority new development and redevelopment projects shall integrate LID principles early in the project planning and design process." The goal is to increase infiltration potential, evaporation, and surface storage while reducing excess stormwater runoff. The LID techniques would consist of a series of surface swales, catch basins, drainage inlets, underground pipes and detention basins. New stormwater facilities would be placed along the natural drainage courses within the SPA to the extent practicable so as to mimic the natural drainage patterns. The goal of the LID features would be to mimic the predevelopment hydrology at the SPA by using the above decentralized design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall.

The proposed water quality detention basins were sized based on criteria outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions (MacKay & Somps 2007; SSQP 2007b). Table 3A.9-6 shows the preliminary water quality volumes required for each SPA subbasin (see Exhibit 3A.9-4) based on these criteria. At locations where subbasins discharge directly into a stormwater detention basin, the water quality volume could be added to the overall detention basin size. The water quality basin sizing and design configuration for each watershed would be finalized during the final design stages.

Water quality BMPs, including those to be used for the Proposed Project Alternative and shown in Table 3A.9-7, such as landscape/buffer strips, wetlands, infiltration trenches, swales, and detention basins have been shown to be successful in controlling water quality and avoiding water quality impacts (metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater [EPA 1983:7-24]). Pollutants are removed from stormwater in detention basins through gravitational settling and biological processes depending on the type of basin. Permanent ponds (i.e., micropools)

in dry weather may enhance pollutant removal through biological and chemical processes (SSQP 2007b:DB-2). To eliminate any flow increase caused by project development, and any erosion related to this increase, stormwater detention facilities would be constructed to maintain peak storm flows not to exceed the level existing before development, as shown on Table 3A.9-3 and illustrated in Exhibit 2-4 in Chapter 2, "Alternatives."

However, because final design plans and specifications have not been submitted to or approved by the City or El Dorado County (for off-site roadway connections), implementation of the Proposed Project Alternative could result in contaminants entering receiving waters, thus resulting in adverse effects from long-term urban runoff. Because the Proposed Project Alternative could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels as a result of runoff from the SPA, the project-related water quality impacts would be both **direct** and **indirect**, and would be **potentially significant**.

Table 3A.9-6
Project Site Water Quality Subbasins and Volumes

Subbasin	Total Subbasin Area (acres)	Storage Volume (inches) [1]	Storage Volume (acre-feet) [1]
ACD9	40	0.16	0.52
ACD9a_1	84.1	0.28	1.98
ACD9a_2	14.7	0.24	0.3
ACD9c	53.7	0.16	0.71
ACD9e	8.79	0.21	0.16
ACD6a	142	0.65	7.65
ACD6b	97.1	0.54	4.4
ACD6d	158	0.56	7.41
ACD6f	89.5	0.75	5.61
ACD5a	25.3	0.21	0.45
ACD5b_1	16	0.27	0.36
ACD5b_2	10.8	0.47	0.42
ACD5b_3	7.1	0.18	0.11
ACD4a_1	56	0.38	1.78
ACD4a_2	21.7	0.05	0.09
ACD4a_3	13.2	0.4	0.44
ACD4a_4	36.4	0.35	1.07
ACD4a_5	4.42	0.08	0.03
ACD4b_1	26.3	0.46	1
ACD4b_2	51.1	0.25	1.07
ACD3a	89.4	0.39	2.88
ACD3b	33	0.33	0.9
ACD2a	83	0.16	1.1
ACD2b_1	105	0.39	3.43
ACD2b_2	45.3	0.13	0.5
ACD2c_1	65	0.21	1.14
ACD2d	81.8	0.48	3.25
ACD1a	28.1	0.21	0.49
ACD1c_1	89.1	0.32	2.38
ACD1c_2	9.26	0.13	0.1
ACD1d_1	10.8	0.37	0.34
ACD1d_2	23.2	0.61	1.19
ACD1d_3	61.1	0.38	1.96
ACD1e_1	247	0.36	7.47
ACD1f_1	22.2	0.68	1.26
CCD1	93.2	0.36	2.81
CCD1a	25	0.86	1.8
CCD1b	53.2	0.22	0.97
CCD2	203	0.25	4.24
BCD2	181	0.39	5.81
BCD3	124	0.16	1.7

Table 3A.9-6
Project Site Water Quality Subbasins and Volumes

Subbasin	Total Subbasin Area (acres)	Storage Volume (inches) [1]	Storage Volume (acre-feet) [1]
BCD4	39	0.13	0.42
ACDhwy_50	38.8	0.79	2.54
ACDhwy_50_a	10.9	0.86	0.78
CoyCrD	82.9	0.29	1.97
AC9a	30.1	0.05	0.12
AC9b	88	0.1	0.73
AC9d	66.4	0.15	0.81
AC9e	53	0.37	1.62
AC9f	74.4	0.51	3.18
AC8a	29.7	0.33	0.81
AC8b	12.6	0.67	0.7
AC7a	71.4	0.08	0.45
AC7b	40.5	0.2	0.67
AC6e	38.7	0.19	0.62
AC6f	86.5	0.45	3.28
AC6g	5.91	0.07	0.03
AC5a	66.3	0.05	0.27
AC5b	5.28	0.06	0.03
AC5c	51.1	0.05	0.21
AC4	36.8	0.08	0.26

Note: [1] This volume incorporates a 48-hour design drawdown period. This is the time that a volume of water must be detained to achieve the maximum extent practicable pollutant removal (SSQP 2007b:DB-2).
Source: MacKay & Somps 2007

Mitigation Measure: Implement Mitigation Measure 3A.9-3.

Implementation of Mitigation Measure 3A.9-3 would reduce the potentially significant impact associated with potential long-term water quality effects of urban runoff under the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives to a **less-than-significant** level because the project applicant(s) of all project phases would develop and implement a BMP and water quality maintenance plan that would demonstrate to the City that the Proposed Project Alternative would conform to applicable state and local regulations restricting surface water runoff including the Stormwater

Quality Design Manual for the Sacramento and South Placer Regions (SSQP 2007b) and El Dorado County's SWMP (El Dorado County 2004). The permanent BMPs proposed for the stormwater treatment system and described in detail in the SSQP have been shown to be effective in reducing contaminant levels in urban runoff (EPA 1999, CASQA 2003). However, some of the off-site elements fall under the jurisdiction of El Dorado County and Caltrans; therefore, neither the City nor the project applicant(s) would have control over their timing or implementation.

Table 3A.9-7 Expected Pollutant Removal Efficiency of BMPs					
BMP Type	Typical Pollutant Removal (%)				
	Suspended Solids	Nitrogen	Phosphorus	Pathogens	Metals
Structural BMPs					
Dry detention basins	30–65	15–45	15–45	<30	15–45
Wet detention/retention basins	50–80	30–65	30–65	<30	50–80
Constructed wetlands	50–80	<30	15–45	<30	50–80
Infiltration basins	50–80	50–80	50–80	65–100	50–80
Infiltration trenches, dry wells	50–80	50–80	15–45	65–100	50–80
Porous pavement	65–100	65–100	30–65	65–100	65–100
Grassed swales	30–65	15–45	15–45	<30	15–45
Vegetated filter strips	50–80	50–80	50–80	<30	50–80
Surface sand filters	50–80	<30	50–80	<30	50–80
Other media filters	65–100	15–45	<30	<30	50–80
Construction Site BMPs					
Silt fence	50–80				
Sediment basin	55–100				
Sediment trap	60				
Note: BMP = best management practices Source: EPA 1999					

IMPACT 3A.9-4 Potential Exposure of People or Structures to a Significant Risk of Flooding as a Result of the Failure of a Levee or Dam. *The SPA is not in an area protected by levees and is not located within the Folsom Dam inundation zone; however, there are existing dams impounding water within and upstream of the SPA.*

On-Site and Off-Site Elements

NP

Under the No Project Alternative, limited development of up to 44 individual residences could occur under the existing Sacramento County zoning AG-80, and no off-site water facilities would be constructed. Because the SPA is not in an area protected by levees, is not within the identified flood hazard zone of the Folsom Dam, and is also within Sacramento County, which implements the Automated Local Evaluation in Real Time (ALERT) system, **direct** and **indirect** impacts related to flooding as a result of the failure of a levee or dam are considered **less than significant**. ***[Lesser]***

NCP, PP, RIM, CD, RHD

For planning purposes, the State Office of Emergency Services (OES), with information from the U.S. Bureau of Reclamation and DWR, has the responsibility to provide local governments with critical hazard response information, including information related to potential flooding from levee failure or dam inundation. The SPA is

not in an area protected by levees; however, Folsom Dam is located approximately 4.5 miles north of the SPA. The OES has mapped the dam inundation zones in Sacramento County for Folsom Dam. The map shows that while a relatively large portion of Sacramento County and the City of Folsom would be inundated with water in the event of a dam or dike failure, the SPA is outside of the mapped inundation area (Sacramento County 2007b:383-384, Figure III-4). In addition, a dam failure plan, the flooding ALERT system, and evacuation procedures are integrated into Sacramento County's Emergency Operations Plan (City of Sacramento 2005:7.2-10). Further, the occurrence of dam inundation (due to dam or dike failure) is based on extremely remote conditions (Sacramento County 2007b:383) and implementation of any of the project alternatives would do nothing to increase the potential for dam failure.

There are five ponds within and three ponds upstream (to the south of White Rock Road) of the SPA that appear to hold water throughout the year. They are formed behind existing dams in topographically low areas along existing drainages located within subwatersheds AC1d, AC2d, AC9a, AC5b, and OF 4a and OF 4b, respectively (see Exhibit 3A.9-2). The pond in subwatershed AC9a, estimated to be approximately 3 to 5 surface acres, is formed by an earthen dam approximately 15 to 20 feet in height on the north side of the pond; the depth and associated volume of the pond is unknown (GenCorp Realty Investments, LLC 2008). The height of the other dams and/or volume of water in the associated impoundments are unknown. Due to the unknown size of the dams and associated water impoundment volumes, it is currently unknown whether or not any of the dams are under the jurisdictional oversight of the DSOD. Additionally, evaluation of the dams has not been conducted to determine stability, potential for risk of failure, and/or estimated area of downstream inundation in the event of failure.

While unlikely based on field observation of what appear to be relatively small dimensions, is currently unknown whether or not the dams are within the jurisdictional oversight of the DSOD. Because the current condition (e.g., stability) of the dams within and upstream of the SPA are unknown and the area of downstream inundation in the event of failure is also uncertain, implementation of the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives could result in people or structures downstream of these features to be exposed to a significant risk of flooding if the dams were to fail. Therefore, project-related impacts related to the failure of a dam are considered **direct** and **potentially significant. No indirect** impacts would occur. ***[Similar]***

> Mitigation Measure 3A.9-4: Inspect and Evaluate Existing Dams Within and Upstream of the Project Site and Make Improvements if Necessary.
>
> Prior to submittal to the City of tentative maps or improvement plans the project applicant(s) of all project phases shall conduct studies to determine the extent of inundation in the case of dam failure. If the studies determine potential exposure of people or structures to a significant risk of flooding as a result of the failure of a dam, the applicants(s) shall implement of any feasible recommendations provided in that study, potentially through drainage improvements, subject to the approval of the City of Folsom Public Works Department.
>
> **Implementation:** Project applicant(s) of all on-site project phases and off-site elements.
>
> **Timing:** Prior to submittal to the City of tentative maps or improvement plans.
>
> **Enforcement:** City of Folsom Public Works Department.

Implementation of Mitigation Measure 3A.9-4 would reduce the potential for increased risk of flooding s a result of the failure of a dam under the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives to a **less-than-significant level** because the project applicant(s) of all project phases would demonstrate that people or structures would not the small dams and associated impoundments within and upstream of the SPA meet minimum stability requirements and not exposure of people or structures to a significant risk of flooding.

IMPACT 3A.9-5 Potential Exposure to 200-Year (0.005 AEP) Flood Prior to Implementation of SB 5. *A delineation of the proposed 200-year (0.005 AEP) floodplain has been developed for the SPA and all development activities would be planned consistent with SB 5 requirements.*

On-Site and Off-Site Elements

NP

The 200-year (0.005 AEP) floodplain as defined by California Water Code Section 9610(a), pursuant to SB 5 (described in the "Regulatory Setting" section above) has not been delineated for the SPA for the No Project Alternative. Under the No Project Alternative, the agricultural activities that could occur under the existing Sacramento County AG-80 zoning, including the construction of up to 44 individual rural residences, would not appreciably alter the existing hydrology and drainage conditions at the SPA. Furthermore, no off-site water facilities would be constructed. Although it has not been determined what areas in the SPA are within the 200-year (0.005 AEP) floodplain under the existing condition, SB 5 prohibits local governments from approving entitlements or permits, including permits resulting in the construction of a new residence, in a flood hazard zone unless 200-year (0.005 AEP) flood protection is provided pursuant to implementation of the Central Valley Flood Protection Plan. Thus, **no direct** or **indirect** impacts would occur. ***[Similar]***

NCP, PP, RIM, CD, RHD,

A delineation of the proposed 200-year (0.005 AEP) floodplain has been developed for the SPA (see Exhibits 3A.9-5a and 3A.9-5b). All development activities associated with the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives would be planned consistent with SB 5 (described in the "Regulatory Framework" section above). Therefore, implementation of the No USACE Permit, Proposed Project, Resource Impact Minimization, Centralized Development, and Reduced Hillside Development Alternatives would not subject people and/or structures to **direct** or **indirect** impacts related to flooding as a result of a 200-year (0.005 AEP) storm. This would be a **less-than-significant impact**. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3A.9-6 Potential Effects on Groundwater Recharge. *Shallow and deep percolation of rainwater and related runoff and consequent depth to groundwater could be affected locally by the development of additional impervious surfaces, which could limit infiltration and recharge.*

On-Site and Off-Site Elements

NP

Under the No Project Alternative, up to 44 rural residences could be developed and agricultural activities could continue under the existing AG-80 land use and zoning designation. Because no off-site water facilities would be constructed, new groundwater wells would likely be installed to support agricultural and/or rural residential development under the existing Sacramento County agricultural zoning classification, AG-80. Although well construction would be required to comply with appropriate Sacramento County well installation policies, in addition to Section 13801 of the California Water Code, localized groundwater use would be expected to increase over existing levels, and as compared to levels under the Proposed Project Alternative and the other four alternatives (since no on-site groundwater use is proposed). Thus, **direct** and **indirect** impacts to groundwater recharge under the No Project Alternative would be **potentially significant**. ***[Greater]***

NCP, RIM, CD

Impacts under the No USACE Permit and Resource Impact Minimization Alternatives would be less than those of the Proposed Project Alternative because an additional 375 acres and 500 acres, respectively, of land throughout the SPA would be designated as open space, thus increasing the area available for infiltration and recharge. Impacts under the Centralized Development Alternative would be less than those of the Proposed Project Alternative because the total acreage of residential development would be reduced by approximately 387 acres within the eastern portion of the SPA.

Those areas within the SPA that are most conducive to groundwater recharge, e.g. the Alder Creek stream and tributary corridors would generally be maintained in open space and the retention basins and the LID features described in Mitigation Measure 3A.9-3, would be sited and designed to maximize infiltration under the Resource Impact Minimization, Centralized Development, and No USACE Permit Alternatives. Furthermore, no wells would be established for domestic use, and increased seasonal groundwater recharge from landscape irrigation activities would occur. Therefore the **direct** and **indirect** impacts on groundwater recharge under these alternatives would be considered **less-than-significant.** ***[Lesser]***

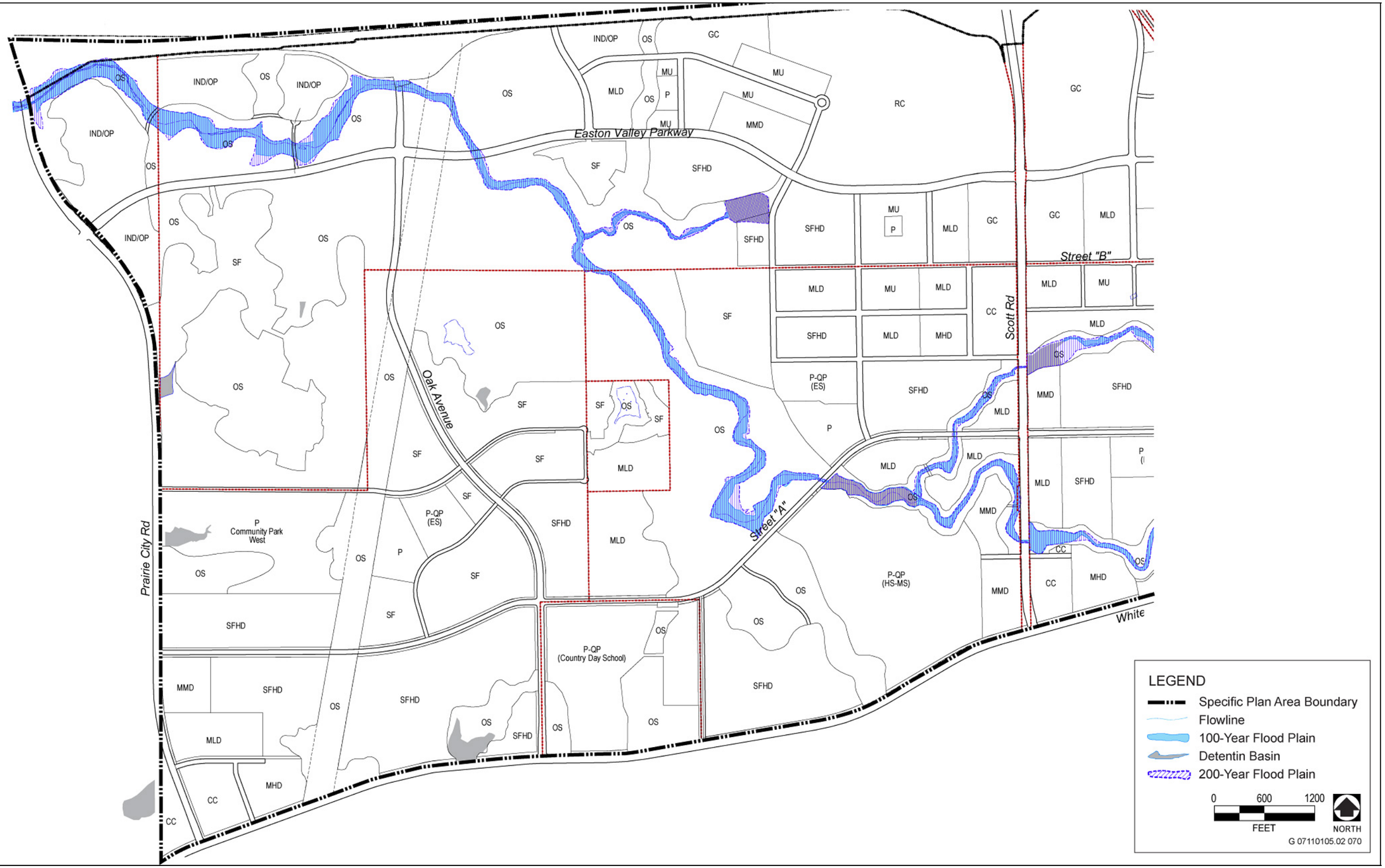
Mitigation Measure: No mitigation measures are required.

PP, RHD

Project-specific water utility, supply, and demand impacts are addressed in Section 3B.16, "Utilities and Service Systems – Water" of this EIR/EIS. This analysis focuses on the potential effects related to on-site groundwater recharge from proposed on-site development. Planned development of the Proposed Project Alternative would include increases in impervious surfaces and the amount of surface runoff generated by proposed development. Of the approximately 3,500 acres at the SPA, approximately 2,330 acres would be developed with residential and commercial land uses, and schools and infrastructure. The remaining 1,200 acres would be retained as open space, including the preservation and enhancement of the Alder Creek stream corridor and associated tributaries. The retention basins and LID features described in Mitigation Measure 3A.9-3 would provide some groundwater recharge through localized infiltration where subsurface conditions allow. The retention areas would be sited and designed to maximize infiltration into the ground. Under the Reduced Hillside Development Alternative, while the residential development on the eastern hillsides would be reduced, thereby providing some groundwater recharge in this area, the total acreage of development subjected to construction activities under this alternative would be reduced by only approximately 64 acres, with an additional 19 acres of commercial and industrial development, resulting in a nearly identical area subject to construction activities as compared to the Proposed Project Alternative.

As described in Subsection 3A.9.1, "Groundwater Hydrology" above, soils in the SPA and surrounding area have a poor capacity for groundwater recharge, with most of the substantial recharge occurring along active stream channels. Because there is little groundwater underneath the SPA, and the amounts vary locally and seasonally, it has traditionally been used for grazing as opposed to irrigation-dependent agriculture. Those areas within the SPA that are most conducive to groundwater recharge, e.g. the Alder Creek stream and tributary corridors would generally be maintained in open space and the retention basins, and the LID features described in Mitigation Measure 3A.9-3, would be sited and designed to maximize infiltration under the Proposed Project and Reduced Hillside Density Alternatives. Furthermore, no new wells would be established for domestic use, and increased seasonal groundwater recharge from landscape irrigation activities would occur. Therefore, **direct** and **indirect** impacts on groundwater recharge under the Proposed Project and Reduced Hillside Density Alternatives would be considered **less-than-significant.** ***[Similar]***

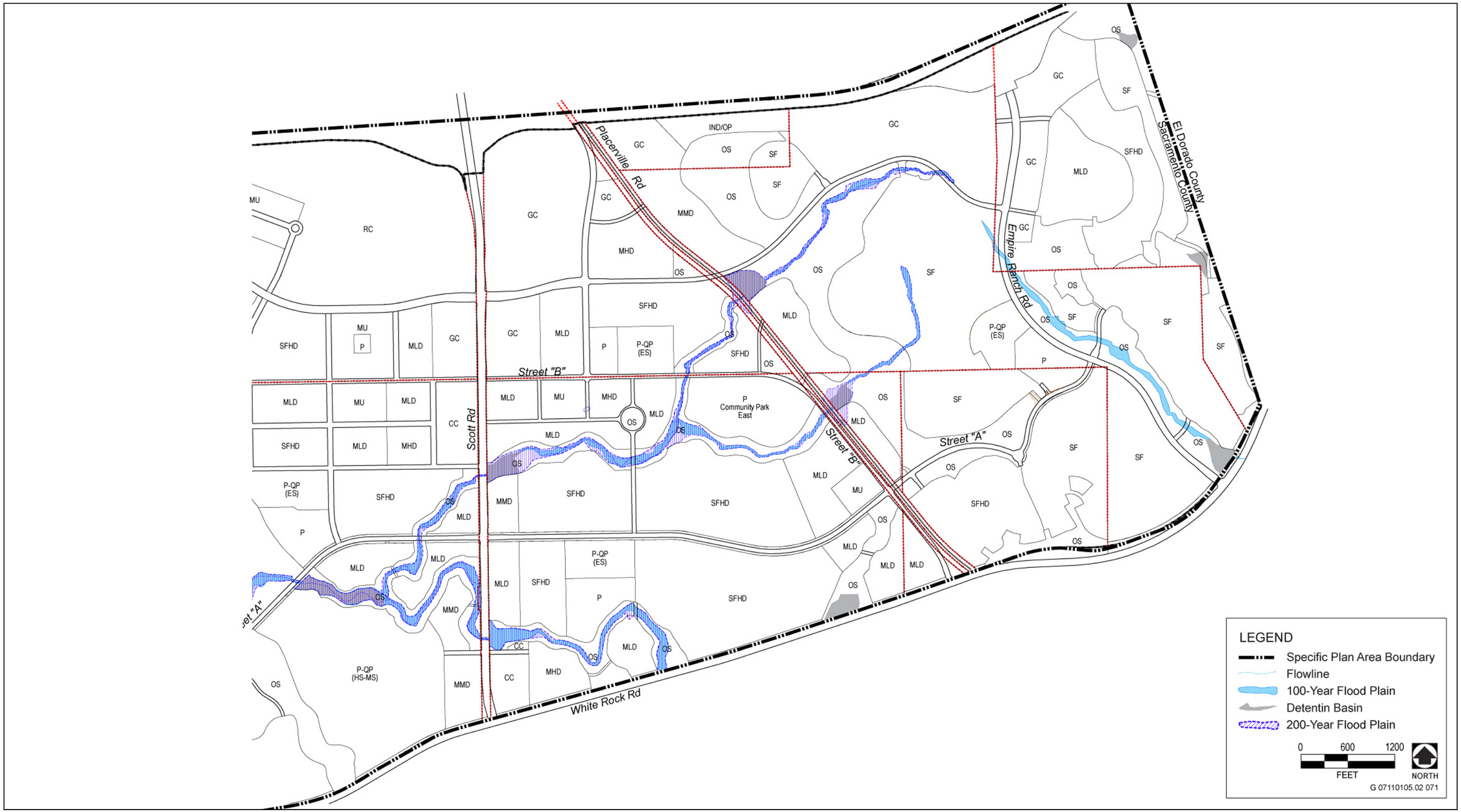
Mitigation Measure: No mitigation measures are required.



Source:MacKay & Somps 2010

Proposed 200-Year (0.01 AEP) Floodplains (Western Half of SPA)

Exhibit 3A.9-5a



Source: MacKay & Somps 2010

Proposed 200-Year (0.01 AEP) Floodplains (Eastern Half of SPA)

Exhibit 3A.9-5b

3A.9.4 RESIDUAL SIGNIFICANT IMPACTS

With implementation of the mitigation measures listed above, project implementation would not result in any residual significant impacts related to short-term alteration of drainages and associated surface water quality and sedimentation, increased risk of flooding or hydromodification from stormwater runoff, water quality and hydrology effects from long-term urban runoff, or groundwater recharge.

However, some of the off-site elements (two roadway connections in El Dorado County, detention basin in Sacramento County, and U.S. 50 interchange improvements) fall under the jurisdiction of El Dorado County, Sacramento County, and Caltrans, respectively; therefore, neither the City nor the project applicant(s) would have control over the timing or implementation of mitigation measures for these off-site elements. Because the City does not control implementation of mitigation measures for off-site improvements constructed in areas under the jurisdiction of El Dorado and Sacramento Counties, or Caltrans, Impacts 3.10-1, 3.10-2, 3.10-3, and 3.10-5 are considered potentially significant and unavoidable for off-site improvements which would be located in Sacramento County, El Dorado County, or Caltrans jurisdiction.

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