4.9 HYDROLOGY AND WATER QUALITY

4.9.1 Introduction

This section describes the existing surface water and groundwater hydrology, use, and quality in the project area for the proposed 500 kV T/L route and Alternative 1, including the existing Antelope and Pardee substations. Surface water and groundwater in the project area were evaluated by reviewing maps showing the water bodies and drainages, by reviewing studies completed by and for state and local water agencies, and by obtaining information from city, regional, county, and state water agencies.

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 (for example, underground storage tanks or landfills). For sites that were identified in these databases, local regulatory agencies were contacted and files were reviewed for specific information regarding existing soil and groundwater conditions.

4.9.2 Watershed and Regulatory Issues

The proposed 500 kV T/L route and its alternative (Alternative 1) are located in two major watersheds that drain into separate basins. Groundwater and surface water in the southern end of the project (including the Pardee Substation) flow to the Santa Clara River Watershed, while the northern end of the project (including the Antelope Substation and Primary Marshalling Yard) drains to the Antelope Valley Watershed. These two watersheds are separated by the northwest portion of the San Gabriel Mountains, which provide a topographic and hydrologic divide.

The Santa Clara River Watershed is under the jurisdiction of the Los Angeles Regional Water Quality Control Board (RWQCB). The Antelope Valley basin is under the jurisdiction of the Lahontan RWQCB. Segment 1 and its Alternative 1 are located in Los Angeles County. They also cross the Angeles National Forest under the jurisdiction of the USFS.

4.9.2.1 Los Angeles County

The proposed T/L and Alternative 1 are located within Los Angeles County (see Figure 4.9-1). Surface water and groundwater quality and use in Los Angeles County are under the jurisdiction of the Los Angeles County Department of Public Works (LACDPW). LACDPW operates and maintains 15 major dams and nearly 500 miles of open channel, 2,500 miles of underground storm drains, over 70,000 catch basins, about 300 debris retaining structures and 230 concrete stream bed stabilization structures, 40 pumping plants, and nearly 27 spreading grounds throughout Los Angeles County. They also monitor water quality at a network of stream stations and supply wells as well as coordinating responsibilities with 88 separate jurisdictions under the National Pollutant Discharge Elimination System (NPDES) Permit Program. Drainage and floodplain permits are required by the LADPW before construction of certain facilities can begin. The permits require the developer to provide measures that keep peak 100-year storm flows at or below pre-development levels. The LACDPW identifies flood control improvements required of new development and applies fees or conditions to ensure the improvements are built. Water quality in this area is also under the jurisdiction of the Los Angeles RWQCB.

4.9.2.2 Federal and State Requirements

The RWQCBs implement water quality regulations under the Federal Clean Water Act (CWA) and the State Porter-Cologne Act. The regulations require compliance with the NPDES program. Construction activities for this project require an NPDES General Construction Permit for discharges of storm water runoff associated with construction activity. SCE would submit a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB) to be covered by the General Permit prior to initiating construction. The General Permit requires the implementation of a Storm Water Pollution Prevention Plan (SWPPP), which must be prepared before construction begins. The SWPPP includes:

- Specifications for best management practices (BMPs) that would be implemented during project construction to minimize the potential for accidental releases and to minimize runoff from the construction areas, including storage and maintenance areas 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 materials

During construction, the RWQCBs would oversee and inspect the project for the SWRCB.

4.9.2.2.1 Section 404 Permits. Waters of the United States (including wetlands) are subject to U.S. Army Corps of Engineers (Corps) jurisdiction under Section 404 of the CCWA. Section 404 regulates the filling and dredging of U.S. waters. 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 as determined by the Corps on a case-by-case basis. A Section 404 permit would be required for project construction activities involving excavation of, or placement of fill material into, waters of the United States (e.g., road construction involving cut-and-fill in streams). A Water Quality Certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for Water Quality Certification (or Waiver thereof) from the RWQCB.

4.9.2.2.2 **<u>Streambed Alteration Agreements</u>.** Section 1601 of the California Fish and Game Code protects the natural flow, bed, channel, and bank of any river, stream, or lake designated by the California Department of Fish and Game (CDFG) in which there is at any time an existing fish or wildlife resources or benefit for the resources. General project plans must be submitted to CDFG that are sufficient to indicate the nature of a project for construction if the project would do the following:

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

4.9.2.2.3 **<u>USFS Requirements</u>.** The proposed 500 kV T/L route and Alternative 1 cross the Angeles National Forest under the jurisdiction of the USFS. The USFS manages the forest to maintain a healthy ecosystem while allowing mineral extraction, timber harvesting, recreation, and other activities, including power T/Ls. Projects on the national forest land must comply with USFS regulations developed to meet their stated land management goals. At this time, it is unclear what conditions the USFS would impose on the proposed project.

USDA Objective 5.1 is to consider opportunities for energy development and the supporting infrastructure on forests and grasslands to help meet the nation's energy needs. This objective has been included in the Draft Land Management Plan under development for the Angeles National Forest (USFS, 2004a, b) as Goal 4. As part of meeting these objectives, a number of power T/Ls already traverse the Angeles National Forest in Non-Recreation Special Uses areas in the Commodity and Commercial Uses category. The proposed 500 kV T/L route would involve replacement of an existing 66 kV line with a 500 kV T/L in the Angeles National Forest. Alternative 1 would parallel an existing LADWP T/L route in the Angeles National Forest.

4.9.3 Surface Water

The proposed route and Alternative 1 alignments generally proceed in a southwesterly direction from the Antelope Substation located in the western portion of the City of Lancaster. From mile 0 to mile 6, the proposed route crosses the surface water Antelope Valley Hydrologic Unit in the South Lahontan Hydrologic Region as defined by the Lahontan RWQCB (2002). From mile 6 to its terminus at the Pardee Substation in Santa Clarita, the proposed route crosses the surface water Santa Clara Hydrologic Region as defined by the Los Angeles RWQCB.

From mile 0 to mile 7, Alternative 1 crosses the surface water Antelope Valley Hydrologic Unit in the South Lahontan Hydrologic Region as defined by the Lahontan RWQCB (2002). From mile 7 to its terminus in Santa Clarita, Alternative 1 crosses the surface water Santa Clara Hydrologic Region as defined by the Los Angeles RWQCB.

4.9.3.1 South Lahontan Hydrologic Region Surface Water

The proposed T/Ls and other project facilities in the South Lahontan Hydrologic Region receive average annual rainfall ranging from 4.04 to 6.89 inches per year based on LACDPW rain gauge data. The proposed T/L route and Alternative 1 traverse several intermittent and ephemeral streams that generally infiltrate all of their runoff into alluvial fans at their canyon outlets. In extreme storm events, the streams eventually convey storm runoff to Rosamond Lake located northeast of the City of Lancaster. Rosamond Lake is generally dry much of the year. When inundated, the streams and lake provide recharge to the underlying groundwater basin. The area is subject to high-intensity thunderstorms and intense general rains in the summer, fall, and winter.

The proposed T/L route and Alternative 1 also cross the California Aqueduct at mile 2.8 and 4.4, respectively. The East Branch of the California Aqueduct alignment along the northeastern margin of the San Gabriel Mountains delivers State Water Project water to the Antelope Valley-East Kern Water Agency (AVEK) and to the Mojave Water Agency further east. AVEK is a State Water Contractor and has received water from the aqueduct since 1972 for delivery to 22 water purveyors for agricultural, municipal and industrial use. AVEK's maximum allocation is 141,400 acre-feet per year. In 1995 and 1996 they received approximately 49,000 and 58,000 acre-feet of water, respectively (Woodward-Clyde, 1997). Currently, AVEK's water customers are using about 75,000 acre-feet per year (KCPD, 2003), which corresponds to an average flow rate in the aqueduct of about 103.5 cubic feet per second.

4.9.3.1.1 Antelope Valley Hydrologic Unit. The portions of the proposed route and Alternative 1 in the South Lahontan Region are in the surface water Antelope Valley Hydrologic Unit. This Unit receives runoff from Big Rock and Little Rock Creeks from the San Gabriel Mountains and from Oak Creek and Cottonwood Creek in the Tehachapi Mountains to the north of the project area. The surface water drains toward the closed basin of Rosamond Lake within the boundaries of Edwards Air Force Base. The proposed route and Alternative 1 cross the California Aqueduct, and Alternative 1 also crosses the Los Angeles Aqueduct.

4.9.3.2 South Coast Hydrologic Region Surface Water

The portions of the proposed route and Alternative 1 located in the South Coast Hydrologic Region are in the upper Santa Clara River Basin in the Santa Clara Hydrologic Region. Based on data obtained from the LACDPW, the project area in the Santa Clara River Basin has an average annual precipitation ranging from 6.97 inches at the Bouquet Canyon Reservoir near the City of Santa Clarita to 9.63 inches at Acton Camp near the Santa Clara River headwaters. Most of the precipitation occurs during the wet season extending from November through April. Typically, all precipitation is in the form of rain. In undeveloped areas, only a small percent of the rainfall appears as runoff in the creeks. The remainder is absorbed by the soil, infiltrates to recharge groundwater, or is evapotranspirated by the grassy and woody vegetation.

The Upper and Lower Santa Clara River Basin total approximately 1,630 square miles within Los Angeles and Ventura Counties with about 40 percent of the watershed in Los Angeles County. The complete watershed extends from the San Gabriel Mountains to its outlet in the Pacific Ocean in Ventura County. Approximately 90 percent of the watershed consists of rugged mountains of up to 8,800 feet in elevation; the remainder consists of valley floor and coastal plain (AMEC Environmental, 2003). Beginning near the City of Santa Clarita, the slopes decrease, leading to deposition of sediments carried by the river flow and formation of an alluvial valley that widens in the downstream direction. In Los Angeles County, the major city in the watershed is the City of Santa Clarita. Portions of the upper Santa Clara River are perennial due to baseflow occurring from groundwater. This baseflow infiltrates into the thick alluvial deposits upstream of the City of Santa Clarita. The Santa Clara River has perennial flow occurring downstream of the City of Santa Clarita as a result of treated wastewater discharges from plants operated by the Los Angeles County Sanitation District (LACSD).

The major tributaries to the Santa Clara River in the Los Angeles County project area from upstream to downstream are Bouquet Canyon Creek, San Francisquito Canyon Creek, and Castaic Creek. There are two major reservoirs, Castaic Lake on Castaic Creek, and the

Bouquet Reservoir on Bouquet Creek, which provide for some control of runoff from about 37 percent of the watershed (AMEC Environmental, 2003). The creeks in the project area are ephemeral or intermittent and are supplied by excess precipitation occurring as runoff and springs.

4.9.3.2.1 Bouquet Canyon Creek and Reservoir. The Bouquet Creek channel is approximately 1 mile from the proposed T/L at the point of nearest approach, but the T/L alignment is located in the Bouquet Canyon watershed close to the adjoining San Francisquito Canyon watershed to the northwest. The proposed T/L route crosses the western end of Bouquet Reservoir beginning at approximately mile 9.3. Alternative 1 is located several miles northwest of the proposed T/L alignment and does not fall within the Bouquet Canyon watershed.

Bouquet Canyon Creek is a southwest trending intermittent stream originating in the San Gabriel Mountains that confluences with the Santa Clara River in the City of Santa Clarita. Most of the creek consists of natural channel in the undeveloped Angeles National Forest. The USGS stream gauge 11107860 for this creek is located near the Santa Clara River confluence in the City of Santa Clarita. Based on the gauge records, the creek has a maximum monthly average flow of 1.92 cubic feet per second (cfs) occurring during the month of February. The drainage area contributing flow measured by the gauge is approximately 51.6 square miles. In some years, the average flow in the creek during February is 0 cfs, primarily due to the presence of the Bouquet Canyon Reservoir providing some flood flow storage. The reservoir owned by LADWP is primarily used to provide storage for the water transported through the Los Angeles Aqueduct from the Owens Valley. It was completed in 1934, and has a storage capacity of approximately 36,500 acre-feet with a drainage area of 13.6 square miles.

4.9.3.2.2 San Francisquito Canyon Creek. Alternative 1 crosses the San Francisquito Canyon Creek at Milepost 12.8 in the vicinity of the Cherry Canyon Creek confluence west of Bouquet Reservoir. San Francisquito Canyon Creek is an intermittent stream in the watershed adjacent to Bouquet Canyon to the southeast. From mile 7 to mile 12.8, the Alternative 1 alignment in the San Francisquito Canyon Creek is west of the creek adjacent to an existing T/L. From mile 12.8 to mile 22.8, Alternative 1 is located east of the creek near the existing T/L.

4.9.3.2.3 Los Angeles Aqueduct. The Los Angeles Aqueduct conveys water from the Owens Valley/Mono Lake area to the City of Los Angeles. Alternative 1 of crosses the aqueduct at mile 12.2 west of Bouquet Canyon Reservoir. The aqueduct in these reaches is a closed conduit.

4.9.3.2.4 Castaic Creek and Reservoir. The terminus of the proposed T/L alignment, as well as Alternative 1, is located east of the Castaic Creek-Santa Clara River confluence. Castaic Creek is south trending creek originating in the San Gabriel Mountains that confluences with the Santa Clara River downstream of the City of Santa Clarita. The USGS stream gauge 11108134 for this creek below the Metropolitan Water District diversion has a maximum monthly average of 42.6 cfs occurring during the month of February during the period of record. The drainage area contributing flow measured by the gauge is approximately 155 square miles. In some years, the average flow in the creek during February is 0 cfs, primarily due to the presence of the Castaic Lake Reservoir relatively close to the Santa Clara River confluence storing all of the available runoff. The reservoir was completed in 1973 as part of the California State Water Project and stores water transported from northern California for use by state water contractors in southern California. It has a storage capacity of approximately 323,700 acre-feet, and provides some flood control for runoff from a drainage area of approximately 153.7 square miles.

4.9.3.3 FEMA 100-Year Floodplain Boundaries

The Federal Emergency Management Agency (FEMA) has estimated areas subject to flooding in the project areas in the Santa Clara River and Antelope Valley Hydrologic Regions as shown on Figure 4.9-2. FEMA's Flood Insurance Rate Maps (FIRMs) define the predicted boundaries of 100-year (Zone A) floods. Many of the areas of potential flooding shown on the map were not delineated through detailed hydrologic and hydraulic analyses and therefore have approximate limits. Although the proposed T/Ls cross 100-year floodplain areas, the substations or other project facilities are not located within 100-year floodplain areas.

4.9.3.4 Dam Failure Inundation Area

To help local jurisdictions develop evacuation plans for areas below dams, the State OES and the Department of Water Resources (DWR) require dam owners to evaluate areas of potential inundation in the event of dam failures and estimate when floodwaters would arrive at downstream locations. Projected inundation limits are approximate and assume severe hypothetical failures, thus showing a conservative estimate of potential flooding in the improbable occurrence of failure and resulting flooding. Inundation maps for Bouquet Canyon and Castaic Lake indicate that the terminus of the proposed alignment and the Pardee

Substation are located within the Castaic Lake inundation boundaries as shown on Figure 4.9-2.

4.9.4 Groundwater

The proposed T/L route and Alternative 1 alignments generally proceed in a southwesterly direction from the Antelope Substation located in the western portion of the City of Lancaster. From mile 0 to mile 6, the proposed T/L route crosses the Antelope Valley Groundwater Basin in the South Lahontan Hydrologic Region as defined by DWR in Bulletin 118 (2003). From mile 19 to its terminus at the Pardee Substation in Santa Clarita, the proposed route crosses the Santa Clara Valley East Groundwater Basin in the South Coast Hydrologic Region.

From mile 0 to mile 7, Alternative 1 crosses the Antelope Valley Groundwater Basin in the South Lahontan Hydrologic Region as defined by DWR. From mile 22 to its terminus in Santa Clarita, Alternative 1 crosses the Santa Clara Valley East Groundwater Basin.

4.9.4.1 Antelope Valley Groundwater Basin

The Antelope Valley Basin is the principal groundwater basin for southeastern Kern County and the portion of Los Angeles County in the vicinity of the City of Lancaster. The surface area of the basin is approximately 1,580 square miles extending across Kern, Los Angeles, and San Bernardino Counties. This basin is bounded to the northwest by the Garlock fault zone and on the southwest by the San Andreas fault zone. The eastern boundary is a surface and groundwater drainage divide to the north is the Fremont Valley Groundwater Basin.

The primary water-bearing materials are the Pleistocene and Holocene age unconsolidated alluvial and lacustrine deposits. An upper aquifer is generally unconfined and supplies most of the groundwater for the valley, while a lower aquifer is generally confined. Wells typically have a moderate to high yields (DWR, 2003). The Antelope Valley Groundwater Basin receives recharge from Big Rock and Little Rock Creeks from the San Gabriel Mountains and from Oak Creek and Cottonwood Creek in the Tehachapi Mountains, as well as a number of other ephemeral and intermittent streams in the project area.

Hydrographs of wells located in the vicinity of Soledad Mountain near the Fremont Valley/ Antelope Valley basin boundary show that the unconfined groundwater table has been decreasing steadily from 1981 through 1997 at a rate of 0.25 to 0.50 feet per year (KCPD, 1997).

4.9.4.2 Santa Clara River Valley East Groundwater Basin

The Santa Clara River Valley East Basin encompasses an area of approximately 103 square miles (DWR, 2003). The basin consists of the following water-bearing geologic units: the Holocene age alluvium, the Pleistocene age terrace deposits, and the Late Plicene-early Pleistocene age Saugus Formation. Groundwater in these units is generally unconfined (AMEC Environmental, 2003).

Alluvial deposits generally form a relatively thin layer of sediments with a maximum thickness of about 225 feet that directly overlie the Saugus Formation. Terrace deposits are found on the low-lying flanks of the foothills and upper reaches of the Santa Clara River tributaries with a maximum thickness of 200 feet. The Saugus Formation consists of an upper loosely consolidated, coarse-grained sandstone, siltstone, and pebbly conglomerate, and a lower more consolidated siltstone and claystone. The upper part of the Saugus is the main aquifer, while the lower portion is not considered to contain usable groundwater due to the quantity and quality of the water yielded to wells in the formation.

The basin is recharged largely by infiltration of surface water in the Santa Clara River and deep percolation of precipitation in its tributaries. Surface water flows percolate through the alluvial deposits to recharge the alluvial aquifer and the underlying Saugus aquifer. The highland areas surrounding the alluvial valleys also provide recharge through direct precipitation and percolation into the Saugus formation outcrops (UWCD and CLWA, 1996).

Annual municipal extractions from the alluvial aquifer ranged from 12,000 to 21,000 acre-feet during the 1987 to 1994 period. The total amount of water in storage varied from an estimated 107,000 acre-feet in 1965 during a dry period and 201,000 in 1945 after a relatively wet period. Groundwater elevations in the alluvial aquifer near the City of Santa Clarita varied by as much as 60 feet from 1965 to 1985. Annual municipal extractions from the Saugus Aquifer ranged from 8,000 to 14,500 acre-feet during 1987 to 1994.

4.9.5 Water Quality

4.9.5.1 South Lahontan Region Surface and Groundwater Quality

Water quality data from a point just upstream of AVEK's first turnout on the California Aqueduct showed that total dissolved solids (TDS) levels ranged from 80 to 404 mg/L with an average of 214 mg/L over the period from January 1995 through July 1997. Arsenic averaged 2 ppm over the same period, less than the maximum contaminant level allowed in drinking water of 5 ppm.

Data from public supply wells show an average TDS content of 374 mg/L, with a range from 123 to 1,970 mg/L. The Lahontan Basin plan (Lahontan RWQCB, 2002) lists the beneficial uses for groundwater from this basin as municipal, agricultural, and industrial supply and freshwater replenishment.

4.9.5.2 South Coastal Region Surface and Groundwater Quality

Water quality objectives for surface water in the Santa Clara River Basin are described in the Los Angeles Region Basin Plan. The narrative and numerical water quality objectives have been established to protect the existing and potential beneficial uses of surface water. For the major creeks crossed or adjacent to the T/L Segment 1 and its Alternative 1, beneficial uses are municipal/domestic supply, industrial process/service supply, agricultural supply, groundwater recharge, freshwater replenishment, power generation, recreation, warm water fisheries, and wildlife habitat.

The quality of surface and groundwater in the upper Santa Clara River is monitored and evaluated by DWR in accordance with State water quality standards. DWR provides periodical assessments of the surface and groundwater quality and advises the RWQCB in preparation of the water quality control plans to ensure protection of the State's water supply (AMEC Environmental, 2003).

Based on water quality data collected by the United Water Conservation District (UWCD) and Castaic Lake Water Agency (CLWA) (UWCD and CLWA, 1996), concentrations of TDS and sulfates in surface water at the Los Angeles/Ventura County line are a factor of 10 higher than in the upper portion of the watershed. However, there has been a general trend towards a decrease in TDS and sulfate concentrations over the period of records. The poorer water quality in the Santa Clara River near the county line is attributed to increased development in the Santa Clarita area and continuous discharges into the river from the two LACSD wastewater treatment plants in the area. The general increase in water quality over the period of record is attributed to the effects of importing water decreasing the use of groundwater with relatively high TDS and sulfate levels. The heavily urbanized areas of the upper Santa Clara River basin have non-point sources of pollution (for example, oily runoff from parking lots and roads, sediment from construction sites) some of which enters the creeks and flood channels in the area. Additionally, accidental releases have been documented in agency databases in various locations within the basin. Consequently surface water quality varies depending on local activities.

DWR reported groundwater TDS concentrations of up to 2,500 mg/L in 1968 in the aquifer near the City of Santa Clarita. Based on a 2002 study, TDS concentrations ranged from 300 to 1,662 mg/L, with an average concentration of 695 mg/L (DWR 2002). UWCD and CLWA

(1996) reported TDS levels in the alluvial aquifer ranging from 376 to 759 mg/L, while TDS levels in the Saugus formation ranged from 400 to 1,800 mg/L. The 2002 study also found nitrate concentrations above the maximum contaminant level (MCL) of 45 mg/L in some parts of the basin.