

This section discusses and analyzes the surface hydrology, groundwater, and water quality characteristics of the Planning Area. The information provided in this section is based on the Zone 40 Water Supply Draft Master Plan Update (2002), the Water Master Plan for Areas Adjacent to Zone 40 Water Supply Master Plan Update's Study Area (1998), the Sacramento Stormwater Quality Improvement Plan (2000), the Local Floodplain Management Plan for the County of Sacramento (2001), The Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region: the Sacramento River Basin and the San Joaquin River Basin (1998), the Sacramento County General Plan Update Environmental Impact Report (1992), the East Franklin Drainage Corridor Alternative Design Project (2002), and various drainage master plans for creeks throughout the Elk Grove Planning Area.

4.8.1 EXISTING SETTING

SURFACE WATER

Sacramento County is part of the Sacramento River watershed, which covers approximately 27,000 square miles, with 400 miles of river from Lake Shasta to the convergence of the Sacramento-San Joaquin Delta. The Planning Area is also part of this larger watershed.

More specifically, surface water resources in the Planning Area are part of the Morrison Creek Stream Group, and include Elder, Elk Grove, Laguna (and tributaries), Morrison, Strawberry, and Whitehouse Creeks. Florin, Gerber, and Unionhouse creeks are located close to the Planning Area in Sacramento County. Deer Creek is located in the eastern portion of the Planning Area, parallel to the Cosumnes River. The Cosumnes River is the eastern border of the Planning Area, however, all of the creeks in the area drain into the Morrison Creek Stream Group, then eventually into the Sacramento River. Runoff from precipitation and snowmelt from the Sierra Nevada mountains are the main sources of surface water supply in the Planning Area.

Laguna Creek, the Cosumnes River, and the Sacramento River are the main surface hydrological features in the Planning Area (see **Figure 4.8-1**). The Morrison Creek Stream Group drainage basin covers 192 square miles. The nine creeks that drain into Morrison Creek flow southwest and eventually drain into the Beach Stone Lakes area west of Interstate 5.

Laguna Creek, the main creek that flows through the City of Elk Grove, has been altered by development. There have been channels, levees, and culverts created to alleviate the possibility of flooding, as well as to accommodate different development scenarios. Some of the other creeks in the Planning Area have also been altered to accommodate development or alleviate flooding potential.

PRECIPITATION

According to the National Weather Service, the annual average precipitation for the Planning Area ranges from 15 to 20 inches. There is very little snow that falls in the Sacramento Valley, so is not considered a climatic feature of the valley floor. More characteristic of the valley is the dense fog occurring in mid-winter. Fog usually occurs in the morning hours, and may continue for several days in a row if atmospheric conditions are stagnant.

FLOODING

A large portion of the Planning Area is located in a Zone X designation, or areas determined by the Federal Emergency Management Agency (FEMA) to be located outside a 500-year floodplain. However, there are areas around the Sacramento River and Laguna Creek inside the 500-year and 100-year floodplains. The entire eastern border of the Planning Area that is

4.8 HYDROLOGY AND WATER QUALITY

near the Cosumnes River, the entire southern border, and the majority of the western border are within the 100-year floodplain (see **Figure 4.8-2**). This data does not reflect the 1997 flood of the Cosumnes River, but is currently being updated.

Cosumnes River Floodplain Modeling

There are several organizations that have dedicated their efforts towards the restoration of the Cosumnes River. The Mokelumne-Cosumnes Watershed Alliance is an organization made up of representatives from different groups (e.g., California Cattlemen's Association, California Rangeland Trust, CALFED Bay-Delta Program, City of Lodi, Delta Protection Commission, Department of Water Resources Central District, East Bay Municipal Utility District, Florin Resource Conservation District, Lodi-Woodbridge Winegrape Commission, Mountain Counties Water Resource Association, Natural Resource Conservation Service Sacramento County, The Nature Conservancy, North Delta Water Agency, The Reclamation Board, Reclamation District 38, Sacramento Area Flood Control Agency, Sacramento County Water Resources Division, San Joaquin Council of Governments, San Joaquin County Public Works, San Joaquin County Resource Conservation District, Sloughhouse Resource Conservation District, U.C. Davis Center for Integrated Watershed Science and Management, U.S. Army Corps of Engineers Sacramento District, U.S. Fish and Wildlife Service, and Woodbridge Irrigation District) that work together to preserve and improve the integration of environmental, flood control, and beneficial use opportunities in the Mokelumne and Cosumnes watersheds. Some of the projects include the Regional Hydraulic Model, the Cosumnes River Task Force, the Lower Cosumnes and Mokelumne Rivers Feasibility Study, and the Cosumnes Research Group.

The Cosumnes Research Group, a joint venture of the University of California, Davis and the Cosumnes River Preserve, is a coordinated university/agency/foundation partnership that focuses on *advancing watershed science to support more effective and sustainable watershed restoration practices and addressing the information needs of adaptive management in the North Delta and the Cosumnes and Mokelumne River watersheds* (Cosumnes Research Group, 2002).

WATER QUALITY

Storm Water

The City of Elk Grove Department of Public Works has jurisdiction over aspects of stormwater management in the City of Elk Grove. The Sacramento County Department of Water Resources has jurisdiction over the remainder of the Planning Area. This department was formed to manage the County's surface water and groundwater resources using the powers of the County of Sacramento and the Sacramento County Water Agency (SCWA).

Upon incorporation in July 2000, Elk Grove adopted Ordinance No. 2000-1, "An Urgency Ordinance of the City Council or the City of Elk Grove Providing for Sacramento County Ordinances to Remain in Effect After Incorporation." By passing this ordinance, the City of Elk Grove also adopted two important County ordinances that provide legal authority for the Stormwater Quality Improvement Program – the Stormwater Management and Discharge Control Ordinance and the Land Grading and Erosion Control Ordinance.

Specific to the East Franklin Policy Area in Elk Grove, the Sacramento County Department of Water Resources prepared the East Franklin Drainage Corridor Alternative Design Project. In addition to this project, there are several other drainage plans throughout the City and Planning Area. These plans include the Lower Laguna Creek Drainage Master Plan, the Strawberry and Jacinto Creeks Drainage Master Plan, the Vineyard Springs Comprehensive Plan Drainage

figure 4.8-1 color 11x17

Figure 4.8-2 100 Year Floodplain Color 8.5x11

Master Plan, and the North Vineyard Station Specific Plan Drainage Master Plan. Refer to the individual descriptions later in this section for further information about each drainage plan.

The City of Elk Grove became a joint participant with Sacramento County's National Pollutant Discharge Elimination System (NPDES). The permit was renewed in December 2002, and allows for the City to discharge urban runoff from Municipal Separate Storm Sewer Systems (MS4s) in their municipal jurisdictions. The permit requires that the City impose water quality and watershed protection measures for all development projects. The NPDES also requires a permit for every new construction project that implements the following measures:

- Eliminate or reduce non-storm water discharges to storm water systems and other waters of the nation;
- Develop and implement a storm water pollution prevention plan (SWPPP); and
- Perform inspections of storm water control structures and pollution prevention measures.

Surface Water

Currently, the Sacramento River portion from Red Bluff to the Delta, which includes the portion along the western border of the Planning Area, as well as Elder Creek, Elk Grove Creek, and Morrison Creek are listed water bodies on the California Clean Water Act Section 303(d) list due to containing specific pollutants. Elder Creek, Elk Grove Creek, and Morrison Creek contain the pollutant Diazinon, which is an insecticide used to control pests on crops. A Total Maximum Daily Load (TMDL) is in process for all three water bodies, all of which began in January 1998, and are scheduled for completion in December 2011. Elder Creek also contains the contaminant Chlorpyrifos, which is also an insecticide used to control pests on crops. The TMDL began in January 1998 and is scheduled for completion in December 2011.

The portion of the Sacramento River that borders the western side of the Planning Area contains Diazinon, Mercury, and an unknown toxicity. Both the Diazinon and Mercury pollutants have a TMDL in process, both of which began in January 1998 and are scheduled for completion in December 2005. The TMDL for the unknown toxicity began in January 2001 and is scheduled for completion in December 2011.

The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board (RWQCB), Central Valley Region, for the Sacramento and San Joaquin River basins, identified objectives to maintain pesticide levels in the water bodies, and not to exceed the Maximum Contaminant Levels set forth in the California Code of Regulations, Title 22, Division 4, Chapter 15.

The RWQCB recently released a staff report to develop a Basin Plan for the Sacramento and Feather Rivers in order to control the discharge of diazinon and orchard runoff and establish a TMDL for diazinon for the Sacramento and Feather Rivers (CVRWQCB, 1998). According to the staff report, the designated study area is north of the Elk Grove Planning Area. Therefore, this new study will not affect the current studies being conducted within the Planning Area.

GROUNDWATER RESOURCES

Regional Aquifer System

The Central Valley contains the largest basin-fill aquifer system in the state. The valley is in a structural trough about 400 miles long and from 20 to 70 miles wide and extends over more than 20,000 square miles. The trough is filled to great depths by marine and continental sediments,

4.8 HYDROLOGY AND WATER QUALITY

which are the result of millions of years of inundation by the ocean and erosion of the rocks that form the surrounding mountains. Sand and gravel beds in this great thickness of basin-fill material form an important aquifer system. From north to south, the aquifer system is divided into the Sacramento Valley, the Sacramento-San Joaquin Delta, and the San Joaquin Valley sub regions, on the basis of different characteristics of surface water basins. The aquifer underlying the Planning Area is part of the Sacramento Valley sub-region.

The Sacramento Valley aquifer system is formed primarily of sand and gravel with significant amounts of silt and clay, all of which have been eroded mainly from older rocks at the boundaries of the valley. The environments in which the continental sediments were deposited varied, but most were deposited in fluvial environments; however, the deposits contain some lacustrine beds. Beds and lenses of fine-grained materials, such as silt and clay, constitute a significant percentage of the aquifer system. In most parts of the valley, fine-grained materials compose 50 percent or more of the aquifer system. The most extensive clay bed, which is informally named the "E-clay", consists primarily of the Corcoran Clay. Because beds of silt and clay do not readily transmit water under natural conditions, they act as barriers to vertical flow and cause differences in hydraulic head with depth.

Sacramento County contains a single heterogeneous aquifer system that contains water under unconfined, or water-table, conditions in the upper few hundred feet; these conditions grade into confined conditions with depth. The confinement is the result of numerous overlapping lens-shaped clay beds. Geophysical well logs indicate that the "E-clay," although probably the largest single confining bed, constitutes only a small percentage of the total thickness of clay layers in the aquifer system. This indicates that the significance of the "E-clay" as a barrier to vertical flow may have been exaggerated. Further, the difference in hydraulic head directly above and below the "E-clay" is small when compared to head differences within intervals of the deep parts of the aquifer system.

Prior to urban development, the aquifer system was under steady-state conditions in which natural recharge balanced natural discharge. Groundwater in the shallow part of the aquifer system flowed from areas of high altitude at the valley margins, where most of the recharge took place, down gradient to discharge into rivers and marshes near the valley axis. Under predevelopment conditions, streams emanating from the Coast and Cascade Ranges and the Sierra Nevada primarily recharged the aquifer system. Most of the recharge was in the northern and eastern parts of the valley. Precipitation falling on the valley floor during the rainy season provided only a small part of the total recharge. Groundwater that was not evaporated or transpired by plants discharged either into the Sacramento and the San Joaquin Rivers that drained to San Francisco Bay or into the Tulare Basin from which it was eventually removed by evaporation or transpiration.

Additionally, under predevelopment conditions in Sacramento County, the hydraulic head in the shallow water-table aquifer where water entered the aquifer system at the valley margins was greater than the head in the deeper confined aquifer; thus, ground water moved downward. Conversely, the head gradient was reversed where water left the aquifer; typically by discharge to surface water bodies, and the hydraulic head in the water table aquifer was less than that in the confined aquifer. The difference in hydraulic head created upward movement of the groundwater toward rivers and marshes. Precipitation that fell on the valley floor and was not lost to evapotranspiration recharged the water-table aquifer and moved down the head gradient toward the rivers and surrounding marshes. Upward vertical flow to discharge areas from the deep confined aquifer was impeded by confining clay beds, which caused a pressure head in the deep parts of the aquifer system. Because of the pressure head, wells that penetrated the deep aquifer in low-lying areas near the rivers and marshes flowed

during the early years of development in the valley, and did not require additional groundwater extraction.

By the early 1960's, urban development and agricultural activities had lowered groundwater elevations and altered groundwater flow patterns in the aquifer system. Because the magnitude of the withdrawals caused hydraulic heads in the confined parts of the aquifer system to fall far below the altitude of the water table, the vertical hydraulic gradient was reversed over much of the Central Valley. As a result, much of the water in the upper unconfined zone of the aquifer system that flowed laterally toward the river under predevelopment conditions leaked downward through the confining beds into the lower confined aquifer. However, concurrent with an increase in surface-water imports in the early 1970's, groundwater withdrawals in the aquifer system decreased, which allowed groundwater levels in many areas to recover in the confined part of the aquifer system, in some cases to pre-1960 levels. With few exceptions, the groundwater flow patterns in the aquifer system today are similar to those in the mid 1970's (USGS, 1995).

Local Setting

Groundwater in the Planning Area occurs in both the upper shallow aquifer zone and in the underlying deeper aquifer zone. The deeper aquifer is composed primarily of the Mehrten Formation and is separated from the shallow aquifer by a discontinuous clay layer. The thickness of the deep aquifer ranges from approximately 200 feet thick in the eastern portion of the County to over 2,000 feet thick in some of the western portions of the County. As mentioned above, a discontinuous clay layer that is not completely impermeable in some areas separates the shallow and deep aquifers. Therefore, there is a potential for vertical movement of groundwater between the two aquifers. Generally, the movement of groundwater between the aquifers occurs when a head differential exists between the aquifer systems. For instance, if heavy pumping in the deep aquifer reduces the pressure head in this system, then groundwater from the shallow aquifer will be induced to recharge the deeper aquifer. Conversely, if groundwater levels are decreased (by increased pumping) in the shallow aquifer, then the potential exists for the upward movement of groundwater to recharge the shallow aquifer.

Recharge to the aquifer system in the Planning Area occurs from a combination of three main sources: stream recharge (primarily from the Cosumnes and Sacramento rivers), subsurface inflows from adjacent areas, and percolation of rainfall and applied water. A large area on both sides of the Cosumnes River as well as a small portion around the Sacramento River have areas with high to moderate recharge capabilities (see **Figure 4.8-3**). The majority of the Planning Area has poor groundwater recharge capabilities. Additionally, a groundwater contour map of the Planning Area shows groundwater levels ranging from fifty feet below sea level to fifty feet above sea level (see **Figure 4.8-4**). The lowest point is located under Bruceville Road, south of Elk Grove Boulevard, just east of the town of Franklin. The highest point is located at the intersection of Grant Line Road and Cosumnes River in the northeast corner of the Planning Area.

Groundwater Production

Sacramento County Water Agency (SCWA) pumps its groundwater for municipal uses from the deeper aquifer due to higher per well yields. The California-American Water Company (Cal-Am) and the Florin Resource Conservation District/Elk Grove Water Service (FRCD/EGWS) also obtain groundwater from the deeper aquifer. The well depths in the aquifer system are determined by the depth of permeable aquifer material and the quality of the groundwater. Generally, municipal wells depths are usually less than 500 feet deep in the Planning Area. The

4.8 HYDROLOGY AND WATER QUALITY

greater depth of wells is a result of the low permeability of the sands in the unconfined aquifer and of highly mineralized water and water high in selenium in the upper parts of the aquifer system. Well yields of more than 1,000 gallons per minute are commonly obtainable throughout the aquifer system. The average yield of wells is approximately 800 gallons per minute, but yields as large as 4,000 gallons per minute have been recorded.

There are approximately 22 municipal wells in and around the Planning Area. Municipal wells are those that are operated and maintained by water purveyors to provide potable water supplies for domestic, commercial and industrial uses within the urbanized portions of Sacramento County. The average municipal well depth in the Planning Area exceeds 350 feet, with few wells having depths of less than 200 feet. Agricultural wells are classified as those that are primarily utilized for crop and pasture irrigation. Because agricultural wells in Sacramento County are privately owned and operated by individual farmers, the total number and specific locations are not readily available. However, the agricultural wells in the County generally range in depths from 60 to 600 feet. The deepest agricultural wells in the County are located in the Galt area where the depth to groundwater levels is the greatest. Rural domestic wells are those that are used to supply rural homes with water. The actual amount of rural wells in operation is difficult to determine as these wells are owned and maintained by private homeowners who use the water for landscaping, livestock, and pastures. There is estimated to be approximately 667 rural wells in the County. Generally, municipal and agricultural wells require higher yields, which many times require tapping the deeper aquifer. Since rural domestic wells require smaller yields than both municipal and agricultural wells, the water is generally obtained from the upper shallow aquifer.

Groundwater Quality

The thickness of aquifer saturated with freshwater (water with less than 1,000 milligrams per liter dissolved-solids concentration) in the aquifer system varies greatly and depends, for the most part, on the depth to and permeability of the rocks that underlie continental deposits. In the Planning Area, the base of freshwater generally coincides with the base of continental deposits. The several isolated lenses of saline water that are within the freshwater zone may be evaporation residues or estuarine water that was trapped by subsequent sedimentation. The depth to the base of freshwater is as much as 2,500 feet in some portions of the Sacramento Valley.

Freshwater is available throughout the Central Valley. The concentration of dissolved solids in the ground water reflects the general chemical character of water in the streams that recharge the aquifer system. Dissolved-solids concentrations in the streams, in turn, are directly related to the type of rocks that form the geologic conditions of the area. Thus, groundwater in the Sacramento Valley has generally lower dissolved-solids concentrations than other sub-regions in the Central Valley. In general, dissolved-solids concentrations increase as the depth increases in the aquifer system. Therefore, the deeper wells are likely to produce water with larger dissolved-solids concentrations than the shallower wells in the aquifer system.

Groundwater in predominantly agricultural areas (i.e., southern and eastern Sacramento County) can become excessively saline and damaging to crops because evaporation of sprayed irrigation water and evapotranspiration of soil moisture and shallow groundwater leaves behind dissolved salts. As a result, the concentration of salts in the soil and shallow groundwater increases and may reach levels detrimental to plant growth. Shallow irrigation wells worsen the problem by recirculating the saline shallow groundwater, thus accelerating the process. The potential for crop damage due to saline irrigation-return flow is widespread in some portions of the valley. Although several individual irrigation return-water drainage systems are operated,

Insert Figure 4.8-3 Recharge Capabilities (11x17) color 2-sided

4.8 HYDROLOGY AND WATER QUALITY

Insert Figure 4.8-3 Recharge Capabilities (11x17) color 2-sided

Insert Figure 4.8-4 Groundwater Elevations (11x17) B/W 1-side

there is not a valley-wide system that removes shallow saline groundwater. An estimated 400,000 to 700,000 acres of arable land may be lost by 2010 because of increasing soil and water salinity with an accompanying loss of \$32 million to \$320 million annually.

Excessive concentrations of nitrate in water are potentially harmful to infants and young children, and the maximum recommended concentrations for drinking water by the U.S. Environmental Protection Agency is 10 milligrams per liter. Some crops may be affected by nitrate concentrations as low as 5 milligrams per liter. Generally, the contaminated wells are shallow, and the source of nitrate pollution can be attributed to effluent from waste-treatment facilities, discharge from septic tanks, or leaching of nitrogen fertilizers. Occurrences of nitrate in concentrations of greater than 5 milligrams per liter are sporadic in the Planning Area and seem to be confined mainly to the shallow parts of the aquifer. The contamination is usually attributable to local sources, such as septic tanks, feed lots, and dairies.

Groundwater Yield

In order to evaluate the groundwater resource availability in the Sacramento County area, the Integrated Groundwater-Surface Model (IGSM) was developed by Montgomery Watson for use by the SCWA. The IGSM is a planning tool, which incorporates all of the major components of surface and groundwater hydrology in the County. Additionally, the IGSM is capable of simulating the effects that varying amounts of groundwater pumping can potentially have on groundwater levels in the aquifer system.

SCWA defines long-term sustainable yield, or the safe yield, as the amount of pumping that does not result in a long-term decline in groundwater levels. The determination of the safe yield of the groundwater system is dependent upon many factors. However, maintaining the yield of the aquifer system at lower levels may increase the yield of the system, and may have associated impacts. These impacts could include any of the following:

- Increased pumping costs due to lower groundwater levels;
- In-migration of lower-quality water from the deep aquifer system or adjacent areas;
- Causing wells to become inoperative due to lower groundwater levels;
- Land subsidence; and/or
- Increased rate of spreading or localized groundwater contamination.

SCWA projects that groundwater pumping of up to 273,000 acre-feet annually in the Central Area (which consists of the Planning Area) would result in the cone of depression in the Elk Grove area stabilizing at approximately 50 feet below existing levels.

Agriculture and Urban Water Use

According to the Sacramento County Department of Water Resources (DWR) projections, a net reduction of approximately 17,500 acres of irrigated cropland is anticipated in Sacramento County between 1990 and 2030. The largest decreases are expected in the northern and southern portions of the County as more agricultural land is converted to urbanization. The actual agricultural demands vary from year to year depending on hydrologic conditions. Based on the IGSM and DWR projections, there would be a net decrease in agricultural demands of approximately 80,000 acre-feet per year (AF/yr) in the County between 1990 and 2030. Agricultural water throughout the Planning Area is generally supplied through groundwater pumping.

4.8 HYDROLOGY AND WATER QUALITY

Based on SCWA baseline conditions (existing), groundwater demand is projected to increase from approximately 530,000 AF/yr to approximately 649,000 AF/yr. Most of the increases in groundwater usage are projected to occur in the South Sacramento Area (i.e., the Sunrise area and Zone 40 sub-regions), where significant urbanization and water demand is anticipated to occur. The projected 2030 projected urban water use was obtained from the Sacramento Area Water Demand Study, which developed urban water demands estimates based on future land uses designated in the current Sacramento County General Plan. The total urban water use in the County is projected to increase significantly from approximately 389,000 AF/yr (1990) to approximately 695,000 AF/yr.

Cosumnes River Groundwater Studies

The University of California, Davis has collaborated with the Cosumnes River Preserve, the United States Fish and Wildlife Service (USFWS), and other non-profit organizations to create a university/agency/foundation partnership with the purpose of advancing watershed science to support more effective and sustainable watershed restoration practices and, addressing the information needs of adaptive management in the North Delta and the Cosumnes and Mokelumne River watersheds. A number of studies were conducted in a wide range of disciplines, including hydrology, geology, engineering, ecology, and wildlife biology. The focus of the studies was to identify the interaction between regional groundwater elevations and surface water flows in the Lower Cosumnes River. The studies conducted include, but are not limited to the following:

- Local and Regional Scale Investigation of Groundwater Surface Water Interaction in an Over-Drafted Groundwater Basin (Jan Fleckenstein, Eriko Suzuki, and Graham Fogg, UC Davis/Cosumnes Research Group).
- Modeling Groundwater Surface Water Interactions to Restore Fall Flows in the Lower Cosumnes River Basin (Jan Fleckenstein, Eriko Suzuki, and Graham Fogg, UC Davis/Cosumnes Research Group).
- Investigations of Groundwater Surface Water Interactions and their Role in Declining Fall Flows in the Lower Cosumnes River Basin (Jan Fleckenstein, Eriko Suzuki, and Graham Fogg, UC Davis/Cosumnes Research Group).

Usually there is some form of hydraulic connection between the river and the groundwater system (aquifer), which means that changes in pressure or stage in one system have a direct effect on the other system and the exchange between the two. Base-flow is contributions to river flow from the groundwater or aquifer system. A hydraulic disconnection means that the groundwater levels lie below the elevation of the river channel bottom for extended reaches of the river. Under hydraulic connection the river can receive flow contributions from the aquifer system and be a gaining or influent river or it can lose flow to the groundwater aquifer and be a losing or effluent river. Additionally, the pumping of groundwater may affect baseflow contributions along various reaches of the river; thereby, potentially influencing aquifer and river interactions.

According to the studies, declining flows on the Cosumnes River may be linked to decreasing base-flows and the overall decline of groundwater tables; however, unequivocal proof of this relationship is difficult due to the limited amount of historical records on ground- and surface-water conditions in Sacramento County. The studies determined that groundwater levels around the river channel were possibly hydraulically connected with the river in the 1940's. However, the studies indicated that the Lower Cosumnes River (river miles 0-36) channel is largely hydraulically disconnected from the regional aquifer.

The Cosumnes River may have been in contact with the aquifer system and received base-flow along its entire length before major groundwater development occurred in Sacramento County in the 1950's and 1960's. Under a no groundwater pumping scenario, the Cosumnes River, even under natural conditions, may have alternated between gaining (influent) and losing (effluent) in some stretches. Enormous amounts of water would be needed to locally recover groundwater tables and restore base-flows to the river.

The hydraulic disconnection is most pronounced in the middle reaches of the river (river miles 11 to 25.8), which is between State Route 99 (SR 99) and Meiss Road. Depth to the regional groundwater table from the river channel elevation steadily increases from 7 to 20 feet in the Dillard Road area (river mile 27.5) to approximately 35 to 55 feet near Wilton Road (river mile 17.3). Between Wilton Road and SR 99 (river mile 11) depth to the regional groundwater table decreases to approximately 15 to 30 feet and decreases even further to approximately 3 to 15 feet around the Twin Cities Road area (river mile 5). In some portions of the river downstream of Twin Cities Road, the water table lies above the channel elevation. Additionally, seasonal water fluctuations from monitored wells along these stretches ranges from 10 to 17 feet.

It was determined that significant lowering of the groundwater tables in these areas could have an adverse effect on river flows; however, river flows over the extended middle reaches of the river (between SR 99 and Meiss Road) are unaffected by groundwater level fluctuations under current conditions. Additionally, these reaches receive no base flow contributions; therefore, are considered to be predominantly effluent or losing. To restore and sustain baseflows along the entire lower river, water table elevations between Dillard and Twin Cities Road would have to be raised by up to approximately 55 feet. Although the studies did indicate that drastic declines in groundwater tables are at least 'partially' responsible for the increasing low flows in the fall on the Lower Cosumnes, changes in groundwater levels were determined to have no immediate effect on flows in the river as long as no hydraulic connection is reestablished.

When a river aquifer system is hydraulically disconnected, the only exchange between the two systems is seepage losses from the river to the aquifer. The simulations indicated that annual seepage losses ranged from 10,000 AF/yr to 20,000 AF/yr in both the upper and lower reaches of the river. Additionally, the simulations indicated that the combining of upstream pumping reductions and flow augmentations from the Folsom South Canal (FSC) would result in the greatest increase in fall flows. This results from less of the augmented water being lost to seepage from a partially reestablished hydraulic connection between the river and the aquifer in the upper reaches.

Reducing seepage losses by reconnecting the regional aquifer with the river channel would require enormous amounts of water. Annual reductions in pumping of approximately 166,000 AF would be required to partially reconnect the river in the upper reaches. In the lower stretches of the river, annual reductions of approximately 250,000 AF (or approximately 50 percent of the annual baseline groundwater pumping) is required to even partially reconnect the aquifer and river.

In 2000, a reversal occurred in September before the first fall rains. The reversal could indicate that the river reaches upstream of Dillard Road had switched from losing conditions to gaining conditions, probably in response to rising water tables and initiated baseflow after the end of summer irrigation, which indicates that the reaches upstream of Dillard Road seasonally receive baseflow. Other reasons for gains in flow may be attributable to additional baseflow from perched water tables that have built up from continuous irrigation return flows. Additionally, the general reaction of the groundwater system to additional recharge from floodplains suggests that large floods could significantly contribute to the recovery of regional groundwater levels.

4.8 HYDROLOGY AND WATER QUALITY

Based on projected land uses and water use conditions in Sacramento County, groundwater levels tend to decline for approximately 20 years due to groundwater pumping that exceeds the level of groundwater recharge. However, groundwater recharge (mainly from stream recharge and subsurface boundary inflows) responds to the lowering of groundwater levels and eventually reaches a quasi-equilibrium position, in which groundwater levels stabilize. Under the quasi-equilibrium condition, groundwater levels fluctuate in response to hydrologic conditions (i.e., wet and dry years), with the long-term average levels remaining the same. It should be noted that generally, excess groundwater pumping beyond certain limits results in a continuous groundwater level decline, which could potentially result in a permanent mining condition of the groundwater basin. However, the results of the Baseline conditions indicated that this would not occur even under the projected level of groundwater pumping under cumulative 2030 conditions. Overall, the studies concluded that to better quantify effects of reconnecting the aquifer system and the river and to assess the potential efficiency of other artificial recharge efforts, a better understanding of local and regional scale hydrostratigraphy and geologic heterogeneity as well as more reliable numerical models would be needed. Additionally, the SCWA is currently working on new and updated models to identify the agencies activities and potential impacts on the Cosumnes River basin. The preliminary and final modeling results will be incorporated into the SCWA's Zone 40 EIR for its Water Supply Master Plan.

4.8.2 REGULATORY FRAMEWORK

FEDERAL

Clean Water Act

The Clean Water Act (CWA) regulates the water quality of all discharges into waters of the United States including wetlands, perennial and intermittent stream channels. Section 401, Title 33, Section 1341 of the CWA sets forth water quality certification requirements for "any applicant applying for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters." Section 404, Title 33, Section 1344 of the CWA in part authorizes the U.S. Army Corps of Engineers to:

- Set requirements and standards pertaining to such discharges: subparagraph (e);
- Issue permits "for the discharge of dredged or fill material into the navigable waters at specified disposal sites": subparagraph (a);
- Specify the disposal sites for such permits: subparagraph (b);
- Deny or restrict the use of specified disposal sites if "the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies and fishery areas": subparagraph (c);
- Specify type of and conditions for non-prohibited discharges: subparagraph (f);
- Provide for individual State or interstate compact administration of general permit programs: subparagraphs (g), (h), and (j);
- Withdraw approval of such State or interstate permit programs: subparagraph (i);
- Ensure public availability of permits and permit applications: subparagraph (o);
- Exempt certain Federal or State projects from regulation under this Section: subparagraph (r); and,

- Determine conditions and penalties for violation of permit conditions or limitations: subparagraph (s).

Section 401 certification is required prior to final issuance of Section 404 permits from the U.S. Army Corps of Engineers.

The California State Water Resources Control Board and RWQCBs that enforce State of California statutes are equivalent to or more stringent than the Federal statutes. RWQCBs are responsible for establishing water quality standards and objectives that protect the beneficial uses of various waters including Morrison Creek, and other creeks in the Planning Area. In the Planning Area the RWQCB is responsible for protecting surface and groundwaters from both point and non-point sources of pollution. Water quality objectives for all of the water bodies within the Planning Area were established by the RWQCB and are listed in its Basin Plan.

Federal Emergency Management Agency (FEMA)

Sacramento County is a participant in the National Flood Insurance Program (NFIP), a Federal program administered by the Federal Emergency Management Agency (FEMA). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years although such a flood may occur in any given year. The County is occasionally audited by the DWR to insure the proper implementation of FEMA floodplain management regulations.

STATE

Senate Bill (SB) 610 and Assembly Bill (AB) 901

During the 2001 regular session of the State Legislature, SB 610 and AB 910 – Water Supply Planning, were signed and became effective January 1, 2002. SB 610 amends Public Resources Code section 21151.9, requiring any EIR, negative declaration, or mitigated negative declaration for a qualifying project to include consultation with affected water supply agencies (current law applies only to NOPs). SB 610 also amends the following: Water Code 10656 and 10657 to restrict state funding for agencies that fail to submit their urban water management plan to the Department of Water Resource's Water Code section 10910 to describe the water supply assessment that must be undertaken for projects referred under PRC Section 21151.9, including an analysis of groundwater supplies. Water agencies would be given 90 days from the start of consultation in which to provide a water supply assessment of the CEQA lead agency; Water Code section 10910 would also specify the circumstances under which a project for which a water supply assessment was once prepared would be required to obtain another assessment. AB 910 amends Water Code section 10631, expanding the contents of the urban water management plans to include further information on future water supply projects and programs and groundwater supplies.

Senate Bill (SB) 221

SB 221 adds Government Code section 66455.3, requiring that the local water agency be sent a copy of any proposed residential subdivision of more than 500 dwelling units within 5 days of the subdivision application being accepted as complete for processing by the city or county. It adds Government Code section 66473.7, establishing detailed requirements for establishing whether a "sufficient water supply" exists to support any proposed residential subdivisions of

4.8 HYDROLOGY AND WATER QUALITY

more than 500 dwellings, including any such subdivision involving a development agreement. When approving a qualifying subdivision tentative map, the city or county must include a condition requiring a sufficient water supply to be available. Proof of availability must be requested of and provided by the applicable public water system. If there is no public water system, the city or county must undertake the analysis described in section 66473.7. The analysis must include consideration of effects on other users of water and groundwater.

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act governs the coordination and control of water quality in the state, and includes provisions relating to non-point source pollution. The California Coastal Commission, pursuant to the coastal act, specified duties regarding the federally approved California Coastal Management Program. This law requires that the State Water Resources Control Board, along with the California Coastal Commission, regional boards, and other appropriate state agencies and advisory groups, prepare a detailed program to implement the state's non-point source management plan on or before February 1, 2001. The law also requires that the state board, in consultation with the Commission and other agencies, submit copies of prescribed state and regional board reports containing information related to non-point source pollution, on or before August 1 of each year.

Regional Water Quality Control Board, Central Valley Region

The RWQCB Central Valley Region provides planning, monitoring, and enforcement techniques for surface and groundwater quality in the Central Valley region. A basin plan provides more specific information for specific waterways within the region, in terms of establishing monitoring techniques to control pollutant levels within the waterways. The RWQCB also monitors storm water quality from construction activities through a National Pollutant Discharge Elimination System (NPDES) permitting process.

Central Valley Regional Water Quality Control Plan (Basin Plan)

The Central Valley Regional Water Quality Control Plan covers all the drainage basin areas for the Sacramento and San Joaquin rivers, extending approximately 400 miles from the California-Oregon border to the headwaters of the San Joaquin River. This plan describes the beneficial uses to be protected in these waterways, water quality objectives to protect those uses, and implementation measures to make sure those objectives are achieved. The Sacramento River is the only waterway in the Planning Area that currently has water quality objective studies occurring. However, the area of study is north of the Planning Area.

National Pollutant Discharge Elimination System (NPDES)

The City of Elk Grove, along with the cities of Citrus Heights, Folsom, and Galt, and the County of Sacramento, operate under a National Pollutant Discharge Elimination System (NPDES) renewed in December 2002 to discharge urban runoff from Municipal Separate Storm Sewer Systems (MS4s) in their municipal jurisdictions. The permit requires that the City impose water quality and watershed protection measures for all development projects. An appeal is anticipated at a later date by the permit holders based on the statutes of the renewal.

Under the NPDES permit, the City of Elk Grove is required to implement the Construction Element of its Stormwater Quality Improvement Plan (SQIP) to reduce pollutants in runoff from construction sites during all construction phases. In addition, the City is required to adopt a Development Standards Plan (DSP) describing measures to reduce pollutant discharges to the maximum extent practical from all new development projects.

LOCAL

Sacramento Area Flood Control Agency

The Sacramento Area Flood Control Agency (SAFCA) was formed in 1989 by the California Legislature to coordinate regional flood control. SAFCA is a joint powers agency, combining the efforts of the City of Sacramento, the counties of Sacramento and Sutter, the American River Flood Control District, and Reclamation District 1000. The main goal of the agency was to provide for 200-year flood protection levels. One of SAFCA's projects that relate to the Planning Area commenced in 2001 with the construction of flood protection improvements along the Cosumnes River, and is expected to be completed in 2003.

Sacramento County Water Agency Urban Water Management Plan and Zone 40 Master Plan

Every urban water supplier that provides water to more than 3,000 customers or supplies more than 3,000 AF/yr is required to prepare and adopt an Urban Water Management Plan (UWMP) that describes the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The SCWA is responsible for developing the UWMP for Sacramento County. Additionally, the UWMP identifies and quantifies, to the extent practicable, the existing and planned sources of water available to the supplier and the reliability of the water supply and vulnerability to seasonal or climatic shortages.

The Zone 40 Master Plan is prepared by the SCWA with the Water Forum Agreement as its foundation (see **Figure 4.8-5**). The Master Plan provides a flexible plan of water management alternatives, which can be implemented and revised as availability and feasibility of water supply sources change in the future. The current Zone 40 Master Plan (December 2002) reflects the changes from the 1987 Master Plan in the pattern of water demand growth, treatment for water quality, expansion of the original service area, and in the availability of potential sources of surface water supplies.

Sacramento County Department of Water Resources Local Floodplain Management Plan

The Sacramento County Water Agency has established the Local Floodplain Management Plan (2001). The Local Floodplain Management Plan area has been mapped out and the Planning Area is included in the majority of the Morrison Creek Stream Group and a portion of the South County area (see **Figure 4.8-6**). The Floodplain Management Plan outlines policies and mitigations for minimizing impacts from new development within most areas of Sacramento County.

East Franklin Drainage Corridor Alternative Design Project

The intentions of this project were to develop conceptual designs for flood control channels that are capable of treating urban runoff. The Department of Water Resources aimed to redesign the planned flood control channel so that it resembled a natural riparian corridor, required little maintenance, provided storm water treatment, and maintained required flood control objectives.

East Elk Grove Drainage Facilities Master Plan

To accommodate urbanization of the East Elk Grove Specific Plan area, it was determined that additional capacity is needed for the tributary of Laguna Creek, which runs through the northern portion of the Specific Plan area, and Elk Grove Creek, which runs through the southern portion

4.8 HYDROLOGY AND WATER QUALITY

of the Specific Plan area. In order to provide this additional capacity, the existing channels would be deepened and widened and the existing wetlands within the channels or floodplain would be recreated and enhanced by providing additional bottom width and a more frequent source of water to feed the wetlands. There are also four water quality/flood control detention basins planned for this area.

Lower Laguna Creek Drainage Master Plan

The Lower Laguna Creek Drainage Master Plan Environmental Impact Report was certified in 1996. The purpose of the master plan was to *provide drainage, flood control, and water quality treatment facilities in the Lower Laguna Creek watershed, while maintaining most of the existing Laguna Creek channel and its associated wetlands in their existing condition* (Michael Brandman Associates, 1996). The master plan provides for structural components such as water quality control basins and flood control improvements as well as enforcement and maintenance. The project area for the Lower Laguna Creek Drainage Master Plan is located within the City of Elk Grove (see **Figure 4.8-7**). The northern boundary of the project area is Sheldon Road, at the border between the City of Sacramento and the City of Elk Grove. The project area extends upstream to 500 feet west of Ski Lake on Whitehouse Creek and upstream to Waterman Road on Laguna Creek. The study area boundary covers the entire Laguna Creek watershed, Whitehouse Creek, and Elk Grove Creek.

Strawberry and Jacinto Creeks Drainage Master Plan (DMP)

The Strawberry and Jacinto Creeks Drainage Master Plan provides for *drainage, flood control, and water quality treatment facilities to serve the master plan area* (County of Sacramento Department of Environmental Review and Assessment, 1994). These facilities included nonstructural components such as channel maintenance, enforcement of floodplain management policies, updating of Federal Emergency Management Agency (FEMA) floodplain designations, and the financing of Master Plan improvements. The plan also included structural components such as channel improvements, drainage basins, and piped drainage ways. The boundaries of the master plan area encompassed the Strawberry and Unionhouse Creek watersheds above their confluence at Bruceville Road, and the Jacinto Creek watershed above its confluence with Laguna Creek (see **Figure 4.8-8**).

Vineyard Springs Comprehensive Plan Drainage Master Plan (VSCP DMP)

The Vineyard Springs Comprehensive Plan area is located just north of the City of Elk Grove, and is entirely within the Planning Area. The boundaries of the Vineyard Springs Comprehensive Plan are Gerber Road to the north, Calvine Road to the south, Excelsior Road to the east, and Bradshaw Road to the west (see **Figure 4.2-4**). The boundaries of the DMP area are the same as the boundaries for the Comprehensive Plan. The purpose of this DMP was to *provide guidance for development of the plan area and incorporates the policies and concepts developed by the Sacramento County Water Resources Division (WRD)* (The Spink Corporation, 1999). This plan provides descriptions of the channel improvements, detention basins, and flood protection planned for Laguna Creek and Gerber Creek.

Figure 4.8-5, Zone 40 Boundaries, page 1 of 2

4.8 HYDROLOGY AND WATER QUALITY

Figure 4.8-5, Zone 40 Boundaries, page 2 of 2

Figure 4.8-6 Morrison Creek Stream Group/South County Flood Management Area Color 8.5x11

4.8-7 8.5x11 b/w

4.8 HYDROLOGY AND WATER QUALITY

4.8-8 8.5x11 b/w

North Vineyard Station Specific Plan Drainage Master Plan (NVSSP DMP)

The NVSSP has boundaries of Florin Road to the north, Gerber Road to the south, roughly Elder Creek to the west, and the extension of Vineyard and Knox Roads to the east (see **Figure 4.2-5**). The boundaries of the DMP area are the same as the boundaries of the Specific Plan. The objectives of the master plan were to provide adequate drainage facilities to the NVSSP area, and to provide 100-year flood protection and stormwater quality management facilities. The drainage patterns in this Specific Plan will affect the Planning Area, since the Specific Plan is partially within the Planning Area boundaries.

Water Forum Agreement

The Water Forum is a diverse group of business and agricultural leaders, citizens groups, environmentalist, water managers and local governments in Sacramento County. The Water Forum was developed to address water related issues facing the Sacramento region, which include water shortages, environmental degradation, groundwater contamination and reliability, and economic prosperity. The Water Forum resulted in the establishment of principles to guide regional development and the development of the Water Forum Agreement (WFA). The comprehensive WFA allows the region to meet its needs in a balanced way through implementation of seven elements. The elements include detailed understandings among stakeholders on how this region will deal with key issues, which include groundwater management practices, water diversions, dry year water usage, water conservation measures, and the protection of the Lower American River. The understandings were included in the Memorandum of Understanding for the Water Forum Agreement, which created the overall political and moral commitment to the WFA. The WFA established the following two main coequal objectives: "Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030" and "Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River."

The Sacramento Metropolitan Water Authority Groundwater Committee and the Sacramento Water Forum Groundwater Negotiation Team developed the Groundwater Management Element of the WFA jointly. The purpose of the groundwater management element is to protect the viability of groundwater resources for current and future uses. Through the creation of a publicly accountable governance structure, with respect to all groundwater users, the element requires the monitoring of total water withdrawn from the groundwater basin and the promotion of groundwater use in conjunction with surface water supplies to maximize the availability of both. To achieve the objectives of the WFA, the Groundwater Management Element addresses both conjunctive use and sustainable yield.

Conjunctive use is the planned management and use of both groundwater and surface water in order to improve the overall reliability of the region's total water supply. For instance, in wet years when ample supplies of surface water are available, groundwater pumping may be reduced or ceased, with only surface water used, which would result in the groundwater basin being replenished in wetter years. In dryer years when surface water is in shorter supply, the water that accumulated during wetter years would be pumped for use, with surface water diversions being reduced or eliminated entirely. It should be noted that additional surface water diversions are required to implement the conjunctive use program. Conjunctive use is also expressed in acre-feet per year (Af/yr), and according to Zone 40 Master Plan estimates, an average of 76,300 Af/yr of surface water is needed to sustain the conjunctive use program.

As defined above, sustainable yield is the amount of groundwater that can be safely pumped from the groundwater basin over a long period of time while maintaining acceptable

4.8 HYDROLOGY AND WATER QUALITY

groundwater elevations and avoiding undesirable effects. Sustainable yield requires a balance between pumping and basin recharge and is expressed as the number of acre-feet of water per year, which can be pumped from the basin on a long-term average basis.

The Baseline Report (existing conditions) used for the WFA and the current Sacramento County Water Agency (SCWA) Zone 40 Master Plan provided a basis for the WFA definition of a sustainable yield for each of the three Sacramento County groundwater basins. The WFA defined three groundwater basins underlying Sacramento County (North Area, Central Area, and the South Area) on the hydraulic boundaries resulting from each of the river sources. **Figure 4.8-9** illustrates the three Sacramento County Groundwater basins, their groundwater elevation contours as of fall 1998 and the cone of depression associated with each sub-basin.

The agreed upon long-term average annual limit (sustainable yield) for each of the three geographic sub-areas of the groundwater basin within Sacramento County are 131,000 acre-feet (AF) for the North Area (north of the American River), 273,000 AF for the Central Area (between the American and Cosumnes rivers) and 115,000 AF for the Galt Area (south of the Cosumnes River). Any proposed water supply project must satisfy the groundwater conditions specified in the WFA for the 2030-projected level of development. Additionally, the WFA predicted that the projected pumping in the Central Area (273,000 AF/yr) would result in the cone of depression in the Elk Grove area stabilizing at approximately 50 feet below existing levels.

Water Forum Successor Effort Element

The WFA was signed by forty stakeholder organizations and agencies in April of 2000 and provided the establishment of the Water Forum Successor Effort (WFSE), which is responsible for overseeing, monitoring and reporting on the implementation of the WFA. The WFSE Element of the WFA is composed of representatives of the stakeholder organizations that are WFA signatories. The WFSE continues the interest-based collaborative process that was used in developing the WFA. The WFSE has no independent governing or regulatory authority. One of the objectives of the WFSE is to continue a public process designed to provide all community interests the opportunity to participate in developing a groundwater management program which takes into account local needs and circumstances. The Sacramento County Department of Water Resources (DWR) entered into a Memorandum of Understanding (MOU) with the Sacramento City-County Office of Metropolitan Water Planning to act on behalf of the WFSE. The MOU for the WFSE calls for the following:

- Identify and convene stakeholders representing all segments of the community that have an interest in developing a groundwater management plan.
- Conduct an educational effort among the stakeholders to establish a common understanding of the groundwater basin conditions.
- Negotiate a groundwater management program, including identification of basin management objectives and some form of governance, if appropriate.

As stated above, the WFA is not a decision-making body and it holds no governing or regulatory authority. The recommendations of the WFA are presented to the WFSE for review and approval and forwarded to the relevant agencies for implementation.

4.8-9 color

Sacramento County General Plan

The Sacramento County General Plan is used as the “blueprint” to guide future development in unincorporated portions of the County, including sections of the Planning Area that are outside the Elk Grove city limits. The following Sacramento County hydrology and water quality policies are applicable to the Planning Area outside the existing city limits of Elk Grove.

- 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.
- CO-10: Development within newly urbanizing areas shall incorporate runoff control measures in their design or participate in an areawide runoff control management effort consistent with the urban runoff management program developed by the Public Works Department.
- CO-11: Hazardous materials shall not be stored in the 100 year floodplain in such a manner as to pose a significant potential for surface water contamination.
- CO-12: The concentration and management of large animals on residential and agricultural-residential parcels shall be such that pasture runoff does not contain excessive nutrient concentrations which would contribute to surface water quality degradation.
- CO-13: 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.
- CO-17: Inform the community on laws governing the proper handling of hazardous materials.
- CO-18: Work with area purveyors to investigate and implement a conjunctive use program between groundwater and surface water supplies, consistent with meeting the in-stream flow requirements of the American River.
- CO-19: Utilize intermittent water in conjunctive use with ground water in agricultural areas.
- CO-24: Development oriented artificial lakes, unless otherwise required by the County, shall not be approved in areas of ground water overdraft where ground water sources maintain lake level.
- CO-25: Should the Board of Supervisors determine that there is a significant adverse effect on ground water, including effects on quality, no building permits for urban commercial and residential uses shall be issued.
- CO-26: Modify the yield estimates of ground water supply as supported by available data and, working in conjunction with area water purveyors, revise conjunctive use and other water supply policies as necessary during five-year General Plan updates.

4.8 HYDROLOGY AND WATER QUALITY

- CO-27: Maintain agricultural zoning, and existing agricultural uses, in primary aquifer recharge areas identified as having a moderate to very high recharge capability (Figure 1). Rezone applications for categories other than agricultural within one quarter mile of ground water recharge capability boundaries shall supply hydrologic data pertinent to recharge capability before the rezone application shall be considered complete.
- CO-28: Discourage urban land use in unincorporated areas with moderate to very high ground water recharge capability.
- CO-29: Discourage any nonagricultural land use in unincorporated areas with moderate to very high ground water recharge capability which could allow the percolation of pollutants into the ground water table.
- CO-30: Locate septic systems outside of primary ground water recharge areas, or if that is not possible, require the use of shallow leaching systems for disposal of septic effluent.
- CO-103: Allow no fill in the 100-year floodplain as delineated by currently effective FEMA Flood Insurance Rate Maps or subsequent comprehensive drainage plans adopted by the County unless the fill would cause no increase in flood surface elevation; in the absence of a floodway master plan the resulting floodplain would not be less than 600 feet in width or actual width of the floodplain, whichever is less, except at road crossings; depth of fill would not exceed two feet, except as may be specified for drainage swales in a comprehensive drainage plan; the proposed fill area is not necessary to serve as a detention basin for stormwater runoff; and no wetlands as defined by the U.S. Army Corps of Engineers exist within the proposed fill area.
- CO-104: Remove unauthorized fill within the 100-year floodplain at the property owner’s request.
- CO-105: Channel modification projects within Urban Stream Corridors shall be considered for approval by the Board of Supervisors only after conducting a noticed public hearing examining the full range of alternatives, relative costs and benefits, and environmental, economic and social benefits.
- CO-106: Channel realignment within Urban Stream Corridors shall be permitted only when necessary to eliminate flood hazards; it is necessary to protect and preserve natural features and vegetation which would otherwise be removed; it is necessary as a result of surface mining within the floodplain; or the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.
- CO-107: To the maximum extent practical retain topographic diversity and variation when channels are realigned or modified, including maintaining meandering characteristics, varied berm width, naturalized side slope, and varied channel bottom elevation.
- CO-108: Natural appearance channels will be encouraged for watercourses in newly developing areas (outside of identified in-fill areas).

- CO-109: Channel lowering shall occur after consideration of alternatives and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.
- CO-110: Channel modifications shall not prevent minimum water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.
- CO-111: Improvements in watercourses in currently undeveloped areas will be designed for low maintenance. Appropriate Manning's "n" values will be used in design of the watercourses to reflect future vegetative growth (including mitigation plantings) associated with the low maintenance concept.
- CO-112: Channel modifications shall retain such marsh and riparian vegetation whenever possible or otherwise recreate the natural stream channel consistent with the ecological integrity of the preexisting stream. Modifications resulting in wetland or riparian loss shall be mitigated.
- CO-113: The placement of concrete within watercourses will be strongly discouraged. However, it will not be prohibited in identified in-fill areas where it is consistent with the existing adjacent reaches of the watercourses.
- CO-114: Encourage revegetation of native plant species and avoid nonindigenous species.
- CO-115: Sacramento County stream courses within the Urban Service Boundary shall be planned so as to protect natural values.
- CO-116: Where there is extensive existing riparian vegetation, consider construction of secondary flood control channels for flood control purposes.

Stormwater Management and Discharge Control Ordinance

As adopted from the County upon incorporation, this ordinance was designed to protect and enhance the quality of water bodies, watercourses, and wetlands consistent with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act, and the NPDES permit. The City is provided the authority by this ordinance to protect the quality of storm water by reducing the discharges of pollutants, and to prohibit non-storm water discharges. The City also is authorized to establish enforcement procedures and penalties for violations of the ordinance.

4.8.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

A hydrologic or water quality impact of the proposed City of Elk Grove General Plan would be considered significant if it would result in any of the following actions based on the following criteria:

- Generate substantial stormwater runoff and/or alter surface water drainage patterns that would result in an increased severity of flooding within the Planning Area or downstream;
- Significantly degrade surface water and groundwater quality directly or indirectly;

4.8 HYDROLOGY AND WATER QUALITY

- Substantially deplete groundwater resources to such an extent that it would impact existing surface water features that rely on groundwater;
- Conflict with applicable local, state, and/or federal policies and standards associated with water resources.
- Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which would cause significant environmental effects;
- Result in not having sufficient water supplies available to serve the project from existing entitlements and resources, or new or expanded entitlements are needed; or
- Substantially degrade groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

METHODOLOGY

The hydrology and water quality analysis is based on a review of published information, reports and plans regarding regional hydrology, climate, and geology. Information was obtained from private and governmental agencies and Internet web sites. Agencies consulted include the Sacramento County Water Agency, the Sacramento County Department of Environmental Review, the Sacramento County Office of Metropolitan Water Planning, and the Cosumnes Research Group.

The analysis takes into account the density and type of land uses proposed, as well as proposed and anticipated development in the City of Elk Grove as well as the Planning Area. The reader is referred to **Table 4.0-1** and Section 4.0 (Introduction to the Analysis and Assumptions Used) regarding assumed land uses and development conditions in this area.

PROJECT IMPACTS AND MITIGATION MEASURES

Construction Surface Water Quality Impacts

Impact 4.8.1 Implementation of the proposed General Plan could result in adverse impacts to construction water quality. This is considered a **less than significant** impact.

Construction associated with subsequent development under the proposed General Plan would consist of grading and vegetation removal activities that would increase soil erosion rates on the areas proposed for development. This would result in the exposure of raw soil materials to the natural elements (wind, rain, etc.). In rainy periods during the summer season grading operations may impact the surface runoff by increasing the amount of silt and debris carried by runoff. Areas with uncontrolled concentrated flow would experience loss of material within the graded areas and this could potentially impact the downstream water quality and the Sacramento River. Approximately 5,900 acres of the City is anticipated to be disturbed with urban levels of development under this land use map, which includes proposed projects such as the Laguna Ridge Specific Plan and the Elk Grove Triangle Comprehensive Plan area.

Refueling and parking of construction equipment and other vehicles onsite during construction may result in spills of oil, grease, or related pollutants that may discharge into Planning Area

drainages. Improper handling, storage, or disposal of fuels and materials or improper cleaning of machinery close to area waterways could cause water quality degradation.

Measures included in subsequent grading plans for development projects would be required to comply with the City's Land Grading and Erosion Control Ordinance and Stormwater Management and Discharge Control Ordinance to help eliminate erosion potential and water quality degradation. These plans would also need to be consistent with the City's NPDES permit #CAS082597. The permit requires that the City impose water quality and watershed protection measures for all development projects.

During construction of the projects in the City, the dischargers must eliminate non-storm water discharges to storm water systems; develop and implement a Storm Water Pollution Prevention Plan (SWPPP); and perform monitoring of discharges to storm water systems. Best Management Practices for construction activities identified in the Erosion and Sediment Control Ordinance, include, but are not limited to, the following:

- Access points to the construction site shall have a Stabilized Construction Access
- The preservation of existing vegetation shall be done in accordance with Preservation of Existing Vegetation, and Silt Fence
- Perimeter protection along property lines shall have Preservation of Existing Vegetation, or Silt Fence
- Slopes greater than 3 percent shall be temporarily seeded and slopes greater 3:1 shall have Hydroseeding and Geotextiles, Plastic Covers, and Erosion Control Blankets installed
- The toe of all slopes shall have Silt Fence and/or Fiber Roll
- Disturbed soil areas behind the curb or back of walk (or curb) shall have Straw Mulch, Soil Binders or Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats in conjunction with Hydroseeding. Surface treatments shall extend to the greater of 6 meters (20 feet) or to the top of slope.
- Roadway Subgrades shall have Fiber Roll, Silt Fence, or Sediment Trap
- Dead end streets, to be extended in the future, shall have Preservation of Existing Vegetation, Hydroseeding, Sediment Trap or other applicable BMP to minimize the transport of sediment onto or from the improved surface.
- Projects include detention basins shall have a Sediment Basin.

General Plan Policies and Action Items

- | | |
|--------|---|
| CAQ-5 | <i>Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.</i> |
| CAQ-11 | <i>The City recognizes the value of streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in removal of nutrients, pollutants, and silt.</i> |
| CAQ-12 | <i>Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.</i> |

4.8 HYDROLOGY AND WATER QUALITY

CAQ-12-Action 1 *Re-vegetation using native plant species shall be encouraged; use of non-native species shall be discouraged. Use of invasive species shall be prohibited.*

CAQ-12-Action 2 *The City shall permit stream channel realignment only:*

- *When necessary to eliminate flood hazards; or*
- *To protect and preserve natural features and vegetation which would otherwise be removed; or*
- *If the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.*

CAQ-12-Action 3 *The City shall require, to the maximum extent practical, retention of topographic diversity and variation when channels are realigned or modified, including "self-sustaining" meander characteristics, berms, naturalized side slope, and varied channel bottom elevation, consistent with the characteristics of the watershed.*

CAQ-12-Action 4 *Channel lowering of existing natural streams shall occur only after consideration of alternatives (including surface drainage systems which do not require channel lowering) and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.*

CAQ-12-Action 5 *All storm drainage improvements on natural streams shall be designed where applicable to provide water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.*

CAQ-12-Action 6 *Improvements in water courses shall be designed for low maintenance, and to accommodate peak flows with vegetation (including mitigation plantings) in the channel. Channel modifications shall retain marsh and riparian vegetation whenever possible.*

CAQ-12-Action 7 *Where existing streams support riparian vegetation, evaluate options for constructing secondary flood control channels for flood control and water quality purposes.*

CAQ-12-Action 8 *Development design shall maximize the total floodplain frontage that is open to the public view. Development adjacent to stream corridors shall be encouraged to provide a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.*

CAQ-12-Action 9 *Trails along stream corridors shall be located to minimize wildlife impacts and shall be restricted to non-motorized traffic.*

CAQ-12-Action 10 *Except where approved by the City as part of the development of a public or private development project, no grading, clearing, tree cutting, debris disposal or any other similar action shall be allowed in stream corridors except for normal channel maintenance.*

CAQ-14 *Development adjacent to a natural stream(s) shall provide a "stream buffer zone" along the stream.*

"Natural streams" shall be generally considered to consist of the following, subject to site-specific review by the City:

- *Deer Creek*
- *Elk Grove Creek*
- *Laguna Creek and its tributaries*
- *Morrison Creek*
- *Strawberry Creek*
- *White House Creek*

The following are examples of desired features for this transition zone; the specific design for each transition zone shall be approved on a case-by-case basis by the City.

Transition zones may include:

1. *A buffer zone of at least 50 (fifty) feet on each side of the stream, measured from the top of the stream bank.*
2. *Additional width to allow for a mowed fire break (where necessary), access for channel maintenance and flood control, and for planned passive recreation uses.*
3. *Sufficient width to provide for:*
 - a. *Quality and quantity of existing and created habitat,*
 - b. *Presence of species as well as species sensitivity to human disturbance,*
 - c. *Areas for regeneration of vegetation,*
 - d. *Vegetation filtration for wildlife habitat,*
 - e. *Corridor for wildlife habitat linkage,*
 - f. *Protection from runoff and other impacts of urban uses adjacent to the corridor, and*
 - g. *Trails and greenbelts.*
4. *The transition zone shall not include water quality treatment structures designed to meet pollutant discharge requirements.*

Implementation of Policies CAQ-5, CAQ-11, CAQ-12 with associated action items, and CAQ-14, as well as compliance with the City's Land Grading and Erosion Control Ordinance and the City's NPDES permit requirements would reduce impacts to construction water quality to a **less than significant** level.

Mitigation Measures

None required.

Operational Surface Water Quality Impacts

Impact 4.8.2 Implementation of the proposed General Plan would result in direct and indirect operational water quality impacts. This is considered a **less than significant** impact.

4.8 HYDROLOGY AND WATER QUALITY

As described under Impact 4.8.1, subsequent development under the proposed City of Elk Grove General Plan would result in substantial development and alteration of approximately 5,900 acres of the City. Direct surface water quality impacts could occur from the following general land use activities in the City:

- **Residential:** Maintenance of yards associated with the use of fertilizers, herbicides and pesticides and motor vehicle operation and maintenance.
- **Commercial:** Maintenance of landscape area associated with the use of fertilizers, herbicides and pesticides and motor vehicle operation and maintenance.
- **Recreation:** Maintenance of parks and golf courses associated with the use of fertilizers, herbicides and pesticides (currently there are two existing golf courses in the City).

Runoff typically contains oils, grease, fuel, antifreeze, byproducts of combustion (such as lead, cadmium, nickel, and other metals), as well as nutrients, sediment and other pollutants. Additionally, sizable quantities of animal waste from pets (e.g., dogs and cats) could lead to fecal contamination of water sources. Precipitation during the early portion of the wet season (December to April) displaces these pollutants into the stormwater runoff resulting in high pollutant concentrations in the initial wet weather runoff. This initial runoff, containing peak pollutant levels, is referred to as the "first flush" of storm events. It is estimated that during the rainy season, the first flush of heavy metals and hydrocarbons would occur during the first five inches of seasonal rainfall.

The amount and type of runoff generated by the various projects would be greater than that under existing conditions due to increases in impervious surfaces. There would be a corresponding increase in urban runoff pollutants and "first flush" roadway contaminants such as heavy metals, oil, grease, as well as an increase in nutrients (i.e., fertilizers), and other chemicals from landscaped areas. These constituents would result in water quality impacts to onsite and offsite drainage flows to area waterways.

There are three waterways within the City that are included on the RWQCB 303(d) list of Impaired Waterbodies. These waterways specifically have concerns over the pollutants diazinon and chlorpyrifos, both of which are insecticides used to control pests on crops.

General Plan Policies and Action Items

CAQ-5 *Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.*

CAQ-11 *The City recognizes the value of streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in removal of nutrients, pollutants, and silt.*

CAQ-12 *Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.*

CAQ-12-Action 1 *Re-vegetation using native plant species shall be encouraged; use of non-native species shall be discouraged. Use of invasive species shall be prohibited.*

CAQ-12-Action 2 *The City shall permit stream channel realignment only:*

- *When necessary to eliminate flood hazards; or*
- *To protect and preserve natural features and vegetation which would otherwise be removed; or*
- *If the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.*

CAQ-12-Action 3 *The City shall require, to the maximum extent practical, retention of topographic diversity and variation when channels are realigned or modified, including "self-sustaining" meander characteristics, berms, naturalized side slope, and varied channel bottom elevation, consistent with the characteristics of the watershed.*

CAQ-12-Action 4 *Channel lowering of existing natural streams shall occur only after consideration of alternatives (including surface drainage systems which do not require channel lowering) and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.*

CAQ-12-Action 5 *All storm drainage improvements on natural streams shall be designed where applicable to provide water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.*

CAQ-12-Action 6 *Improvements in water courses shall be designed for low maintenance, and to accommodate peak flows with vegetation (including mitigation plantings) in the channel. Channel modifications shall retain marsh and riparian vegetation whenever possible.*

CAQ-12-Action 7 *Where existing streams support riparian vegetation, evaluate options for constructing secondary flood control channels for flood control and water quality purposes.*

CAQ-12-Action 8 *Development design shall maximize the total floodplain frontage that is open to the public view. Development adjacent to stream corridors shall be encouraged to provide a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.*

CAQ-12-Action 9 *Trails along stream corridors shall be located to minimize wildlife impacts and shall be restricted to non-motorized traffic.*

CAQ-12-Action 10 *Except where approved by the City as part of the development of a public or private development project, no grading, clearing, tree cutting, debris disposal or any other similar action shall be allowed in stream corridors except for normal channel maintenance.*

CAQ-14 *Development adjacent to a natural stream(s) shall provide a "stream buffer zone" along the stream.*

"Natural streams" shall be generally considered to consist of the following, subject to site-specific review by the City:

4.8 HYDROLOGY AND WATER QUALITY

- *Deer Creek*
- *Elk Grove Creek*
- *Laguna Creek and its tributaries*
- *Morrison Creek*
- *Strawberry Creek*
- *White House Creek*

The following are examples of desired features for this transition zone; the specific design for each transition zone shall be approved on a case-by-case basis by the City.

Transition zones may include:

- 4. A buffer zone of at least 50 (fifty) feet on each side of the stream, measured from the top of the stream bank.*
- 5. Additional width to allow for a mowed fire break (where necessary), access for channel maintenance and flood control, and for planned passive recreation uses.*
- 6. Sufficient width to provide for:*
 - a. Quality and quantity of existing and created habitat,*
 - b. Presence of species as well as species sensitivity to human disturbance,*
 - c. Areas for regeneration of vegetation,*
 - d. Vegetation filtration for wildlife habitat,*
 - e. Corridor for wildlife habitat linkage,*
 - f. Protection from runoff and other impacts of urban uses adjacent to the corridor, and*
 - g. Trails and greenbelts.*
- 4. The transition zone shall not include water quality treatment structures designed to meet pollutant discharge requirements.*

CAQ-26 The City shall seek to ensure that the quality of groundwater and surface water is protected to the extent possible.

CAQ-26-Action 1 Continue to cooperate with the County, other cities, and the Regional Water Quality Control Board regarding compliance with the NPDES permit system, and support for other water quality improvement projects in order to maintain compliance with the Basin Plan.

CAQ-26-Action 2 Implement the City's NPDES permit on all public and private development projects and activities.

Implementation of Policies CAQ-5, CAQ-11, and CAQ-12 with associated action items, CAQ-14, and CAQ-26 with associated action items would reduce impacts to operational surface water quality to a **less than significant** level.

Mitigation Measures

None required.

Groundwater Quality

Impact 4.8.3 Implementation of the proposed General Plan could result in the degradation of groundwater quality resulting from future land uses. This is considered a **potentially significant** impact.

Development of various projects would urbanize certain areas in the City and these areas would generate runoff that would contain oils, grease, fuel, antifreeze, byproducts of combustion (such as lead, cadmium, nickel, and other metals), other household pollutants, nutrients (i.e., fertilizers), and other chemicals from landscaped areas. Gas stations and industrial uses are of primary concern. In addition, areas with Rural Residential designations may utilize individual septic systems that could also contribute to groundwater quality impacts. Refer to Section 4.12 (Public Services and Utilities) regarding potential septic system impacts.

The City's NPDES permit also requires sanitary sewage system maintenance, overflow, and spill prevention procedures. A response plan shall be implemented that consists of investigation of complaints, immediate response to notifications of overflow, and notification to the appropriate public health agencies when the sewer overflows to the public storm water conveyance system.

The City of Elk Grove has adopted Sacramento County's approval process for private septic systems. The process includes fee payment, permit submittal, soil testing, design standards, and guidelines for where to establish a septic system in relation to wells, property lines, swimming pools, and other locations around the property. Currently, there have been no reports of failing septic systems in the eastern portion of the City of Elk Grove.

General Plan Policies and Action Items

- PF-5 The City shall seek to protect the quality and quantity of groundwater resources, including those which serve households and businesses which rely on private wells.*
- PF-11 To reduce the potential for health problems and groundwater contamination resulting from the use of septic systems, the City shall take the following actions:*
- PF-11-Action 1 The City shall prepare and implement a public information campaign aimed at homeowners in areas with septic systems on the proper design, use, and care of septic systems.*
- PF-11-Action 2 The City shall consider adopting Plumbing Code revisions to allow the use of updated technologies which offer an alternative to septic systems for the treatment of sewage in individual sites.*

Mitigation Measure

The following mitigation measure shall be incorporated into the City of Elk Grove General Plan as a policy under Goal 3 of the Conservation and Air Quality Element.

MM 4.8.3 Future land uses that are anticipated to utilize hazardous materials or waste shall be required to provide adequate containment facilities to ensure that surface water and groundwater resources are protected from accidental releases. This shall include double-containment, levees to contain spills, and

4.8 HYDROLOGY AND WATER QUALITY

monitoring wells for underground storage tanks, as required by local, state and federal standards.

Implementation of Policies PF-5, PF-11 with its associated action items, as well as mitigation measure MM 4.8.3 would reduce impacts to groundwater quality to **less than significant**.

Flood Hazards

Impact 4.8.4 Implementation of the proposed General Plan would increase impervious surfaces and alter drainage conditions and rates in the City, which could result in potential flooding impacts. This is considered a **potentially significant** impact.

A vast majority of the City, per the Federal Emergency Management Agency (FEMA) via their National Flood Insurance Program, is in a Zone X designation – “Areas determined to be outside the 500 year floodplain”. There are small areas around Laguna Creek and its tributaries that are within the 100-year and 500-year floodplain (see **Figure 4.8-2**).

Subsequent development under the proposed City of Elk Grove General Plan would be located outside of the designated 100-year floodplain. The 100-year floodplain would be designated as Public Recreation/Open Space. However, this land use map would result in the substantial development of approximately 5,900 acres of the City, which would increase impervious surfaces and would alter drainage conditions and rates.

General Plan Policies and Action Items

CAQ-11 *The City recognizes the value of streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in the removal of nutrients, pollutants, and silt.*

CAQ-12 *Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.*

CAQ-12-Action 1 *Re-vegetation using native plant species shall be encouraged; use of non-native species shall be discouraged. Use of invasive species shall be prohibited.*

CAQ-12-Action 2 *The City shall permit stream channel realignment only:*

- *When necessary to eliminate flood hazards; or*
- *To protect and preserve natural features and vegetation which would otherwise be removed; or*
- *If the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.*

CAQ-12-Action 4 *Channel lowering of existing natural streams shall occur only after consideration of alternatives (including surface drainage systems which do not require channel lowering) and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.*

- CAQ-12-Action 7 *Where existing streams support riparian vegetation, evaluate options for constructing secondary flood control channels for flood control and water quality purposes.*
- SA-12 *The City shall give priority to the designation of appropriate land uses in areas subject to flooding to reduce risks to life and property. Construction of new flood control projects shall have a lower priority, unless land use controls (such as limiting new development in flood-prone areas) is not sufficient to reduce hazards to life and property to acceptable levels.*
- SA-13 *Development shall not be permitted on land subject to flooding during a 100-year storm event, based on the most recent floodplain mapping prepared by the Federal Emergency Management Agency (FEMA) or updated mapping acceptable to the City of Elk Grove. Potential development in areas subject to flooding may be clustered onto portions of a site which are not subject to flooding, consistent with other policies of this General Plan.*
- SA-14 *A buildable area outside the 100-year floodplain must be present on every residential lot sufficient to accommodate a residence and associated structures. Fill may be placed to create a buildable area only if approved by the City and in accordance with all other applicable policies and regulations.*
- The use of fill in the 100-year floodplain to create a buildable area is strongly discouraged, and shall be subject to review to determine potential impacts on wildlife, habitat, and flooding on other parcels.*
- SA-15 *Vehicular access to the buildable area of all parcels must be at or above the 10-year flood elevation.*
- SA-16 *Creation of lots whose access will be inundated by flows resulting from a 10-year or greater storm shall not be allowed. Bridges or similar structures may be used to provide access over creeks or inundated areas, subject to applicable local, state, and federal regulations.*
- SA-17 *Discourage the number of creek crossings in order to reduce potential flooding and access problems.*
- SA-17-Action 1 *Lots which will contain two or more buildable areas on both sides of a creek or floodplain shall be discouraged.*
- SA-18 *Parcels should not be created on which the presence of easements, floodplain, marsh or riparian habitat, or other features would leave insufficient land to build and operate structures. This policy shall not apply to open space lots specifically created for dedication to the City or another appropriate party for habitat protection, flood control, drainage, or wetland maintenance.*
- SA-19 *Where necessary due to clear dangers to life or property, the City will support the construction of flood control projects.*
- SA-19-Action 1 *The City will participate through the Sacramento Area Flood Control Agency in obtaining federal authorization for construction of a backbone flood*

4.8 HYDROLOGY AND WATER QUALITY

control project along the Sacramento and American Rivers and the immediate connection of local internal streams to these rivers.

SA-19-Action 2 The City will continue local efforts that encourage implementation of the Federal Flood Insurance Program.

SA-19-Action 3 The City will participate with the City of Sacramento, the Army Corps of Engineers and other Federal, State and local governments and agencies to develop policies to finance, construct, and plan flood improvements to eliminate flooding in Elk Grove.

SA-20 New and modified bridge structures shall not cause an increase in water surface elevations of the 100-year floodplain exceeding one foot, unless analysis clearly indicates that the physical and/or economic use of upstream property will not be adversely affected.

SA-21 The City shall require all new urban development projects to incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.

SA-21-Action 1 As part of the review of development projects, ensure that runoff control measures are planned and provided.

SA-22 Drainage facilities should be properly maintained to ensure their proper operation during storms.

Implementation of Policies CAQ-11 and CAQ-12 with its associated action items, as well as Policies SA-12 through SA-22 with associated action items would reduce potential flood hazard impacts, but would not result in a less than significant impact. Therefore, further mitigation is required.

Mitigation Measures

The following mitigation measure shall be incorporated into the City of Elk Grove General Plan as a policy under Goal 3 of the Conservation and Air Quality Element.

MM 4.8.4 The City shall require that all new projects not result in new or increased flooding impacts on adjoining parcels on upstream and downstream areas.

Implementation of Policies CAQ-11 and CAQ-12 with its associated action items, and Policies SA-12 through SA-22 with associated action items, as well as mitigation measure MM 4.8.4 would reduce flood hazard impacts to **less than significant**.

Environmental Effects of Increased Water Demand

Impact 4.8.5 Implementation of the proposed General Plan would increase demand for water supply to the City requiring increased groundwater production and the use of surface water supplies. This is considered a **significant** impact.

The Zone 40 Water Supply Master Plan was developed assuming land uses consistent with the existing Sacramento County General Plan; however, SCWA did take into account the land uses associated with the proposed City of Elk Grove General Plan (Eck, 2003). According to SCWA

staff, the proposed land use mix of the City's General Plan would not result in increased water demand, substantial depletion of water resources, or unforeseen impacts over those identified for the current Sacramento County General Plan land uses. The majority of new development proposed under the General Plan would be served almost exclusively by Zone 40 facilities. As such, implementation of the proposed General Plan is not expected to adversely impact the California-American Water Company (Cal-Am) or the Florin Resource Conservation District/Elk Grove Water Service (FRCD/EGWS) facilities or service areas given that these areas are nearing buildout within the City.

The land uses associated with the proposed General Plan would result in an approximate water demand of 51,487 AF/yr (see **Table 4.8-1**). Based on the projected demand of 273,000 AF/yr for the Central Basin, the proposed General Plan would require approximately 18.4 percent of the 2030 demand for the Central Basin. It should be noted that the projected 51,487 AF/yr is the total demand for the proposed General Plan land uses, which would be fulfilled by the conjunctive use of surface, ground, and recycled water discussed below. This water resources discussion is divided into two separate discussions, which include groundwater, surface and recycled water resources, and interactions between groundwater and surface water.

Ground, Surface, and Recycled Water Resources

The proposed Elk Grove General Plan would include the development of approximately 23,492 acres under various land use designations, which include residential, commercial, industrial, recreation, open space, and commercial land uses. **Table 4.8-1** indicates the land use category associated with the proposed General Plan, the unit water demand factors for each land use designation, and the total land use and water demand projections associated with each land use designation.

**TABLE 4.8-1
PROPOSED GENERAL PLAN FUTURE WATER DEMANDS**

Land Use Category	City of Elk Grove General Plan Buildout		
	Unit Water Demand Factors (AF/Acre/Year) ¹	Land Use (Acres)	Water Demand (AF/Year)
Residential Land Use Designations			
Rural Residential (0.1 to 0.5 du/ac)	1.33	5,231	6,957
Estate Residential (0.6 to 4.0 du/ac)	1.33	1,840	2,448
Low Density Residential (4.1 to 7.0 du/ac)	2.89	7,635	22,065
Medium Density Residential (7.1 to 15.0 du/ac)	2.89	444	1,282
High Density Residential (15.1 to 30.0 du/ac)	4.12	341	1,407
Mixed Land Use Designations			
Office/Multi-family (20.0 du/ac, maximum) ⁽²⁾	4.12	248	1022
Commercial/Office	2.51	135	338
Commercial/Office/Multi-Family (20.0 du/ac)	4.12	393	1,619

4.8 HYDROLOGY AND WATER QUALITY

Land Use Category	City of Elk Grove General Plan Buildout		
	Unit Water Demand Factors (AF/Acre/Year) ¹	Land Use (Acres)	Water Demand (AF/Year)
maximum) ⁽²⁾			
Open Space Land Use Designations			
Public Parks	3.46	704	2,437
Public Open Space/Recreation	1.04	936	973
Private Open Space/Recreation	1.04	234	244
Policy Area			
South Pointe Policy Area - Low Density Residential (4.1 to 7.0 du/ac) except for 4 percent of PA is designated for multi-family at a maximum density of 20 du/ac.	2.89	LDR- 186; HDR - 11	568
Southeast Policy Area - Mix of residential, office and commercial land uses with 22 acres designated for multi-family at a maximum density of 20 du/ac.	2.51	LDR-1144 MDR - 35; HDR - 60	3,108
Elk Grove Triangle Policy Area - Residential land uses with lot sizes ranging from 1 to 10 acres.	1.33	RR - 353; ER - 353	939
Non-Residential Land Uses			
Commercial	2.75	1132	1,135
Office	2.75	51	141
Public Schools	2.51	676	1,696
Institution	2.51	160	402
Public/Quasi Public	1.04	312	325
Light Industry	2.71	359	974
Heavy Industry	2.71	519	1,407
Total		23,492⁽³⁾	51,487

Notes:

1. Based on SCWA unit water demand factors.
2. The highest unit water demand factors were used for the multi-family designation.
3. Approximate buildout acreage of proposed City of Elk Grove General Plan Land Use Map.

As indicated in **Table 4.8-1**, and based upon SCWA's Zone 40 Water Supply Master Plan unit water demand factors and a buildout scenario, ultimate water demand in the City would be approximately 51,487 AF/yr. According to the Zone 40 Water Supply Master Plan, the sustainable groundwater yield for the Central Basin is 273,000 AF/yr. Additionally, the South County Municipal and Industrial Users Group (South County M&I Users Group), which makes up the majority of the Central Basin and includes the existing City limits of Elk Grove has a Purveyor Specific Agreement (PSA) with SCWA which states:

Groundwater will be used in a conjunctive use basis by the South County M&I Users Group with a total 2030 demand of 117,600 AF. The South County Users Group also includes a portion of Citizen Utility Company (Currently known as California-American Water Company) and the Elk Grove Water Works (Currently known as the Florin Resource Conservation District/Elk Grove Water Service).

Consistent with the Water Forum, water for the City would be delivered on a conjunctive basis, which was defined above as, "the planned use of surface and groundwater to improve overall water supply reliability." SCWA's conjunctive use program is in the initial phases of implementation, which will meet the agencies (and City's) projected water needs through 2030. Water supplies for the proposed General Plan land uses are supplied by three main sources: groundwater, surface water, and recycled water. Groundwater refers to groundwater pumped from the Central Sacramento County Groundwater Basin. Surface water is defined as water from the American and/or Sacramento Rivers, and recycled water is defined as recycled wastewater used for non-potable purposes. As indicated above, SCWA did take into account the land uses associated with the proposed City of Elk Grove General Plan in preparation of the Zone 40 Master Plan.

As depicted in the following tables, SCWA's Zone 40 currently has entitlements for 87,300 AF/yr of surface water supplies and has a maximum groundwater yield of 76,655 AF/yr and an average yield of 40,900 Af/yr. Additionally, as depicted in **Table 4.8-2**, recycled water for the SRWTP would yield approximately 4,400 AF/yr for conjunctive uses. Overall, Zone 40's conjunctive use program would yield an average of approximately 132,600 AF/yr, which is adequate to serve the projected total 2030 demand of the South County M&I Users Group of 117,600 AF/yr and the estimated 51,487 AF/yr demand generated by the proposed General Plan.

**TABLE 4.8-2
ZONE 40 RECYCLED WATER SUPPLY PROJECTIONS**

Source	Maximum Yield (AF/yr)	Average Yield (AF/yr)	Reliability
Sacramento Regional Wastewater Treatment Plant (SRWWTP)	4,400	4,400	High

Source: SCWA Zone 40 Water Supply Master Plan, December 2002.

Groundwater Supplies

Table 4.8-3 illustrates Zone 40's groundwater production capacity, which was developed to provide peaking capacity to meet projected maximum day demands and the conjunctive use objectives as detailed in the WFA. It should be noted that **Table 4.8-3** depicts Zone 40's average and maximum groundwater yields, which indicates that the proposed General Plan land uses could be met exclusively by groundwater.

**TABLE 4.8-3
ZONE 40 GROUNDWATER SUPPLY**

Source	Maximum Yield (AF/yr)	Average Yield (AF/yr)	Reliability
Groundwater	76,655	40,900	High

Source: SCWA Zone 40 Master Supply Plan, December 2002.

4.8 HYDROLOGY AND WATER QUALITY

Surface Water Supplies

As previously discussed, surface water supplies also would be used to fulfill SCWA's conjunctive use program. The surface water supply would come from the American and/or Sacramento Rivers. All surface water supplies require conventional treatment prior to distribution within the City. **Table 4.8-4** illustrates Zone 40's surface water components, the source, entitlement amount, supply estimates, and reliability.

TABLE 4.8-4
ZONE 40 SURFACE WATER SUPPLY COMPONENTS

Component	Water Sources	Entitlement Amount (AF/yr)	Dry Year Supply (AF/yr)	Estimated Long Term Average Use (AF/yr)	Reliability
Appropriative Water	American and Sacramento Rivers	Undetermined	0	22,000	Low
SMUD 1 Assignment	American River	15,000	11,250	13,000	Moderate
SMUD 2 Assignment	American River	15,000	11,250	13,000	Moderate
"Fazio" Water (PP 101-514)	American River	15,000	11,250	13,000	Moderate
Other Water Supplies	American and Sacramento Rivers	Undetermined	12,000	6,000	Variable (Low to Moderate)
Purchase of Water from City for American River POU	American River	9,300	9,300	9,300	High
Total Surface Water		87,300	55,050	76,300	

Source: SCWA Zone 40 Water Supply Master Plan, December 2002.

- **Appropriative Water.** Appropriative water is considered intermittent water typically available during winter months or normal or wet years and may also be used as a source of groundwater recharge.
- **SMUD 1 Surface Water Assignment.** Under the terms of a three party agreement (SCWA, SMUD, and the City of Sacramento), the City provides water to SMUD for use at two of SMUD's cogeneration facilities. In turn, SMUD will assign 15,000 AF/yr of water for use by the SCWA and municipal and industrial uses.
- **SMUD 2 Surface Water Assignment.** SMUD's PSA directs SMUD to assign a second 15,000 AF/yr to SCWA and Zone 40 to construct groundwater facilities necessary to meet SMUD's dry year water shortages of up to 10,000 AF/yr.
- **"Fazio Water" (CVP Water Public Law 101-514).** In April 1999, the SCWA obtained a CVP water service contract pursuant to PL 101-514 that provides a permanent water supply to Zone 40 of 15,000 AF/yr.
- **Other Water Supplies.** The SCWA enters into purchase and transfer agreements with other entities that currently hold surface water rights in the north Sacramento River Basin.

- **Purchase of City of Sacramento Water for use in City Place Of Use (POU).** SCWA's PSA directs the agency to enter into an agreement with the City of Sacramento whereby the City will sell surface water to the SCWA for use in the portion of Zone 41 service area within Zone 40 boundaries that lies with the City's American River POU.

The environmental effects of utilizing surface water supplies associated with CVP Water Public Law 101-514 were addressed in the Final Environmental Impact Statement/Environmental Impact Report for the Central Valley Project Water Supply Contracts Under Public Law 101-514 (State Clearinghouse No. 93042023). The anticipated types of environmental effects from utilizing the above water supply sources as well as water supply and distribution infrastructure facilities would consist of the following:

Hydrology and Water Quality: Changes in the magnitude and timing of flows along the American and Sacramento rivers as well as potential changes in related reservoir levels. Potential construction and operational surface water quality effects associated with sediment, dissolved oxygen, pollutants and temperature.

Geology and Soils: Construction impacts associated with soil erosion and geologic stability.

Biological Resources: Construction and operational effects to fisheries, special-status plant and animal species, wetland resources, riparian habitat as well as locally important tree resources.

Public Services and Utilities: The routing of new water supply infrastructure could conflict with existing infrastructure facilities. Changes in hydrologic conditions of the American and Sacramento rivers and associated reservoirs could adversely affect water dependent (e.g., swimming, boating and fishing) and water enhanced (e.g., sightseeing and trail use) recreation activities.

Visual Resources: Installation of infrastructure facilities and changes in hydrologic conditions of the American and Sacramento rivers and associated reservoirs could result in adverse visual effects.

Cultural Resources: Installation of infrastructure facilities could impact known or unknown historic, prehistoric or paleontological resources.

Land Use: Installation of infrastructure facilities could conflict with existing land uses or be in conflict with applicable land use policies and standards.

Air Quality: Air quality impacts from construction associated with installation of infrastructure facilities.

Noise: Construction and operational noise impacts associated with installation of infrastructure facilities.

Transportation: Construction and traffic impacts and conflicts associated with existing traffic operations from installation of infrastructure facilities.

Growth Inducement: The potential of the new water supply and infrastructure to result in unplanned growth not previously evaluated by the local land use agency.

4.8 HYDROLOGY AND WATER QUALITY

Recycled Water Supplies

Recycled water is supplied from treated wastewater for non-potable uses and is primarily used for landscape irrigation at parks, schools and rights-of-way. Recycled water for the Planning Area is provided by the Sacramento Regional Wastewater Treatment Plan (SRWTP), which currently has a maximum daily use of approximately 9 million gallons per day (mgd). **Table 4.8-4** illustrates the recycled water supply for SCWA's Zone 40.

Table 4.8-4 indicates that recycled water for non-potable uses would yield a maximum of 4,400 AF/yr with an average yield of 4,400 AF/yr. The reliability of recycled water is considered high, as the SRWWTP has a maximum day use of approximately 9 mgd.

Interactions Between Groundwater and Surface Water Resources

As previously discussed, several recent studies have been conducted to identify the interactions between the Cosumnes River, the regional aquifer system, and regional groundwater levels. Recent declining fall flows on the Cosumnes River may be linked to decreasing base-flows and the overall decline of groundwater tables; however, unequivocal proof of this relationship is difficult due to the limited amount of historical records on ground- and surface-water conditions in Sacramento County. Usually there is some form of hydraulic connection between a river and the groundwater system (aquifer), which means that changes in pressure or stage in one system have a direct effect on the other system and the exchange between the two. Base-flow is contributions to river flow from the groundwater or aquifer system. A hydraulic disconnection means that the groundwater levels lie below the elevation of the river channel bottom for extended reaches of the river. Under hydraulic connection, the river can receive flow contributions from the aquifer system and be a gaining or influent river or it can lose flow to the groundwater aquifer and be a losing or effluent river. Additionally, the pumping of groundwater may affect baseflow contributions along various reaches of a river, thereby influencing aquifer and river interactions. The studies indicated that the regional aquifer system and the Lower Cosumnes River are hydraulically disconnected for extended reaches of the river. The hydraulic disconnection is most pronounced in the middle reaches of the river (river miles 11 to 25.8), which is between State Route 99 (SR 99) and Meiss Road. Depth to the regional groundwater table from the river channel elevation steadily increases from 7 to 20 feet in the Dillard Road area (river mile 27.5) to approximately 35 to 55 feet near Wilton Road (river mile 17.3). Between Wilton Road and SR 99 (river mile 11) depth to the regional groundwater table decreases to approximately 15 to 30 feet and decreases even further to approximately 3 to 15 feet around the Twin Cities Road area (river mile 5). In some portions of the river downstream of Twin Cities Road, the water table (aquifer) lies above the channel elevation and appears to be hydraulically connected with the river. Increased groundwater pumping or a significant lowering of the groundwater tables in these areas could have an adverse effect on river flows.

Various scenarios were developed to estimate the amount of water needed to recover regional groundwater levels and potentially restore baseflows to the river. The scenarios were assessed for the potential recovery of groundwater levels or to directly restore river flows without the need for large pumping reductions. According to the Cosumnes River studies, annual groundwater reductions of approximately 166,000 in the upper reaches of the river and approximately 250,000 AF/yr would be needed in the lower reaches to even partially restore a hydraulic connection. This would require a 31 percent to 47 percent reduction in current Sacramento County groundwater pumping rates. DWR projections estimate that there will be a net decrease in agricultural demands of approximately 80,000 AF/yr in the County between 1990 and 2030. However, as urban development continues, groundwater production in the Sacramento County is projected to increase from 530,000 AF/yr to approximately 649,000 AF/yr through 2030.

The proposed General Plan and existing and projected water use conditions in Sacramento County are anticipated to result in groundwater elevation declines for approximately 20 years due to groundwater pumping exceeding the level of groundwater recharge. Additionally, the persistent cone of depression conditions in and around the City of Elk Grove would correspond with the associated groundwater production in the Central Basin. However, groundwater recharge (mainly from stream recharge and subsurface boundary inflows) responds to the lowering of groundwater levels and eventually reaches a quasi-equilibrium position, in which groundwater levels stabilize. The cone of depression in the Elk Grove area is approximately 80 feet below the ground surface and groundwater levels along some reaches of the river are 55 feet below the river channel. The Zone 40 groundwater pumping projections are based on sustainable groundwater yields. The projected sustainable groundwater yield would not result in the lowering of regional groundwater elevations in excess of 10 feet. Additionally, the Zone 40 sustainable groundwater yield projections would result in the Elk Grove cone of depression and groundwater elevations near the Cosumnes River stabilizing at near current levels.

Water demand of proposed land uses under the General Plan would contribute to increased groundwater production under cumulative conditions, which may alter current interactions between groundwater pumping and Cosumnes River flows and result in reduced flows. A reduction in flows within the Cosumnes River could result in adverse impacts to fishery and other aquatic resources as well as potential impacts to riparian habitat conditions along the river. Currently, the Sacramento County Water Agency is conducting detailed groundwater modeling associated with the Zone 40 Master Plan Update to evaluate potential effects on the Cosumnes River from increased groundwater production. However, no results from this modeling effort were available at the time of the release of this document.

General Plan Policies and Action Items

- CAQ-1 *Reduce the amount of water used by residential and non-residential uses by encouraging water conservation.*
- CAQ-1-Action 1 *Implement the City's Water Conservation Ordinance.*
- CAQ-1-Action 2 *The City shall actively encourage water conservation by both agricultural and urban water users.*
- CAQ-1-Action 3 *The City will work with urban and agricultural water purveyors to establish long range conservation plans which set specific conservation objectives and utilize, to the extent possible, a common planning horizon, plan framework and estimating/forecasting procedures.*
- CAQ-1-Action 4 *Promote the use of drought-tolerant vegetation to minimize water consumption by providing information to developers and designers.*
- PF-3 *Water supply and delivery systems shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction.*
- PF-3-Action 1 *The following shall be required for all development projects, excluding subdivisions:*

4.8 HYDROLOGY AND WATER QUALITY

- *An assured water supply and delivery system shall be available at the time of project approval. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project.*
- *All required water infrastructure for the project shall be in place at the time of project approval, or shall be assured through the use of bonds or other sureties to the City's satisfaction. Water infrastructure may be phased to coincide with the phased development of large-scale projects.*

PF-3-Action 2 The following shall be required for all subdivisions to the extent permitted by state law:

- *Proposed water supply and delivery systems shall be identified at the time of tentative map approval to the satisfaction of the City. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project.*
- *The agency providing water service to the subdivision shall demonstrate prior to the approval of the Final Map by the City that sufficient capacity shall be available to accommodate the subdivision plus existing development, and other approved projects in the same service area, and other projects which have received commitments for water service.*
- *Offsite and onsite water infrastructure sufficient to provide adequate water to the subdivision shall be in place prior to the approval of the Final Map or their financing shall be assured to the satisfaction of the City, consistent with the requirements of the Subdivision Map Act.*
- *Offsite and onsite water distribution systems required to serve the subdivision shall be in place and contain water at sufficient quantity and pressure prior to the issuance of any building permits. Model homes may be exempted from this policy as determined appropriate by the City, and subject to approval by the City.*

PF-4 The City supports the use of reclaimed water for irrigation whenever feasible.

PF-5 The City shall seek to protect the quality and quantity of groundwater resources, including those which serve households and businesses which rely on public wells.

Mitigation Measures

The following mitigation measure shall be included as a policy under Goal 1 of the Public Facilities and Finance Element.

MM 4.8.5 The City shall encourage water supply service providers and County Sanitation District 1 to design water supply and recycled water supply facilities in a manner that avoids and/or minimizes significant environmental effects. The City shall specifically encourage the Sacramento County Water Agency to design well facilities and operation to minimize surface flow effects to the Cosumnes River.

Implementation of General Plan policies CAQ-1 and PF-3 with their associated action items, and PF-4 and PF-5, as well as Mitigation Measure MM 4.8.5 would assist in reducing water demand impacts. Since the City does not provide water service or currently has no direct jurisdiction over water service, facilities, or entitlements; as such, there are no feasible mitigation measures available to the City to avoid significant environmental impacts associated with water supply provisions. Therefore, this impact is considered **significant and unavoidable**.

4.8.4 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

CUMULATIVE SETTING

As previously described, the Planning Area is located within the 27,000 square mile Sacramento River watershed, which includes the portions of the Sacramento River and Cosumnes River that are the western and eastern boundaries of the Planning Area. More specifically, the Planning Area is part of the Morrison Creek Stream Group, which covers 192 square miles, and includes the waterways of Elder, Elk Grove, Florin, Gerber, Laguna (and tributaries), Morrison, Strawberry, Union House, and Whitehouse Creeks. The cumulative water supply analysis focuses on water demand projections in Sacramento County and more specifically on the two groundwater basins underlying southern Sacramento County which include the Central Area and the South Area. The Central Area lies between the American and Cosumnes Rivers, and the South Area (Galt) includes portions of Sacramento County, south of the Cosumnes River. Reducing and mitigating the cumulative water impacts from development within these areas was the premise behind the preparation of the *Water Forum Agreement*. The *Water Forum Agreement* indicates that development within the Urban Services Boundary in southern Sacramento County (Central Area served by SCWA Zone 40 facilities) would result in an estimated water demand of 117,600 through 2030. Additionally, the South Area's (City of Galt) projected water demand through 2030 is approximately 115,000.

Table 4.0-2 and **Figure 4.0-1** illustrates proposed and approved development projects in the City of Elk Grove and vicinity that would contribute to cumulative water resource impacts. In addition, the cumulative analysis takes into account current surface water quality improvement efforts underway under the Central Valley RWQCB associated with the Sacramento River.

As discussed in Section 4.0 (Introduction to the Environmental Analysis and Assumptions Used), potential development of the Urban Study Areas could have an affect on hydrology and water quality in those areas. This could also result in potential affects to hydrology and water quality in the Planning Area, as well as to the geographic extent of Sacramento County.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Water Quality Impacts

Impact 4.8.6 Implementation of the proposed General Plan along with the potential development of the Urban Study Areas, could contribute to cumulative water quality impacts. This is considered a **cumulative significant** impact.

As described under Impacts 4.8.1 and 4.8.2, approximately 5,900 acres of the City is anticipated to be substantially disturbed with urban levels of development under the implementation of the proposed General Plan, which includes proposed projects such as the Laguna Ridge Specific Plan, the South Pointe Policy Area, and Calvine Pointe. This would add to other potential development activities referenced above and listed in **Table 4.0-2**, as well as potential development of the Urban Study Areas, depending on the timing and rate of development.

4.8 HYDROLOGY AND WATER QUALITY

Development of any of these areas would result in cumulative water quality impacts, which include impacts on surface water and ground water quality.

General Plan Policies and Action Items

- CAQ-5 *Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.*
- CAQ-11 *The City recognizes the value of streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in removal of nutrients, pollutants, and silt.*
- CAQ-12 *Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.*
- CAQ-12-Action 1 *Re-vegetation using native plant species shall be encouraged; use of non-native species shall be discouraged. Use of invasive species shall be prohibited.*
- CAQ-12-Action 2 *The City shall permit stream channel realignment only:*
- *When necessary to eliminate flood hazards; or*
 - *To protect and preserve natural features and vegetation which would otherwise be removed; or*
 - *If the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.*
- CAQ-12-Action 3 *The City shall require, to the maximum extent practical, retention of topographic diversity and variation when channels are realigned or modified, including "self-sustaining" meander characteristics, berms, naturalized side slope, and varied channel bottom elevation, consistent with the characteristics of the watershed.*
- CAQ-12-Action 4 *Channel lowering of existing natural streams shall occur only after consideration of alternatives (including surface drainage systems which do not require channel lowering) and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.*
- CAQ-12-Action 5 *All storm drainage improvements on natural streams shall be designed where applicable to provide water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.*
- CAQ-12-Action 6 *Improvements in water courses shall be designed for low maintenance, and to accommodate peak flows with vegetation (including mitigation plantings) in the channel. Channel modifications shall retain marsh and riparian vegetation whenever possible.*

CAQ-12-Action 7 *Where existing streams support riparian vegetation, evaluate options for constructing secondary flood control channels for flood control and water quality purposes.*

CAQ-12-Action 8 *Development design shall maximize the total floodplain frontage that is open to the public view. Development adjacent to stream corridors shall be encouraged to provide a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.*

CAQ-12-Action 9 *Trails along stream corridors shall be located to minimize wildlife impacts and shall be restricted to non-motorized traffic.*

CAQ-12-Action 10 *Except where approved by the City as part of the development of a public or private development project, no grading, clearing, tree cutting, debris disposal or any other similar action shall be allowed in stream corridors except for normal channel maintenance.*

CAQ-14 *Development adjacent to a natural stream(s) shall provide a "stream buffer zone" along the stream.*

"Natural streams" shall be generally considered to consist of the following, subject to site-specific review by the City:

- *Deer Creek*
- *Elk Grove Creek*
- *Laguna Creek and its tributaries*
- *Morrison Creek*
- *Strawberry Creek*
- *White House Creek*

The following are examples of desired features for this transition zone; the specific design for each transition zone shall be approved on a case-by-case basis by the City.

Transition zones may include:

1. *A buffer zone of at least 50 (fifty) feet on each side of the stream, measured from the top of the stream bank.*
2. *Additional width to allow for a mowed fire break (where necessary), access for channel maintenance and flood control, and for planned passive recreation uses.*
3. *Sufficient width to provide for:*
 - a. *Quality and quantity of existing and created habitat,*
 - b. *Presence of species as well as species sensitivity to human disturbance,*
 - c. *Areas for regeneration of vegetation,*
 - d. *Vegetation filtration for wildlife habitat,*
 - e. *Corridor for wildlife habitat linkage,*
 - f. *Protection from runoff and other impacts of urban uses adjacent to the corridor, and*
 - g. *Trails and greenbelts.*

4.8 HYDROLOGY AND WATER QUALITY

4. *The transition zone shall not include water quality treatment structures designed to meet pollutant discharge requirements.*

CAQ-26 *The City shall seek to ensure that the quality of groundwater and surface water is protected to the extent possible.*

CAQ-26-Action 1 *Continue to cooperate with the County, other cities, and the Regional Water Quality Control Board regarding compliance with the NPDES permit system, and support for other water quality improvement projects in order to maintain compliance with the Basin Plan.*

CAQ-26-Action 2 *Implement the City's NPDES permit on all public and private development projects and activities.*

PF-5 *The City shall seek to protect the quality and quantity of groundwater resources, including those which serve households and businesses which rely on private wells.*

PF-11 *To reduce the potential for health problems and groundwater contamination resulting from the use of septic systems, the City shall take the following actions:*

PF-11-Action 1 *The City shall prepare and implement a public information campaign aimed at homeowners in areas with septic systems on the proper design, use, and care of septic systems.*

PF-11-Action 2 *The City shall consider adopting Plumbing Code revisions to allow the use of updated technologies which offer an alternative to septic systems for the treatment of sewage in individual sites.*

Mitigation Measures

Implementation of the above Policies CAQ-5, CAQ-11, CAQ-12, CAQ-14, CAQ-26, PF-5, and PF-11, and their associated action items, as well as mitigation measure MM 4.8.3 would reduce the City's contributions to cumulative water quality impacts to **less than significant**.

Cumulative Flood Hazards

Impact 4.8.7 Implementation of the proposed General Plan along with potential development of the Urban Study Areas would increase impervious surfaces and alter drainage conditions and rates in the Planning Area, which could contribute to cumulative flood conditions in the Sacramento River, Cosumnes River, and inland creeks. This is considered a **cumulative significant** impact.

Subsequent development under the proposed General Plan would be located outside of the designated 100-year floodplain. The majority of the land within the 100-year floodplain is under the jurisdiction of Sacramento County and is anticipated to remain designated as Agricultural Cropland under the Sacramento County General Plan. However, implementation of the proposed General Plan would result in the substantial development of approximately 5,900 acres of the City, which would increase impervious surfaces and alter drainage conditions and rates. In addition, potential development of the Urban Study Areas as described in Section 4.0 (Introduction to the Environmental Analysis and Assumptions Used) would also increase impacts

to drainage and impervious surface coverage. Potential development in the Urban Study Area east of Grant Line Road could also result in increases to flooding impacts from the Cosumnes River.

General Plan Policies and Action Items

- CAQ-11 *The City recognizes the value of streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in the removal of nutrients, pollutants, and silt.*
- CAQ-12 *Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.*
- CAQ-12-Action 1 *Re-vegetation using native plant species shall be encouraged; use of non-native species shall be discouraged. Use of invasive species shall be prohibited.*
- CAQ-12-Action 2 *The City shall permit stream channel realignment only:*
- *When necessary to eliminate flood hazards; or*
 - *To protect and preserve natural features and vegetation which would otherwise be removed; or*
 - *If the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.*
- CAQ-12-Action 4 *Channel lowering of existing natural streams shall occur only after consideration of alternatives (including surface drainage systems which do not require channel lowering) and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.*
- CAQ-12-Action 7 *Where existing streams support riparian vegetation, evaluate options for constructing secondary flood control channels for flood control and water quality purposes.*
- SA-11 *The City opposes the construction of flood control facilities which would alter or reduce flows in the Cosumnes River and supports retention of the Cosumnes River floodplain in non-urban uses consistent with location in an area subject to flooding.*
- SA-12 *The City shall give priority to the designation of appropriate land uses in areas subject to flooding to reduce risks to life and property. Construction of new flood control projects shall have a lower priority, unless land use controls (such as limiting new development in flood-prone areas) is not sufficient to reduce hazards to life and property to acceptable levels.*
- SA-13 *Development shall not be permitted on land subject to flooding during a 100-year storm event, based on the most recent floodplain mapping prepared by the Federal Emergency Management Agency (FEMA) or updated mapping acceptable to the City of Elk Grove. Potential development in areas subject*

4.8 HYDROLOGY AND WATER QUALITY

to flooding may be clustered onto portions of a site which are not subject to flooding, consistent with other policies of this General Plan.

- SA-14 *A buildable area outside the 100-year floodplain must be present on every residential lot sufficient to accommodate a residence and associated structures. Fill may be placed to create a buildable area only if approved by the City and in accordance with all other applicable policies and regulations.*
- The use of fill in the 100-year floodplain to create buildable area is strongly discouraged, and shall be subject to review to determine potential impacts on wildlife, habitat, and flooding on other parcels.*
- SA-15 *Vehicular access to the buildable area of all parcels must be at or above the 10-year flood elevation.*
- SA-16 *Creation of lots whose access will be inundated by flows resulting from a 10-year or greater storm shall not be allowed. Bridges or similar structures may be used to provide access over creeks or inundated areas, subject to applicable local, state, and federal regulations.*
- SA-17 *Discourage the number of crossings of natural creeks in order to reduce potential flooding and access problems.*
- SA-17-Action 1 *Lots which will contain two or more buildable areas on both sides of a creek or floodplain shall be discouraged.*
- SA-18 *Parcels should not be created on which the presence of easements, floodplain, marsh or riparian habitat, or other features would leave insufficient land to build and operate structures. This policy shall not apply to open space lots specifically created for dedication to the City or another appropriate party for habitat protection, flood control, drainage, or wetland maintenance.*
- SA-19 *Where necessary due to clear dangers to life or property, the City will support the construction of flood control projects.*
- SA-19-Action 1 *The City will participate through the Sacramento Area Flood Control Agency in obtaining federal authorization for construction of a backbone flood control project along the Sacramento and American Rivers and the immediate connection of local internal streams to these rivers.*
- SA-19-Action 2 *The City will continue local efforts that encourage implementation of the Federal Flood Insurance Program.*
- SA-19-Action 3 *The City will participate with the City of Sacramento, the Army Corps of Engineers and other Federal, State and local governments and agencies to develop policies to finance, construct, and plan flood improvements to eliminate flooding in Elk Grove.*
- SA-20 *New and modified bridge structures shall not cause an increase in water surface elevations of the 100-year floodplain exceeding one foot, unless*

analysis clearly indicates that the physical and/or economic use of upstream property will not be adversely affected.

- SA-21 *The City shall require all new urban development projects to incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.*
- SA-21-Action 1 *As part of the review of development projects, ensure that runoff control measures are planned and provided.*
- SA-22 *Drainage facilities should be properly maintained to ensure their proper operation during storms.*

Mitigation Measures

Implementation of General Plan policies CAQ-11, CAQ-12, and SA-11 through SA-22 and their associated action items, as well as Mitigation Measure MM 4.8.4 would reduce the City's contribution to cumulative flooding hazard impacts to **less than significant**.

Cumulative Water Supply Impacts

Impact 4.8.8 Implementation of the proposed General Plan along with potential development of the Urban Study Areas, would contribute to an increased demand for water supply requiring increased groundwater production and the use of surface water supplies that could result in significant environmental impacts. This is considered a **cumulative significant** impact.

Buildout conditions under the proposed General Plan would result in the development of approximately 23,492 acres with various land uses and an ultimate water demand of approximately 51,487 AF/yr. The availability of groundwater was addressed in the SCWA Zone 40 Water Supply Master Plan, which established sustainable yields of Sacramento County groundwater basins to meet the projected water demands through the year 2030. According to SCWA estimates, the sustainable groundwater yield for the Central Basin (which includes the Planning Area) is 273,000 AF/yr. Additionally, potential development in the Urban Study Areas would include the development of approximately 7,150 acres and result in a further increase in the demand for water service and related facilities. Assuming a similar mix of land uses as set forth in the proposed General Plan for the City, the Urban Study Areas could result in an additional cumulative water demand of approximately 16,000 AF/yr, which was not considered in the Zone 40 Master Plan. This would add to the environmental effects (including effects to the Cosumnes River) described under Impact 4.8.5.

General Plan Policies and Action Items

- CAQ-1 *Reduce the amount of water used by residential and non-residential uses by encouraging water conservation.*
- CAQ-1-Action 1 *Implement the City's Water Conservation Ordinance.*
- CAQ-1-Action 2 *The City shall actively encourage water conservation by both agricultural and urban water users.*

4.8 HYDROLOGY AND WATER QUALITY

CAQ-1-Action 3 *The City will work with urban and agricultural water purveyors to establish long range conservation plans which set specific conservation objectives and utilize, to the extent possible, a common planning horizon, plan framework and estimating/forecasting procedures.*

CAQ-1-Action 4 *Promote the use of drought-tolerant vegetation to minimize water consumption by providing information to developers and designers.*

PF-3 *Water supply and delivery systems shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City’s satisfaction.*

PF-3-Action 1 *The following shall be required for all development projects, excluding subdivisions:*

- An assured water supply and delivery system shall be available at the time of project approval. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project.*
- All required water infrastructure for the project shall be in place at the time of project approval, or shall be assured through the use of bonds or other sureties to the City’s satisfaction. Water infrastructure may be phased to coincide with the phased development of large-scale projects.*

PF-3-Action 2 *The following shall be required for all subdivisions to the extent permitted by state law:*

- Proposed water supply and delivery systems shall be identified at the time of tentative map approval to the satisfaction of the City. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project.*
- The agency providing water service to the subdivision shall demonstrate prior to the approval of the Final Map by the City that sufficient capacity shall be available to accommodate the subdivision plus existing development, and other approved projects in the same service area, and other projects which have received commitments for water service.*
- Offsite and onsite water infrastructure sufficient to provide adequate water to the subdivision shall be in place prior to the approval of the Final Map or their financing shall be assured to the satisfaction of the City, consistent with the requirements of the Subdivision Map Act.*
- Offsite and onsite water distribution systems required to serve the subdivision shall be in place and contain water at sufficient quantity and pressure prior to the issuance of any building permits. Model homes may be exempted from this policy as determined appropriate by the City, and subject to approval by the City.*

PF-4 *The City supports the use of reclaimed water for irrigation whenever feasible.*

PF-5 *The City shall seek to protect the quality and quantity of groundwater resources, including those which serve households and businesses which rely on public wells.*

Mitigation Measures

Implementation of General Plan policies CAQ-1 and PF-3 with their associated action items, and PF-4 and PF-5, as well as Mitigation Measure MM 4.8.5 would assist in reducing the City's contribution to cumulative water demand impacts. Since the City does not provide water service or currently has no direct jurisdiction over water service, facilities, or entitlements; as such, there are no feasible mitigation measures available to the City to avoid significant environmental impacts associated with water supply provisions. Therefore, this impact is considered **significant and unavoidable**.

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