Chapter 9—Hydrology and Water Quality

9.1 Introduction

This chapter describes the existing surface-water and groundwater hydrology, use, and quality; and the potential for erosion and flooding in the Project Area. It also describes the potential impacts from development and operation of the Project on surface-water and groundwater quality and hydrology. With implementation of the recommended mitigation measures, construction and operation of all phases of the Project are expected to have less-than-significant impacts on hydrology and water quality.

9.1.1 Methodology

Surface water and groundwater in the Project Area were investigated by reconnaissance-level field surveys (May 8 and August 7 through 9, 2002), review of studies completed by and for state and local water agencies, and by obtaining information from city, county, regional, and state water agencies. The potential impacts of the Project on surface water and groundwater were evaluated by considering the initial construction activities and the long-term operation of the proposed transition station, transmission lines, and modified substations. PG&E will comply with all applicable federal, state, and local regulatory requirements that protect surface water and groundwater.

Areas of existing soil and water quality degradation were identified by searching federal and state regulatory-agency databases that track sites with known, suspected, or potential hazardous-substance contamination (e.g., underground storage tanks or landfills). The results of the database search are provided in Chapter 11, Hazards and Hazardous Materials.

9.2 Existing Conditions

9.2.1 Watersheds and Regulatory Issues

The proposed Project is located within several adjoining watersheds, as shown in Figure 9-1. The northern portion of the Project Area is in the Visitacion Valley Watershed; the southern portion is in the Guadalupe Valley, Colma Creek, and San Mateo Creek Watersheds. The San Mateo Creek Watershed includes the Upper and Lower Crystal Springs reservoirs and San Andreas Reservoir, all of which are paralleled by the preferred alternative for Segment 1 (Jefferson / San Bruno Overhead / Underground [OH / UG]). All of the watersheds drain into the San Francisco Bay Regional Water Quality Control Board (RWQCB) South Bay Basin, which encompasses the northeastern San Mateo Peninsula and much of the East Bay. The major creeks in the South Bay Basin are San Mateo and Colma Creeks.

A portion of the San Mateo Creek Watershed, which includes Upper Crystal Springs, Lower Crystal Springs, and San Andreas reservoirs, is also located in the San Francisco Public Utilities Commission's (SFPUC) 23,000-acre Peninsula Watershed. The Peninsula Watershed

is denoted by the property boundary of the SFPUC's lands surrounding the reservoirs and Pilarcitos Reservoir to the west, and contains almost all of the land draining into the reservoirs. The reservoirs form part of the SFPUC's Hetch-Hetchy system, which serves as a reliable supply of high-quality potable water for Bay Area homes and businesses. As a result of its water collection and storage use, the watershed has been protected from urbanization, and the watershed lands serve as a state fish and game refuge.

The Water Supply & Treatment Division of the SFPUC has the primary responsibility for storage, maintenance, quality control, and distribution of local drinking water supplies. The RWQCB serves as the primary regulatory agency establishing water-quality objectives and standards. San Mateo County establishes policies for protection and management of water supply.

Applicable federal, state, local, and county requirements are described subsequently.

9.2.1.1 Federal and State Requirements

Section 404 Permits

The fill and dredging of waters in the United States (including wetlands) are subject to U.S. Army Corps of Engineers (Corps) jurisdiction under Section 404 of the Clean Water Act (CWA). The limits of nontidal waters extend to the Ordinary High Water (OHW) line, defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics such as a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter or debris, or other appropriate means. In general, ditches excavated on dry land that do not convey flows from historical streams are considered nonjurisdictional. Final status of jurisdiction is determined by the Corps on a case-by-case basis. A Section 404 permit would be required for Project construction activities involving excavation or placement of fill material into U.S. waters. A Water Quality Certification or Waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions from the RWQCB.

Streambed Alteration Agreements

Sections 1600-1603 of the California Department of Fish and Game (CDFG) Code protect the natural flow, bed, channel, and bank of any river, stream, or lake (designated by the CDFG) in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. General Project plans must be submitted to CDFG that are sufficient to indicate the nature of a Project for construction if the Project would:

- Divert, obstruct, or change a streambed
- Use material from the streambeds
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream

The CDFG Code requires completion of formal notification and subsequent agreements, including mitigation measures, prior to initiating such construction activities.

INSERT FIGURE 9-1
Surface Waterbodies and Watersheds

INSERT FIGURE 9-1
Surface Waterbodies and Watersheds

Stormwater Pollution Prevention Plan (SWPPP)

The RWQCB implements water-quality regulations under the Federal CWA and the State Porter-Cologne Act. The regulations require compliance with the National Pollutant Discharge Elimination System (NPDES). Construction activities for this Project would need to comply with the California Stormwater NPDES General Construction Permit for discharges of stormwater runoff associated with construction activity. The Project applicant must submit a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB) to be covered by the State's General Permit for construction activities or negotiate a Project-specific Stormwater NPDES permit with the RWQCB prior to initiating construction. Because the area of construction is greater than 5 acres, the General Permit for construction requires the implementation of a Stormwater Pollution Prevention Plan (SWPPP), which must be prepared before construction begins. The SWPPP will include:

- Specifications for best management practices (BMPs) that will be implemented and maintained during Project construction to minimize the potential for accidental releases of potentially hazardous materials and to minimize runoff from the construction areas, including storage, maintenance, and building materials laydown areas
- A description of a plan for communicating appropriate work practices to field workers
- A plan for monitoring, inspecting, and reporting any release of hazardous substances

During construction, the RWQCB will oversee and inspect the Project for the SWRCB.

9.2.1.2 Local Requirements

San Mateo County Flood Control District

The San Mateo Flood Control District serves as the governing body to control and conserve storm and flood waters, prevent waste or exportation of water, and retain drainage, storm, flood, and other waters for beneficial use in the district. The flood district's jurisdiction covers all of San Mateo County, which is divided into three main flood-control zones: Colma Creek Flood Control Zone, San Bruno Flood Control Zone, and the San Francisquito Flood Control Zone. The district is managed by the San Mateo County Board of Supervisors.

San Mateo County

Water quality for San Mateo County is managed by the RWQCB and the SFPUC. The SFPUC monitors water quality at a network of stream stations, supply wells, and pipeline facilities in the Project vicinity. Water-quality protection and water-supply management measures for the SFPUC's lands in the Peninsula Watershed are found in the *SFPUC Draft Peninsula Watershed Management Plan, April 1998* (SFPUC 1998).

Within San Mateo County, boundaries are approximately 30 municipalities that must adhere to the water-quality standards and flood-control measures set forth by the RWQCB and the County. In the Project Area, these municipalities include the cities of Burlingame, Colma, Daly City, Hillsborough, Millbrae, San Bruno, and South San Francisco. To adhere to these regulations, the municipalities rely on the goals and objectives set forth in the *San Mateo County 1986 General Plan* (San Mateo County 1986) and the *San Francisco Bay Basin Plan* (RWQCB 1995a).

9.2.2 Precipitation and Infiltration Rates

As a result of its proximity to the Pacific Ocean, the South Bay Basin is strongly influenced by a coastal climate, with ocean fog particularly persistent along the ridgelines in the northern half of the basin. The mean annual precipitation in the Project Area is approximately 20 to 25 inches, generally occurring between November and April. The vast majority of precipitation in the region is rain. Runoff is rapid from the hills and slow across the alluvial plains, with precipitation draining into the San Mateo, Colma, and Flume creeks, and many other ephemeral creeks (USDA Forest Service 2002).

Runoff in the Peninsula Watershed provides 5 to 10 percent of the total supply of the local water system. The catchment area for the Crystal Springs Reservoir is 22.5 square-miles, and the reservoir storage area has a maximum capacity of 58,400 acre-feet. The San Andreas Reservoir catchment area is 4.4 square-miles, and the reservoir storage area has a maximum capacity of 19,000 acre-feet.

The smaller Colma Creek, Guadalupe Valley, and Visitacion Valley watersheds have similar precipitation and climate characteristics. Local creeks in urbanized areas are highly channelized; runoff into these channels, both above and below ground, is managed as part of the stormwater system. Colma Creek has a high degree of channelization, approximately 63 percent, the highest in San Mateo County (Daly City 2002).

9.2.3 Surface Water Bodies

9.2.3.1 Creeks

Significant creeks in the Project Area include Colma, Flume, and San Mateo creeks. Colma Creek lies in the northern portion of the Project Area. The watershed for Colma Creek includes portions of San Bruno Mountain as well as urbanized areas of Daly City, Colma, and South San Francisco. Most of this urbanized creek is either channelized or routed underground to allow for the development of urban structures. The 12-Mile Creek also crosses the proposed transmission-line alignment south of Chestnut Avenue, near milepost 2.0 of Segment 2. Colma Creek ultimately drains into San Francisco Bay.

Guadalupe Canyon, which lies within the Guadalupe Valley watershed, is east of the Project Area between Visitacion Valley watershed and Colma Creek watershed. Guadalupe Canyon drains from west to east into the San Francisco Bay.

San Mateo Creek generally flows west to east, with the Crystal Springs Dam (described below) controlling flow that enters San Mateo Creek from Crystal Springs Reservoir. Flume Creek, which drains a portion of the San Mateo Creek watershed, is a permanent body of water that flows south from the San Andreas Reservoir to the Crystal Springs Dam. San Mateo Creek also captures urban stormwater runoff.

Other small creeks in the urbanized portions of the Project Area have been channelized and / or placed underground for flood control for most of their lengths, ultimately draining into San Francisco Bay. Approximately 23 swales, ditches, and intermittent creeks; 9 seasonal wetlands; and 2 freshwater marshes supplied by precipitation runoff and springs are located along the proposed Project alignment, especially along Segments 1 and 5. These features drain into Crystal Springs Reservoir and San Andreas Reservoir, or San Francisco Bay.

9.2.3.2 Reservoirs, Ponds, and Wetlands

Upper and Lower Crystal Springs Reservoirs

Crystal Springs Reservoir, consisting of the Upper and Lower Reservoirs, is situated 13 miles south of San Francisco. The reservoir is nine miles long and 122 feet deep at its deepest point. Formed by the damming of the San Mateo Creek in 1888, the reservoir waters cover portions of early Spanish ranchos, including Cañada de Raymundo, de las Pulgas, Feliz, and San Mateo. The reservoir holds 22.6 billion gallons of water for delivery to San Francisco and various cities and towns on the northern peninsula. Approximately 5 to 10 percent of the water reservoirs' water supply is the result of local precipitation. The vast majority of the water is unfiltered and has been piped through the Hetch-Hetchy Aqueduct, from a reservoir system in the Sierras, to the Pulgas Water Temple just south of Upper Crystal Springs Reservoir. The quality of water pumped from Hetch-Hetchy is generally excellent. The supply has been granted numerous annual exemptions from EPA water-filtration regulations, most recently in 2001 (SFPUC 2001). The reservoirs may also be used to store water from the SFPUC's Alameda Watershed in the East Bay.

The Crystal Springs Dam is 600 feet long and 154 feet high, and has been designated a California Historical Civil Engineering landmark for withstanding the 1906 earthquake. This Dam is on Lower Crystal Springs Reservoir, and controls releases to San Mateo Creek. A previous dam, also called Crystal Springs Dam, separated the Upper and Lower Reservoirs. It was constructed in 1867. The original dam is no longer used to hold water, but supports the roadbed of State Highway 92 as it crosses between the reservoirs (SFPUC 1998).

San Andreas Reservoir

San Andreas Reservoir is a "sag pond" that was naturally formed in the valley of the San Andreas fault. The strike-slip fault creates a low spot to collect water and grinds up the rock underneath, making an impermeable layer that holds water. The San Andreas Reservoir, in addition to the Crystal Springs Reservoir, holds water supply for the City of San Francisco. Water supplied to the San Andreas Reservoir comes from runoff in its 4.4-square-mile watershed and from the Hetch-Hetchy system. Raw water from Hetch-Hetchy is conveyed in pipelines under the southern part of San Francisco Bay and up the San Francisco Peninsula. Most Hetch-Hetchy water supplied to the San Andreas Reservoir bypasses the Crystal Springs Reservoir via the Crystal Springs Bypass Tunnel off the Pulgas Portal Tunnel. The water is then pumped through the Crystal Springs Pumping Station and is processed in the Tracy Water Treatment Plant before it is sent on to the peninsula transmission mains for delivery to San Francisco and northern-peninsula communities. Water also enters the reservoir through rainfall runoff (approximately 5 to 10 percent of the supply).

Ponds and Wetlands

Natural depressions accumulate runoff and hillslope seepage during wet periods, forming intermittent streams and seasonal ponds. Wetlands are in the Project Area adjacent to some of the surface water bodies, and near isolated springs. Chapter 6, Biological Resources, describes these wetland areas in more detail and lists the locations of pertinent seasonal streams and ponds.

9.2.4 Stormwater Management System and Flooding Potential

Urbanized portions of the Project Area have flood-control channels and piped storm-drain systems to contain and direct stormwater runoff associated with impervious surface areas, such as roads and buildings. Most of these pipes and channels feed stormwater runoff to the largest of the natural creeks, which have been partially improved to accommodate flood flows. Storm-drain systems are typically maintained by the cities. In the less densely populated portion of the Project Area in Segment 1, precipitation that exceeds infiltration rates flows over the ground surfaces toward natural swales or channels.

The Federal Emergency Management Agency (FEMA) has mapped areas subject to flooding for portions of the Project Area, primarily low-lying areas in northeastern San Mateo County. FEMA's mapped areas do not include most of Segment 1. Figure 9-2 shows 100-year-flood boundaries in the Project Area, as mapped by FEMA. In this figure, areas of localized roadway flooding during heavy rains and/or high tides are shown. Based on a review of the available FEMA maps, only one of the proposed underground transmission-line segments is situated in a floodplain area. Segment 2 (San Francisco Bay Area Rapid Transit [BART] South UG Segment) runs north to south along Huntington Avenue and traverses the Colma Creek floodplain at the Huntington Avenue/South Spruce Avenue intersection, as shown on Figure 9-3. Based on this information, there is the potential for flooding in Segment 2. Local general plans showing flood-prone areas (other than the dam-failure inundation area described below) indicate no overlap with proposed overhead transmission-line locations.

9.2.5 Dam Failure Inundation Area

To help local jurisdictions develop evacuation plans for areas below dams, the State Office of Emergency Services (OES) and the California Department of Water Resources (DWR) have identified areas of potential inundation in the event of dam failures throughout California; they have estimated when flood waters would arrive at downstream locations, should a dam failure occur. Projected inundation limits are approximate and assume severe hypothetical failures; thus, the limits encompass all potential flooded areas in the improbable occurrence of dam failure. The City of San Mateo cites the failure of Crystal Springs Dam, located on San Mateo Creek, as a potential flood threat to the city's western edge. Also, if a large release or overflow of water from the reservoir occurred, a significant portion of Hillsborough would lie in the resulting dam inundation area. See Figure 9-2 for the approximate location of the dam-failure inundation area, and Figure 9-4 for more detail on the dam and tower locations. A review of the USGS San Mateo Quadrangle Topographic Map indicates that the spillway for Crystal Springs Dam is situated at an elevation of 284 feet above mean sea level (msl), which is lower than the proposed transmission-line-tower base elevations. No other portions of the proposed Project, including the transition station, lie within the predicted inundation area. In addition, the existing transmission line spans San Mateo Creek in approximately the same location as the proposed transmission line, with existing towers located in approximately the same place as the proposed towers.

9.2.6 Surface Water Quality

Water quality objectives for surface water in the Project Area are described in the *San Francisco Bay Region Basin Plan* (RWQCB 1995a). The plan establishes narrative and numerical water-quality objectives to protect existing and potential beneficial uses of surface water.

INSERT FIGURE 9-2A
Floodplains and Dam Inundation

INSERT FIGURE 9-2B
Floodplains and Dam Inundation

INSERT FIGURE 9-3A
Colma Creek Floodplain

INSERT FIGURE 9-3B
Colma Creek Floodplain

INSERT FIGURE 9-4A
Dam Failure Inundation Area

INSERT FIGURE 9-4B
Dam Failure Inundation Area

Most streamflow in creeks along the proposed Project alignment originates as stormwater runoff. In the more urbanized portions of the proposed Project alignment (primarily Segments 2, 3, and 4), stormwater runoff carries urban pollutants generated by residential, commercial, industrial, and transportation land uses. These pollutants include oil and grease, heavy metals, pesticides, and debris. Although some of these contaminants percolate in the streambed, most of them are discharged directly into the Bay, adding to the Bay's overall pollutant load. In the less urbanized and open-space areas along the proposed Project alignment (primarily Segments 1 and 5), water quality in creeks is relatively higher because of the adjacent land use and lower pollutant-loadings in stormwater runoff. This is especially true for stormwater runoff within the SFPUC Peninsula Watershed, which is protected from development and other activities that could negatively affect water quality in San Andreas and Crystal Springs Reservoirs. Consequently, surface-water quality varies by creek depending on local activities.

9.2.7 Groundwater Hydrology, Use, and Quality

The San Francisco Bay Basin can be characterized as a bedrock-rimmed, sediment-filled bowl. However, geologic conditions and the character of groundwater in the basin are variable. The near-surface sediments underlying the Project site consist of silty sands, sandy gravels, and clays at the higher elevations, and grade to clays and silts in the lower lying areas. Portions of the Project are located over three groundwater basins: the Visitacion Basin; the Westside Basin; and the San Mateo Plain. Groundwater throughout the Project Area is generally found at depths greater than 30 feet; however, occasional undefined and discontinuous shallow-perched water zones have been encountered at lower elevations within the Project Area, including those adjacent to local recharge sources (surface-water bodies) or springs.

Groundwater basins in the Project Area are depicted in Figure 9-5. The Project's underground alignments that have the potential to affect groundwater lie within the Westside Basin and the southern portion of Visitacion Basin in the city limits of San Bruno, South San Francisco, Colma, Daly City, Millbrae, and Brisbane. In particular, perched water in the vicinity of the preferred alignment for Segment 2 (BART South UG Alternative) has been encountered at a depth of 5 feet below grade during subsurface investigations for other projects in that area (Gregg Drilling 2002).

9.2.7.1 Visitacion Valley Groundwater Basin

Visitacion Valley Groundwater Basin encompasses approximately 800 acres in the City and County of San Francisco (CCSF) and 4,300 acres in San Mateo County. It overlaps the northernmost edge of the Project Area, just south of Candlestick Point. A large portion of the rock at land surface is bedrock. Much of the remaining land surface is created by an artificial-fill deposition on Bay Mud. Unconsolidated sediment thicknesses range from zero to 200 feet. Groundwater in the Visitacion Valley Basin is currently used for industrial and commercial purposes; however, potential beneficial uses include municipal, domestic, and agricultural water supply (RWQCB 1995a). Monitoring well data indicates that concentrations of TDS, chloride, and nitrate in the Visitacion Valley Groundwater Basin meet the primary or secondary drinking water standards (CCSF 1996).

9.2.7.2 Westside Groundwater Basin

The Westside Groundwater Basin has provided a reliable source of water for municipal and irrigation uses for more than a century. The basin underlies parts of San Francisco and

northern San Mateo County, including the cities of San Francisco, Daly City, South San Francisco, Colma, San Bruno, Millbrae, and parts of Burlingame and Hillsborough (Westside Basin Partners 1999).

The elevation difference between the ground surface and basal bedrock defines the aquifer thickness. In the northern portion of the basin adjacent to Golden Gate Park, the maximum depth to bedrock is approximately 500 feet. In northern San Mateo County, the maximum depth to bedrock is 3,500 feet. Sediment thickness estimates were not available for the southernmost portion of the basin. Groundwater movement south of Lake Merced is generally southward toward the areas of heavier pumping in San Mateo County (CCSF 1996).

Water quality in the Westside Basin is generally considered good, though somewhat hard; the majority of groundwater samples have a hardness of over 200 mg/l as $CaCO_3$ (CCSF 1996). Most groundwater samples taken from around the southern basin in San Mateo County meet primary and secondary standards for TDS, chloride, and nitrate. Samples taken from around Colma Creek indicate elevated levels of TDS and nitrates (greater than 500 mg/l and 45 mg/l, respectively) (CCFS 1996). Groundwater in the basin supplies numerous municipal wells for irrigation and potable uses, with potential beneficial industrial uses. Potable water is drawn from a deep aquifer that serves a large portion of northern San Mateo Peninsula (Daly City 2002).

Forty percent of San Bruno's water supply is derived from wells (City of San Bruno 1984). The well system serves parts of the city generally east of Highway 280, while the SFPUC Hetch-Hetchy system serves the western areas. South San Francisco obtains slightly over three percent of its water supply from groundwater pumps. Colma also uses a combination of groundwater and purchased water sources. Both South San Francisco and Colma are within Cal Water's South San Francisco District. Cal Water is a privately owned company that owns and manages numerous water districts in California and the United States. Cal Water draws from wells at approximate depths of 200 to 400 feet. About half of the water serviced by the Daly City Water System is from local wells drawing from an average depth of 300 feet (Daly City 2002).

9.2.8 Sites With Known or Potential Contamination

Based on a review of the Environmental Data Resources (EDR) report generated for and described in Chapter 11, approximately 83 sites with soil and/or groundwater contamination were identified along or near the preferred Project alignment as having the potential to affect public and construction-worker health and safety. A number of the sites identified with known groundwater contamination are associated with leaking underground storage tanks from gasoline stations. Consequently, groundwater in the vicinity of these sites potentially contains varying amounts of various petroleum hydrocarbons (e.g., gasoline and diesel) and fuel additives such as MTBE. The data search performed also indicates that groundwater at some of these sites may also be affected by solvents, tanning sludge, isopropyl alcohol, mercury compounds, and/or sulfuric acid. For greater detail, see Chapter 11, Hazards and Hazardous Materials.

INSERT FIGURE 9-5A
Groundwater Basins

INSERT FIGURE 9-5B
Groundwater Basins

9.3 Potential Impacts

9.3.1 Significance Criteria

Significance criteria were derived from Appendix G of the revised CEQA Guidelines. Impacts to surface water or groundwater quality would be considered significant if construction or operation of the Project were to:

- Violate any water-quality standards or waste-discharge requirements
- Result in substantial degradation of surface or groundwater quality to the extent that beneficial uses are affected or water-quality criteria are exceeded
- Result in a long-term substantial increase in the sediment load of a stream
- Cause a detrimental increase in site erosion or downstream siltation
- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite
- 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 decrease the available groundwater supply or substantially interfere with groundwater recharge in such a way that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)
- Otherwise substantially degrade water quality
- Place within a 100-year-flood hazard area structures which would substantially 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 dam
- Increase the potential for substantial flood damage

PG&E will comply with all applicable federal, state, and local regulatory requirements that protect surface water and groundwater. In accordance with the CWA, PG&E will prepare and implement a SWPPP that will include BMPs to minimize construction impacts on surface-water and groundwater quality. The SWPPP will be prepared once the Project is approved and after Project facilities are sited and designed.

9.3.2 Construction Impacts

Impact 9.1: Accelerated Soil Erosion, Downstream Sedimentation, and Reduced Surface Water Quality. Accelerated soil erosion, subsequent downstream sedimentation, and reduced surface-water quality could potentially increase during construction of the proposed Project

as described below. Potential impacts, however, would be temporary and would be reduced to less-than-significant levels with the implementation of mitigation measures.

Overhead Transmission Line

Overhead transmission line construction will require earth-moving activities (e.g., excavation and grading). Soil erosion rates could potentially be accelerated and sedimentation of downstream waterways could occur because of soil disturbance and vegetation removal. Proposed transmission lines and access roads would also cross several ephemeral waterways and storm-drain systems. Surface-water quality could be diminished as a result of: (1) vehicular traffic on unpaved areas; (2) excavation and grading for tower foundations at the proposed tower locations; (3) soil disturbance from material laydown at pull sites / laydown areas; and (4) scraping, grading, and culvert installation in ephemeral watersheds for construction of temporary access roads. If sediment-laden runoff enters nearby drainages, it could potentially increase turbidity and increase channel siltation. The potential for erosion significantly increases as slopes become steeper and less vegetated. Construction activities conducted when the ground is wet also create the potential for increased sediment runoff. However, with implementation of Mitigation Measures 9.1 and 9.2, impacts will be less than significant.

Transition Station

One new underground-to-overhead transition station will be installed. The transition station site is flat, with no existing runoff channels or swales, and is surrounded by a low earthen berm. The transition station site is bounded on the south and east by paved roadways, on the west by a flat undeveloped parcel, and on the north by open space that slopes away from the station site. Minimal grading will be required during construction. With implementation of Mitigation Measures 9.1 and 9.2, erosion and sedimentation impacts will be less than significant at this site.

Substations

The substations would be modified within the existing substation properties as part of this Project (see Subsection 2.3.5, Substations). Scraping, grading, and / or excavation activities may be required for the new equipment installation. Stormwater runoff at these sites is currently handled by the local stormwater systems. Potential construction-related erosion and sediment-transport impacts at the substation sites are considered less than significant because of the limited scale of construction activities and with the implementation of Mitigation Measure 9.1.

Underground

Approximately 13 total miles of trench, typically 2 feet wide and 6 feet deep, will be required for the underground segments. In Segment 2, the Colma Creek and 12-Mile Creek crossings near milepost 2.4 along the BART alignment will be dry-bored horizontally at a depth of about 5 feet below the bottom of the channel to avoid impacts to the creek. Access pits for the dry-bore stream crossing will be located outside the concrete channel of the creek, and no Streambed Alteration Agreement or Section 404 Permit will be required for these bores. If water accumulates in the pits, the water will be collected and stored, tested to determine appropriate disposal methods, and ultimately disposed of at approved locations. Erosion and sedimentation impacts will be less than significant with the implementation of Mitigation Measures 9.1 and 9.2. Similarly, any impacts from encountering contamination in

soil during trenching will be less than significant with the implementation of Mitigation Measures 9.3 and 9.5.

Impact 9.2: Water-Quality Degradation Caused by Accidental Release of Environmentally Deleterious Materials During Construction. Construction of the proposed Project would require the use of a variety of motorized heavy equipment including trucks, cranes, dozers, air compressors, graders, backhoes, and drill rigs. This equipment requires job-site replenishment of chemicals in the form of diesel fuel, gasoline, lubrication oil, hydraulic fluid, antifreeze, transmission fluid, lubricating grease, and other fluids. Surface water and groundwater quality may be affected during construction by an accidental release from a vehicle or motorized piece of equipment, or by a release of materials during concrete preparation or pouring for the tower foundations or for placement of backfill over the duct bank. Tower locations, pull sites/laydown areas, trenching sites, the new transition-station site, or modified substation sites may be affected by such a release. Such spills could wash into nearby drainages or infiltrate the soil. Surface or groundwater quality could potentially be degraded. However, implementation of Mitigation Measures 9.2 through 9.4 will reduce impacts to a less-than-significant level. Concrete washout stations will be placed in accordance with Mitigation Measure 9.1; therefore, impacts will be less than significant.

Impact 9.3: Groundwater Quality Degradation Caused by Construction of Underground Transmission Line. Shallow groundwater may be encountered during construction and installation of underground facilities, which would require collection of groundwater in excavations, especially along Segments 2 and 3. Potential sources of groundwater entering excavations may include locally shallow groundwater levels and other sources of perched groundwater (e.g., buried stream-channel deposits and utility-backfill materials). Significant groundwater inflow could cause erosion or even destabilization of excavation slopes, resulting in caving, sloughing, and running ground conditions. As part of design-level geotechnical studies, the potential for groundwater infiltration into excavations along the Project alignment will be evaluated.

As discussed in Chapter 11, approximately 83 known contaminated sites are located along or near the proposed alignment. The majority of these sites exist along four portions of the preferred route: along Bayshore Boulevard, Hillside Boulevard, the BART ROW, and along San Bruno Avenue. In addition, unknown sites of contaminated soils or groundwater could be present. A significant hazard could exist if pre-existing contaminated groundwater is exposed and comes in contact with uncontaminated soil and/or groundwater during construction, or if contaminant mobility is enhanced as a result of the construction process (e.g., cross-contaminating soils during excavation, breaching of a confining layer, or through the transport of contaminated spoils). Additionally, the exposure of humans to contaminated groundwater or soil, or contamination of the ground surface, is a potentially significant hazard. Implementation of Mitigation Measures 9.2, 9.3, and 9.5 will mitigate the potential for unprotected human exposure to contamination and reduce the likelihood of cross-contamination and enhancement of contaminant mobility, reducing this impact to a less-than-significant level.

Impact 9.4: Increased Runoff from Construction of Tower Foundations, Temporary Access Roads, and Pull Site/Laydown Areas. At each tower site, four concrete foundations approximately 2.5 feet in diameter and approximately 15 to 40 feet deep will be constructed. An area of

approximately 100 feet in diameter around each site would be disturbed during construction, but would be revegetated following construction as described in Chapter 6, Biological Resources. Placement of impervious material will restrict stormwater infiltration, which could lead to increased run-off from these areas. However, this impact is considered less than significant because the total area permanently affected by tower foundations is extremely small (about 700 square feet over 14 miles for the length of the Project) relative to the surrounding locale.

Scraping and grading for temporary access roads and pull sites will remove vegetation and disturb the soil surface, which will result in a reduction in the infiltration and absorption capacity of the affected area. The potential impacts would be localized and temporary, and disturbed sites would be revegetated, as described in Chapter 6, and are therefore less than significant.

Construction of the proposed transition station will require scraping and grading and the installation of concrete foundations and impervious surfaces covering approximately 500 square feet. Localized compaction of soil from these activities as well as from use of heavy equipment could diminish the stormwater infiltration capacity at the transition station site. However, this impact is considered less than significant because the effects will be minor and localized.

Flood impact from construction of the transition station at the San Bruno Avenue / Highway 35 (Skyline Boulevard) intersection would be less than significant because the site is flat and there are no waterways in the vicinity. Additionally, the surface area made impermeable by the new transition station is small compared to the area of surrounding permeable surfaces. Stormwater will continue to sheet flow to and infiltrate in the surrounding undeveloped property. These impacts will be less than significant.

Impact 9.5: Impacts to Groundwater Hydrology from Dewatering, Soil Backfill and Compaction During Construction of Underground Transmission Line. Where localized shallow groundwater is encountered, active and / or passive dewatering systems may be installed in trenches and excavations as appropriate to allow construction under dry conditions. Dewatering activities may have localized effects on groundwater levels. However, any effects would be temporary and are not expected to affect area wells, which draw from deeper aquifers. Impacts would be less than significant. The underground portions of the proposed Project will be installed under existing streets and the BART ROW. Soils in these areas have been compacted during street and / or BART construction, and the streets already are covered with impermeable surfaces. The trench to be constructed for the underground line will be narrow and typically shallow (6 to 8 feet, except where additional depth is needed based on final design). Soils in the trench vicinity will not experience any significant additional compaction, and should not create a significant new barrier to groundwater flow.

Construction is not expected to have a significant impact on the overall groundwater flow patterns in the Project Area because depth to groundwater aquifers in the Project Area exceeds 30 feet below grade. Perched groundwater could be encountered at shallower depths; however, perched water does not have a significant flow component. As describes in Chapter 2, Project Description, the lower portion of the trench is occupied by the concrete duct bank, on top of which will be placed the roadway base. The duct will be placed on

native soil at the bottom of the trench and is not expected to induce significant longitudinal flow. Furthermore, the trench is located in city streets already containing utilities in an urbanized area, and no shallow-groundwater-dependent resources are found in the vicinity that could be affected by changes to shallow-groundwater flow. Any impacts to flow of shallow groundwater would be minor and localized; therefore, impacts would not be significant.

Impact 9.6: Construction in a Predicted Dam Inundation Area. The towers proposed to span San Mateo Creek will be above the elevation of the dam spillway, and out of the dam failure inundation area as shown in Figure 9-4. Given that the proposed Project is more than 1/4 mile downstream of the dam, construction of the Project will not affect the structural integrity of Crystal Springs Dam, nor does it include development of any inhabited structures. It would not increase exposure of people or structures to flooding. The proposed towers will be at approximately the same location and elevation as the existing transmission-line towers spanning the creek. No significant change from existing conditions would occur. Impacts will be less than significant.

9.3.3 Operation Impacts

Impact 9.7: Water Quality Degradation Caused by Accidental Releases of Mineral Oil. Surface-water and groundwater quality could be affected by a mineral-oil release from new oil-filled electrical equipment at the Jefferson, Watershed, Ralston, Hillsdale Junction, Crystal Springs, Martin substations or transition station. Such releases, either from slow leaks or catastrophic failure, could wash into nearby drainages or infiltrate soil to the water table. Although mineral oil is non-toxic, the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act prohibit the release of any oil into state waters. The RWQCB requires that all necessary measures be taken to regulate runoff from urban uses to protect the quality of surface water and groundwater from detrimental conditions. In the event of a release, surface or groundwater quality may be degraded. With implementation of Mitigation Measure 9.6, the impacts would be less than significant.

9.4 Mitigation Measures

9.4.1 Construction Mitigation Measures

Mitigation Measure 9.1: Implementation of Erosion Control and Sediment Transport Plan. An erosion control and sediment transport control plan will be prepared in association with the SWPPP and the revegetation plan. This plan will be prepared in accordance with RWQCB guidelines and other applicable BMPs.

Implementation of the plan will help stabilize graded areas and waterways, and reduce erosion and sedimentation. The plan will designate BMPs that will be followed during construction activities. Erosion-minimizing efforts may include measures such as avoiding excessive disturbance of steep slopes; using drainage control structures (e.g., coir rolls or silt fences) to direct surface runoff away from disturbed areas; strictly controlling vehicular traffic; implementing a dust-control program during construction; restricting access to sensitive areas; using vehicle mats in wet areas; and revegetating disturbed areas following construction. Erosion-control measures will be installed before extensive clearing and

grading begins, and before the onset of winter rains. Concrete washout stations will be established to avoid direct release to surface water or to areas where groundwater could become contaminated.

In areas where soils are to be temporarily stockpiled, soils will be placed in a controlled area and managed with similar erosion-control techniques. In the case of hand-dug foundations, excavated soils will be collected in bins or drums to be lifted out by helicopter or used as part of the Revegetation Plan (refer to Chapter 6, Biological Resources). Where construction activities occur near a surface water body or drainage channel, stockpiles will be placed at least 100 feet from the water body or properly contained (such as bermed or covered to minimize risk of sediment transport to the drainage). Mulching, seeding, or other suitable stabilization measures will be used to protect exposed areas during and after construction activities. Revegetation plans, the design and location of retention/settlement ponds, and grading plans will be submitted to the CDFG and COE for review if construction requires a Streambed Alteration Agreement or Section 404 Permit, respectively.

The Stormwater Pollution Prevention Plan (SWPPP) will be designed specifically for the hydrologic setting of the proposed Project, which includes water-supply reservoirs, upland slopes, and intermittent and seasonal streams. BMPs documented in the Erosion Control and Sediment Transport Plan will also be included in the SWPPP. As previously noted, the staging of construction materials, equipment, and excavation spoils will be performed at least 100 feet outside of drainage channels, intermittent streams, and reservoirs, where these receive overland runoff. This measure would not be required where runoff is already directed away from the channels, such as at Colma Creek where the channel lip is constructed above grade or where other protection measures such as berming and/or covering of stockpiles is performed. The SWPPP will identify such special circumstances.

Trench spoils from the underground transmission line may be stockpiled and used to backfill the trench, and, upon completion of construction activities, the area will be graded to match the surroundings. In general, as described in Chapter 2, Project Description soils under the streets and in the BART ROW are unlikely to meet the specific backfill requirements and will be hauled offsite immediately after excavation. Open portions of the trench will be covered when not under active construction. Temporary stockpiles of excavated soil will be collected and placed in a controlled area and managed with erosion-control techniques as noted in the Project's Erosion Control and Sediment Transport Plan and SWPPP. Standard erosion and dust-control practices will be used during construction according to BMPs to protect biological and hydrological resources. Surplus soils will be transported from the site and appropriately disposed.

Mitigation Measure 9.2: Environmental Training and Monitoring Program. An environmental-training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures and proper BMP implementation, to all field personnel. The training program will emphasize site-specific physical conditions to improve hazard prevention (e.g., identification of flow paths to nearest water bodies) and will include a review of all site-specific plans, including but not limited to the Project's SWPPP, Erosion Control and Sediment Transport Plan, Health and Safety Plan, and Hazardous Substances Control and Emergency Response Plan.

A monitoring program will also be implemented to ensure that the plans are followed throughout the construction period. BMPs, as identified in the Project SWPPP and Erosion Control and Sediment Transport Plan, will also be implemented during the Project to minimize the risk of an accidental release and provide the necessary information for emergency response.

Mitigation Measure 9.3: Hazardous Substance Control and Emergency Response Plan. PG&E will prepare a Hazardous Substance Control and Emergency Response Plan that will include preparations for quick and safe cleanup of accidental spills. This plan will be submitted with the grading-permit application. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle-maintenance activities and storage of hazardous materials, if any, will be permitted. These directions and requirements will also be reiterated in the Project SWPPP.

Mitigation Measure 9.4: Emergency Spill Supplies and Equipment. Oil-absorbent material, tarps, and storage drums will be used to contain and control any minor releases of transformer oil. In the event that excess water and liquid concrete escapes from tower foundations during pouring, it will be directed to lined and bermed areas adjacent to the borings, where the water will evaporate and the concrete will begin to set. Once the excess concrete has been allowed to set up, it will be removed and transported for disposal, according to applicable regulations.

Mitigation Measure 9.5: Soil Sampling/Waste and Groundwater Characterization. Soil sampling and potholing will be conducted before construction begins, and soil information will be provided to construction crews to inform them about soil conditions and potential hazards. If hazardous substances are unexpectedly encountered during trenching, work will be stopped until the material is properly characterized and appropriate measures are taken to protect human health and the environment. If excavation of hazardous materials is required, they will be handled in accordance with applicable regulations.

Prior to initiating excavation activities at tower locations and along the underground transmission-line routes, soil borings will be advanced to identify areas where contaminated groundwater may be contacted. The location, distribution, or frequency of such tests will give adequate representation of the conditions in the construction area. If suspected contaminated groundwater is encountered in the depths of the proposed construction areas, samples will be collected and submitted for laboratory analysis of petroleum hydrocarbons, metals, volatile organic compounds, and semi-volatile organic compounds. If necessary, groundwater will be collected during construction, contained, and disposed of in accordance with all applicable regulations. Appropriate personal protective equipment will be used and waste management will be performed in accordance with applicable regulations. Non-contaminated groundwater will be released to one of the cities' stormwater drainage systems (with prior approval) or contained, tested, and disposed of by methods described above.

9.4.2 Operation Mitigation Measures

Mitigation Measure 9.6: Spill Prevention, Countermeasure, and Control Plans. PG&E will prepare or modify existing Spill Prevention, Countermeasure, and Control (SPCC) plans for the proposed transition station and substations as required by applicable regulations. The plan will include engineered and operational methods for preventing, containing, and controlling potential releases (e.g., construction of retention pond, moats, or berms), and provisions for quick and safe cleanup. The plan will be submitted to the appropriate agency for review. Existing SPCC plans for the substations mentioned above will be revised to include new equipment. Incorporation of SPCC measures in the Project design will reduce impacts to a less-than-significant level. (Also see Chapter 11, Hazards, Hazardous Materials, and Public Health.)

9.5 References

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