5.15 WATER RESOURCES

5.15.1 INTRODUCTION

This section includes an analysis of the effects due to implementation of the BEP or SVRTP alternative. A discussion of project features, such as design requirements and best management practices, is also included. Incorporation of project features often avoids or minimizes adverse effects.

For all issues related to water resources, VTA has coordinated, and will continue to coordinate with the Alameda County Flood Control and Water Conservation District, Santa Clara Valley Water District, Alameda County Public Works Agency, Milpitas Department of Public Works, San Jose Department of Public Works, Santa Clara Department of Public Works, and other regulatory agencies to ensure the design of the BEP and SVRTP alternatives avoids or minimizes adverse effects to surface water resources, floodplains, and groundwater resources.

5.15.2 IMPACT DISCUSSION

Surface Waters

No Build Alternative

The No Build Alternative consists of the existing transit and roadway networks and planned and programmed improvements in the SVRTC (see Section 2.6, Related Projects, for a list of these projects). The No Build Alternative projects would likely result in effects to surface waters typically associated with transit vehicles and facilities and roadway projects. The projects would likely include best management practices to reduce pollutants from storm water runoff that are consistent with the SCVURPPP and ACCWP NPDES permits, the NPDES General Industrial Storm Water Permit, MS4 permits, and/or General Waste Discharge Requirements. Projects planned under the No Build Alternative would undergo separate environmental review to define effects to water quality.

BEP and SVRTP Alternatives

The BEP and SVRTP alternatives would be in an at grade configuration as the alignment crosses Agua Caliente Creek, Agua Fria Creek, Toroges Creek, Line B-1, Line B, Scott Creek, Calera Creek, Berryessa Creek, and Wrigley Creek. These alternatives would be in an aerial configuration as the alignment crosses Upper Penitencia Creek. The SVTRP Alternative only would pass under Lower Silver Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek, where no effects to surface waters are anticipated due to the depth of the tunnel, where the tunnel crown (top of the tunnel) would be greater than 20 feet below the creek beds. The tunnel would be at its

deepest when passing under the Guadalupe River to avoid a retaining wall that was constructed as part of the Guadalupe River Park and Flood Protection Project. At this location, the tunnel crown would be greater than 40 feet below the creek bed.

Effects to surface water quality could occur from polluted storm water runoff primarily associated with the station areas (especially the parking areas), park-and-ride lots, access roads, yard and shops sites (one under each alternative), and other sites that include impervious surfaces. Constituents of concern include oil, grease, total organic carbons, chloride, iron, nickel, and trace amounts of other heavy metals such as lead. Runoff from these areas would be directed to the local storm drain systems and eventually to receiving waters. To minimize any adverse effects on water quality due to storm water runoff, storm water inlets would include trash grates and maintainable silt traps, and inlet traps would be inspected at least annually and cleaned as required to maintain function. The outlet structures would provide for proper energy dissipation in accordance with standard specifications for storm drainage. Regular maintenance would include a program to clean curbside pavement areas of litter, fuel, and oil spills. The BEP and SVRTP alternatives would include best management practices to reduce pollutants from storm water runoff that are consistent with the SCVURPPP and ACCWP NPDES permits, the NPDES General Industrial Storm Water Permit, MS4 permits, and/or General Waste Discharge Requirements. During subsequent engineering phases, specifications and design detail drawings will be further developed to include Storm Water Prevention Pollution Plans and best management practices will be detailed on Water Pollution Control and Erosion Control plans.

The drainage system for the Newhall Yard and Shops facility includes two open detention basins. One detention basin would be located in the city of San Jose and would discharge to the storm drain along Newhall Street. The other detention basin would be located in the city of Santa Clara and would discharge to the storm drain along Brokaw Road. An underground storage basin consisting of either an array of pipes or underground storm water storage vault would also be located in Santa Clara for drainage areas at the station and tail track area. Detention basins serve to detain water temporarily to reduce peak discharges and then slowly release the water to the storm sewer system by gravity flow. Standard components of an open detention basin include the basin itself with designated side slopes, a safety fence, an inlet, a low flow outlet, an overflow outlet, and an emergency spillway. Upstream of each basin, a mechanism for removal of pollutants would be installed. Regardless of whether water is released to the storm sewer system through the detention basins or though direct discharge, compliance with applicable NPDES and/or MS4 permit requirements would be implemented and would include best management practices, such as swales and inlet filtration, to reduce pollutants from storm water runoff.

The BEP and SVRTP alternatives include several pump stations that collect groundwater seepage and/or rainwater at the lowest elevation points of the alignment, i.e. in the tunnel, in underground stations, in the retained cut segments, and underneath roadways that are reconfigured to pass under the alignment. In cases of emergency, pump stations also collect water discharged from fire hydrant valves. Discharge of the water collected by the pump station would be to either the storm sewer system or

sanitary sewer system and would comply with applicable NPDES and/or MS4 permit requirements and/or publicly owned treatment works pretreatment requirements to reduce pollutants.

The BEP and SVRTP alternatives would not contribute any detectable concentrations of diazinon or mercury to any watercourse in the SVRTC identified as impaired by the RWQCB pursuant to Section 303(d) of the federal Clean Water Act.

The BEP and SVRTP alternatives would not violate water quality standards or waste discharge requirements or provide substantial additional sources of polluted runoff. No mitigation is necessary.

Floodplains

No Build Alternative

The No Build Alternative consists of the existing transit and roadway networks and planned and programmed improvements in the SVRTC (see Section 2.6, Related Projects, for a list of these projects). The No Build Alternative projects would likely result in effects to floodplains typically associated with transit vehicles and facilities and roadway projects. The projects would be designed in accordance with regulatory requirements and agency criteria from FEMA, Caltrans, the Alameda County Flood Control and Water Conservation District Hydrology and Hydraulics Criteria, Santa Clara Valley Water District criteria and engineering guidelines, and the municipal codes of the local cities. Projects planned under the No Build Alternative would undergo separate environmental review to define effects to floodplains and to determine appropriate mitigation measures.

BEP and SVRTP Alternatives

The FIRMs and hydraulic analysis indicate that the BEP and SVRTP alternatives in Alameda County lie generally within areas that are not expected to be inundated by a 100-year flood event, except for some areas on the east side of the railroad corridor around Agua Caliente Creek and between Kato Road and Dixon Landing Road near Scott Creek and the county boundary. In Santa Clara County, approximately 30 to 40 percent of the railroad corridor is located within the base flood limits, with a significant portion in the floodplains of Berryessa, Upper Penitencia, and Coyote creeks.

The design criteria for the BEP and SVRTP alternatives require that the alignment be protected from 100-year design flows by improving or replacing the existing cross-drainage structures, installing underdrains under ballast in ballasted trackway, raising the BART track subgrade above the computed base flood elevation, or constructing flood walls. The raised tracks and drainage facilities should not exacerbate flooding upstream and downstream from the railroad corridor for floods up to and including the 100-year design flow. Cross-drainage structures should be designed in a way that the design flow can be conveyed through BART facilities. The retained cut sections, retained fill sections, station entrances, and access points should maintain 6-inches to

1-foot of freeboard above the base 100-year flood elevation, as required. In addition, the location of electrical, communication, and other critical facilities such as traction power substations, gap breaker stations, train control buildings, and vent shaft openings, must be above the 500-year floodplain elevation. Where the locations of critical facilities are not above the 500-year floodplain elevations, the facilities would be raised above the 500-year floodplain level.

The design criteria for the BEP and SVRTP alternatives related to floodplains are derived from regulatory requirements and agency criteria from FEMA, Caltrans, BART, the Alameda County Flood Control and Water Conservation District Hydrology and Hydraulics Criteria, Santa Clara Valley Water District criteria and engineering guidelines, and the municipal codes of the local cities. These are described in detailed in the technical reports that support this section.

The BEP and SVRTP alternatives would not construct all the drainage improvements required along the railroad corridor to address flooding, as several projects are planned and/or programmed (funded) to address design flow and flooding conditions. The objective of these projects is to upgrade the creek channels to contain the design flows within the channel. Once completed, these projects will eliminate flooding in the areas of improvements, which include the SVRTC. These projects include:

- **Freight Railroad Relocation and Lower Berryessa Creek Project.** This project includes drainage improvements on Toroges Creek, Line B-1, Line B, Scott Creek, Calera Creek, Berryessa Creek, and Wrigley Creek to accommodate design flow and water surface elevations from a 100-year flood event. These improvements are planned and programmed for construction in 2009 and 2010, prior to construction of either the BEP or SVRTP alternative. These improvements are discussed in the *Freight Railroad Relocation and Lower Berryessa Creek Project – Initial Study with Mitigated Negative Declaration* (September 2007) and the addendums to this document.

- **Warren Avenue/Union Pacific Railroad Grade Separation and Mission/Warren/Truck Rail Program.** The Warren Avenue/Union Pacific Railroad Grade Separation Project includes relocating Agua Fria Creek to accommodate the new Warren Avenue underpass and constructing drainage improvements to convey the 100-year design flow. The grade separation project is included in a Statutory Exemption (Title 14, Section 15282(h) of the California Code of Federal Regulations and Section 21080.13 of the Public Resource Code) filed in July 2002 by the City of Fremont. The first phase of the work at Agua Fria Creek to relocate the downstream portion of the channel was constructed by Caltrans as part of the I-880/Mission Boulevard (Route 262)/Warren Avenue Interchange Reconstruction and I-880 Widening Project. The Mission/Warren/Truck Rail Program includes construction of the second and final phase of the remaining improvements at Agua Fria Creek, and is planned and programmed to be complete by 2010.

- **Berryessa Creek Flood Protection Project.** The Santa Clara Valley Water District is planning the Berryessa Creek Flood Protection Project within the SVRTC to increase the conveyance capacity of the creek to convey the 100-year design flow and to remove areas in Milpitas and San Jose from the 100-year floodplain. The project is divided up into the joint Santa Clara Valley Water District/U.S. Army Corp of Engineers Berryessa Creek Project and the Lower Berryessa Creek Project (AKA Berryessa Creek Levees Project). The joint Santa Clara Valley Water District/U.S. Army Corp of Engineers Berryessa Creek Project begins at Calaveras Boulevard in Milpitas and ends at Old Piedmont Road in San Jose. The Lower Berryessa Creek Project begins at the confluence with Lower Penitencia Creek in Milpitas and ends at Calaveras Boulevard. This project includes improvements on Calera Creek to prevent flooding upstream of the railroad corridor. Upon completion of these projects, flooding from overflow of Berryessa Creek within the SVRTC would be eliminated, including along the alignment, at the Milpitas Station area, and around East Penitencia Channel. It should be noted that the Freight Railroad Relocation and Lower Berryessa Creek Project discussed above includes construction of the improvements at Berryessa Creek (a multi-cell box culvert) within the railroad ROW that are part of the larger Lower Berryessa Creek Project.

- **Upper Penitencia Creek Flood Protection Project**. The Santa Clara Valley Water District and Army Corp of Engineers are studying various alternatives to reduce the flooding potential along Upper Penitencia Creek from Coyote Creek to Dorel Road in San Jose. Among the alternatives being studied are widening of the existing channel and constructing an underground bypass channel box structure on Upper Penitencia Creek to convey high creek flows directly to Coyote Creek. With implementation of this project, Upper Penitencia Creek would be able to convey the design flows without overtopping the banks near the Berryessa Station area. This project also would eliminate the floodplains around the railroad corridor.

- **Lower Silver Creek Flood Protection Project.** The Lower Silver Creek Flood Protection Project, currently under construction, provides flood protection along an approximately 4.4 mile long channel reach between Cunningham Avenue and Coyote Creek. Reaches 1 and 2 are located at the confluence with Coyote Creek and McKee Avenue. Reach 3 is located between McKee Avenue and Cunningham Avenue. The construction of Reaches 1 and 2 is complete, near the Las Plumas Yard Option site, and the channel in the vicinity of US 101 is wide and the banks are protected with gabions where necessary. This project eliminates the 100-year floodplains along the railroad corridor in this area, at the Las Plumas Yard Option site under the BEP Alternative, and at the east tunnel portal and Alum Rock Station area under the SVRTP Alternative. This project eliminates the 500-year floodplain for both the critical facilities at the Las Plumas Yard Option site and the east tunnel portal.

- **Mid-Coyote Creek Flood Protection Project**. The Mid-Coyote Creek Flood Protection Project is located in the central portion of the Coyote Watershed. Its limits extend approximately 6.1 miles in San Jose between Montague Expressway and I-280. The purpose of this project is to increase the conveyance capacity of

Coyote Creek to provide flood protection to homes, schools, businesses, and highways from a 100-year flood event, and would reduce the likelihood of flooding issues associated with Berryessa Station.

VTA will coordinate with appropriate agencies to obtain updated information on the progress of these projects. In the event that any of these flood protection projects, which eliminate the 100-year floodplains within the BEP and SVRTP alternative areas, is not implemented on schedule, additional hydrologic and hydraulic studies will be prepared during subsequent engineering phases. The design criteria, as discussed above, would be incorporated into the BEP and SVRTP alternatives to ensure that the BART trackway and facilities are protected from the 100- or 500-year flood event, as required, and these alternatives do not exacerbate flooding or change local flooding conditions in the SVRTC. For example, if the flood protection projects on Berryessa and Upper Penitencia creeks were not in place or under construction by the time the BEP or SVRTP alternative was operational, the BART trackway would act as a barrier to the east-west flood flows, except where roads cross the tracks near Milpitas Station, including Montague Expressway, the extended East Milpitas Boulevard, North Capitol Avenue, and Trade Zone Boulevard. The limited road crossing widths (approximately 500 feet) would result in raising floodplain elevations. Therefore, drainage structures or siphons may be required under the BART tracks to minimize the rise in floodplain elevations, and the capacity of the drainage entering East Penitencia Channel may need to be enlarged. In addition, the increase in the base flood elevations would require parapets of the retained cut U-walls to be raised above the base floodplain elevation. Flood proofing may also be needed to the Milpitas Station facilities and some nearby existing structures. Details of such design requirements would be determined with additional analysis, if required.

While the flood protection projects listed above would resolve flooding issues at several creek crossings along the railroad corridor and other project areas, some locations would require improvements as part of BEP or SVRTP alternative to ensure design flow and flooding conditions are addressed.

The SVRTP alternative ROW would extend approximately 60 to 80 feet into the Agua Caliente Creek/Line F floodplain, which would encroach on approximately 24,000-32,000 square feet of floodplain area. Assuming an average 1.5 feet flood depth, floodplain volume would be reduced by approximately 36,000-48,000 cubic feet in this area, which would either result in increasing the extent of the floodplain or flooding downstream of the railroad corridor. To address this encroachment, the BART tracks would be raised and the cross drainage structure under the railroad corridor would be upgraded to include construction of a series of cross-drains that would prevent floodwaters from backing up on the east side of the corridor. Also, the existing box culvert would be upgraded to contain the design flows. Upon the completion of these upgrades, the 100-year flood elevation will be maintained at a lower or similar elevation compared to the existing floodwater elevation.

The Alum Rock Station area is in both the 100- and 500-year floodplain of Coyote Creek. Therefore, the at grade portions of the station area and the critical facilities would be designed to be 2 feet above the existing ground to prevent flooding during the 500-year flood. The 100-year flood flows are contained within the Guadalupe River with the flood improvement project now in place. However, for the 500-year flood, the river overflows its banks towards the east along West Santa Clara Street. Since West Santa Clara Street slopes away from the Guadalupe River, flooding would flow toward the Market Street Station but would not reach the station area. The Diridon/Arena Station is outside the 100- and 500-year floodplain of the Guadalupe River and Los Gatos Creek. The west tunnel portal, Newhall Yard and Shops site, and the Santa Clara Station are within a 100-year floodplain due to overland flow. A retaining wall would surround the tunnel portal to protect it from inundation during a flood. The Newhall Yard and Shops site and the Santa Clara Station, both which include critical facilities, would be designed to prevent flooding during the 500-year flood.

The BEP and SVRTP alternatives would add impervious surfaces at the station areas, access roads, yard and shops sites, and other facility sites that could result in an increase in the volume of storm water runoff to the storm drain system or directly into the creeks. In general, the increase in impervious surfaces compared to existing conditions would be limited, as most of the SVRTC is already developed, and the amount of new impervious surfaces would not produce runoff volumes that would exceed the capacity of existing or planned drainage systems. However, any new areas could concentrate and redirect flows that may result in onsite flooding. BART Design Criteria require that drainage systems that collect runoff from the BEP and SVRTP alternatives be designed to convey the surface flow generated by a 10-year storm event or to the minimum requirements of the cities, whichever is greater. As described above, the BEP and SVRTP alternatives would include best management practices to reduce pollutants from storm water runoff that are consistent with the SCVURPPP and ACCWP NPDES permits, the NPDES General Industrial Storm Water Permit, MS4 permits, and/or General Waste Discharge Requirements.

The BEP and SVRTP alternatives would not expose people or structures to the risk of flooding, create floodplains, or result in increase in the base flood elevation. Natural and beneficial floodplain values would not be affected by these alternatives. The BEP and SVRTP alternatives would not create or contribute runoff that would exceed the capacity of existing or planned drainage systems. No mitigation is necessary.

Groundwater

No Build Alternative

The No Build Alternative consists of the existing transit and roadway networks and planned and programmed improvements in the SVRTC (see Section 2.6, Related Projects, for a list of these projects). The No Build Alternative projects could result in effects to groundwater associated with transit vehicles and facilities and roadway projects. The projects could be designed to facilitate groundwater recharge, if

necessary, through engineered methods that either reduce the hardscape or otherwise allow for infiltration. Projects planned under the No Build Alternative would undergo separate environmental review to determine effects to groundwater.

BEP and SVRTP Alternative

The increase in impervious areas at the stations and other project sites compared to existing conditions would be limited, as these sites are already developed, and would have minimal adverse effect on groundwater recharge. However, to facilitate groundwater recharge, if necessary, engineered methods that either reduce the hardscape or otherwise allow for infiltration would be included in the project.

The retained cuts and tunnel bores will be designed in accordance with BART Design Criteria to resist anticipated hydrostatic pressures and buoyant forces. These criteria include factors of safety against flotation.

Groundwater flow directions and pathways may be affected by the retained cut U-walls, tunnel structure, and underground stations, potentially causing the diversion of the normal flow of groundwater, the mounding of groundwater up-gradient of these facilities, or the rise of the water table. To minimize these adverse effects at the retained cut locations, highly permeable gravel channels and/or slotted PVC pipes would be constructed directly beneath the U-wall sections where needed to allow water to be routed underneath the U-wall. Mounding of groundwater up-gradient of the tunnel structure is not anticipated, as the tunnel would be constructed at a minimum depth of 20 feet below ground surface at the tunnel crown (top of tunnel), which is below the water table in the San Jose area at approximately 15 feet below ground surface. Therefore, groundwater would be able to flow above and below the tunnel structure. Highly permeable gravel channels placed in select locations above the tunnel would facilitate drainage, as well as along cut and cover stations if any fill material placed during construction does not provide adequate permeability. During subsequent engineering phases, additional hydrogeological studies will be conducted. The result may find that the permeable pathways are unnecessary and that no effect to groundwater is anticipated.

Dewatering inside the retained cuts, underground stations, and tunnel may be necessary during the operation of the BEP and SVRTP alternatives to keep these facilities dry. The total quantity of water removed is anticipated to be minimal (the retained cuts and underground stations would be designed to prevent water intrusion and the tunnel would be sealed) and no detectable changes to the groundwater supply would occur.

The BEP and SVRTP alternatives would not affect groundwater supply, and would have minimal effects on groundwater recharge. The BEP and SVRTP alternatives would not alter groundwater flow directions and pathways. No mitigation is necessary.

5.15.3 CUMULATIVE IMPACTS

Surface Waters

The projects included in the No Build Alternative and other projects planned in the BEP and SVRTP alternative areas would be subject to the federal, state, and local requirements related to surface water resources. NPDES permits issued that authorize construction and/or operations will require implementation of short- and long-term best management practices to avoid or minimize any adverse effects on water quality due to storm water runoff. Many projects would also be subject to MS4 permits and/or General Waste Discharge Requirements.

The City of Fremont, County of Alameda, and the Alameda County Flood Control and Water Conservation District participate in the Alameda Countywide Clean Water Program. The program includes a Storm Water Quality Management Plan that consists of a joint plan and individual plans by participating jurisdictions to reduce storm water pollution. Similarly, the cities of Milpitas, San Jose, Santa Clara, County of Santa Clara, and the Santa Clara Valley Water District participate in the Santa Clara Valley Urban Runoff Pollution Prevention Program. The program includes an Urban Runoff Management Plan to reduce storm water pollution. Both the Storm Water Quality Management Plan and the Urban Runoff Management Plan serve as the basis of the NPDES permits issued to these programs. New and redevelopment projects are subject to requirements to ensure compliance with these permits.

The BEP and SVRTP alternatives would not violate water quality standards or waste discharge requirements or provide substantial additional sources of polluted runoff. Substantial adverse cumulative effects are not anticipated and mitigation is not required.

Floodplains

The projects included in the No Build Alternative and other projects planned in the BEP and SVRTP alternative areas would be subject to the regulatory requirements and agency criteria from the Federal Emergency Management Agency, Alameda County Flood Control and Water Conservation District, Santa Clara Valley Water District, and the municipal codes of the local cities. To address known design flow constraints and flooding issues, projects are planned and/or programmed (funded) on several creeks within the BEP and SVRTP alternative areas, as well as upstream and downstream. These are described in Section 5-15.2. Once completed, these projects will eliminate flooding in the areas of improvements. However, the BEP or SVRTP alternative would require improvements at some locations to ensure design flow and flooding are addressed. Substantial adverse cumulative effects are not anticipated and mitigation is not required.

The BEP and SVRTP alternatives are located in a highly urbanized area where very few vacant lots remain to be developed that would add large areas of impervious surfaces. Nevertheless, the alternatives will add some impervious surfaces at the station areas, access roads, yard and shops sites, and other facility sites that could result in an

increase in the volume of storm water runoff to the storm drain system or directly into the creeks. This may or may not be the case with projects under the No Build Alternative and other projects planned in area. For the BEP and SVRTP alternatives, the amount of new impervious surfaces would not produce runoff volumes that would exceed the capacity of existing or planned drainage systems. BART Design Criteria require that drainage systems that collect runoff from the BEP and SVRTP alternatives be designed to convey the surface flow generated by a 10-year storm event or to the minimum requirements of the cities, whichever is greater. Other projects would also have to address runoff volumes that do not exceed the capacity of existing or planned drainage systems and that meet requirements of the cities or other jurisdictional authority. Substantial adverse cumulative effects are not anticipated and mitigation is not required.

Groundwater Resources

The BEP and SVRTP alternatives would not affect groundwater supply, and would have minimal effects on groundwater recharge. To facilitate groundwater recharge, if necessary, engineered methods that either reduce the hardscape or otherwise allow for infiltration would be included in the BEP and SVRTP alternatives. The BEP and SVRTP alternatives would not alter groundwater flow directions and pathways. Therefore, these alternatives would not contribute to a cumulative effect on groundwater resources. Mitigation is not required.