# 3.12 HYDROLOGY AND WATER QUALITY

## Introduction

This section of the EIR addresses local and regional hydrologic conditions in the Santa Clara-Alum Rock Corridor. It describes the existing drainage, flood hazards, water quality, and groundwater issues relevant to the Corridor. The proposed construction of the proposed project, including station areas and associated roadway modifications, have the potential to cause direct and indirect impacts on local water resources. Related plans and policies are discussed, including the San Jose General Plan, the San Jose Urban Runoff Management Plan (URMP), and the recommended Best Management Practices (BMPs) of the San Francisco Bay Regional Water Quality Control Board (RWQCB) (Region 2). The discussion describes the existing conditions and potential impacts to storm drainage, flood control, and water quality based on an analysis prepared by PBS&J.[1] This study included a site reconnaissance, analysis of project plans, review of appropriate regulations, and communication with the Santa Clara Valley Water District (SCVWD), Santa Clara County Planning Department, and City of San Jose Public Works Department.

Background information was collected from topographical maps of the area and reports prepared by the Department of Water Resources, the United States Geological Survey (USGS), the Natural Resources Conservation Service (formerly the Soil Conservation Service), Region 2, and the City of San Jose. These data, in conjunction with the results of field surveys by PBS&J hydrologists in 2001 and reevaluation in 2004, were used to determine the existing site conditions, on-site resources, and drainage routes. Potential hydrology impacts were identified by assessing what changes implementation of the proposed project could cause in drainage, groundwater conditions, sediment generation, and water quality during and following the construction period.

## Existing Conditions

### Environmental Setting

**Regional Hydrology.** The Santa Clara-Alum Rock Corridor occupies developed level floodplain areas along lower portions of the Guadalupe River and Coyote Creek watersheds (Figure 3.12-1). Elevations range from approximately 130 feet above mean sea level (+130 feet msl) in the higher elevations above Lower Silver Creek on the eastern end of the Corridor to about +85 feet msl along the Lower Guadalupe River channel at the western extent of the Corridor. The prevailing land surface slopes gently northwest toward South San Francisco Bay.

The Lower Guadalupe River, Coyote Creek and its tributary Lower Silver Creek are the primary surface water features in the project area. The upland areas of these watersheds are only lightly developed and the General Plan of the City of San Jose calls for nominal development in the future.

[1] EIP Associates, *Hydrology and Water Quality Report*, May 2004.

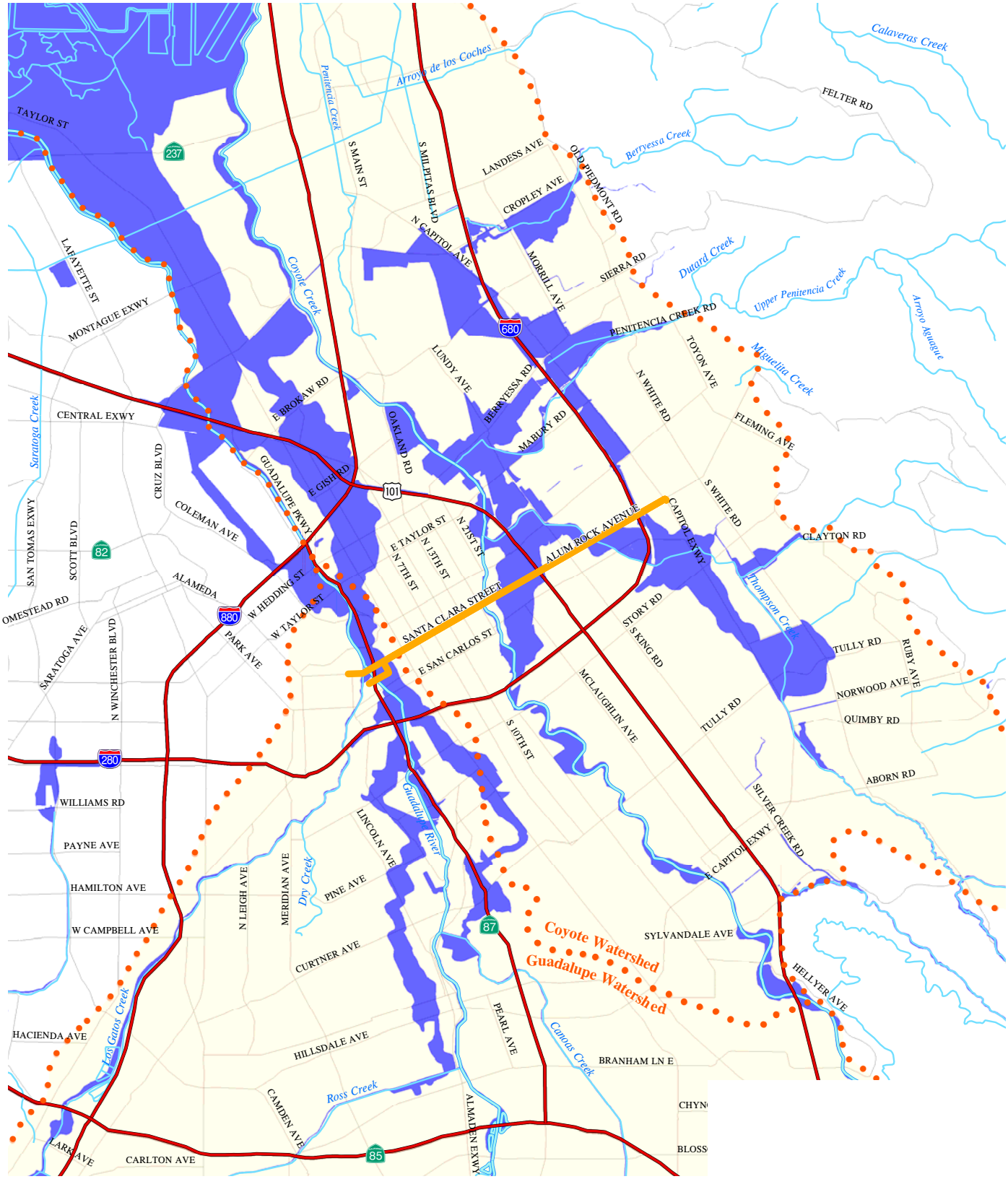


**FIGURE 3.12-1: WATERSHED AREAS AND FLOOD HAZARD ZONES**

Source: PBS&J 2008.

The valley floor and lower foothills have been actively developed with numerous subdivisions, shopping centers, and light industries. The creeks often experience very high winter flows because of the highly developed nature of their lower watersheds.

The Guadalupe River drainage basin covers approximately 170 square miles, including the 95-square mile upper Guadalupe River drainage area. Elevations within the watershed range from 0 to +3,790 feet msl. The watershed is typical of the Central California Coast Ranges where major stream flows occur during the rainy season (November through March), and decrease through the summer months.

The drainage basin is bounded on the south and southwest by the Santa Cruz Mountains, on the west by the drainage basins for San Tomas and Saratoga creeks, on the east by the Coyote Creek Basin, and on the north by San Francisco Bay. The watershed is mostly rural in the higher elevations and heavily urbanized in the lower reaches, where the project would be constructed.

The Santa Clara-Alum Rock Corridor, primarily along the 100-foot right-of-way of East Santa Clara Street, is nearly level, slopes very gradually to the northwest, and covers approximately 60 acres. The area contains existing roadways and adjacent developments (mostly office and light industrial). The average site elevation is approximately +100 feet msl.[2] Natural runoff from the Corridor flows northwest into existing municipal stormwater drainage systems, enters the Lower Guadalupe River or Coyote Creek, and hence to San Francisco Bay.

Coyote Creek extends 31 miles in San Jose and drains approximately 354 square miles of watershed. The urban area in the lower region of the watershed is a broad plain with rolling foothills to the east. Coyote Creek and its tributaries (including Lower Silver Creek) flow northwest through San Jose. The SCVWD regulates discharges from Lake Anderson and Coyote Lake, which control the flows in the northern part of the creek. Average daily flows in the northern reaches of the creek typically are less than 50 cubic feet per second (cfs), although major storm flows can produce discharges of up to 1,000 cfs.

**Site Drainage.** The Santa Clara-Alum Rock Corridor is in the Downtown San Jose area. The regional hydrology has been described previously by the San Jose General Plan[3] . That information is incorporated by reference in this EIR and is summarized below. Yearly average rainfall for the region totals approximately 14 inches, with most of that rain falling during the winter months: November through April.[4] Typically, precipitation exceeds evaporation only in December, January, and February; high temperatures throughout the rest of the year cause evaporation rates to exceed precipitation. Following periods of substantial rainfall, runoff is rapid on both developed and undeveloped surfaces,

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2 United States Geological Survey, *San Jose East Quadrangle*, photo-revised 1980.

3 City of San Jose Community Development Department, *San Jose 2020 General Plan*, adopted August 1994, most recent update May 6, 2004.

4 Santa Clara Valley Water District, *Draft Engineers Report for the Lower Guadalupe River Flood Protection Project*, 2001.

and stream flow rises quickly. Shallow ponding occurs for prolonged periods in depressions and low-elevation areas following heavy rains.

Land development and modification of natural drainages has altered infiltration and runoff rates, changing the timing, distribution and magnitude of surface water and groundwater flow. Urbanization has increased runoff from the development of impervious areas, surface soil compaction, grassland conversion, dewatering of upland stream valleys, and the degradation of natural riparian communities. As development occurs in San Jose, storm drainage systems are extended to convey stormwater to San Francisco Bay. Stormwater flows from urbanized areas are routed through street gutters/open channels to drop inlets connected to underground conduits beneath roadways. Storm drainage facilities in San Jose consist of main trunk storm drain lines and many smaller laterals draining into them. The mains convey drainage to outfalls in the creeks and adjacent tributaries. Various subdivision developments adjacent to City watercourses drain directly into the respective main channel.

The system is divided into separate subareas to reduce distance and keep pipe sizes as small as possible. The Engineering Design Standards in San Jose require that all open channels be designed to contain the 100-year flood. The design storm for other drainage facilities is based on the size of the design area. Drainage for areas of less than 640 acres (one square mile) must contain the 10-year storm; between 640 and 3,200 acres (five square miles) must contain the 25-year storm; and over 3,200 acres must contain the 100-year storm. The Engineering Design Standards for storm drain facilities meet SCVWD standards. The Santa Clara-Alum Rock Corridor is served by the City's storm drain system.[5]

**Stream Flows and Flood Hazards.** Based on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps,[6] about 35 percent of the Corridor is in the 100-year floodplain. Areas adjacent to each of the creeks are subject to flood hazards, including the areas where the Corridor would cross them. Flooding is considered a potential hazard along the Corridor because it is so low in the watershed and the effectiveness of the existing local storm drain system is questionable. Upper watersheds detention basins/recharge ponds and the Guadalupe River Flood Protection Project provide improved flood protection to Downtown San Jose (including the project area), as well as protection and improvement of water quality.[7]

**Groundwater.** The Santa Clara-Alum Rock Corridor is in the Santa Clara Valley Groundwater Basin. The Guadalupe River and Coyote Creek are important elements of the SCVWD's program to recharge water to the Basin. In the lower watershed of Coyote Creek (including the project area), clay-rich surface soils allow recharge only to the upper aquifer of the Basin, and no deep percolation occurs (Thomas Iwamura, SCVWD, 1998). The drinking water for the Basin typically comes from a confined

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5 City of San Jose Department of Public Works, Design and Construction Division, telephone conversations with Dave Kowal, Senior Engineer, 19 November 2001, March 19, 2004.

6 Federal Emergency Management Agency, National Flood Insurance Program, Flood Insurance Rate Maps, Community Panel Numbers 0603 49 0020F (1998), 0603 49 0019E (1988), and 0603 49 0025D (1982) for Santa Clara County and the City of San Jose, California.

7 Santa Clara Valley Water District, *Draft Engineers Report for the Lower Guadalupe River Flood Protection Project*, 2001.

aquifer beneath a regional aquitard about 100 feet below the ground surface. About 40 percent of the drinking water supplied to San Jose by the San Jose Water Company is from local groundwater wells in the Basin. The remaining 60 percent is treated surface water imported from the South Bay Aqueduct Project and local reservoirs.

Municipal well data provided by SCVWD (incorporated by reference and summarized below) is representative of general groundwater quality conditions in the Santa Clara-Alum Rock Corridor. Measured alkalinities ranged from 204 to 379 mg/l with pH values of 7.5 to 8.8. There are no primary or secondary drinking water standards for alkalinity. The secondary (i.e., not health related) standard for pH is a range from 6.5 to 8.5. Nitrate concentrations typically ranged between 3 and 5 mg/l of nitrogen, well below the drinking water limit of 10 mg/l. There is an increase in salinity levels over time. There are no high concentrations of constituents in the groundwater in the area of the Corridor.

The climate, topography, geology, and land use affect groundwater conditions along the Santa Clara-Alum Rock Corridor. The soils survey of Santa Clara County has mapped the corridor as Yolo Association silty clay loams.[8] Surface soils contain silty clays with medium to low infiltration rates (0.05 to 0.2 inches per hour) and high shrink-swell potential, and clay loams with medium infiltration rates (0.2 to 0.6 inches per hour) and moderate shrink-swell potential. Groundwater in the region typically is shallow, at depths of about 10 to 30 feet below ground surface. Previous geotechnical investigations in the project vicinity have encountered groundwater at depths of about 20 feet below ground surface.

**Water Quality.** Surface water quality in Lower Guadalupe River and Coyote Creek is influenced primarily by physical and chemical characteristics of the watershed, hydrologic and climatic factors, and urban and agricultural discharges. During the summer low flow conditions, the water quality characteristics of most importance to aquatic life are temperature, dissolved oxygen, turbidity, pathogenic bacteria, nutrients (e.g., nitrogen and phosphorus), and nuisance algae growth. During the winter, streamflow is much higher and is influenced more by stormwater runoff and its associated constituents, such as eroded soil, oils and grease from automobiles and paved areas, nutrients from agricultural/open-space areas and livestock boarding areas, pesticides from urban and suburban landscaped areas, and organic litter such as leaves and grass clippings. Runoff characteristics change with landscape changes, such as the conversion of natural ground surface to impervious surfaces through construction, thereby reducing the land's capacity to absorb rainwater. Increasing the amount of impervious ground surfaces increases the amount and velocity of stormwater runoff, creating greater potential for erosion, alteration of stream habitat, and flooding. In Downtown San Jose, as in all of the Santa Clara Valley, storm drains convey untreated stormwater to local creeks and San Francisco Bay. Physical and chemical constituents and sediment washed into the storm drains are deposited in the creeks, rivers, wetlands, and the Bay, affecting natural biological systems, often to the detriment of fish and other wildlife.

[8] United States Department of Agriculture, Natural Resources Conservation Service (formerly the Soil Conservation Service), *Soil Survey of Santa Clara County, California*, V.C. Miller, Party Chief, Washington, D.C., 1977.

Low flow water quality of the creeks is fairly good in upstream canyon areas, but degraded in the urbanized downstream reaches by high nutrient levels, siltation, and urban refuse/debris. The quality of the stormwater runoff from the Corridor is typical of urban watersheds and may contain constituents such as landscaping chemicals (nitrates, phosphates, herbicides, and pesticides); oil, grease, and metal brake dust from automobiles; and, sediment (turbidity) from soil erosion or aerial deposition of dust. A water quality concern identified by Region 2 for Coyote Creek and its receiving waters (San Francisco Bay, which has been identified as an impaired water body[9]) is the discharge of contaminated urban and irrigation runoff.

The most common sources of stormwater pollution are construction sites, streets and parking lots, large landscaped areas, and household and industrial materials dumped into storm drains. Grading and earthmoving activities associated with new construction accelerate soil erosion, even in lowland areas. Grease, oil, hydrocarbons, and heavy metals deposited by vehicles and heavy equipment accumulate on streets and paved parking lots, and are carried into storm drains by runoff. Pesticides, herbicides, and fertilizers used for landscape maintenance are washed into storm drains by over watering. Paints, solvents, soap products, and other toxic materials are inadvertently or deliberately deposited in storm drains in residential and industrial areas. The federal Clean Water Act requires local municipalities to implement measures to control this type of pollution entering their storm drainage systems. To comply with the federal regulations, the City of San Jose obtained a National Pollutant Discharge Elimination System (NPDES) permit from Region 2. The permit requires the City to develop and implement control measures for reducing stormwater pollutants from construction sites and areas of new development or significant redevelopment.

The region's surface water quality is under the jurisdiction and is monitored by Region 2 which implements the Water Quality Control Plan (Basin Plan) to achieve the maximum water quality benefit possible.[10] Under the Basin Plan present beneficial uses for Lower Guadalupe River and Coyote Creek include agricultural and industrial supply, recreation, freshwater habitat, wildlife habitat and groundwater basin recharge. Present and potential water quality problems identified by Region 2 in the Basin Plan include increased surface runoff, sedimentation, the disposal of municipal wastes and wastewater, and impacts associated with underground storage tanks. The designation and inclusion of San Francisco Bay in the 1998 California 303(d) list of impaired water bodies indicates that several of the primary pollutants/stressors of concern are agriculture; non-point sources, including sedimentation and siltation; and urban runoff/storm sewer discharge. The following sources of sedimentation were identified as potential contributors within the San Jose URMP: construction/land development, highway/road/bridge construction, urban runoff, channelization, removal of riparian vegetation, and streambank destabilization. The first three items of this list are specifically applicable to the proposed project.

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9 United States Environmental Protection Agency, Office of Water, Total Maximum Daily Load (TMDL) Program, *California List of Impaired Waters for 1998*.

10 California Regional Water Quality Control Board Central Valley Region, *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board San Francisco Bay Region - The San Francisco Bay Basin,* Fourth Edition, 1995.

## Regulatory Setting

**City of San Jose Water Policy Framework.** The City of San Jose has made a strong commitment to maintain and improve the condition of its streams and adjacent water bodies. The City recognizes that a healthy watershed enhances the quality of life and promotes the long-term economic well-being of its citizens. The Plan is updated annually and provides a basis from which land use policies and ordinances are developed and implemented. To this end, the City Council has adopted a *Water Policy Framework,*[11] the primary elements of which include:

*A1* *The City shall protect, maintain and restore the ecological integrity of its ecosystem; including wetlands, riparian corridors and other water bodies.*

*A2* *The City shall promote a watershed/ecosystem approach to regulations at the regional, State and federal levels to emphasize programs that produce net environmental benefits.*

*D1* *The City shall identify, address, and prevent pollution at its source.*

*D2* *The City shall promote grading standards that minimize soil erosion.*

*D5* *The City shall encourage all residential and non-residential entities to meet Best Management Practices and Reasonable Control Measures for environmental protection.*

*E2* *The City shall provide information and education to the public on their roles and responsibilities related to water issues.*

**City of San Jose General Plan.** To ensure that the community's vision is achieved, the City has adopted, in its *San Jose 2020 General Plan*[12], goals and policies aimed at land use and future development. Although the SCVWD has the primary responsibility for flood control and modifications to stream channels, San Jose has jurisdiction over, and responsibility for, the development of areas adjacent to all rivers and streams in the City's Urban Service Area. City policies and land use decisions directly affect the design of channel modifications required as a part of a development. In particular, the City's regulation of development is the vehicle for requiring the dedication of waterways to the Water District, preservation of flood plains, and in some cases, the construction of flood control improvements.

Several of the Plan's major goals are designed to protect the watershed resources in San Jose. Those that relate to water resources that could be affected by the proposed project include:

*Riparian Corridor and Upland Wetland Protection: Preserve, protect and restore riparian corridors and upland wetlands.*

[11] City of San Jose, Environmental Services Department, *Water Policy Framework*, August 1996.

[12] City of San Jose, Planning, Building and Code Enforcement Department, *San Jose 2020 General Plan*, adopted August 1994, most recent update May 6, 2004.

*Bay and Baylands Protection: Preserve and restore natural characteristics of the Bay and adjacent lands, and recognize the role of the Bay's vegetation and water area in maintaining a healthy regional ecosystem.*

*Soils and Geologic Conditions: Protect the community from the hazards of soil erosion, weak and expansive soils and geologic instability.*

*Water Resource Protection: Protect water resources because they are vital to the ecological and economic health of the region and its residents.*

Pertinent Flooding Policies include:

1. New development should be designed to provide protection from potential impacts of flooding during the "1 percent" or "100-year" flood.

4. The City and the Santa Clara Valley Water District should cooperate to develop flood control facilities to protect the Alviso and North San Jose areas from the occurrence of the "1 percent" or "100-year" flood.

**City of San Jose Urban Runoff Management Plan, Santa Clara Valley Urban Runoff Pollution Prevention Program.** The City's plan for the implementation of programs that address the Region 2 NPDES permit requirements is the Urban Runoff Management Plan (URMP), which outlines the strategy and includes performance standards. The City has a policy requiring new development projects to include specific measures for improving the water quality of urban runoff to the maximum extent feasible. The Post-Construction Urban Runoff Management Policy establishes general guidelines and minimum Best Management Practices (BMPs) for specified land uses, and includes the requirement of regular maintenance to ensure their effectiveness.

The New Development and Construction Controls Activities component identifies non-point source pollution control measures that are required as a condition of approval for development projects. The measures cover pre-construction, construction, and post-construction activities designed to reduce the amounts of sediments and other constituents discharged into the storm drainage system. BMPs for new development and construction controls identified in the URMP have been incorporated into the mitigation measures presented later in this section.

**Santa Clara Valley Water District.** The SCVWD reviews project plans for proposed on-site drainage systems, wastewater disposal systems, and potable water supply, as well as for all new or upgraded facilities that may be required off-site in the City or County as a result of the development. The Water District reviews projects for conformance with the District's flood control design criteria, stream maintenance and protection plans, and groundwater protection programs. The District coordinates its efforts with federal, State, other Santa Clara County, and City agencies such as FEMA, RWQCB, and the Department of Environmental Health, to promote health and safety through the effective management water resources.

**Clean Water Act.** Section 303 of the federal *Clean Water Act* (CWA) requires states to adopt water quality standards for all surface water of the United States. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards typically are numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where supplements to numerical standards are needed. The State Water Resources Control Board (SWRCB) and the San Francisco Bay Regional Water Quality Control Board (Region 2) are responsible for ensuring implementation and compliance with the provisions of the federal CWA and California's *Porter-Cologne Water Quality Control Act*. Along with the SWRCB and Region 2, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as city and county governments, and requires the coordinated efforts of these various entities.

Surface water quality is monitored by Region 2, which implements a *Water Quality Control Plan* (Basin Plan), to protect water quality in the San Francisco Bay Estuary to achieve the maximum beneficial use possible. Under the Basin Plan for the Santa Clara Basin region, present beneficial uses listed for the southernmost end of San Francisco and its adjacent tributaries include cold freshwater habitat, ocean, commercial, and sport fishing, estuarine habitat, industrial service supply, fish migration, navigation, preservation of rare and endangered species, water contact recreation, noncontact water recreation, fish spawning, warm freshwater habitat, and wildlife habitat. Present and potential water quality problems identified in the Basin Plan for this region include the increased surface runoff, sedimentation, the disposal of municipal wastes and wastewater, and impacts associated with leaking underground fuel storage tanks.

The CWA requires states to develop a list of water quality limited (impaired) segments, establish priority rankings, and develop action plans (called Total Maximum Daily Loads or TMDLs) to improve water quality. Coyote Creek and the Guadalupe River are listed in California's 2002 CWA Section 303(d) list of Water Quality Limited Segments. Coyote Creek is listed for diazinon and the Guadalupe River is listed for diazinon and mercury.

**National Pollution Discharge Elimination System (NPDES).** The federal *Clean Water Act* prohibits the discharge of pollutants to navigable waters from point and non-point sources unless authorized by a NPDES permit. Point source discharges generally pertain to discharges from wastewater treatment facilities or other identifiable dischargers; non-point discharges pertain to area-wide or stormwater discharges. Point source discharges are regulated by individually issued NPDES permits; stormwater source discharges are regulated by general NPDES permits issued to states by the United States Environmental Protection Agency. NPDES permits contain discharge prohibitions, effluent limitations, and specifications and provisions that ensure proper treatment, storage, and disposal of wastewater. In San Jose, NPDES permits are issued and enforced by Region 2.

The Phase I NPDES stormwater regulations in the federal Clean Water Act require, large municipalities (populations of 250,000 or more) and medium municipalities (100,000 to 250,000), certain construction activities, and certain industrial activities to obtain NPDES permit coverage. The City has NPDES permit coverage from Region 2, as a co-permittee with the SCVWD's Urban Runoff

Program. Phase II NPDES permitting requires an area-wide collaborative effort with all county agencies.

The City has adopted a separate Phase II NPDES General Permit for stormwater discharge associated with construction activity. Stormwater runoff from construction sites of one acre or more must be covered under the State's General Construction Activity Storm Water Permit and must be managed by a *Storm Water Pollution Prevention Plan* (SWPPP). A SWPPP describes measures to control or minimize pollutants from entering stormwater. Developers of projects one acre or larger must file a Notice of Intent with Region 2 to obtain coverage under the General Permit. The General Permit requires the applicant to develop a SWPPP that addresses both grading/erosion impacts and non-point source pollution impacts of the development project, including post-construction impacts and sampling/monitoring requirements. Because the proposed development exceeds one acre, an appropriate SWPPP would be required.

The City of San Jose requires that Best Management Practices (BMPs) be implemented in individual project's storm drainage system design to reduce or eliminate stormwater pollution. Developers must submit a copy of the Notice of Intent to the City for approval before issuance of grading permits.

**Water Quality Control Plan.** Region 2 has primary authority for implementing SWRCB policy and ensuring that water quality and designated beneficial uses of water resources are protected from potential adverse impacts of development in the project area. Narrative and numerical water quality objectives are established in Region 2's water quality control plan for the Basin Plan to protect established beneficial uses of surface water and groundwater. Region 2 implements the Basin Plan by imposing waste discharge requirements under the NPDES permit and CEQA process. Lower Guadalupe River and Coyote Creek have designated beneficial uses for contact and non-contact recreation. The principal water quality objective for recreation is to maintain low levels of potentially pathogenic organisms in discharges, regulated through total coliform bacteria counts.

## Impact Assessment and Mitigation Measures

### Approach and Methodology

For those areas in which transit development improvements are proposed, existing surface water and groundwater conditions described in the environmental setting were reviewed to determine whether water quality-related effects could occur, based on thresholds of significance used by VTA.

The potential hydrologic effects on the environment within the Santa Clara-Alum Rock Corridor are considered from two points of view: the direct (construction) and indirect (downstream) effects of the project. Potential construction effects are water quality degradation from on-site excavation, erosion and subsequent sedimentation, as well as from improper disposal of materials, chemicals, equipment wash-down water, etc. Potential indirect hydrologic changes are the alteration of water quality and flooding in, and downstream from, the project area. The construction of the proposed project in the Corridor is not expected to have direct or indirect adverse effects on hydrology and water quality

because all construction and operation activities are regulated by a set of existing laws that require such effects to be avoided.

## Standards of Significance

Based on significance criteria used by VTA, the hydrology or water quality effects associated with the proposed project in the Santa Clara-Alum Rock Corridor would be adverse if one or more of the following conditions were created in the vicinity of the project:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete water resources;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- 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 preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

## Environmental Analysis

In order to determine hydrology and water quality impacts due to construction and operation of the proposed project, a level of significance is determined and reported. Conclusions of significance are defined as follows: significant (S), potentially significant (PS), less than significant (LTS), no impact (NI), and beneficial (B). If the mitigation measures would not diminish potentially significant or significant impacts to a less-than-significant level, the impacts are classified as "significant and unavoidable (SU)." For this section, HYDRO refers to Hydrology and Water Quality.

For the purposes of this analysis, the proposed project includes the implementation of BRT and Single Car LRT in the Santa Clara-Alum Rock Corridor in two phases. Phase 1 includes the implementation of BRT service and Phase 2 includes the implementation of Single Car LRT service. Potential hydrology and water quality impacts associated with Phase 1 and Phase 2 of the proposed project, including project options, would be largely similar. Therefore, the analyses for the two project phases are discussed together. Areas in which the effects of the two phases differ are detailed within the discussion of each significance threshold.

Potential impacts associated with the extension of transit services in the Capitol Expressway Corridor were analyzed in the Capitol Expressway Light Rail Final Supplemental Environmental Impact Report (FSEIR) dated January 2007, which is incorporated herein by reference. Potential impacts of the proposed project not analyzed in the Capitol Expressway Light Rail FSEIR are described below, as necessary.

*HYDRO-1. The proposed project would not violate any water quality standards or waste discharge requirements. (LTS)*

Urban contaminants in runoff from the reconstructed impermeable surfaces along the alignment could lower the quality of stormwater runoff and infiltrating groundwater. The major contributor of contaminants to runoff and infiltrating groundwater is the land surface over which the water passes. In developed areas, streets and gutters are connected directly to storm drains that collect and guide stormwater runoff. Between rainstorms materials accumulate on these surfaces from debris dropped or scattered by individuals, street sweepings, debris and other particulate matter washed into roadways from adjacent areas, wastes and dirt from construction and renovation or demolition, fecal droppings from animals, remnants of household refuse dropped during collection or scattered by animals or wind, oil and various residues contributed by automobiles, and fallout of air-borne particles.

During rainfall, a film of water builds up on impermeable surfaces. Once this film is of sufficient depth (about 0.1 inch), the water collecting on the impermeable surface begins to flow. The initial flow of each storm often contains the highest concentrations of pollutants, but this is not always the case because the phenomenon is dependent on the duration of the preceding dry weather period, rainfall patterns, rainfall intensity, the chemistry of individual pollutants, and other site-specific conditions.

If uncontrolled, the accumulation of urban pollutants could have a detrimental cumulative effect because overland flow from paved surfaces and landscaped areas carry many of the above-listed constituents, thereby contributing to the deterioration of the quality of stormwater runoff and infiltrating groundwater. The eventual result would be the deterioration of water quality in downstream receiving waters and recharge basins. Downstream reaches of the two creeks would carry stormwater runoff to San Francisco Bay, which would be subject to water quality deterioration.

To fulfill CWA requirements embodied in the NPDES permitting process, for discharges of groundwater (dewatering) to the storm drainage system or directly to waters of the State (San Francisco Bay, Coyote Creek, Guadalupe River), Region 2 makes the following six points as the minimum level of compliance before written authorization to discharge is granted by the Region 2.[13]

[13] Brian Wines, Water Resources Control Engineer, Alameda-Santa Clara Watershed Section, California Regional Water Quality Control Board, San Francisco Bay Region, letter to Tom Fitzwater, VTA Environmental Planning Department, May 12, 2004.

1. The discharged water shall not exceed 110 percent of the ambient stream turbidity of the receiving water that the storm drain discharges to, if the receiving water is a flowing stream with turbidity greater than 50 NTU, or 5 NTU above ambient turbidity for ambient turbidities that are less than or equal to 50 NTU. If the storm drain discharges to a dry streambed, the discharged water shall not exceed 50 NTUs. Turbidity shall be monitored every 15 minutes during the first hour of operation of any sedimentation or filtration device used to meet the discharge limitation and once every two hours thereafter.
2. The pH of the discharged water shall be in the range of 6.5 to 8.5. pH shall be measured once per day of discharge.
3. A ~~lot~~ report of the monitoring results shall be maintained.
4. The discharge shall not cause pollution, contamination, or nuisance. The discharge shall cause no scouring or erosion at the point of discharge into the receiving water.
5. If a sheen is visible on the surface of the extracted groundwater, the groundwater shall be tested for petroleum hydrocarbons and Regional Board staff shall be notified immediately of the presence of the sheen. The groundwater shall not be discharged to the storm drain system until a treatment method has been approved by the Regional Board staff.
6. Self-Monitoring Reports shall be submitted no later than 30 days following the last day of each month in which the discharges occur. These reports shall summarize turbidity measurements, pH measurements, and approximate volumes of the discharges. An explanatory cover letter transmitting legible copies of field notes is an acceptable format for the self-monitoring reports.

The previous discussions of erosion/sedimentation control and storm-drainage system design provide documentation of the requirements to reduce the turbidity and capacity effects. The City of San Jose Water Policy Framework encourages the use of environmentally sensitive drainage improvements to ensure protection of surface water quality and stream integrity. To respond to City concerns and Region 2 requirements, the Project SWPPP will include guidelines for the use of such systems as easily cleanable sediment catch basins, debris screens, and grease separators or similar water quality protection devices in the drainage facilities serving the project (e.g., vegetated swales, buffer strips, a detention pond in a park, etc.), labeling storm drain inlets to educate the public about the water quality implications associated with dumping hazardous liquids and debris into receiving waters, and cleaning and/or sweeping of roadways on a regular and frequent basis during construction and operation of the project.

Each water-related aspect of the proposed project would be covered by regional or local regulations or policies that monitor and limit potential project effects on runoff volume and rate, erosion, groundwater recharge, and surface/groundwater quality linked to chemical constituents or turbidity. In addition, the proposed project is located in a highly urbanized

area, with construction occurring primarily within existing roadways and sidewalks. Consequently, implementation of the proposed project would result in a less-than-significant impact relating to water quality standards and waste discharge requirements.

*HYDRO-2. The proposed project would not substantially deplete water resources. (LTS)*

The Santa Clara-Alum Rock Corridor has no potential as a groundwater recharge zone because it already is paved and drains to the City's storm drainage system. Previous geotechnical investigations of the vicinity of the Corridor indicate groundwater at depths of about 20 feet below ground surface. Because project construction is expected to involve grading cuts and fills of between one and four feet, it is unlikely that groundwater would be encountered or dewatering would be necessary. Consequently, implementation of the proposed project in the Corridor would result in a less-than-significant impact regarding water resources.

*HYDRO-3. The proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. (LTS)*

The City maintains the storm drainage conduits in the vicinity of the Corridor; the SCVWD maintains the creeks. The existing conduits were designed to convey flows from the 3-year storm and, at selected locations, from the 10-year storm. Drainage within the Santa Clara-Alum Rock Corridor does, and would, discharge to the two creeks. As discussed in HYDRO-5 (below) the City's General Plan Flooding Policy 1 requires that new development be designed to provide protection from the 100-year flood as required by FEMA. The City's Storm Drain Policy requires that the combined flood-carrying capacity of the roads and the underground pipes must be adequate to contain 100-year flood flows. City Policy, in conformance with FEMA requirements, plans for the 100-year flood and requires that new construction provide protection from the 100-year flood. Implementation of the proposed project would not exceed the "capacity" portion of the HYDRO-3 threshold of significance because VTA will meet the FEMA standards (and, by extension, the City Policies).

As stated in HYDRO-1 (above) turbidity, spills, and urban constituents are required to be controlled during construction and operation of the proposed project. Thus, implementation of the proposed project would not exceed the "additional sources of polluted runoff" portion of this threshold of significance; therefore, this impact would be less than significant.

*HYDRO-4. The proposed project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site. (LTS)*

Implementation of the proposed project would replace existing predominantly impervious surfaces with new impervious surfaces. The vast majority of the Corridor is covered by impervious surfaces of existing roadways and adjacent developed areas. Implementation of the proposed project would create only a slight increase in the proportion of impermeable surfaces along the Corridor, increasing the runoff rate from the existing 36.1 cubic feet per second to 37.4 cubic feet per second after construction.[14]

Traditional designs for managing runoff emphasize maintaining the efficiency of conduits (i.e. pipes and channels) in transporting stormwater to downstream locations where the water can be released or stored, although this approach may limit opportunities for improving water quality. Small collection and infiltration strategies, located at the point where runoff initially meets the ground, repeated consistently over an entire project area, will yield the greatest runoff control and water quality improvements for the least cost.

The Bay Area Stormwater Management Agencies Design Guidance Manual provides methods that can be used to modify roadway, landscaping, and drainage facilities to incorporate design elements such as sediment traps, gravel strips and/or trenches, concave planting areas (vegetated swales), permeable substrate (pavement), and stormwater infiltration basins. This approach of detaining a portion of the stormwater generated by impervious surfaces so that the rate of stormwater leaving the site is equal to or less than existing conditions is advocated by Region 2.

VTA would comply with the Region 2 standards, and implementation of the proposed project would result in a less-than-significant impact relating to drainage patterns in the project area.

*HYDRO-5. The proposed project would not place within a 100-year flood hazard area structures that would impede or redirect flood flows. (LTS)*

Based on FEMA data, approximately 35 percent of the Santa Clara-Alum Rock Corridor is within the 100-year floodplain: about 7 percent crossing the Lower Guadalupe River is subject to about three feet of flooding, and about 27 percent east of Silver Creek is subject to about one foot of flooding. The City's General Plan Flooding Policy 1 requires that new development be designed to provide protection from the 100-year flood. The Storm Drain

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[14] The Rational Formula, Q=CIA, in which:
C = the average runoff coefficient (infiltration factor) of 0.2 for vegetated, open space and un-developed areas (3.0 acres) and 0.9 for impervious area including pavement, roofs, and sidewalks (64.0 acres);
I = the precipitation intensity of 0.62 inches per hour for a 10-year recurrence interval storm event (USGS *Suggested Criteria for Hydrologic Design of Storm-Drainage Facilities in the San Francisco Bay Region California*, Open-File Report, 1971);
A = the area in acres of each land use type.
$Q_{existing}$ = [(0.9) x (0.62) x (64.0)] + [(0.2) x (0.62) x (3.0)] = 36.1 cubic feet per second (cfs).
Assuming conversion of the 3.0 acres of undeveloped area to an impervious surface, yields:
$Q_{post\text{-}project}$ = [(0.9) x (0.62) x (64.0)]+[(0.9) x (0.62) x (3.0)] = 37.4 cfs.
The potential increase in surface runoff (associated with a 10-year storm) from the proposed project alignment would be approximately 1.3 cfs.

Policy (City of San Jose Design Guidelines for Storm Drains (December 1993), Section 3.01.01 b.) requires that "overland release conveyance for the 100-year frequency storm … comply with freeboard requirements," meaning that the combined flood-carrying capacity of the roads and the underground pipes must be adequate to contain 100-year flood flows. City Policy requires that new construction provide protection in flood-prone areas and that projects not contribute to the displacement of 100-year flood flows beyond the designated drainage ways. This policy reflects the FEMA standards, which VTA would meet. Consequently, implementation of the proposed project would result in a less-than-significant impact.

*HYDRO-6. The proposed project would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. (LTS)*

The discussion in HYDRO-4 (above) addresses methods listed in the Bay Area Stormwater Management Agencies Design Guidance Manual to control flooding. Implementation of these methods would avoid flooding hazards on or downstream from the Corridor. Consequently, implementation of the proposed project would result in a less-than-significant impact.

*HYDRO-7. The proposed project would not 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 preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted). (LTS)*

Construction of impervious surfaces along the Corridor would have little or no effect on infiltration to the water table. The Corridor has no potential as a groundwater recharge zone because it already is paved and drains to the City's storm drainage system. Although implementation of the proposed project would not reduce groundwater recharge, there remains the cumulative potential for adverse long-term effects on the quality groundwater through the reduction of the quality of the surface water available for infiltration to the water table. This potential effect would be reduced through the application of stormwater runoff management (both quality and rate) and erosion/sedimentation control as described in HYDRO-1, above. Therefore, impacts relating to depletion of groundwater supplies and interference with groundwater recharge would be less than significant.