D. HYDROLOGY AND WATER QUALITY

This section describes the existing hydrological setting for the project site, including runoff, drainage, and water quality, based on available information about the project, consultation with City staff, review of geotechnical and environmental investigation reports, and other published materials, and a site reconnaissance. Based on existing hydrologic information, this section identifies impacts that could result from project development, and recommends mitigation measures to reduce these impacts. Biological impacts to waterways on the site are evaluated in Section IV.F., Biological Resources.

1. Setting

A description of the existing conditions at and near the site related to hydrology is provided below.

a. Climate. The climate of the Benicia area is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and warmer dry summers. The approximate average high temperature is 86°F (July) and low is 39°F (January). The mean annual rainfall in the vicinity of the project site, for the period between 1970 and 2005, was approximately 20.5 inches.[1,2] Analysis of long-term precipitation records indicates that wetter and drier cycles, lasting several years, are common in the region. Severe, damaging rainstorms occur at a frequency of about once every three years.[3]

b. Surface Water, Runoff and Drainage. The project site is located in the foothills of California's Coast Range, with onsite elevations ranging between 25 and 280 feet above mean sea level (msl).[4] The project site is in the Suisan-Fairfield basin with the hilly uplands of the site and the surrounding vicinity divided across two sub-watersheds. The eastern third of the site is within the Goodyear Slough sub-watershed, and drains to the southeast to Suisan Bay. The western two-thirds of the site is within the Sulphur Springs (also known as Lake Herman) sub-watershed and drains to the south/southwest to lower Sulphur Springs Creek and from there to the Carquinez Strait.[5]

The dominant hydrologic features in the vicinity of the project site are Lake Herman to the west and Sulphur Springs Creek along the western site boundary of the project site. Lake Herman was formed by construction of an earthen dam in 1905 on Sulphur Springs Creek, and is not a primary drinking water supply; however, in an emergency, the lake would be used to supply raw (untreated) drinking water to the City of Benicia's water treatment plant. Lake Herman has a capacity of 1,800 acre-feet and a drainage area of 10.2 square miles.[6] Below the dam at Lake Herman, Paddy Creek and several other unnamed tributaries flow into Lower Sulphur Springs Creek (Figure IV.D-1). Neither Paddy

[1] Western Regional Climate Center, 2006. *Martinez Water Plant Report*. www.wrcc.dri.edu. September 21.

[2] Stetson Engineers, 2004. Technical Memorandum re: Summary of HEC-HMS (HEC-1) Analyses for Peak Runoff, Hydrology of Existing Conditions and the Proposed Benicia Business Park (Tentative Map), Job# 1978-05. February 18.

[3] Brown, William M. III, 1988. Historical Setting of the Storm: Perspectives on Population, Development, and Damaging Rainstorms in the San Francisco Bay Region, in Landslides, Floods, and Marine Effects of the Storm of January 3-5, 1982, in the San Francisco Bay Region, California, Stephen D. Ellen and Gerald F. Wieczorek, Eds., U.S. Geological Survey Professional Paper 1434

[4] ENGEO Incorporated, 1998. *Preliminary Geotechnical Exploration, Lake Herman Road Industrial Park, Benicia, California*, submitted to West Coast Home Builders, Inc., Concord Ca., Project # 1708-V3. June 18.

[5] California Interagency Watershed Mapping Committee, 1999. California Interagency Watershed Map of 1999 (CalWater 2.2.1), USGS and NRCS sponsored. Website: cain.nbii.gov/calwater. September 26.

[6] Department of Water Resources, 1988. *Dams Within the Jurisdiction of the State of California*, Bulletin 17-88. October.

Creek nor Lower Sulphur Springs Creek cross the project site (they merge near the northwest corner of the site and flow along the western boundary). Several of the unnamed tributaries, which originate in the hills north of the site, flow across the project site in a general northeast to southwest direction. Some of the creeks may flow year round following particularly rainy winters, but most surface flows would be expected to dry up by mid to late summer in dry years.

c. Flooding. The project site is not located within the 100-year flood hazard zone, as mapped by the Federal Emergency Management Agency (FEMA),[7] and therefore the project site would not be expected to be susceptible to storm-related flooding. Catastrophic failure of the dam retaining water at Lake Herman could result in inundation of a relatively small area downstream along Lower Sulphur Springs Creek, but would not be expected to affect the project site.[8] The elevation of the project site (ranging from 25 to 280 feet above msl) and distance from the coast preclude potential inundation by coastal hazards, such as tsunamis, extreme high tides, or sea level rise.[9,10,11,12]

d. Water Quality. The quality of surface and groundwater at the project site is affected by historic and current land uses in the vicinity and the composition of subsurface geologic materials. Water quality in surface and groundwater bodies is regulated by the State Water Resources Control Board and Regional Water Quality Control Boards. The project site is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB), which is responsible for implementation of State and federal water quality protection guidelines in the Bay Area. The RWQCB implements the Water Quality Control Plan (Basin Plan),[13] a master policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

(1) Groundwater. Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.[14] Designated groundwater basins rarely align precisely with drainage basins (discussed above) due to variations in geology, water-bearing capacity, and groundwater flow characteristics. In addition, not

[7] Federal Emergency Management Agency (FEMA), 1989. City of Benicia, Solano County, Flood Insurance Rate Map (FIRM) #0603680002C. Website: msc.fema.gov. September 25.

[8] Association of Bay Area Governments (ABAG), 2003. Map of Dam Failure Inundation Areas, San Francisco Bay Region. Website: gis.abag.ca.gov/?go=dam_inundation. September 25.

[9] Houston, J.R., Garcia, A.W., 1975. Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, Technical Report H-75-17. November.

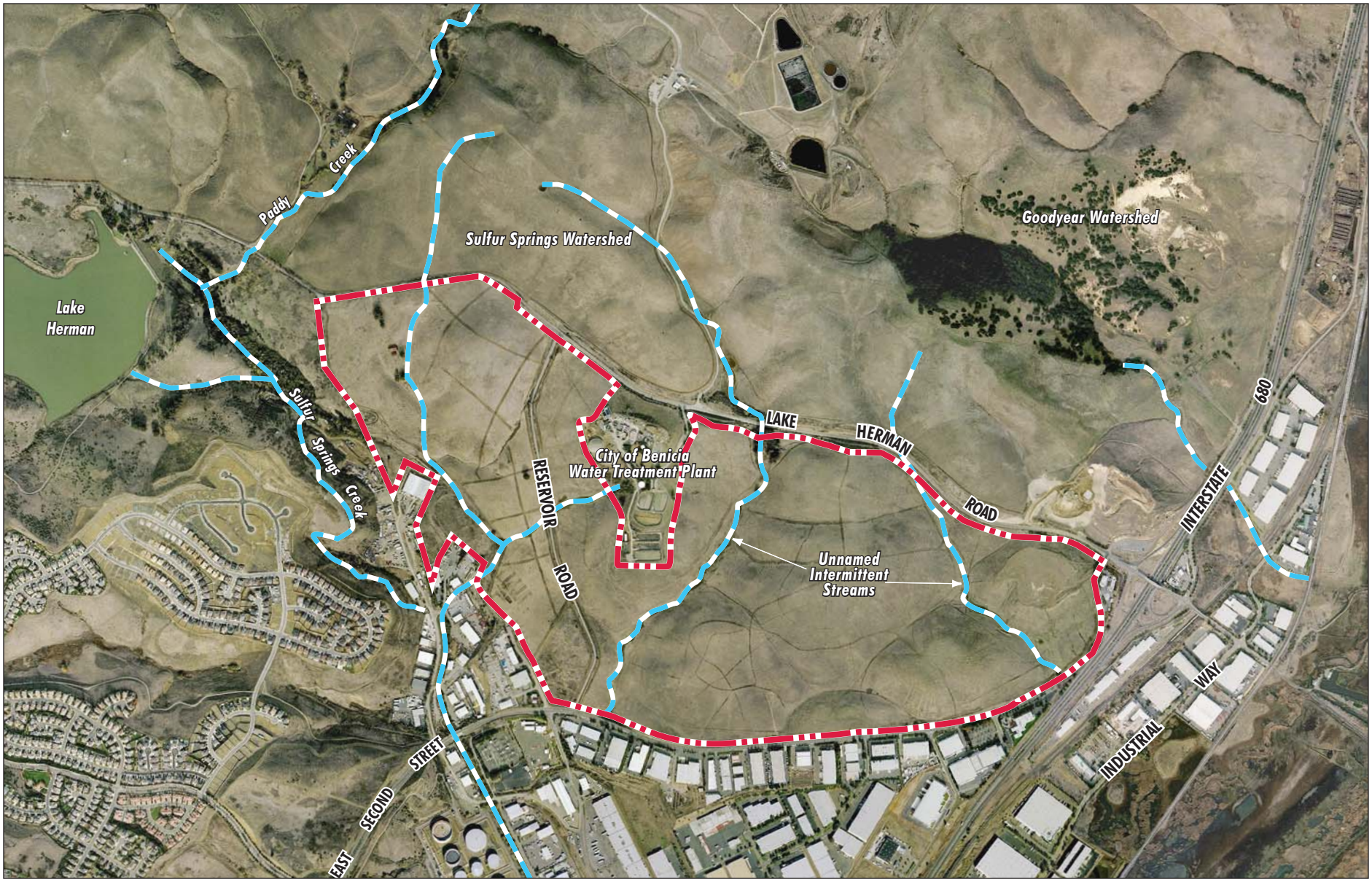
[10] Ritter, J., Dupre, W., 1972. Maps Showing Areas of Potential Inundation of Tsunamis in the San Francisco Bay Region, California, Department of the Interior, U.S. Geological Survey, Misc. Field Studies, MF480.

[11] United States Army Corps of Engineers, 1984. *San Francisco Bay Tidal Stage vs. Frequency Study*. October.

[12] U.S. EPA, 1995. The Probability of Sea Level Rise, EPA 230-R-95-008. October.

[13] San Francisco Bay Regional Water Quality Control Board (RWQCB), 2004. *Water Quality Control Plan (Basin Plan).* November 17.

[14] RWQCB, 2004. op. cit.



LSA

LEGEND

PROJECT BOUNDARY

CREEKS AND STREAMS

0 800 1600

FEET

SOURCE: GLOBEXPLORER, NOVEMBER, 2005

I:\CIB530 Benicia Bus Park\figures\Fig_IVD1.ai (10/12/06)

FIGURE IV.D-1

Benicia Business Park EIR

Tributary Map

all areas are included within a designated groundwater basin due to a lack of suitability as a groundwater source.

The project site is not located within a designated groundwater basin (as specified by the San Francisco Bay Regional Water Quality Control Board Basin Plan); the California Department of Water Resources has no groundwater level monitoring locations in the vicinity of the project site,[15] indicating that important regional groundwater supplies are not reasonably exploitable in this area. While groundwater does occur in the geologic units underlying the site, it does not occur in quantities and/or yields that would allow for economically feasible extraction. [16] Use of groundwater underlying the project site is not proposed as part of the proposed project.

The project site, which has been historically used for livestock grazing, is relatively undeveloped. Typical urban-type pollutants (i.e., petroleum hydrocarbons, heavy metals, pesticides) would not be expected to occur in significant concentrations in surface water or groundwater from on-site sources. Typical pollutants associated with rangeland and livestock include excess sediment and nutrients (i.e., nitrate and phosphate); these pollutants may occur in creeks in the area. No site-specific water quality data were available. Groundwater quality in the area has been affected by the former IT Panoche Class I hazardous waste facility to the north of the project site. The facility stopped receiving hazardous waste in 1987 and completed closure in 2000 under the oversight of the State of California, Department of Toxic Substances Control (DTSC). Groundwater monitoring wells are located on the IT Panoche site and are used to identify groundwater contaminants. For further discussion of the regulatory status of the IT site, refer to Section IV.E, Hazards and Hazardous Materials.

(2) Stormwater Quality. Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Nonpoint Source Program (established through the Clean Water Act); the NPDES program objective is to control and reduce pollutants to water bodies from nonpoint discharges. Regionally, the NPDES program is administered by the RWQCB. On December 8, 1999, U.S. EPA promulgated regulations, known as Phase II, requiring permits for storm water discharges from Small Municipal Storm Sewer Systems (MS4s). General Permit CAS000004 regulates storm water discharges from MS4s. Compliance with the NPDES Permit is mandated by State and federal statutes and regulations. Regulated MS4s subject to this requirement must adopt an ordinance or other document to ensure implementation of the Design Standards included therein or a functionally equivalent program that is acceptable to the RWQCB.[17] The ordinance or other document must be adopted and effective prior to the expiration of this General Permit or, for Small MS4s designated subsequent to the Permit adoption, within five years of designation as a regulated Small MS4.

Participating agencies (including the City of Benicia) must comply with the provisions of the permit by ensuring that new development and redevelopment projects mitigate water quality impacts to storm water runoff both during construction and operation periods. The City of Benicia, as required by the EPA under the provisions of the NPDES Phase II regulations and the RWQCB Phase II

[15] California Department of Water Resources (DWR), 2006. *Ground Water Level Data*. Website: wdl.water.ca.gov/gw. September 26.

[16] RWQCB, 2004. op. cit.

[17] State Water Resources Control Board (SWRCB), 2003. Water Quality Order No. 2003 – 0005 – DWQ.

General Permit requirements, developed and implemented a Storm Water Management Plan (SWMP) in 2003.[18]

All discretionary development and redevelopment projects that fall into one of the following categories are subject to the Design Standards. These categories are:

- Single-Family Hillside Residences;
- 100,000 Square Foot Commercial Developments;[19]
- Automotive Repair Shops;
- Retail Gasoline Outlets;
- Restaurants;
- Home Subdivisions with 10 or more housing units; and
- Parking lots of 5,000 square feet or more or with 25 or more parking spaces that are potentially exposed to storm water runoff.

The proposed project would be considered a discretionary project under these guidelines and therefore would be required to meet all the terms of the permit, including (but not limited to):

> ***Numeric Sizing Criteria for Pollutant Removal Treatment Systems.*** The Permittees shall require that post-construction treatment control BMPs incorporate, at a minimum, either a volumetric or flow based treatment control design standard, or both, so as to mitigate (infiltrate, filter or treat) approximately 85 percent of storm water runoff (in the Bay Area this is equivalent to about the 1-inch storm).
>
> ***Operation and Maintenance of Treatment Measures.*** Improper maintenance is one of the most common reasons why water quality controls will not function as designed or cause the system to fail entirely. It is important to consider who will be responsible for maintenance of a permanent BMP, and what equipment is required to perform the maintenance properly. As part of project review, if a project sponsor has included or is required to include, Structural or Treatment Control BMPs in project plans, the Permittee shall require that the sponsor provide verification of maintenance provisions through such means as may be appropriate, including, but not limited to legal agreements, covenants, CEQA mitigation requirements, and/or Conditional Use Permits.
>
> ***Limitation on Increase of Peak Storm Water Runoff Discharge Rates.*** Post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion.

[18] City of Benicia, 2003. *Stormwater Management Plan.* Adopted Aug 5.

[19] 100,000 Square Foot Commercial Development is defined as any commercial development that creates at least 100,000 square feet of impermeable area, including parking areas.

In addition, projects disturbing more than 1 acre of land[20] during construction are required to file a Notice of Intent (NOI) with the RWQCB to be covered under the State General Construction Permit for discharges of storm water associated with construction activity. A developer must propose control measures that are consistent with the General Construction Permit. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented for each site covered by the General Construction Permit and should include Best Management Practices (BMPs) designed to reduce potential impacts to surface water quality during the construction of the project.

The City of Benicia adopted a stormwater management and discharge control ordinance chapter in November 2006.[21] The intent of this chapter is to protect and enhance the water quality in the City of Benicia's watercourses pursuant to, and consistent with, the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.), the federal Clean Water Act (33 U.S.C. Section 1251 et seq.) and the goals of the city of Benicia General Plan. This chapter also codifies the provisions of the City's National Pollutant Discharge Elimination System (NPDES) permit that require, effective upon adoption of the chapter, implementation of appropriate source control and site design measures and storm water treatment measures for projects that create or replace 1 acre or more of impervious surface. On January 1, 2008, this threshold will be reduced to projects that create or replace 10,000 square feet or more of impervious surface.

Key specifications of the ordinance include:

- Eliminating non-storm water discharges to the municipal separate storm drain;
- Controlling the discharge to municipal separate storm drains from spills, dumping, or disposal of materials other than storm water;
- Reducing pollutants in storm water discharges to waters of the United States to the maximum extent practicable;
- Complying with applicable State and federal laws;
- Minimizing increases in nonpoint source pollution caused by storm water runoff from development that would otherwise degrade local water quality; and
- Reducing storm water runoff rates and volumes and nonpoint source pollution whenever possible, through storm water management controls and ensuring that these management controls are properly maintained and pose no threat to public safety.

e. City of Benicia General Plan. Applicable hydrology and water quality goals, policies, and programs from the Benicia General Plan are presented below.

[20] The State Water Resources Control Board, Water Quality Order 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES), General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) states that: The regulations provide that discharges of stormwater to waters of the United States from construction projects that encompass five (5) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999 expand the existing NPDES program to address stormwater discharges from construction sites that disturb land equal to or greater than one (1) acre and less than five (5) acres (small construction activity). The regulations require that small construction activity, other than those regulated under an individual or Regional Water Quality Control Board General Permit, must be permitted no later than March 10, 2003.

[21] City of Benicia, 2006. Storm Water Management and Discharge Control, Chapter 15.64, City of Benicia Municipal Code.

Community Services

- *Water Goal 2.36:* Ensure an adequate water supply for current and future residents and businesses.
  - *Water Policy 2.36.1:* Approve development plans only when a dependable and adequate water supply to serve the development is assured.
    - *Water Program 2.36.A:* Pursue use of reclaimed wastewater—especially for major industrial users—where feasible.
  - *Water Policy 2.36.3:* Implement measures to reduce water consumption.
    - *Water Program 2.36.B:* Initiate water conservation programs and conduct drought contingency planning.
    - *Water Program 2.36.C:* Continue to implement City-adopted water conservation Best Management Practices (BMP).
    - *Water Program 2.36.D:* Continue to require development to utilize adopted City standards for low-water-use landscaping.
  - *Water Policy 2.36.4:* Encourage public and private uses to minimize water use and to recycle processed water whenever and wherever feasible.
- *Water Goal 2.37:* Identify and preserve groundwater resources.
  - *Water Policy 2.37.1:* Work with the RWQCB to protect groundwater quality.
- *Water Goal 2.38:* Protect water quality.
  - *Water Policy 2.38.1:* Continue to require the use of feasible and practical Best Management Practices (BMP) to protect receiving waters from adverse effects of construction and urban runoff.
    - *Water Program 2.38.A:* Continue the Storm Water Pollution Prevention Program (SWPPP) and the Industrial Pretreatment Program, and continue to implement the Erosion Control Ordinance. Such measures would include providing water conservation literature to visitors and tourists and installing a full range of water-conserving fixtures in hotels and restaurants.
- *Water Goal 2.40:* Ensure adequate wastewater treatment capacity to serve all development shown in the General Plan.
  - *Water Policy 2.40.1:* Approve changes in land use designations for new development only if adequate wastewater treatment capacity is assured.
  - *Water Policy 2.40.2:* Promote use of reclaimed wastewater where feasible.
    - *Water Program 2.40.A:* Prepare, adopt, and implement a sewer maintenance and replacement program.
    - *Water Program 2.40.B:* Continue to implement the City's Wet Weather Management Plan.
  - *Water Policy 2.40.3:* Encourage developments with projected high strength discharges to reduce pollutants directly to the City's wastewater system.
    - *Water Program 2.40.C:* Educate developers about recycling and other technological methods where feasible.
    - *Water Program 2.40.D:* Continue to pursue the City's Pollution Prevention Program for all users of the City's wastewater system including commercial, industrial, and residential.
    - *Water Program 2.40.E:* Continue to pursue the City's pretreatment program for industrial dischargers.

Open Space and Conservation of Resources

- *Water Resources Goal 3.22:* Preserve water bodies.
  - *Water Resources Policy 3.22.1:* Avoid development that will degrade existing lakes and streams.
    - *Water Resources Program 3.22.A:* Require that all development in watersheds flowing into lakes and unchannelized streams include features to preserve run-off water quality.

        - *Water Resources Program 3.22.B:* Require a minimum setback of 25 feet from the top of bank of streams and ravines. Do not allow development within the setback.

- *Water Resources Goal 3.24:* Protect watersheds.
- *Water Resources Goal 4.13:* Prevent property damage caused by flooding.
    - *Water Resources Policy 4.13.1:* Continue to implement the floodplain management policy currently followed by the City.
        - *Water Resources Program 4.13.A:* Require all potential developers in the Sulphur Springs Creek floodplain to provide flood hazard mitigation measures that ensure the subject properties are not at risk of flooding during the FEMA-designated 100-year base flood.
    - *Water Resources Policy 4.13.2:* Promote non-structural solutions to flood problems, where feasible.
        - *Program 4.13.B:* Where appropriate, promote the use of stormwater retention basins rather than standard engineering *modifications* to natural channels.
        - *Program 4.13.C:* Encourage use of meandering drainage channels in all new developments and wherever channels are *replaced*.
- *Water Resources Goal 4.14:* Prevent ground and surface water contamination.
        - *Water Resources Program 4.14.A:* Inform businesses and the public of current technology and standards for preventing ground and surface water contamination, and regulations governing hazardous material use, storage, and disposal, plus agency reporting requirements.
        - *Water Resources Program 4.14.B:* Continue to communicate with State, regional, and local agencies and legislatures to relay information on Benicia's current and potential water quality contamination concerns, particularly regarding hazardous waste sites, existing and closed landfills, new and existing waste-generating industries and commercial operations, and City waste disposal and water/sewage treatment facilities.
    - *Water Resources Policy 4.14.1:* Implement non-point source pollution strategies.
        - *Water Resources Program 4.14.C:* Provide information to the public on provisions of the City's Stormwater Pollution Prevention Plan (SWPPP) program and preparation of SWPPPs for all construction projects of five acres or more. Implement Best Management Practices (BMPs) for stormwater runoff and erosion controls for all development.
        - *Water Resources Program 4.14.D:* Conduct an outreach program to industry and residents on how to reduce storm water-related pollution.

2. Impacts and Mitigation Measures

This section analyzes the impacts related to hydrology and water quality that could result from implementation of the proposed project. This section begins with a listing of criteria of significance, which establish the thresholds for determining whether a project impact is significant. The latter part of this section presents the potential hydrology and water quality impacts associated with the proposed project. Mitigation measures are provided as appropriate.

a. Criteria of Significance. The project would have a significant effect on hydrology or water quality if it would:

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

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

b. Less-than-Significant Hydrology and Water Quality Impacts. The project site is not underlain by recognized groundwater aquifers; therefore the project would not result in impacts to aquifer volume or public water supplies. The project would not be expected to be susceptible to regional flood hazards since it is entirely located outside the 100-year flood hazard zone, nor would the project alter the course of flood waters. The project site is not adjacent to the coastline and therefore coastal hazards, such as extreme high tides, tsunamis, or sea level rise would not pose a substantial risk the project. The remaining significance criteria are discussed below under Impacts and Mitigation Measures.

c. Significant Impacts and Mitigation Measures. This section describes potential impacts of the project associated with modifications to storm drainage, including potential increases in peak runoff volume, and potential water quality impacts associated with construction and operation-period activities.

Impact HYDRO-1: Increased runoff volume resulting from creation of new impervious surfaces could cause downstream flooding. (S)

The proposed project would increase impervious surfaces and modify drainage patterns, which could alter runoff volumes and velocities, at and downstream of the project site. Portions of the existing storm water conveyance system downstream of the project site are already at capacity, and any increase in peak runoff volumes to these conveyances associated with new development would be considered a significant impact.[22]

A Technical Memorandum, including an analysis of peak runoff hydrology of the existing site and the proposed project, has been prepared by engineers under contract to the project sponsor.[23] The study followed the Solano County guidelines to quantify the change in peak flows for the 10-year and 100-year storm events following the development of the proposed project. On the basis of peak flow estimates, the project proposes three strategies to provide mitigation of increases in peak storm flows due to urbanization: 1) the use of upstream detention basins; 2) the use of downstream detention basins; and 3) a design of the stormwater drainage network (modification of drainage areas to shift drainage away from sub-basins without downstream detention areas and adequate culvert capacity) to

[22] Roberts, Michael, 2006. Senior Civil Engineer, Public Works Dept., City of Benicia. Personal communication with Ralph E. Russell of Baseline. September 28.

[23] Stetson Engineers, 2004. op. cit.

reduce overall peak flows and water velocity. The hydrologic modeling for the nine sub-basins of the site indicates that all nine would achieve individual reductions in peak runoff magnitudes for both the 10- and 100-year storm. Implementation of the following mitigation measure would ensure that the project's contribution to downstream flooding is less-than-significant.

> Mitigation Measure HYDRO-1: As a condition of approval of the final grading and drainage plans for the project, a final detailed design-level hydraulic analysis shall be submitted to the City of Benicia detailing that implementation of the proposed drainage plans will conform to the following standards or include the following components:
>
> 1) The project sponsor shall pay the cost of the City to hire a professional engineer with expertise in flood control and stormwater quality/management techniques to review the significant grading and drainage plans, the SWPPP, and proposed post construction BMPs and implementation, and to perform inspections.
>
> 2) The project shall result in no increase peak in runoff rates from any subareas and no increase in combined peak runoff volumes from subareas draining to the same downstream conveyance component (i.e. reductions in one subarea can offset increases in another subarea, if they drain to the same downstream conveyance, so long as total peak flows are not in excess of current flow levels). The final drainage plan for the project shall be prepared by a licensed professional engineer;
>
> 3) Include drainage components that are designed in compliance with City of Benicia standards. The grading and drainage plans shall be reviewed for compliance with these requirements by the City of Benicia Department of Public Works. Any improvements deemed necessary by the City shall be part of the conditions of approval; and
>
> 4) The sponsor shall establish a self-perpetuating drainage system maintenance program (to be managed by a project site business owners association or similar entity), that includes annual inspections of sedimentation basins, drainage ditches, and drainage inlets. Any accumulation of sediment or other debris shall be promptly removed. An annual report documenting the inspection and any remedial action conducted shall be submitted to the City of Benicia Department of Public Works for review. (LTS)

Impact HYDRO-2: Construction activities and post-construction site uses could result in degradation of water quality in creeks and the Carquinez Strait by reducing the quality of storm water runoff. (S)

The following discussion includes a description of construction period and operation period water quality effects, both of which are captured under this impact and addressed by Mitigation Measure HYDRO-2:

(1) Construction Period Water Quality Impacts. Construction and grading within the project site would require temporary disturbance of surface soils and removal of existing cover. During the construction period, grading and excavation activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment in the runoff. Soil stockpiles and excavated parcels at the project site would be exposed to runoff and, if not managed properly, the

runoff could cause erosion and increased sedimentation in the creek and downstream conveyances. The accumulation of sediment could result in blockage of flows, resulting in increased localized ponding or flooding.

The potential for chemical releases related to heavy equipment operation is present at most construction sites, and would be present at the project site during the construction period. Once released, substances such as fuels, oils, paints, and solvents could be transported to surface water and/or groundwater in storm water runoff, wash water, and dust control water, potentially reducing the quality of the receiving waters. The potential for impacts to water quality during construction of the proposed project represents a potentially significant impact.

(2) Operation Period Water Quality Impacts. New construction and intensified land uses at the project site would result in increased vehicle use and industrial/commercial uses and discharge of associated pollutants. Leaks of fuel or lubricants, tire wear, and fallout from exhaust contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from common landscaped areas could contain residual pesticides and nutrients. Long-term degradation of water quality runoff from the site could adversely affect the quality of surface water runoff and the Carquinez Strait. The sponsor has not specified any particular measures to be included in the project to mitigate operation-period water quality impacts. Implementation of the following mitigation measure would reduce construction period and operation period impacts to a less-than-significant level:

> Mitigation Measure HYDRO-2: The sponsor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) designed to reduce potential impacts to surface water quality through the construction and life of the project. The SWPPP would act as the overall program document designed to provide measures to mitigate potential water quality impacts associated with implementation of the proposed project. The SWPPP shall include:
>
> 1) *Specific and detailed Best Management Practices (BMPs) designed to mitigate construction-related pollutants*. These controls shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g. fuels, lubricants, paints, solvents, adhesives) with storm water. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain.
>
> To educate on-site personnel and maintain awareness of the importance of storm water quality protection, site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list shall be specified in the SWPPP.
>
> The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, and shall include both dry and wet weather inspections. City of Benicia personnel shall conduct regular inspections to ensure compliance with the SWPPP.
>
> If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control (keeping sediment on the site). End-of-pipe sediment control measures (e.g. basins and traps) shall be used only as secondary measures. If hydro-seeding is selected as the primary soil stabilization method, then hydroseeded areas

shall be seeded by September 1 and irrigated to ensure that adequate root development has occurred prior to October 1. Entry and egress from the construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be designed to be accessible and functional both during dry and wet conditions.

2) *Measures designed to mitigate post construction-related pollutants.* The SWPPP shall include measures designed to mitigate potential water quality degradation of runoff from all portions of the completed development. The specific BMPs that would be required of a project can be found in San Francisco Bay Regional Water Quality Control Board Staff Recommendations for New and Redevelopment Controls for Storm Water Programs. The selection of required BMPs for a specific project is based on the size of the development and the sensitivity of the area. In general, areas near surface waters (i.e. creeks, lakes, or the Bay) are considered sensitive areas by the RWQCB. Passive, low-maintenance BMPs (e.g., grassy swales, porous pavements) are preferred over higher maintenance BMPs (e.g. sedimentation basins, fossil filters). The funding for long-term maintenance needs shall be provided by the project sponsor (the City will not assume maintenance responsibilities for these features). Design of stormwater management features in open space areas shall also incorporate recommendations in Start at the Source: Design Guidance Manual for Stormwater Quality Protection (Bay Area Stormwater Management Agencies Association, 1999).

   In addition, some of the individual industrial businesses (depending on the type of activity) that operate within the project site may be subject to regulation under the General Industrial Activities Storm Water Permit administered by the RWQCB. These businesses would be required to file a Notice of Intent (NOI) to comply with General Permit, conduct site inspections, collect runoff samples, and file annual reports. (LTS)

Impact HYDRO-3: Proposed grading at the site would substantially alter surface water drainage patterns, potentially resulting in flooding and/or erosion. (S)

Extensive grading proposed for the project site would alter the condition of existing unnamed creeks crossing the site, in many cases eliminating the creeks, and placing them in buried storm drainage culverts.

The proposed project would not be in conformance with General Plan policies regarding grading and construction setbacks of 25 feet from water bodies (creeks). Proposed storm water infrastructure on the project site is characterized by a system of underground pipes and culverts (with the exception of one preserved drainage and several detention basins) and would conflict with General Plan policies that encourage the use of landscape storm water management features in lieu of underground pipelines. General Plan consistency is discussed in Section IV.A, Land Use and Planning Policy, of this Draft EIR. As discussed in that section, the project would result in a significant and unavoidable physical environmental impact resulting from conflicts with General Plan policies.

However, from a hydraulic efficiency perspective, as long as the drainage system is adequately sized and constructed, there would be no significant hydrology impact related to the creation of flooding or erosion.[24]

Culverting creeks can result in secondary impacts to water quality by reducing the natural filtering capacity of the system. Pollutants contained in water flowing in creeks are subject to a variety of processes that provide some level of treatment, including photodegradation (from exposure to sunlight), physical filtering, biological assimilation, and volatilization. These processes are essentially nonexistent in buried pipes, because water flowing in pipes is not exposed to light, does not pass through a filter medium, and typically would not be exposed to the filtering and cleansing effects of a riparian ecological system. In addition, residence time of the water is important to enhancement of water quality. Water in pipes flows quickly by design and allows little time for settlement of sediments and associated pollutants. Water in creeks flows much more slowly, allowing physical processes to provide some level of pollutant reduction.

As part of compliance with the City NPDES permit and the Storm Water Management and Discharge Control ordinance, the detention basins proposed by the project (and other BMPs, which may include grassy swales and ponds) would be required to provide for treatment of runoff prior to discharge from the site. Depending on their design, these constructed BMPs could replace some of the water quality enhancement value provided by the open creek channels currently located in the project site.

Implementation of Mitigation Measure HYDRO-1, which would ensure proper sizing of the drainage system, and HYDRO-2, which would ensure that runoff from the project site is treated to the maximum extent practicable, would reduce the potential erosion and flooding impacts associated with altering drainage patterns to a less-than-significant level:

> Mitigation Measure HYDRO-3: Implement Mitigation Measures HYDRO 1 and HYDRO-2. (LTS)

[24] The primary impact associated with culverting creeks is typically associated with loss of associated biological resources, including riparian vegetation and animal communities. Impacts and mitigation measures related to potential loss of biological resources are presented in Section IV.G., Biological Resources.