

## **4.9 HYDROLOGY AND WATER QUALITY**

This section describes the existing conditions and potential impacts related to hydrology and water quality in the area of the proposed TRTP. An overview of hydrology and water quality is provided in Section 4.9.1. The technical methodology is provided in Section 4.9.2. Applicable rules, regulations, and standards are provided in Section 4.9.3. Significance criteria used to evaluate potential impacts of the proposed Project are presented in Section 4.9.4. Applicant Proposed Measures (APMs) to be incorporated as feasible into the proposed Project to avoid and minimize potential impacts to hydrology and water quality are presented in Section 4.9.5. Descriptions of the environmental setting, including surface water, groundwater, water quality, and climate, are provided in each of the segment subsections within Section 4.9.6. Section 4.9.6 also contains the analysis of potential impacts for the proposed Project segments.

### **4.9.1 Overview**

For the purposes of this analysis of hydrology and water quality, the study area for the proposed Project and alternatives is defined as the area encompassing the watersheds traversed by the proposed alignments. For the proposed Project route, this includes the Antelope Valley Watershed, the Santa Clara River Watershed, the Los Angeles-San Gabriel Watershed, and the Middle Santa Ana River Watershed. Discussion of the environmental setting, impacts analysis, and mitigation is provided for each of the segments. Due to some overlap and parallel segments within the same watershed, and to avoid repetition, some data described for a particular TRTP segment that is relevant to another segment may be referenced in a subsequent segment discussion.

The proposed Project traverses parts of Kern County, Los Angeles County, and San Bernardino County as shown on the Hydrologic Units Map (Figure 4.9-1), Hydrologic Areas Map (Figure 4.9-2), Floodplain Maps (Figures 4.9-3 and 4.9-4), and the Groundwater Basin Map (Figure 4.9-5).

### **4.9.2 Technical Methodology**

Because watershed boundaries and waterways do not necessarily follow municipal boundaries, the environmental setting discussions are based upon the watersheds and waterbodies that the proposed Project traverses. One exception from a regulatory standpoint is the division of the Los Angeles Regional Water Quality Control Board (LARWQCB) and the Santa Ana RWQCB (SARWQCB) boundaries which follows the county boundary lines.

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The naming conventions and water quality discussions are consistent with state and regionally established methods.

The methodology for analyzing impacts consists of the following:

- Identify surface water and groundwater features (watersheds, basins, waterbodies, floodplains, etc.) traversed by the project
- Identify existing hydrologic or water quality restrictions or impairments to the surface water and groundwater features traversed by the project
- Evaluate proposed construction and operation activities in relation to the CEQA water resources significance criteria and determine potentially significant impacts
- Describe measures to avoid or reduce potentially significant impacts

The construction-phase impact assessment includes assessment of hydrologic effects caused by site preparation (e.g., excavation, cut-and-fill, compaction, drainage pattern modification, etc.). The operation-phase assessment considers changes in absorption rates and the amount of surface runoff, including the adequacy of the storm water runoff drainage system. Potential releases of chemicals into ground and surface water resources and associated effects are also assessed. APMs that have been incorporated into the Project design are presented as appropriate to reduce potentially significant Project-related effects on water resources to less-than-significant levels.

**4.9.3 Regulations, Plans, and Standards**

**4.9.3.1 Federal**

The Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402).

In California, NPDES permitting authority is delegated to, and administered by, the nine RWQCBs. For the proposed Project, NPDES permits would be delegated to the Lahontan RWQCB (LRWQCB), the LARWQCB, and the SARWQCB. Section 401 of the CWA requires that any activity, including river or stream crossing during road, pipeline, or

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transmission line construction, which may result in discharges of dredged or fill material into a State waterbody, must be certified by the RWQCB. This certification ensures that the proposed activity does not violate State and/or federal water quality standards. Proposed Project activities would adhere to State and federal water quality standards and would be in compliance with Section 401 of the CWA.

Under Section 402 of the Clean Water Act, the California State Water Resources Control Board issued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ, referred to as the “General Construction Permit”) and associated modifications. The General Permit requires all dischargers where construction activity disturbs one or more acre, to:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters.
- Eliminate or reduce nonstorm water discharges to storm sewer systems and other waters of the nation.
- Perform inspections of all BMPs.

The General Permit is implemented and enforced by the nine California Regional Water Quality Control Boards (RWQCBs). The SWRCB has issued a new draft General NPDES Permit for Construction Activities with significant changes from the existing General Construction Permit in the following items: technology-based action levels and numeric effluent limitations, risk-based permitting approach, more minimum BMPs, project site soil characteristics monitoring and reporting, effluent and receiving water monitoring and reporting, active treatment systems, hydromodification, rain event action plan, self monitoring and reporting, annual reporting, and training requirements.

Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (USACE) to regulate the discharge of dredge or fill material to the waters of the U.S. and adjacent wetlands. The limits of non-tidal 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, changes in the character of the soil, and presence of debris. The USACE may issue either individual, site-specific permits or general, or nationwide permits for discharge into waters of the U.S.

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A Section 404 permit would be required for the proposed Project construction activities involving excavation or replacement of fill material into waters of the United States (i.e., road construction involving cut-and-fill in streams) with the exception of Project elements within the Antelope Valley Watershed. The Antelope Valley is an internally drained basin with no connection to navigable waters, therefore, the USACE has chosen to disclaim all wetland and drainages within the basin (CPUC, 2006b). Therefore, drainages within Antelope Valley Watershed are not subject to the regulatory jurisdiction of the USACE. This excludes the need for 404 determinations on Segments 4, 5, 10, and portions of Segment 9 within the Antelope Valley Watershed. See Section 4.5.3.1.2 for more background and the legal framework for this topic.

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 applicable RWQCB. Proposed Project activities would adhere to State and federal water quality standards and would be in compliance with Section 404 of the CWA.

Section 303(d) of the CWA (CWA, 33 USC 1250, et seq., at 1313[d]) requires states to identify “impaired” water bodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the United States Environmental Protection Agency (USEPA) for review and approval. This list is known as the Section 303(d) list of impaired waters. As part of this listing process, states are required to prioritize waters and watersheds for future development of Total Maximum Daily Load (TMDL) requirements. The State Water Resources Control Board (SWRCB) and RWQCBs have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements (LARWQCB, 2004). Beneficial uses of surface waterways in the proposed Project area are described below in Section 4.9.6. The proposed Project would not be expected to disrupt current or designated beneficial uses of water bodies.

In addition to the Section 303(d) listings, every two years states must submit water quality reports to the USEPA under 305(b) of the CWA. The National Water Quality Inventory Report to Congress (305[b] report) is the primary vehicle for informing Congress and the public about general water quality conditions in the United States. This document characterizes water quality, identifies widespread water quality problems of national significance, and describes various programs implemented to restore and protect our waters. The 2002 National Assessment Database summarizes information submitted electronically by the states in 2002 (USEPA, 2002).

The USDA Forest Service Land Management Plan for the Angeles National Forest (ANF) (USDA, 2005) provides management direction for the Angeles National Forest. The 2005 Land Management Plan was approved on September 20, 2005, and became effective on October 31, 2005. Part 2, Appendix B, of the 2005 Land Management Plan includes a description of “Program Strategies and Tactics” that the ANF may choose to emphasize to progress toward achieving the desired conditions and goals of the Plan. The following is a summary of the program strategies related to hydrology and water quality that are applicable to the proposed Project.

- Watershed Function – Protect, maintain and restore natural watershed functions including slope processes, surface water and groundwater flow and retention, and riparian area sustainability.
- Water Management – Manage groundwater and surface water to maintain or improve water quantity and quality in ways that minimize adverse effects.
- Hazardous Materials – Manage known hazardous materials risks.

#### 4.9.3.2 State

**4.9.3.2.1 California Department of Fish and Game (CDFG) Code Section 1602 (Streambed Alteration Agreement).** Section 1602 protects the natural flow, bed, channel, and bank of any river, stream, or lake designated by the CDFG in which there is, at any time, any existing fish or wildlife resources, or benefit for the resources. Section 1602 requires an agreement between the CDFG and a public agency proposing a project that would:

- Divert, obstruct, or change a streambed
- Use material from the streambed
- 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

As described in the following impact analysis, it is not expected that the proposed Project would cause or facilitate the actions listed above. However, if it is determined during final engineering and design of the proposed Project that any Project-related actions would have the potential to necessitate a Streambed Alteration Agreement, then such an agreement would be prepared and implemented prior to construction of the proposed Project, thus maintaining compliance with Section 1602 of the California Fish and Game Code.

**4.9.3.2.2 Porter Cologne Water Quality Control Act.** The Porter Cologne Water Quality Control Act of 1967, California Water Code Section 13000 et seq., requires the SWRCB and

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the nine RWQCBs to adopt water quality criteria to protect State waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures.

**4.9.3.2.3 California Water Code §13260.** California Water Code §13260 requires that any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the State, other than into a community sewer system, must submit a report of waste discharge to the applicable RWQCB. Any actions related to the proposed Project that would be applicable to California Water Code §13260 would be reported to the applicable RWQCB.

**4.9.3.3 Local**

Within Kern County, surface water and groundwater quality and use are regulated by the County of Kern Engineering and Survey Service (KCESS). Water quality in Kern County is also under the jurisdiction of the LRWQCB. Within Los Angeles County, surface water and groundwater quality and use are regulated by the Los Angeles County Department of Public Works (LACDPW). The LACDPW has Master Plans for many of its large flood control facilities including the Los Angeles River. Water quality in Los Angeles County is also under the jurisdiction of the LARWQCB. Water quality in the eastern part of Los Angeles County is also under the jurisdiction of the SARWQCB. Within San Bernardino County, surface water and groundwater quality and use are regulated by the San Bernardino County Department of Public Works (SBCDPW) in addition to the SARWQCB.

Local water quality control plans applicable to the proposed Project include the LRWQCB Basin Plan, the LARWQCB Basin Plan, and the SARWQCB Basin Plan. Each of these plans defines water quality objectives for their jurisdiction. These Regional Boards regulate the sources of water quality problems which could result in the impairment of beneficial uses or degradation of water quality, including both point sources of pollution and non-point sources of pollution (LARWQCB, 2004; LRWQCB, 2002; SARWQCB, 1995).

In order to maintain compliance with each of these plans, which are described below, coverage under the applicable NPDES permits would be obtained from the SWRCB and each of the applicable RWQCBs. In general, the NPDES permits would be used to regulate point sources of pollution, with point sources including all single, identifiable sources of contamination. In addition, BMPs included in the NPDES permits and in the impact analysis section below (Section 4.9.6) would be used to regulate non-point sources of pollution, with non-point sources including all diffuse sources such as storm water runoff. By using NPDES permits and BMPs to regulate and minimize potential sources of water quality degradation or

impairment of beneficial uses associated with the proposed Project (as regulated by the RWQCBs), proposed Project activities would be in compliance with the Basin Plans described below.

Southern California Edison has also developed site-specific Storm Water Management Plans (SWMPs) for each of its attended substations and service centers. These SWMPs address operational water quality and storm water issues. The existing SWMP for Vincent Substation would be updated to reflect the planned changes. There is currently no SWMP for Antelope Substation because it is not an attended facility. Whirlwind Substation is not proposed to be an attended facility, and therefore a SWMP would not be developed for this substation. In addition to the SWMPs, which are internal SCE documents, Los Angeles County requires that new construction or redevelopment projects create a Standard Urban Stormwater Mitigation Plan (SUSMP) document. This document applies to the Vincent Substation and the Antelope Substation, both located in Los Angeles County. The Whirlwind Substation site is located in an unincorporated area of Kern County, where there are no requirements for post construction water quality documents analogous to the SUSMP.

**4.9.3.3.1 Water Quality Control Plan for the Lahontan Region.** The basin plan for the Lahontan Region (South and North regions) is administered by the LRWQCB. The basin plan for the Lahontan Region is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the Lahontan Region. The basin plan sets forth the water quality standards for surface and groundwater, defines types of water quality problems and makes recommendations to address such problems. In addition, the basin plan summarizes water quality programs and identifies monitoring activities for the water resources of the area (LRWQCB, 2002).

**4.9.3.3.2 Water Quality Control Plan for the Los Angeles Region.** This basin plan contains water quality standards for the Los Angeles Region. Water quality standards include designated beneficial uses for surface and ground waters, narrative or numeric water quality objectives to protect those beneficial uses, and a policy to maintain high quality waters (i.e., anti-degradation policy). The basin plan also includes implementation plans for water quality objectives through various regulatory programs, and fulfills statutory requirements for water quality planning in California Water Code (CWC) section 13240 and the federal Clean Water Act (CWA) section 303(c) (LARWQCB, 2004).

**4.9.3.3.3 Water Quality Control Plan for the Santa Ana River Basin.** This basin plan and associated amendments establish water quality standards for the Santa Ana River Basin region. Water quality standards include designated beneficial uses for surface and ground waters, and narrative or numeric water quality objectives to protect those beneficial uses. The

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basin plan also includes implementation plans describing the actions by the RWQCB and others that are necessary to achieve and maintain the water quality standards (SARWQCB, 1995).

The basin plans are periodically updated. Prior to preparation and implementation of Project-related construction Storm Water Pollution Prevention Plans (SWPPPs), the RWQCBs would be contacted to determine if the basin plans and associated beneficial uses, 303(d) listings, or TMDLs have been updated for the waterbodies traversed by the Project.

**4.9.4 Significance Criteria**

The impact assessment relies on the significance criteria based on the CEQA environmental checklist presented in Appendix G of the State CEQA guidelines. The following questions are provided in State CEQA Guidelines Appendix G to assess whether Hydrology and Water Quality related impacts would be considered potentially significant. Would the project:

- Violate any water quality standards or waste discharge requirements?
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would:
  - Result in substantial erosion or siltation onsite or offsite?
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
- Otherwise substantially degrade water quality?
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
- Result in or be subject to inundation by seiche, tsunami, or mudflow?

The project does not propose to construct or place housing, so that criterion is not evaluated or analyzed further. The criterion “Otherwise substantially degrade water quality?” is evaluated and analyzed together with the first criterion listed above. The remaining criteria are assessed for the various Project segments within Section 4.9.6.

#### **4.9.5 Applicant Proposed Measures**

APMs to be incorporated as applicable into the proposed Project to avoid and minimize potential impacts to hydrology and water quality are presented in Table 4.9-1. APMs within other sections, such as Section 4.7, Geology and Soils, and Section 4.8, Hazards and Hazardous Materials, would also complement the Hydrology and Water Quality related APMs.

#### **4.9.6 Proposed Project and Alternatives**

The following sections provide descriptions of the environmental setting, impact analysis (construction and operations), mitigation measures, and impact significance after mitigation measure application for the various Project segments. Because some segments of the proposed Project overlap or parallel each other within certain watersheds, reference is made to information in preceding sections as applicable to avoid duplication of information. To avoid repetition within the Segment discussions, overall environmental setting data including climate, watersheds and waterbodies crossed by the Project, and general definitions are provided in this section.

##### **4.9.6.1 Climate**

**4.9.6.1.1 South Lahonton Hydrologic Region.** The climate of the South Lahonton Hydrologic Region, comprised of the Antelope Valley Hydrologic Unit (see Figure 4.9-1) and several hydrologic areas as identified on Figure 4.9-2. This hydrologic region is characterized by long, hot, dry summers, and short, mild, relatively wet winters. Storms that have the potential to produce significant amounts of precipitation and flooding are extra tropical cyclones of North Pacific origin, which normally occur from December through March. As these large winter storms move south over the ocean, they are warmed and accumulate moisture until they are forced landward by high pressure over the Pacific. When the storms reach land, they encounter colder air masses and the orographic effect of the

**TABLE 4.9-1  
APPLICANT PROPOSED MEASURES,  
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APM #	APM Description
APM HYD-1	<p data-bbox="363 600 570 625">Construction SWPPP</p> <p data-bbox="363 642 1382 1205">A Construction SWPPP would be developed for the Project. Notices of Intent (NOIs) would be filed with the SWRCB and/or the RWQCBs, and a Waste Discharge Identification Number (WDID) would be obtained prior to construction. The SWPPP would be stored at the construction site for reference or inspection review. In addition, grading permit applications would be submitted, as applicable, to local jurisdictions. Implementation of the SWPPP would help stabilize graded areas and waterways, and reduce erosion and sedimentation. The plan would designate BMPs that would be adhered to during construction activities. Erosion minimizing efforts such as straw wattles, water bars, covers, silt fences, and sensitive area access restrictions (for example, flagging) would be installed before clearing and grading begins. Mulching, seeding, or other suitable stabilization measures would be used to protect exposed areas during construction activities. During construction activities, measures would be in place to ensure that contaminants are not discharged from the construction sites. The SWPPP would define areas where hazardous materials would be stored, where trash would be placed, where rolling equipment would be parked, fueled and serviced, and where construction materials such as reinforcing bars and structural steel members would be stored. Erosion control during grading of the construction sites and during subsequent construction would be in place and monitored as specified by the SWPPP. A silting basin(s) would be established, as necessary, to capture silt and other materials, which might otherwise be carried from the site by rainwater surface runoff.</p>
APM HYD-2	<p data-bbox="363 1226 678 1251">Environmental Training Program</p> <p data-bbox="363 1268 1373 1394">An environmental training program would be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. A monitoring program would be implemented to ensure that the plans are followed throughout the period of construction.</p>
APM HYD-3	<p data-bbox="363 1415 586 1440">Accidental Spill Control</p> <p data-bbox="363 1457 1373 1625">The Construction SWPPP identified above would include procedures for quick and safe cleanup of accidental spills. The Construction SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The SWPPP would identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, would be permitted.</p>
APM HYD-4	<p data-bbox="363 1646 948 1671">Non-storm Water and Waste Management Pollution Controls</p> <p data-bbox="363 1688 1360 1879">Oil-absorbent materials, tarps, and storage drums would be used to contain and control any minor releases of transformer oil. In the event that excess water and liquid concrete escapes from foundations during pouring, it would be directed to bermed areas adjacent to the borings where the water would infiltrate or evaporate and the concrete would remain and begin to set. Once the excess concrete has been allowed to set up (but before it is dry), it would be removed and transported to an approved landfill for disposal.</p>

**TABLE 4.9-1 (CONTINUED)  
APPLICANT PROPOSED MEASURES  
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APM #	APM Description
APM HYD-5	<p>Hazardous Material Identification</p> <p>A Phase I Environmental Site Assessment (ESA) would be performed at each new or expanded substation location and along newly acquired transmission line R-O-Ws. Depending on the results of the Phase I ESA, soil sampling would be conducted and remedial activities would be implemented, if applicable. If hazardous materials were encountered during any construction activities, work would be stopped until the material was properly characterized and appropriate measures were taken to protect human health and the environment. If excavation of hazardous materials is required, they would be handled, transported, and disposed of in accordance with federal, state, and local regulations.</p>
APM HYD-6	<p>Drilling and Construction Site Dewatering Management</p> <p>Any dewatering operations associated with drilling and LST/TSP footing installation would follow applicable state and local regulatory requirements. If groundwater were encountered while excavating or constructing the transmission line or substations, dewatering operations would be performed. These operations would include, as applicable, the use of sediment traps and sediment basins in accordance with BMP NS-2 (Dewatering Operations) from the California Stormwater Quality Association's (CASQA) California Stormwater BMP Handbook – Construction (CASQA, 2003).</p>
APM HYD-7	<p>Flood and Erosion Structure Damage Protection</p> <p>Transmission towers or other structures would not be placed within waterway protection corridors (floodways) defined by city and county codes. Aboveground project features such as transmission line towers and substation facilities will be designed and engineered to withstand potential flooding and erosion hazards. Although some project features may need to be placed within 100-year floodplain boundaries, they will be designed per applicable floodplain development guidelines. Measures would include specially designed footings to withstand flooding due either to a 100-yr flood event or a failure of a nearby upstream dam or reservoir. The main Project facilities (i.e., substations) will be located outside of known watercourses.</p>
APM HYD-8	<p>Operation Storm Water Management Plan.</p> <p>The post-construction (Operation) Storm Water Management Plan (SWMP) for Vincent Substation would be updated.</p> <p>The SWMP identifies potential pollutants based on the activities that take place at the site, and discusses the appropriate Best Management Practices that should be used to prevent pollutants from entering the storm water and non-storm water runoff from the site. The SWMP also includes requirements for periodic site training for employees and inspections by onsite personnel.</p>

mountains, producing widespread precipitation. These storms often last for several days. In addition to the extra-tropical cyclones, this area of the proposed Project may receive thunderstorms, which can occur at any time of the year. Thunderstorms cover comparatively small areas, but result in high intensity precipitation, usually lasting for less than three hours.

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On a smaller watershed, thunderstorms can produce flash flooding, which is generally not large enough to produce widespread flooding.

The average maximum and minimum winter (January) temperatures in Lancaster are 57°F and 31°F respectively, and in Mojave are 58°F and 34°F, respectively. The average maximum and minimum summer (July) temperatures in Lancaster are 95°F and 66°F respectively, and in Mojave are 97°F and 67°F, respectively. The average annual precipitation ranges from 7.4 inches (Lancaster) to 9.48 inches (Mojave), with over 75 percent of all annual precipitation occurring between the months of December and March. Little precipitation occurs during summer because migrating storm systems traveling over the eastern Pacific are diverted from the Antelope Valley area by a high pressure cell. Higher altitude areas have slightly more extreme temperatures and precipitation events that vary somewhat from lower-altitude areas.

**4.9.6.1.2 South Coast Hydrologic Region.** The climate within the South Coast Hydrologic Region, including the Santa Clara, Los Angeles, San Gabriel, and Santa Ana River watersheds is described in the LARWQCB and SARWQCB Basin Plans and is summarized below.

With prevailing winds from the west and northwest, moist air from the Pacific Ocean is carried inland in the Los Angeles Region until it is forced upward by the mountains. The resulting storms, common from November through March, are followed by dry periods during summer months. Differences in topography are responsible for large variations in temperature, humidity, precipitation, and cloud cover throughout the Region. The coastal plains and islands, with mild rainy winters and warm dry summers, are noted for their subtropical “Mediterranean” climate. The inland slopes and basins of the Transverse Ranges, on the other hand, are characterized by more extreme temperatures and little precipitation. The average maximum and minimum winter (January) temperatures in downtown Los Angeles are 67°F and 49°F respectively, and in Ontario are 68°F and 45°F, respectively. The average maximum and minimum summer (July) temperatures in downtown Los Angeles are 83°F and 63°F respectively, and in Ontario are 95°F and 62°F, respectively.

Precipitation in the region generally occurs as rainfall, although snowfall can occur at high elevations. Most precipitation occurs during just a few major storms. Large variations in annual rainfall exist within the region, from 10 inches to over 40 inches, depending largely on location and elevation. Mount Islip along the crest of the Angeles National Forest has annual rainfall highs of approximately 42 inches, while annual rainfall lows of approximately 10 inches are typical of lower elevation locations. Average annual rainfall in the City of Los Angeles is approximately 16 inches.

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**4.9.6.2 Surface Water**

Surface water hydrology describes flow of surface water systems, including watersheds, floodplains, rivers, streams, lakes, and reservoirs, among others.

**4.9.6.3 Watersheds**

The proposed Project route traverses watersheds and groundwater basins in Kern County, Los Angeles, and San Bernardino Counties. The term “watershed” refers to area of land within which all waterways drain to one specified outlet, or body of water such as a river, lake, ocean, or wetland. Watersheds are separated topographically by areas of elevation, such as ridges, hills, or mountains. All precipitation that occurs within a given watershed (or “basin”) area will eventually drain into the same body of water as the rest of the watershed.

The State of California uses a hierarchical naming and numbering convention to define watershed areas for management purposes. This means that boundaries are defined according to size and topography, with multiple sub-watersheds within larger watersheds. A general description of how watershed levels are defined is provided in Table 4.9-2. The Natural Resources Conservation Service (NRCS), which is part of the U.S. Department of Agriculture (USDA), is responsible for maintaining the California Interagency Watershed Mapping Committee (IWMC), formerly the CalWater Committee. This committee works on watershed mapping and dataset creation throughout the State. The IWMC has defined a set of naming and numbering conventions applicable to all watershed areas in the State, for the purposes of interagency cooperation and management.

Table 4.9-2 shows the primary watershed classification levels used by the State of California, as defined by the IWMC, which are applicable to this analysis. The second column indicates the approximate size that a watershed area may be within a particular classification level, although variation in size is common. Due to a wide variety in the topographic and geologic characteristics of the watershed levels described in Table 4.9-2, the size of a watershed area on any given level may vary greatly. For instance, although the approximate size of an HSA is 125,000 acres, the actual size may vary between 50,000 acres and upwards of 450,000 acres, depending on the specific location. The boundaries of watershed areas on different levels, for instance an HU and an HA, are only the same when their boundaries include “all the source area contributing surface area to a single defined outlet point” (IWMC, 2007). Watershed levels for the proposed Project are listed in Table 4.9-3.

**4.9.6.3.1 Antelope Valley Watershed.** Segments 4, 5, and 10 lie within the Antelope Valley Watershed, which is a large, closed basin in the western Mojave Desert. This

**TABLE 4.9-2  
STATE WATERSHED NAMING CONVENTION**

Watershed Level	Approximate Square Miles	Description
Hydrologic Region (HR)	12,735	Defined by large-scale topographic and geologic considerations. The State of California is divided into ten HRs.
Hydrologic Unit (HU)	672	Defined by surface drainage; may include a major river watershed, groundwater basin, or closed drainage, among others.
Hydrologic Area (HA)	244	Major subdivisions of hydrologic units, such as by major tributaries, groundwater attributes, or stream components.
Hydrologic Sub-area (HSA)	195	A major segment of an HA with significant geographical characteristics or hydrological homogeneity.

**TABLE 4.9-3  
WATERSHED LEVELS FOR THE PROPOSED PROJECT**

South Lahonton HR	South Coast HR		
Antelope Valley HU <sup>1</sup>	Santa Clara-Calleguas HU <sup>1</sup>	Los Angeles-San Gabriel HU <sup>1</sup>	Santa Ana River HU <sup>1</sup>
Chafee HA	Upper Santa Clara HA	San Fernando HA	Anaheim HA
Willow Springs HA		Raymond HA	Lower Santa Ana River HA
Neenach HA		Los Angeles	HA
Lancaster HA		San Gabriel Valley HA	Middle Santa Ana River HA
Rock Creek HA		Upper San Gabriel HA	River HA
		Lower San Gabriel HA	
Chafee HSA	Acton HSA	Tujunga HSA	Chino HSA
Willow Springs HSA		Upper Canyon HSA	Cucamonga Creek HSA
Neenach HSA		Main San Gabriel HSA	HSA
Lancaster HSA		Central HSA Split	
Rock Creek HSA		Pasadena HSA	
		Monk Hill HSA	

<sup>1</sup> Not all HSAs are included on Figure 4.9-2.

watershed straddles the Los Angeles-Kern County line and drains a total of 3,387 square miles. Approximately 80 percent of the watershed is characterized by a low to moderate slope (0 to 7 percent). The remaining 20 percent consists of foothills and rugged mountains, some of which reach up to 3,600 feet in elevation. The floor of the Antelope Valley Watershed generally lacks defined natural channels outside of the foothills and is subsequently subject to unpredictable sheet flow patterns (LACSD, 2005).

The Antelope Valley Watershed is a closed basin with no outlets to the ocean. All water that enters the watershed either infiltrates into the underlying groundwater basin, or flows toward three playa lakes located near the center of the watershed. A playa lake is formed when rain fills a playa, or small, round depression in the surface of the ground. Playa lakes usually have no outflow of water. The playa lakes in the Antelope Valley Watershed are all located on Edwards Air Force Base, approximately 20 to 30 miles northeast of the Antelope Substation. They include the following: Rosamond Lake, which covers approximately 21 square miles and is the closest playa lake to the Antelope Substation; Rogers Dry Lake, which is located east of Rosamond Lake and encompasses approximately 32 square miles; and Buckhorn Dry Lake, which is located between Rosamond and Rogers Dry Lake, encompassing 3 square miles. These playa lakes are usually dry, and they only receive water following large winter storms. Surface runoff that collects in the dry lakes quickly evaporates, and only a small quantity of water infiltrates to the groundwater due to the nearly impermeable nature of the playa soils (LACSD, 2005).

**4.9.6.3.2 Santa Clara River Watershed.** Parts of Segment 5, 6, and 11 lie within the Santa Clara River Watershed is separated from the Antelope-Fremont Valleys Watershed by the northwest portion of the San Gabriel Mountains, which provides a topographic and hydrologic divide. The Santa Clara River Watershed encompasses the Santa Clara River system, which is divided into two sections: the Upper Santa Clara River and the Lower Santa Clara River. The proposed Project would cross the origins of the Upper Santa Clara River just before the Vincent Substation.

Portions of the Upper Santa Clara River are perennial (year-round flow) due to baseflow occurring from groundwater. The baseflow contributes to surface water flow by seeping through thick alluvial deposits, which characterize the area. The Santa Clara River originates at Pacifico Mountain in the San Gabriel Mountains and flows westward for approximately 84 miles to the Pacific Ocean. The Santa Clara River Watershed drains a total area of 1,634 square miles. Ninety percent of the watershed consists of rugged mountains which reach up to 8,800 feet in elevation. The remaining 10 percent consists of valley floor and coastal plain (VCWPD and LACDPW, 2005).

The average slope severity in the Santa Clara River Watershed decreases from the northeast to the southwest, with the proposed Project situated in the southeastern area of the watershed. The result of this changing topography is the deposition of sediments carried by the river in the vicinity of the City of Santa Clarita, forming an alluvial valley that widens as it progresses downstream towards the Pacific Ocean. Other important hydrologic resources in the Santa Clara River Watershed include multiple tributaries of the Santa Clara River, as well as four major reservoirs. Principal tributaries to the Santa Clara River include: Castaic Creek

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in Los Angeles County, and Piru, Sespe, and Santa Paula Creeks in Ventura County. The four reservoirs, which include Lake Piru and Pyramid Lake on Piru Creek, Castaic Lake on Castaic Creek, and Bouquet Reservoir on Bouquet Creek, control approximately 37 percent of runoff that occurs within the watershed boundaries (VCWPD and LACDPW, 2005).

**4.9.6.3.3 Los Angeles-San Gabriel Hydrologic Unit Watershed.** Portions of Segments 6, 7, 8, and 11 lie within the Los Angeles-San Gabriel Hydrologic Unit. Los Angeles and San Gabriel Hydrologic Areas combine to form the Los Angeles-San Gabriel Hydrologic Unit because downstream of the Whittier Narrows Dam, the two watersheds are combined. The Los Angeles-San Gabriel Hydrologic Unit covers most of Los Angeles County and small areas of southeastern Ventura County. This drainage area totals 1,608 square miles, with a high degree of impervious surfaces due to existing development. The Los Angeles River, San Gabriel River, and Ballona Creek, which are the major drainage systems in the area, drain the coastal watersheds of the Transverse Ranges. These surface waters also recharge large reserves of groundwater that exist in alluvial aquifers underlying the San Fernando and San Gabriel valleys and the Los Angeles Coastal Plain.

Portions of Segments 7 and 8 of the proposed Project cross or are adjacent to the Santa Fe and Whittier Narrows dams. Santa Fe and Whittier Narrows dams are two of the five federal flood control dams in the Los Angeles County Drainage Area (USACE, 1985). Santa Fe Dam is located in the northeastern San Gabriel Valley on the San Gabriel River about 4 miles below the mouth of San Gabriel Canyon. Bordering communities include Irwindale, Baldwin Park, Duarte, and Azusa. Whittier Narrows Dam is located approximately 7 miles downstream of Santa Fe Dam and spans both the San Gabriel River and the Rio Hondo. Flood control is the primary purpose for both dams.

**4.9.6.3.4 Santa Ana River Watershed.** Segment 8A traverses waterways that are tributary to the Lower and Middle Santa Ana River Hydrologic Areas past S8A MP 19.0. The Santa Ana River Region is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean. The Santa Ana Region is the smallest of the nine regions in the state with an area of 2,800 square miles. The average annual rainfall in the region is about 15 inches, most of it occurring between November and March.

The boundaries between California's nine regions are usually hydrologic divides that separate watersheds, but the boundary between the Los Angeles and Santa Ana Regions is the Los Angeles County line. Since that county line only approximates the hydrologic divide, part of the Pomona area drains into the Santa Ana Region, and, in Orange County, part of La Habra drains into the Los Angeles Region. The east-west alignment of the crest of the San

Gabriel and San Bernardino Mountains separates the Santa Ana River basin from the Mojave Desert, which is part of the Lahontan Basin. In the south, the regional boundary divides the Santa Margarita River drainage area from that of the San Jacinto River, which normally terminates in Lake Elsinore. Near Corona, the Santa Ana River has cut through the Santa Ana Mountains and flows down onto the Orange County coastal plain. The Pacific Ocean coast of the Santa Ana Region extends from just north of Laguna Beach up to Seal Beach and the Los Angeles County line. Other features of the coast include Newport Bay, Anaheim Bay-Huntington Harbor, and the major coastal wetlands areas associated with those bays.

San Antonio Dam is a flood control and water conservation project constructed and operated by the USACE, Los Angeles District. The dam is located on San Antonio Creek approximately 10.5 miles upstream of its confluence with Chino Creek. The dam was constructed in conjunction with improvements to San Antonio Creek and Chino Creek. Significant areas in the vicinity of Chino would be subject to shallow flooding associated with San Antonio dam failure inundation (USACE, 1986).

#### **4.9.6.4 Lakes, Reservoirs, and Aqueducts**

**4.9.6.4.1 Los Angeles Aqueduct.** The Los Angeles Aqueduct conveys water from Mono Lake in the Owens Valley to the City of Los Angeles. Construction of the aqueduct was completed in 1913. The project includes 223 miles of 12-foot-diameter steel pipe, which still transports water to the southern California market today. A second Los Angeles Aqueduct was built in 1970, stretching 137 miles. The proposed Project would be situated near the original aqueduct, which has a present capacity of 485 cubic feet per second (cfs).

**4.9.6.4.2 California Aqueduct.** The California DWR operates the State Water Project (SWP), which transports water from the Sacramento Delta to southern California via the California Aqueduct. The East Branch of the California Aqueduct extends eastward along the southern edge of the Antelope Valley, passing just south of the City of Palmdale. The aqueduct continues eastward to Silverwood Reservoir, where water is conveyed southward. Segment 5 crosses the California Aqueduct at approximately S5 MP 4.5, as noted in Table 4.9-4. The East Branch of the California Aqueduct, which runs along the northeastern margin of the San Gabriel Mountains, delivers water from the SWP to the Antelope Valley-East Kern Water Agency (AVEK) and, further east, to the Mojave Water Agency. As a State Water Contractor, AVEK delivers SWP water to 22 water purveyors for agricultural, municipal, and industrial use, with a maximum allocation of 141,400 acre-feet per year.

A phenomenon particular to large standing bodies of water are seiches. A seiche is a standing wave in an enclosed or partially enclosed body of water caused by atmospheric or seismic

**TABLE 4.9-4**  
**SOUTH LAHONTAN HYDROLOGIC REGION**  
**MAJOR WATERBODIES TRAVERSED BY THE PROPOSED PROJECT**

Project Segment - Milepost	Waterbody Name	Water Body Description
S10 MP 2.0	Oak Creek	Antelope Valley Watershed; receives surface water runoff from the Tehachapi Mountains and is tributary to Rosamond Dry Lake.
S4 MP 2.0 S10 MP 6.8 S10B MP 0.2 S10B MP 4.9	Los Angeles Aqueduct	Owned and operated by LADWP. Total length of 223 miles to transport water in pipes from Owens Valley to southern California.
S10 MP 15.0 S10A MP 8.2	Cottonwood Creek	Antelope Valley Watershed; receives surface water runoff from the Tehachapi Mountains and is tributary to Rosamond Dry Lake.
S5 MP 4.5	California Aqueduct	Primary aspect of the CA State Water Project (SWP). Operated and maintained by the CA Department of Water Resources. Total length of 444 miles to transport water for the SWP as well as the federal Central Valley Project.
S5 MP 7.8	Amargosa Creek	Large ephemeral stream. Collects runoff from the Sierra Pelona Mountain Range. Flows eastward and drain northerly through Palmdale and Lancaster. Tributary to Rosamond Dry Lake.
S5 MP 9.9	Anaverde Creek	Collects runoff from the Sierra Pelona Mountains. Drains easterly through Anaverde Valley. Flows into a retention basin in western Palmdale, then to Amargosa Creek.

events. Segments 7 and 8A cross the Whittier Narrows Flood Control Basin, which if full, could be subject to a seiche. However, it is extremely rare for recordable seiches to occur in areas west of the Rocky Mountains, so it is highly unlikely that a seiche could occur within the basin. Additionally, none of the project segments would be subject to damage from a tsunami.

#### **4.9.6.5 Rivers and Streams**

**4.9.6.5.1 Ephemeral Streams and Desert Washes.** Due to arid conditions throughout the proposed Project area, there are numerous waterways that may be characterized as ephemeral streams, or as a desert wash. An ephemeral stream is a stream or reach of a channel that flows only in direct response to precipitation in the immediate locality. The channel of an ephemeral stream is at all times above the saturation zone, so it is not re-charged by

groundwater. Therefore, ephemeral streams lose water to the streambed, which causes flood discharge downstream to be less than flood discharge upstream, except under the condition of flow that is significant enough to saturate the streambed (Briggs, 1996). Similarly, a desert wash is a dry streambed which only carries water after heavy rainfall. During thunderstorms or heavy rain events, desert washes may fill rapidly, triggering flash flood conditions.

There are multiple ephemeral streams and washes crossed by or near the proposed Project (refer to Table 4.9-5) that carry surface water to the playa lakes described above. As a result of the dry climate in the Project area, the existing ephemeral streams and washes typically flow only during periods of heavy rainfall, or as a result of melting snow pack from the local mountains. Many areas in the Antelope Valley experience sheet flow during heavy rainstorms due to a lack of prior saturation, but they tend to remain dry with moderate and low-intensity storms (LACSD, 2005).

**4.9.6.5.2 Floodplains.** A floodplain is a geographic area of relatively level land that is occasionally subject to inundation by surface water from rivers or streams that lie within the floodplain. A “100-year flood” refers to the maximum level of water that is expected to inundate a floodplain once every 100 years, on average. In other words, a 100-year floodplain is an area of land that has a one percent chance of being inundated by a flood in any given year. The Federal Emergency Management Agency (FEMA) estimates the boundaries for 100-year floodplains, referred to as “Flood Hazard Areas,” and produces Flood Insurance Rate Maps (FIRMs) which define the 100-year floodplain boundaries. Typically, where detailed floodplain studies have not been conducted or, FEMA designates 100-year floodplains as “Zone A” on the FIRMs. Any development which takes place in a Flood Hazard Area must comply with floodplain management ordinances (FEMA, 2007).

Similar to the FEMA-designated Flood Hazard Areas, the California State Office of Emergency Services (OES) and the California Department of Water Resources (DWR) require that dam owners identify the potential magnitude of flooding, or the dam inundation area, that would occur in the case of a dam failure.

#### **4.9.6.6 Groundwater**

**4.9.6.6.1 Antelope Valley Groundwater Basin.** Segments 4, 5, 9, and 10 traverse, or are located entirely within the Antelope Valley Groundwater Basin which is predominately contained within the Antelope Valley Watershed (see Figures 4.9-1 and 4.9-5). The northernmost regions of the Antelope Valley Groundwater Basin cross into the Fremont Valley Watershed and small portions along the southeastern boundary cross into the Santa Clara River Watershed (see Figures 4.9-1 and 4.9-5).

**TABLE 4.9-5**  
**SOUTH COAST HYDROLOGIC REGION**  
**MAJOR WATERBODIES TRAVERSED BY THE PROPOSED PROJECT**

Project Segment Milepost	Waterbody Name	Water Body Description
S5 MP 17.3	Upper Santa Clara River (Soledad Canyon)	The Upper Santa Clara River comprises the headwaters for the Santa Clara River system. The Upper Santa Clara River is largely an intermittent river, with some portions that may be characterized as ephemeral and other portions that flow for several days after a rain event.
S6 MP 0.2, 2.2, 2.4; S11 MP 0.2	Kentucky Springs Canyon	Tributary of Soledad Canyon Creek
S6 MP 6.5, 6.6 S11 MP 3.5	Aliso Canyon	Tributary of Soledad Canyon Creek
S6 MP 16.4	Upper Big Tujunga Canyon	Tributary of Big Tujunga Canyon Creek (upstream of Big Tujunga Reservoir)
S11 MP 13.1	Big Tujunga Creek	The upper portion of Big Tujunga Wash. It travels roughly east and several tributaries from the north and south join it as it flows to Big Tujunga Reservoir, formed by Big Tujunga Dam.
S6 MP 18.8	West Fork San Gabriel River	Tributary of the San Gabriel River
S7 MP 1.7, 3.2, 5.0, 5.6, 5.9, 8.5, 8.6, 10.5, 10.8, 11.6 S8A MP 3.7	San Gabriel River	Receives drainage from a large area of eastern Los Angeles County. Its headwaters originate in the San Gabriel Mountains.
S7 MP 11.6 S7 MP 13.7	Whittier Narrows Flood Control Basin	A flood control and water conservation project constructed and operated by the U.S. Army Corps of Engineers.
S7 MP 13.6	Rio Hondo	Tributary of Los Angeles River
S8A MP 2.2, 4.4	Whittier Narrows Flood Control Basin	A flood control and water conservation project constructed and operated by the U.S. Army Corps of Engineers.
S8A MP 4.5, 4.7	San Jose Creek	Tributary of San Gabriel River (downstream of Santa Fe Flood Control Basin)
S11 MP 14.8	Clear Creek	Tributary of Big Tujunga Canyon Creek (downstream of Big Tujunga Reservoir)
S11 MP 19.3	Arroyo Seco	The Arroyo Seco begins high in the San Gabriel Mountains and flows through the communities of La Canada Flintridge, Altadena, Pasadena, South Pasadena and Northeast Los Angeles to meet the Los Angeles River just north of downtown Los Angeles.
S11 MP 20.2	El Prieto Canyon	Tributary of Arroyo Seco

**TABLE 4.9-5 (CONTINUED)**  
**SOUTH COAST HYDROLOGIC REGION**  
**MAJOR WATERBODIES TRAVERSED BY THE PROPOSED PROJECT**

Project Segment Milepost	Waterbody Name	Water Body Description
S11 MP 20.6	Millard Canyon	Tributary of Arroyo Seco
S11 MP 22.5	Las Flores Canyon	Captures runoff from Las Flores Canyon.
S11 MP 22.9	Rubio Canyon	Tributary of Rio Hondo (downstream of Santa Fe Flood Control Basin)
S11 MP 24.1	Eaton Canyon	Tributary of Eaton Dam and Reservoir
S11 MP 26.1, 28.3, 28.5, 29.2	Eaton Wash	Tributary of Rio Hondo (downstream of Santa Fe Flood Control Basin)
S11 MP 29.2, 29.5	Eaton Wash Basin	Flood control and debris storage basin located northeast of Pasadena
S11 MP 34.0	Alhambra Wash	Tributary of Whittier Narrows Flood Control Basin
S8A MP 17.1	Brea Canyon	Captures runoff from Puente Hills within the Anaheim HA
S8A MP 18.6	Tonner Canyon	Captures runoff from Puente Hills within the Anaheim HA
S8A MP 22.4	Carbon Canyon	Tributary of Chino Creek
S8A MP 22.6, 22.9, 23.8, 24.6	Little Chino Creek	Tributary of Chino Creek
S8A MP 26.1	Chino Creek	Tributary to Prado Dam (Middle Santa Ana River HA). Chino Creek baseflow includes urban runoff, reclaimed water, and periodic imported water.
S8A MP 32.9; S8B MP 4.5; S8C MP 4.5	Cucamonga Creek	The channel is concrete-lined and trapezoidal in shape located above the Prado Flood Control Reservoir. Located within the Middle Santa Ana River HA.

The Antelope Valley Groundwater Basin is the principal groundwater basin for southeastern Kern County and the portion of Los Angeles County surrounding the City of Lancaster. The basin is bounded on the northwest by the Garlock Fault zone at the base of the Tehachapi Mountains and on the southwest by the San Gabriel Mountains. To the east, the basin is bounded by ridges, buttes, and low hills, and to the north it is bounded by the Fremont Valley Groundwater Basin (DWR, 2004). The surface area of the Antelope Valley Groundwater Basin is approximately 1,580 square miles, extending across portions of Kern and Los Angeles Counties, and into the western edge of San Bernardino County (CPUC, 2006a, 2006b).

The primary water-bearing materials of the basin are Pleistocene- and Holocene-age unconsolidated alluvial and lacustrine deposits that consist of compact gravels, sand, silt, and

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clay. In general, groundwater in the Antelope Valley is divided vertically into three aquifers: a shallow, unconfined, upper aquifer that is not highly productive; a thicker, deeper, confined middle aquifer that produces the most groundwater; and a thin, lower aquifer that is the deepest and produces little groundwater. Horizontally, the Antelope Valley Ground Water basin is divided into 12 sub-basins, including the Lancaster, Pearland, and Buttes sub-basins. Segment 4 is underlain by the Lancaster sub-basin (LACSD, 2005).

Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. Eighty percent of natural recharge comes from mountain runoff, of which more than 50 percent is attributed to Big Rock and Littlerock Creeks. Hydrographs of wells in the vicinity of the proposed Project route show that the unconfined groundwater table has been decreasing steadily from 1981 through 1997 at a rate of 0.25 to 0.5 feet per year (CPUC, 2006a, 2006b).

**4.9.6.6.2 Acton Valley Groundwater Basin.** Portions of Segments 5, 6, and 11 traverse the Acton Valley Groundwater Basin which is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east, and west. The valley is drained by the Santa Clara River. Average annual precipitation ranges from 10 to 16 inches. Groundwater is the source of most potable water in this unsewered area. However, increasing concentrations of nitrate are degrading the quality of this water (LARWQCB, 2004).

**4.9.6.6.3 San Gabriel Valley Groundwater Basin.** Portions of Segments 6, 7, 8, and 11 traverse the San Gabriel Valley Groundwater Basin which is located in eastern Los Angeles County and includes the water-bearing sediments underlying most of the San Gabriel Valley and includes a portion of the upper Santa Ana Valley that lies in Los Angeles County. This basin is bounded to the north by the Raymond fault and the contact between Quaternary sediments and consolidated basement rocks of the San Gabriel Mountains. Exposed consolidated rocks of the Repetto, Merced, and Puente Hills bound the basin on the south and west, and the Chino fault and the San Jose fault form the eastern boundary. The Rio Hondo and San Gabriel drainages have their headwaters in the San Gabriel Mountains, then surface water flows southwest across the San Gabriel Valley and exit through the Whittier Narrows, a gap between the Merced and Puente Hills. Precipitation in the basin ranges from 15 to 31 inches, and averages around 19 inches.

**4.9.6.6.4 Raymond Groundwater Sub-basin.** Portions of Segment 11 traverse the Raymond Groundwater Sub-basin which is part of the San Gabriel Valley Groundwater Basin. The Raymond Basin is located in the northwest part of the San Gabriel Valley, in eastern Los Angeles County. The Raymond Basin includes the water-bearing sediments bounded by the contact with consolidated basement rocks of the San Gabriel Mountains on

the north and the San Rafael Hills on the southwest. The west boundary is delineated by a drainage divide at Pickens Canyon Wash and the southwest boundary is the Raymond fault. Precipitation averages in the basin range from about 19 inches in the valley to 25 inches in upland areas. The average precipitation over the basin is about 21 inches.

**4.9.6.6.5 Upper Santa Ana Valley Groundwater Basin (Chino Sub-basin).** Portions of Segment 8 traverse the Upper Santa Ana Valley Groundwater Basin (Chino Sub-basin). This basin is bounded on the east by the Rialto-Colton fault on the southeast by the contact with impermeable rocks forming the Jurupa Mountains and low divides connecting the exposures. On the south the sub-basin is bounded by contact with impermeable rocks of the of the Puente Hills and by the Chino fault on the northwest by the San Jose fault; and on the north by impermeable rocks of the San Gabriel Mountains and by the Cucamonga fault. San Antonio Creek and Cucamonga Creek drain the surface of the sub-basin southward to join Santa Ana River. Annual mean precipitation ranges from 13 to 29 inches across the surface of the sub-basin and averages about 17 inches. The most serious water-related problem in the Santa Ana Valley Basin at this time is water supply. This region now uses approximately twice as much water as is available from local sources. As a result, the quantity of water imported into this region each year now equals or exceeds the amount of ground and surface water utilized.

#### **4.9.6.7 Water Quality**

An effective water quality control plan requires the determination of one or more beneficial uses categories, as defined by the applicable RWQCB basin plans. Beneficial use designation is a legislated process meant to reduce the impacts of water quality impairment by assigning a particular use to the water body, with corresponding water quality criteria. Beneficial use designations may include categories such as agriculture, culture, supply, and environmental, among others. Once beneficial uses are designated, appropriate water quality objectives can be established. Programs that maintain or enhance water quality can then be implemented to ensure the protection of the designated beneficial uses. Water quality standards are formed through the combined designated beneficial uses and water quality objectives. Such standards are mandated for all water bodies within the State of California, including surface water and groundwater, under the California Water Code.

**4.9.6.7.1 Surface Water Quality.** Section 303 (d) of the Clean Water Act (CWA) requires the following:

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*Each State shall identify those waters within its boundaries for which the effluent limitations are not stringent enough to implement any water quality standards applicable to such waters.*

The CWA also requires states to establish a priority ranking for water bodies that qualify them for the 303(d) list of impaired water bodies and establish a total maximum daily load (TMDL) for such waters.

**Antelope Valley Watershed.** Water quality problems in the Antelope Valley Watershed and in the South Lahontan Hydrologic Region (HR) overall are largely related to non-point sources of pollution, including erosion from construction and agricultural activities such as livestock grazing. Non-point sources of pollution can also be significant and include stormwater, acid drainage from inactive mines, and individual wastewater disposal systems. Water quality data in the Antelope Valley Watershed indicate that the level of total dissolved solids (TDS) ranges from 80 to 404 milligrams per liter (mg/l). The average TDS level between January of 1995 and July of 1997 was 214 mg/l. Arsenic averaged 2 parts per million (ppm) over the same period, which is less than the 5 ppm maximum contaminant level (MCL) allowed for arsenic in drinking water (CPUC, 2006a, 2006b).

The Lahontan RWQCB has jurisdiction over the Antelope Valley Watershed. Together with the State Water Board, the Lahontan RWQCB has identified 22 beneficial uses within the South Lahontan HR. Table 4.9-6 shows the beneficial uses designated for the water bodies located in the Antelope Valley Watershed which are also in the vicinity of the proposed Project. As the table indicates, there are no Section 303(d) listings (impaired water bodies) in the South Lahontan HR or the Antelope Valley Watershed.

**Santa Clara River Watershed.** Water quality in the Santa Clara River is relatively poor due to the combined impacts of natural mineralization processes as well as widespread agricultural runoff. Based on water quality data collected by the United Water Conservation District (UWCD) and DWR, concentrations of TDS and sulfates in the Santa Clara River at the Ventura/Los Angeles County Line (the most downstream sample point) are about ten times higher than TDS concentrations at Lang Station (the most upstream sample point) (VCWPD and LACDPW, 2005). This can be attributed to the increased development in the City of Santa Clarita and other land use changes that have taken place within the Santa Clara River Watershed. In addition, there are two Los Angeles County Sanitation District (LACSD) wastewater plants in the area, both of which also contribute to poor water quality in the Santa Clara River.

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**TABLE 4.9-6  
SOUTH LAHONTAN HYDROLOGIC REGION – BENEFICIAL USES AND SECTION  
303(d) LISTING OF SURFACE WATER IN THE VICINITY OF THE PROPOSED PROJECT ROUTE**

Water Body Name	Beneficial Use																				303(d)	TMDL or Pollutant Stressor				
	MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC1	REC2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL	RARE	MGR	SPWN			WQE	FLD		
Antelope Valley Watershed																										
Oak Creek	E	E		E	E				E	E	E		E				E								N/A	N/A
Minor Surface Waters	E	E			E				E	E	E		E	E			E								N/A	N/A
Minor Wetlands	E	E			E	E			E	E			E				E					E	E		N/A	N/A
California Aqueduct <sup>1</sup>																									N/A	N/A
Los Angeles Aqueduct <sup>1</sup>																									N/A	N/A

<sup>1</sup> Both the California and Los Angeles Aqueducts are listed on USEPA's 2002 National Assessment Database [305(b) list] as impaired.

Table Abbreviation Descriptions:

E: Existing Beneficial Use

MUN: Municipal Supply and Recharge

IND: Industrial Service Supply

NAV: Navigation

REC2: Non-contact Water Recreation

WARM: Warm Freshwater Habitat

WILD: Wildlife Habitat

MGR: Migration of Aquatic Organisms

FLD: Flood Peak Attenuation / Flood Water Storage

AGR: Agricultural Supply

GWR: Ground Water Recharge

POW: Hydropower Generation

COMM: Commercial and Sport fishing

COLD: Cold Freshwater Habitat

BIOL: Preservation of Biological Habitats of Special Significance

SPWN: Spawning, Reproduction, and Development

PRO: Industrial Process Supply

FRSH: Freshwater Replenishment

REC1: Water Contact Recreation

AQUA: Aquaculture

SAL: Inland Saline Water Habitat

RARE: Rare, Threatened, or Endangered Species

WQE: Water Quality Enhancement

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In recent years, there has been a general trend towards a decrease in TDS and sulfate concentrations, thus resulting in better overall water quality in the area. The general improve in water quality is attributed to the effects of importing water, which has decreased the use of groundwater containing relatively high TDS and sulfate levels. Other sections of the Upper Santa Clara River, such as the heavily urbanized Santa Clara River basin, continue to have poor water quality due to high levels of non-point source pollution, most of which enter the creeks and flood channels

**Beneficial Uses and Section 303(d) Listing.** The LARWQCB has jurisdiction over the Santa Clara River Watershed. As the presiding authority, the LARWQCB has documented 24 beneficial uses that apply to waters within the South Coast HR, including the Santa Clara River Watershed. The beneficial uses for the major creeks and streams that would be traversed by the proposed Project include the following: municipal/domestic supply; industrial process/service supply; agricultural supply; groundwater recharge; freshwater replenishment; power generation; recreation; warm water fisheries, and wildlife habitat. From among these beneficial uses, waterways that provide wildlife habitat are the key areas of concern regarding surface water quality, particularly due to shrinking wetland habitat areas.

The Upper Santa Clara River, Reach 9, is on the 2002 Section 303(d) list for coliform. The upstream limits of Reach 9 are near Lang Station which is over 15 miles downstream of the Segment 5 crossing and the Vincent Substation. Table 4.9-7 lists the beneficial uses, Section 303(d) listing, and TMDLs for water bodies that are along the project route within the South Coast Hydrologic Region.

**Los Angeles-San Gabriel Hydrologic Unit.** Major surface waters of the Los Angeles Region flow from head waters in mountain areas (largely in two National Forests and the Santa Monica Mountains), through urbanized foothill and valley areas, high density residential and industrial coastal areas, and terminate at highly utilized recreational beaches and harbors. Uncontrolled pollutants from nonpoint sources are believed to be the greatest threats to rivers and streams within the Region (LARWQCB, 2004).

**Los Angeles River Watershed.** The Los Angeles River is highly modified, having been lined with concrete along most of its length from the 1930s to the 1960s. The upper reaches of the river carry urban runoff and flood flows from the San Fernando Valley. Below the Sepulveda Basin (see Figure 4.9-1), flows are dominated by tertiary-treated effluent from several municipal wastewater treatment plants. Because the watershed is highly urbanized, urban runoff and illegal dumping are major contributors to impaired water quality in the Los Angeles River and tributaries (LARWQCB, 2004).

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**TABLE 4.9-7  
SOUTH COAST HYDROLOGIC REGION – BENEFICIAL USES AND  
SECTION 303(D) LISTING OF SURFACE WATER IN THE VICINITY OF THE PROPOSED PROJECT ROUTE**

Water Body Name	Beneficial Use																303(d)	TMDL or Pollutant Stressor						
	MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC1	REC2	COMM	AQUA	WARM	COLD	SAL	WILD			BIOL	RARE	MGR	SPWN	WCE	FLD
<b>Santa Clara-Calleguas Hydrologic Unit (Santa Clara Watershed)</b>																								
Upper Santa Clara River <sup>1</sup>	E	E		E		E			E	E			E			E		E					Reach 9	Coliform
Aliso Canyon	P	P			E				E	E			E			E							N/A	N/A
<b>Los Angeles-San Gabriel Hydrologic Unit</b>																								
Santa Fe Dam Park	P				I				P	I			I			E							E	Copper, Lead, pH
San Gabriel River <sup>2</sup>	P				I				I	I			I			E							Reach 3	Toxicity
San Jose Creek <sup>2</sup>	P								P	I			I			E							Reach 1	Algae, Coliform
Rio Hondo <sup>2</sup>	P				I				I	E			P			I		E					Reach 2	Coliform, NH <sub>3</sub>
Legg Lake	P				E				E	E			E	E		E							E	Ammonia, Copper, Lead, pH, Trash
Whittier Narrows Basin	P				E				E	E			E			E		P					E	
Mill Creek	P				E				E	E			E	E		E								
Upper Big Tujunga Canyon	P				E				E	E			E	E		E		E					E	
Big Tujunga Reservoir	P				E				P	E			E	P		E							E	
Big Tujunga Creek	P				E				E	E			E	E		E		E					E	
Clear Creek	P				E				E	E			E	E		E								
Arroyo Seco	E		E	E	E				E	E			E	E		E								

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**TABLE 4.9-7 (CONTINUED)  
SOUTH COAST HYDROLOGIC REGION – BENEFICIAL USES AND  
SECTION 303(D) LISTING OF SURFACE WATER IN THE VICINITY OF THE PROPOSED PROJECT ROUTE**

Water Body Name	Beneficial Use																				303(d)	TMDL or Pollutant Stressor					
	MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC1	REC2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL	RARE	MGR	SPWN			WQE	FLD			
El Prieto Canyon	I		I	I	I				I	I			I			E											
Millard Canyon	E		E	E	E				E	E			E			E		E									
Las Flores Canyon	P								I	I			I														
Rubio Canyon	P				E				I	I			I			E		E									
Eaton Canyon	P				E				E	E			E			E		E		E							
Eaton Wash Dam	P				I				P	I			I			E											
Eaton Wash (Below Dam)	P				I				I	I			I			I											
Alhambra Wash	P				I				P	I			P			P		E									
<b>Santa Ana River Hydrologic Unit</b>																											
Carbon Canyon	P				I				I	I			I														
Chino Creek <sup>2</sup>	P	P	P	P																					Reach 2	Coliform	
Cucamonga Creek <sup>2</sup>	P	P	P	P																							

<sup>1</sup> Vincent Substation is located in Reach 10 of the Upper Santa Clara River which is not listed as impaired on the USEPA's 2002 National Assessment Database [305(b) list] as impaired.

<sup>2</sup> These waterbodies are listed on USEPA's 2002 National Assessment Database [305(b) list] as impaired.

Table Abbreviation Descriptions:

E: Existing Beneficial Use

AGR: Agricultural Supply

FRSH: Freshwater Replenishment

REC2: Non-contact Water Recreation

P: Potential Beneficial Use

PRO: Industrial Process Supply

NAV: Navigation

COMM: Commercial and Sport Fishing

I: Intermittent Beneficial Use

IND: Industrial Service Supply

POW: Hydropower Generation

AQUA: Aquaculture

MUN: Municipal Supply and Recharge

GWR: Ground Water Recharge

REC1: Water Contact Recreation

WARM: Warm Freshwater Habitat

**TABLE 4.9-7 (CONTINUED)  
SOUTH COAST HYDROLOGIC REGION – BENEFICIAL USES AND  
SECTION 303(D) LISTING OF SURFACE WATER IN THE VICINITY OF THE PROPOSED PROJECT ROUTE**

RARE: Rare, Threatened, or Endangered Species    SAL: Inland Saline Water Habitat    COLD: Cold Freshwater Habitat    BIOL: Preservation of Biological Habitats of Special Significance  
WQE: Water Quality Enhancement    MIGR: Migration of Aquatic Organisms    SPWN: Spawning, Reproduction, and Development  
WILD: Wildlife Habitat    FLD: Flood Peak Attenuation/Flood Water Storage

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***San Gabriel River Watershed.*** While the upper San Gabriel River and its tributaries remain in a relatively good condition, intensive recreational use of this area for picnicking, off road vehicle use, fishing, and hiking threaten water quality and aquatic and riparian habitats. Further problems in the upper San Gabriel River occur as vast amounts of naturally eroding sediment from the rugged San Gabriel Mountains settle into reservoirs behind flood control dams. Improper sediment sluicing operations from these reservoirs can impact aquatic habitats and groundwater recharge areas. In the San Gabriel Valley, the middle reaches of the river have been extensively modified in order to control flood and debris flows and to recharge ground water. Extensive sand and gravel operations area found along these stretches of the river. The lower San Gabriel River (i.e., those stretches flowing through the Los Angeles Coastal Plain) also has been extensively modified and is lined with concrete from approximately Firestone Boulevard to the estuary. Flow in these lower reaches is dominated by effluent from several municipal wastewater treatment facilities and urban runoff. Beneficial uses have been impaired in these lower reaches of the San Gabriel River, as evidenced by ambient toxicity and bioaccumulation of metals in fish tissue (LARWQCB, 2004).

Other more generalized surface water problems in the Region include:

- Poor mineral quality in some areas due to a variety of reasons including geology, agricultural runoff, discharge of highly mineralized ground water, and poor quality of some imported waters
- Bioaccumulation of toxic compounds in fish and other aquatic life
- Impacts from increased development and recreational uses
- In-stream toxicity from point and non-point sources
- Diversion of flows necessary for the propagation of fish and wildlife populations
- Channelization, dredging, and other losses of habitat
- Impacts from transient camps located along creeks and lagoons
- Illegal dumping
- Introduction of non-native plants which are of little value to the biota and clog the streams
- Impacts from sand and gravel mining operations
- Natural oil seeps

- Eutrophication and the accumulation of toxic pollutants in surface waters

**Beneficial Uses and Section 303(d) Listing.** Table 4.9-7 lists the beneficial uses, Section 303(d) listing, and TMDLs for water bodies along the Project route within the South Coast Hydrologic Region.

**Santa Ana River Watershed.** Portions of Segment 8 lie within the Chino HSA which is a tributary to Reach 3 of the Santa Ana River (Middle Santa Ana River) and Prado Dam. The Prado Flood Control Basin is a largely undisturbed, dense riparian wetland. All of the creeks that drain Chino Basin come into the river on the north side, but the total dry-weather surface flow is negligible. Reclaimed wastewater from Chino Basin MWD's Regional Plant 1 is discharged to Cucamonga Flood Control Channel and Prado Park Lake. Cucamonga Channel is concrete-lined and offers extremely limited aquatic habitat with some attached algae, a few worms and insects, but no resident finfish. The improved channel ends near Prado Basin, and the stream changes names to Mill Creek. Chino Basin MWD's Regional Plant 2 discharges to Chino Creek near Prado Basin, some distance downstream of the discharge from the relatively new Carbon Canyon Plant. The lowest segments of Chino and Mill Creeks in the Prado Basin are quite different from most other streams in the watershed, with their muddy bottoms and deeper, slow-flowing water. Most of the rising Chino Basin groundwater in the Prado area is high in TDS, nitrate, and other constituents, largely reflecting heavy present and historic agricultural water use in the area. Reach 2 of Chino Creek is listed for coliform impairment on the 2002 303(d) list.

**4.9.6.7.2 Groundwater Quality.** The federal Safe Drinking Water Act of 1974 and its respective updates require that maximum containment level (MCL) standards be applied to all water intended for public drinking water supply. MCL standards are both primary and secondary. Primary standards are legally enforceable and are imposed for the protection of public health and safety. In comparison, secondary standards are generally non-enforceable guidelines, which are imposed for the protection of aesthetic quality (taste, odor, appearance) and cosmetic quality (skin or tooth discoloration). Under these primary and secondary MCL standards, the USEPA regulates more than 90 contaminants and the California Department of Health and Services (CDHS) regulates approximately 100 contaminants. MCL standards for total dissolved solids (TDS) are used to indicate the aesthetic characteristics of drinking water, such as odor, taste, and appearance, and to indicate the presence of chemical constituents which could affect water treatment methodologies.

**Antelope Valley Groundwater Basin.** Over this large basin the characteristics of groundwater vary somewhat. Near the surrounding mountains, the groundwater is characterized primarily by concentrations of calcium bicarbonate, whereas in the central part

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of the basin, groundwater is characterized by sodium bicarbonate or sodium sulfate concentrations. In the eastern part of the basin, the upper aquifer contains water with sodium-calcium bicarbonate characteristics and the lower aquifer contains water with sodium bicarbonate characteristics. As described above, MCL standards for TDS levels are used to indicate and protect the odor, taste, and appearance of drinking water. Table 4.9-8 presents the groundwater quality in public supply wells for the Antelope Valley Groundwater Basin. Throughout the Antelope Valley Groundwater Basin, TDS content averages 300 mg/l, ranging from 200 to 800 mg/l (DWR, 2004). Primary inorganics exist in concentrations which exceed the applicable MCLs in approximately 12 percent of the wells tested. Searches for existing or past Leaking Underground Fuel Tank (LUFT) sites and sites listed on the Spills, Leaks, Investigations, and Cleanups (SLIC) program list were conducted along the proposed Segment 4, 5, and 10 alignments within the Antelope Valley Groundwater Basin. No sites were located within 1 mile of the proposed facilities (SWRCB, 2006).

**TABLE 4.9-8  
WATER QUALITY IN PUBLIC SUPPLY WELLS  
ANTELOPE VALLEY GROUNDWATER BASIN**

Constituent Group <sup>1</sup>	Number of Wells Sampled <sup>2</sup>	Number of Wells That Exceed the Applicable MCLs <sup>3</sup> (%)
Inorganics – Primary	214	25 (12)
Radiology	183	6 (3)
Nitrates	243	8 (3)
Pesticides	207	2 (1)
VOCs and SVOCs <sup>4</sup>	207	4 (2)

Source: DWR, 2004.

<sup>1</sup> A description of each member in the constituent groups and the relevance of these groups are included in the Lahontan Basin Plan.

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> This data represents the water quality at the sample location, and not the water quality delivered to the consumer. This information is intended as an indication of the types of activities that cause contamination in a given basin.

<sup>4</sup> VOC: volatile organic compound, SVOC: semivolatile organic compound.

**South Coast Groundwater Quality.** Surface and ground waters within the Los Angeles Region have proven insufficient to support the rapidly growing populations in the Los Angeles Region. Water imported from other areas meets about 50 percent of fresh water demands in the Region. Groundwater accounts for most of the Region’s local (i.e., non-imported) supply of fresh water.

The general quality of groundwater in the Region has degraded substantially from background levels. Much of the degradation reflects land uses. In areas with industrial or commercial activities, aboveground and underground storage tanks contain vast quantities of hazardous substances. Thousands of these tanks in the Region have leaked or are leaking, discharging petroleum fuels, solvents, and other hazardous substances into the subsurface. These leaks as well as other discharges to the subsurface that result from inadequate handling, storage, and disposal practices can seep into the subsurface and pollute ground water. Searches for existing or past LUFT sites and sites listed on the SLIC program list were conducted within the Raymond and San Gabriel Valley groundwater basins. Portions of the proposed Segment 7, 8, and 11 alignments are located within 1 mile of numerous known existing or past LUFT sites or SLIC program sites (SWRCB, 2006).

Table 4.9-9 provides a water quality of public supply wells in the San Gabriel Valley Groundwater Basin. Primary inorganics exist in concentrations which exceed the applicable Maximum Containment Levels (MCLs) in approximately 1 percent of the wells tested. However, nitrates, Volatile Organic Compounds (VOCs), and Semi-volatile Organic Compounds (SVOCs) exceed the applicable MCLs for 24 and 28 percent of the wells tested, indicating the relatively high number of leaking underground storage tanks and other land use related contamination.

***Upper Santa Ana Valley Groundwater Basin (Chino Sub-basin).*** The Upper Santa Ana Valley Groundwater Basin (Chino Sub-basin) is bounded on the east by the Rialto-Colton fault on the southeast by the contact with impermeable rocks forming the Jurupa Mountains and low divides connecting the exposures. On the south the sub-basin is bounded by contact with impermeable rocks of the of the Puente Hills and by the Chino fault on the northwest by the San Jose fault; and on the north by impermeable rocks of the San Gabriel Mountains and by the Cucamonga fault. San Antonio Creek and Cucamonga Creek drain the surface of the sub-basin southward to join Santa Ana River. Annual mean precipitation ranges from 13 to 29 inches across the surface of the sub-basin and averages about 17 inches. Table 4.9-10 lists the water quality characteristics of public supply wells in the Chino Sub-basin of the Santa Ana Valley Groundwater Basin. As indicated in Table 4.9-10, nitrates, primary inorganics, and VOCs/SVOCs are of significant concern in this groundwater basin.

#### **4.9.7 Proposed Project Analysis**

##### **4.9.7.1 Segment 4**

**4.9.7.1.1 Environmental Setting.** Segment 4 is located in the Antelope Valley Watershed and Antelope Valley Groundwater Basin (see Figure 4.9-5, and Section 3.0 for a detailed

**TABLE 4.9-9  
WATER QUALITY IN PUBLIC SUPPLY WELLS –  
SAN GABRIEL VALLEY GROUNDWATER BASIN**

Constituent Group <sup>1</sup>	Number of Wells Sampled <sup>2</sup>	Number of Wells That Exceed the Applicable MCLs <sup>3</sup> (%)
Inorganics – Primary	287	3 (1)
Radiology	278	4 (1)
Nitrates	300	73 (24)
Pesticides	292	1 (0)
VOCs and SVOCs <sup>4</sup>	301	85 (28)

Source: DWR, 2004.

<sup>1</sup> A description of each member in the constituent groups and the relevance of these groups are included in the Los Angeles Basin Plan.

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> This data represents the water quality at the sample location, and not the water quality delivered to the consumer. This information is intended as an indication of the types of activities that cause contamination in a given basin.

<sup>4</sup> VOC: volatile organic compound, SVOC: semivolatile organic compound.

**TABLE 4.9-10  
WATER QUALITY IN PUBLIC SUPPLY WELLS – UPPER SANTA ANA VALLEY  
GROUNDWATER BASIN (CHINO SUB-BASIN)**

Constituent Group <sup>1</sup>	Number of Wells Sampled <sup>2</sup>	Number of Wells That Exceed the Applicable MCLs <sup>3</sup> (%)
Inorganics – Primary	153	17 (11)
Radiology	149	5 (3)
Nitrates	164	73 (45)
Pesticides	153	6 (4)
VOCs and SVOCs <sup>4</sup>	151	10 (7)

Source: DWR, 2004.

<sup>1</sup> A description of each member in the constituent groups and the relevance of these groups are included in the Santa Ana Basin Plan.

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> This data represents the water quality at the sample location, and not the water quality delivered to the consumer. This information is intended as an indication of the types of activities that cause contamination in a given basin.

<sup>4</sup> VOC: volatile organic compound; SVOC: semivolatile organic compound.

description of this segment). Detailed discussions are provided below under “Watershed” and “Groundwater.” The climate of the Antelope Valley Watershed is described previously under

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the general Section 4.9.6 climate discussion. The following subsections describe the surface water, groundwater, and water quality in the vicinity of Segment 4.

**Watersheds.** Segment 4 lies within the Antelope Valley Watershed described previously. Segment 4 traverses the South Lahontan Hydrologic Region; Antelope Hydrologic Unit; the Willow Springs, Neenach, and Lancaster Hydrologic Areas; and the Chafee, Willow Springs, Neenach, and Lancaster Hydrologic Sub-areas. Table 4.9-3 provides the names of the watershed levels for the South Lahontan Hydrologic Region and their associated hierarchy. For the purposes of this PEA, the boundaries of the Antelope Valley Watershed, as discussed above and shown in Figure 4.9-2, are used as the basis for analysis of surface water hydrology. The watershed levels shown in Table 4.9-2 are considered in this analysis, as appropriate.

**Lakes, Reservoirs, and Aqueducts.** Segment 4 does not traverse any lakes or reservoirs. The closest lakes are the three playa lakes located on Edwards Air Force Base approximately 20 to 30 miles from Segment 4 as described in the previous section. Segment 4 crosses the Los Angeles Aqueduct at approximately S4 MP-2.0, as noted in Table 4.9-4.

**Rivers and Streams.** Segment 4 crosses approximately 10 ephemeral waterways or desert washes. A summary of the major waterways traversed within the South Lahontan HR is provided above in Table 4.9-4.

**Floodplains.** Segment 4 would traverse the following FEMA designated Flood Hazard Areas, which are listed in geographic order from north to south: unnamed Zone A at S4 MP 0.4, Los Angeles Aqueduct, Zone A flooding from S4 MP 4.6 to 6.9, Broad Canyon at S4 MP 10.6, unnamed Zone A at S4 MP 10.9, Myrick Canyon at S4 MP 15.5, unnamed Zone A at S4 MP 16.6, and unnamed Zone A at S4 MP 16.9 to 18.0. Figure 4.9-3 shows FEMA's predicted 100-year flood boundaries for the significant Flood Hazard Areas listed above. The Whirlwind Substation Alternates A and C would be partially or completely located within a Zone A floodplain. Substation Alternate A is located entirely within a FEMA designated Flood Hazard Area, and a portion of Substation Alternate C is located in a FEMA designated Flood Hazard Area (approximately from West 170th Street to 500 feet west of 170th Street). As mentioned above, any development in a Flood Hazard Area, including the proposed transmission line facilities, would be required to comply with floodplain management ordinances. There are no dams that would inundate Segment 4.

**Groundwater.** Segment 4 lies within the Antelope Valley Groundwater Basin.

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**Water Quality.** Water quality for Segment 4 is described above for the Antelope Valley Watershed and Groundwater Basin.

**4.9.7.1.2 Impact Analysis.** Detailed discussion of each impact and APMs are provided in the following sub-sections.

**Construction.**

**Would the Project violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality?**

Disturbance of soil during construction could result in soil erosion and sedimentation. Construction of Segment 4 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix P, Tables 3.3-1 and 3.3-2 for specific disturbance estimates for each Project feature):

- Installation of approximately 165 new LSTs (including 88 single-circuit 220 kV LSTs and 77 single-circuit 500 kV LSTs). Permanent ground disturbance would include grading and excavation needed for level LST pads. Temporary ground disturbance for temporary crane pads as required for new towers.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling yards.
- Road construction and improvements as needed to provide temporary construction access as well as permanent maintenance access along the length of the route.

In particular, road construction for both temporary and permanent roadways has the potential to cause soil instability resulting in erosion and sedimentation, which could potentially degrade surrounding water quality. Land disturbance associated with road construction and improvements would include the following activities: removal of vegetation, blade grading, soil compaction, installation of drainage structures and stream crossings, and installation of slope-strengthening structures as needed. These activities involve soil disturbance and stockpiling of earth that could potentially accelerate soil erosion. Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries, including: Broad Canyon, Myrick Canyon, and other multiple ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a precipitation event.

As detailed in Appendix P, Tables 3.3-1 and 3.3-2, approximately 152 acres of total land disturbance would occur due to the proposed Segment 4 construction. Although

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approximately 124 acres of the total disturbed area would be restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

Surface water and groundwater quality could be affected through the accidental release of hazardous materials during Project-related construction activities. Such materials include: diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, lubricant grease, and other fluids. The preparation and pouring of concrete and the use of motorized equipment are examples of construction activities that would specifically involve the use of potentially harmful materials. The release of one or more hazardous materials could occur at tower installation locations, site laydown and preparation areas, and other locations where construction activities would occur.

Accidentally spilled hazardous materials could pollute surface water through direct runoff into nearby waterways or water bodies, including ephemeral streams and desert washes. These materials could also pollute groundwater through soil infiltration or direct runoff, if the groundwater table is exposed during excavation activities and such activities coincide with the occurrence of an accidental spill. Any of the waterways listed in Table 4.9-4 traversed by Segment 4 could be affected by this impact. In addition, tributaries of these waterways could also be affected, depending on the severity of the spill. Implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described above in Section 4.9.6.6 (Groundwater), Segment 4 traverses the Acton and San Gabriel Groundwater Basins. Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations.

General Project-related surface construction activities would not be expected to result in the disturbance of existing groundwater resources. However, drilling and excavation for footings (particularly TSP footings that can be up to 60-feet deep) have a potential to encounter groundwater. If groundwater is expected to be encountered during construction as indicated by geologic borings, a dewatering plan would be prepared, as appropriate, under APM HYD-6, and included in the construction SWPPP (APM HYD-1). With an appropriately

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implemented construction dewatering plan that accounts for the presence of nearby groundwater supply wells, it is not anticipated that there will be substantial depletion of groundwater supplies or recharge such that there would be a net deficit in aquifer volume or lowering of the local groundwater level, particularly due to the temporary nature of any construction related excavation and dewatering activities. If groundwater resources were encountered during drilling, excavation, or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 would reduce potentially significant impacts to a less-than-significant level.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

Existing drainage patterns would not be substantially altered to result in increased erosion and siltation onsite or offsite. Minor modification of drainage patterns may occur due to grading of access roads, construction pads, laydown areas, and tower construction; however implementation of APM HYD-1 and APM HYD-7 would reduce this potential impact to less than a significant level. Additionally, each new transmission tower would be designed and engineered to facilitate natural drainage patterns to minimize or avoid any potential impacts to erosion and siltation.

Permeability is a measure of the ability of a substance to transmit fluids through it. Impervious surfaces seal the soil surface, eliminating the infiltration of precipitation and natural groundwater recharge. As a result, storm water runoff flows directly across impervious surfaces, raising flood peaks in the area, which causes erosion of unlined stream channels and increased sediment loads. New impervious surfaces would be introduced during construction of the proposed Project. In general, construction of Segment 4 would introduce a minor amount of new permanent impervious areas. Any new impervious areas associated with temporary construction access ways, laydown areas, and marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction.

Construction of the 165 LSTs associated with Segment 4 would introduce new impermeable areas through concrete foundations. For instance, each new LST would require four drilled pier concrete footings each approximately 42 inches to 48 inches in diameter. In general, new impervious area would be permanently introduced through these footings for each LST.

Drainage control features would be installed where appropriate, as well as other stormwater protection measures included as part of the SWPPP required by APM HYD-1.

Scraping and grading for the towers and new spur and access roads would remove vegetation and disturb the soil surface, which would result in a reduction in the infiltration and absorption capacity of surface soils within the impacted area. The potential impacts from spur roads and access roads would be localized and temporary. In addition, the SWPPP required by APM HYD-1 would include an erosion control plan to minimize any potential increase in surface water runoff resulting from new or improved roads.

In summary, with implementation of the aforementioned APMs potentially significant impacts would be reduced to less-than-significant levels.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main category of Segment 4 features that could potentially affect a local stormwater drainage system includes construction of 165 new transmission towers and the associated access roads if needed. As discussed above, permanent impervious areas would be introduced from transmission tower footings within Segment 4 (see Appendix P, Tables 3.3-1 and 3.3-2 for specific disturbance estimates for each Project feature). Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segment 4 would traverse or be adjacent to the City of Lancaster, which has some municipal separate stormwater drain systems in place. The potential runoff generated by permanent Project features such as the transmission towers would be expected to be minimal due to the inclusion of drainage features in Project design. This potential impact would be less-than-significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

The proposed transmission line route would traverse six individual FEMA designated Flood Hazard Areas, including those associated with the following waterways: Los Angeles Aqueduct, Broad Canyon, and Myrick Canyon (Figure 4.9-3). According to FEMA, development is permitted in Flood Hazard Areas, provided that the development complies with local floodplain management ordinances (FEMA, 2007). The placement of towers in Flood Hazard Areas is not expected to cause diversion of flows or increased flood risk for

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adjacent property. All applicable floodplain management ordinances would be fully complied with in accordance with FEMA's regulations on development in Flood Hazard Areas.

None of the infrastructure associated with Segment 4 of the proposed Project would be situated within a watercourse. Although the proposed route does span multiple waterways, as indicated in Table 4.9-4, towers would be located on nearby hillsides and other land areas, and be engineered to withstand stresses associated with their proximity to the waterways. Without the implementation of appropriate APMs, this impact has the potential to be significant due to differences in site-specific tower locations and the associated stresses such conditions could impose upon aboveground infrastructure. However, with the implementation of APM HYD-7 potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 4 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with Segment 4 of the proposed Project would be situated within a watercourse. Nor would construction activities have the potential to cause the failure of a levee or dam. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Segment 4 will not result in or be subject to inundation by seiche or tsunami because no large water bodies exist near Segment 4.

There is little chance that mudflows and associated hazards or impacts would impact Segment 4. Mudflow events occur due to a combination of soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Segment 4 is located predominately within the relatively flat Antelope Valley and, therefore, slope stability concerns, such as the potential for a mudflow is not considered a significant hazard within the flat valley areas. However, portions of Segment 4 traverse Fairmont Buttes between S4 MP-2.3 to 3.0, and Antelope Buttes between S4 MP-11.8 to 12.6, so there is a minor potential for mudflow hazards to be encountered or created. However, implementation of APM HYD-1 and APM HYD-7 would reduce this potential impact to a less-than-significant level.

**Operation.**

**Would the Project violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality?**

Surface and groundwater quality could potentially be affected during activities associated with the operation and maintenance of Segment 4. Potentially harmful materials could be accidentally released during operational and maintenance activities at tower locations and along access roads. Due to the use of vehicles and other motorized equipment, some of the potentially hazardous substances that could be released include: diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease. Transformer oil and other substances associated with transformers could also be accidentally released during operation or maintenance activities. These materials could contaminate surface water through direct release or runoff to local surface waterways. Groundwater resources could be affected through soil infiltration or through direct runoff, if exposure of the groundwater table coincides with the accidental release of hazardous materials. There are multiple federal, State, and local agencies and bodies of law with authority over the mitigation of hazardous materials spills. The specific authority over a spill depends on multiple factors such as the location and nature of the spill.

In contrast with construction activities, which would include greater land disturbance and more invasive activities for the installation of Project facilities, operation of the proposed Project would include activities with substantially less potential to result in water quality degradation from the accidental spill of hazardous materials. Operational activities would include annual visual inspections of Project facilities via helicopter and truck, with maintenance performed on an as-needed basis. These activities would not have the potential to cause a significant degradation in water quality from the accidental release of hazardous materials. Therefore, no mitigation measures are recommended for operational and maintenance activities due to the less invasive and less hazardous nature of such activities. Thus, this potential impact would be less than significant.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

It is anticipated that any potential impacts associated with typical operation activities such as access road and tower maintenance along Segment 4 would be less than significant.

**4.9.7.1.3 Mitigation Measures.** The aforementioned APMs have been incorporated into the Project design; therefore, any potentially significant impacts have been avoided or reduced to a less-than-significant level, and no mitigation is required.

**4.9.7.1.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 4 are considered to be less than significant.

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**4.9.7.2 Segment 5**

**4.9.7.2.1 Environmental Setting.** Segment 5 would traverse two major watersheds. The southern end of Segment 5, surrounding Vincent Substation, is located in the Santa Clara River Watershed. The northern end of Segment 5, surrounding the Antelope Substation, is located in the Antelope Valley Watershed. Figure 4.9-1 indicates the respective watershed boundaries (Hydrologic Units [HUs]).

**Surface Water.** Segment 5 traverses the Antelope Valley from S5 MP-0.0 to 14.0 and the Santa Clara River Watershed from S5 MP 14 to 17.8 (Vincent Substation).

**Lakes, Reservoirs, and Aqueducts.** Segment 5 crosses the California Aqueduct at approximately S5 MP 4.5. Segment 5 does not cross any lakes or reservoirs.

**Rivers and Streams.** Segment 5 would cross approximately 14 ephemeral waterways or desert washes including: Amargosa Creek, Anaverde Creek, and Soledad Canyon (headwaters of Upper Santa Clara River). The Upper Santa Clara River is largely an intermittent river, with some portions that may be characterized as ephemeral and other portions that flow for several days after a rain event. The Upper Santa Clara River comprises the headwaters for the Santa Clara River system. The proposed Project route crosses the Upper Santa Clara River at approximately S5 MP 17.3, where the river is within Soledad Canyon. A summary of the major waterways traversed by Segment 5 is provided in Tables 4.9-4 and 4.9-5.

**Floodplains.** Segment 5 would traverse the following FEMA designated Flood Hazard Areas, which are listed in geographic order from north to south: Amargosa Creek, Anaverde Creek, and Soledad Canyon. Figure 4.9-3 shows FEMA's predicted 100-year flood boundaries for the Flood Hazard Areas north of Vincent Substation. Although Segment 5 traverses multiple Flood Hazard Areas, none of the substation facilities associated with the proposed Project would be located in a Flood Hazard Area. There are no dams that would inundate Segment 5.

**Groundwater.** The majority of Segment 5 lies within the Antelope Valley Groundwater Basin and Acton Valley Groundwater Basin described previously in Section 4.9.6.

**Water Quality.** Water quality issues for the Antelope Valley Watershed and Santa Clara River Watershed were discussed previously in Section 4.9.6.

**4.9.7.2.2 Impact Analysis.** Detailed discussions of each impact and APMs are provided in the following sub-sections.

**Construction.**

**Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Construction of Segment 5 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix P, Table 3.3-3 for specific disturbance estimates for each Project feature):

- Installation of 67 new LSTs. Permanent ground disturbance would include grading and excavation needed for level tower sites.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling.
- Existing access road improvements as needed to facilitate temporary construction access as well as permanent maintenance access along the length of the route.

Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries, including: California Aqueduct, Amargosa Creek, Anaverde Creek, Soledad Canyon, and multiple ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a precipitation event.

Approximately 165 acres of total land disturbance would occur due to the proposed Segment 5 construction. Although approximately 153 acres of the total disturbed area would be restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 traversed by Segment 5 could be affected by an accidental release of hazardous materials during Project-related construction activities. However, implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described above in Section 4.9.6.6 (Groundwater), Segment 5 traverses the Antelope Valley Groundwater Basin. Excavation activities associated with the proposed Project would

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be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation is not expected to result in the disturbance of existing groundwater resources. However, if groundwater resources were encountered during excavation activities or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 would reduce potential impacts to less-than-significant levels.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

New impervious surfaces would be introduced during construction of Segment 5 (see Appendix P, Table 3.3-3 for temporary and permanent disturbance estimates for Segment 5). However, these areas would have negligible impact on increased surface water runoff. Any new impervious areas associated with temporary construction access ways, laydown areas, and marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction. This potential impact would be less than significant with no mitigation required.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main aspect of Segment 5 features that could potentially affect a local stormwater drainage system includes construction of 67 new transmission towers. Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segment 5 would traverse or be adjacent to the cities of Lancaster and Palmdale, which have municipal separate storm drain systems in place. The potential runoff generated by permanent Project features such as the transmission towers is expected to be minimal due to the inclusion of drainage features in the Project design. This potential impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

As described in Section 4.9.6.2 (Surface Water), the proposed Segment 5 transmission line route traverses three individual FEMA designated Flood Hazard Areas, including those associated with the following waterways: California Aqueduct, Amargosa Creek, Anaverde

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Creek, and Soledad Canyon. The placement of towers in Flood Hazard Areas is not expected to cause diversion of flows or increased flood risk for adjacent property. Without the implementation of appropriate APMs, this impact has the potential to be significant due to differences in site-specific tower locations and the associated stresses such conditions could impose upon aboveground infrastructure. However, with the implementation of APM HYD-7 potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 5 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with Segment 5 would be situated within a watercourse. In addition, construction activities would not have the potential to cause the failure of a levee or dam. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 5. There is a potential that mudflows and associated hazards or impacts could result from the construction of Segment 5. Most of Segment 5 is located within the relatively flat Antelope Valley and, therefore, slope stability concerns, such as the potential for a mudflow is not considered a significant hazard within the flat valley areas. However, portions of Segment 5 traverse Portal Ridge between S5 MP 4.7 to 7.2 and the Sierra Pedona area between S5 MP 10.5 to 16.5, so there is a potential for mudflow hazards to be encountered or created during construction. However, implementation of APM HYD-1 and APM HYD-7 and appropriate Soils and Geology-related APMs would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 5 is analogous to that of Segment 4 because Segment 5 because both would be constructed within existing R-O-W, and because similar engineering, use of materials, BMPs, and APMs apply. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.2.3 Mitigation Measures.** The APMs listed in Table 4.9-1 have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.2.4 Impact Significance After Mitigation Measure Application.** The potential impacts from to hydrology and water quality associated with construction and operation of Segment 5 are considered to be less than significant.

### **4.9.7.3 Segment 6**

**4.9.7.3.1 Environmental Setting.** Segment 6 would traverse three major surface watersheds and two groundwater basins (Figures 4.9-1 and 4.9-5). The northern end of Segment 6 is located in the Santa Clara River Watershed; the middle of Segment 6 is located in the Los Angeles River Watershed, and the southern end of Segment 6 is located in the San Gabriel River Watershed. The Santa Clara River Watershed is separated from the Los Angeles-San Gabriel Watersheds by the San Gabriel Mountains (roughly along the route of the Pacific Crest Trail) which provides a topographic and hydrologic divide. The northern end of Segment 6 lies within the Antelope Valley and Acton Valley Groundwater Basins (Figure 4.9-5). See Section 3.0 for details regarding construction and operation of this Project segment.

#### **Surface Water.**

**Watersheds.** Segment 6 traverses the Santa Clara River Watershed from S6 MP 0.0 to 7.3 the Los Angeles River Watershed from S6 MP 7.3 to 16.8 and the San Gabriel Watershed from S6 MP 16.8 to 21.9.

**Lakes, Reservoirs, and Aqueducts.** Segment 6 would not cross any lakes, reservoirs, or aqueducts.

**Rivers and Streams.** Segment 6 would cross approximately 34 waterways and ephemeral drainages predominately within the Angeles National Forest including: Kentucky Springs Canyon at S6 MP 0.2, MP 2.3, and MP 3.2; Aliso Canyon at S6 MP 6.6 and MP 7.2; Monte Cristo Creek at S6 MP 10.8, Lynx Gulch at S6 MP 12.3; Alder Creek at S6 MP 13.6; Upper Big Tujunga Canyon at S6 MP 16.4; Shortcut Canyon at S6 MP 17.0; San Gabriel River at S6 MP 18.8; and Cold Springs Canyon at S6 MP 24.5. A summary of the major waterways traversed by Segment 6 is provided in Tables 4.9-4 and 4.9-5.

**Floodplains.** Segment 6 would traverse the following FEMA designated Flood Hazard Area: Kentucky Springs Canyon at S6 MP 0.2 and S6 MP 2.2. Segment 6 would also cross Big Tujunga Canyon at S6 MP 16.4, and San Gabriel River at S6 MP 18.8, which are not FEMA designated Flood Hazard Areas, but are significant drainage features. Figures 4.9-3 and 4.9-4 shows FEMA's predicted 100-year flood boundaries for the Flood Hazard Area listed above. Although Segment 6 traverses a Flood Hazard Area, none of the substation

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facilities associated with Segment 6 would be located in a Flood Hazard Area. There are no dams that would inundate Segment 6 facilities.

**Groundwater.** Segment 6 lies within the Antelope Valley and Acton Valley groundwater basins discussed previously in Section 4.9.6.6.

**Water Quality.** Segment 6 lies within Santa Clara River Watershed and Los Angeles-San Gabriel Watersheds described previously for water quality related issues.

**4.9.7.3.2 Impact Analysis.** Detailed discussion of each impact and APMs are provided in the following sub-sections.

**Construction.**

**Would the Project violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality?**

Disturbance of soil during construction could result in soil erosion and sedimentation. Construction of Segment 6 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix P, Table 3.3-4 for temporary and permanent disturbance estimates for Segment 6):

- Installation of approximately 106 new LSTs, 30 TSPs, and 4 three-pole dead-end 500 kV structures. Permanent ground disturbance would include grading and excavation needed for level tower sites.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling.
- Existing access road improvements as needed to facilitate temporary construction access as well as permanent maintenance access along the length of the route.

Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries, including: Kentucky Springs Canyon, Aliso Canyon, Tie Canyon, Monte Cristo Creek, Lynx Gulch, Alder Creek, Shortcut Canyon, Cold Springs Canyon, Upper Big Tujunga Canyon, the San Gabriel River and multiple ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a precipitation event.

Approximately 176 acres of total land disturbance would occur due to the proposed Segment 6 construction. Although approximately 166 acres of the total disturbed area would be

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restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

Segment 6 and Segment 11 traverse the ANF, with steep terrain and associated high potential for erosion during soil disturbance activities. The construction SWPPPs developed for Segments 6 and 11 will provide site specific guidance and BMPs to minimize the potential for erosion from soil disturbing construction activities in steep terrain. The BMPs selected shall provide an effective combination of soil stabilization and sediment control in these areas to minimize potential erosion-related water quality impacts.

Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 could be affected by the accidental release of hazardous materials during Project-related construction activities. However, implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

Segment 6 traverses the Acton and Antelope Valley Groundwater Basins. Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation is not expected to result in the disturbance of existing groundwater resources. However, if groundwater resources are encountered during excavation activities or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 would reduce potential impacts to a less-than-significant level.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

New impervious surfaces would be introduced during construction of Segment 6, however these areas would have negligible impact on increased surface water runoff. Any new impervious areas associated with temporary construction access ways, laydown areas, and

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marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction. Impacts would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main category of Segment 6 features that could potentially affect a local stormwater drainage system includes construction of new transmission towers. Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segment 6 would traverse currently undeveloped areas of the cities of Monrovia and Duarte, and the Angeles National Forest; which do not have significant stormwater drainage systems in place along the proposed Segment 6 Route. The potential runoff generated by permanent Project features such as the transmission towers is expected to be minimal due to the inclusion of drainage features in the Project design. This potential impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

As described in Section 4.9.6.6.2 (Surface Water), the proposed Segment 6 transmission line route traverses one Flood Hazard Area along Kentucky Springs Canyon. FEMA does not designate or map Flood Hazard Areas within the National Forest. However, other drainage crossings within the ANF that may have potential undesignated 100-year Flood Hazard Areas include Big Tujunga Canyon and San Gabriel River, because they have FEMA designated Flood Hazard Areas outside the ANF. With the implementation of APM HYD-7, potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 6 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with the Segment 6 would be situated within a watercourse. Nor would construction activities have the potential to cause the failure of a levee or dam. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

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**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 6. There is a potential that mudflows and associated hazards or impacts could result from the construction of Segment 6. Segment 6 is located predominately within the Angeles National Forest in areas of steep slopes; therefore, slope stability concerns, such as the potential for a mudflow are considered a potentially significant hazard. However, implementation of APM HYD-1 and APM HYD-7 and appropriate Soils and Geology related APMs would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 6 is analogous to that of Segment 4 because both are constructed within existing R-O-W, and because similar engineering, use of materials, BMPs, and APMs apply. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.3.3 Mitigation Measures.** The APMs listed in Table 4.9-1 have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.3.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 6 are considered to be less than significant.

**4.9.7.4 Segment 7**

**4.9.7.4.1 Environmental Setting.** Segment 7 lies entirely within the Los Angeles and San Gabriel watersheds and within the San Gabriel Valley Groundwater Basin. These watersheds are described in Section 4.9.6. See Section 3.0 for a detailed description of the proposed Segment 7.

**Surface Water.**

**Lakes, Reservoirs, and Aqueducts.** Segment 7 would parallel the Santa Fe Flood Control Basin in Irwindale from S7 MP 3.0 to 4.0. Segment 7 also traverses portions of the Whittier Narrows Dam Flood Control Basin from approximate S7 MP 12.0 to 13.9, and parallels Legg Lake, located within the flood control basin from S7 MP 12.5 to 13.0.

**Rivers and Streams.** Segment 7 generally parallels the San Gabriel River along much of its length from S7 MP 5.0 to 12.0 with crossings of the River at S7 MP 5.8 and 10.6 at the confluence of the San Jose Creek Diversion Channel.

**Floodplains.** Segment 7 would traverse the following FEMA designated Flood Hazard Area: Whittier Narrows Flood Control Basin (including San Gabriel River and Rio Hondo). Figure 4.9-4 shows FEMA's predicted 100-year flood boundaries for the Flood Hazard Area listed above. Segment 7 south of S7 MP 3.0 traverses areas subject to dam inundation flooding from Santa Fe Dam and Whittier Narrows Dam Flood Control Basins (USACE, 1985).

**Groundwater.** Segment 7 lies within the San Gabriel Valley Groundwater Basin which was described previously in Section 4.9.6.6.

**Water Quality.** The water quality setting of surface water and groundwater along Segment 7 are discussed in Section 4.9.6.6 (San Gabriel Watershed and Groundwater Basin). Reach 3 of the San Gabriel River between Ramona Boulevard to the Whittier Narrows Dam (S7 MP 7.3 to 12.0) is listed for toxicity impairment. Additionally, Reach 1 of San Jose Creek between the confluence with the San Gabriel River and Temple Street is listed for algae and coliform impairments.

**4.9.7.4.2 Impact Analysis.** Detailed discussion of each impact and APMs are provided in the following sub-sections.

**Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Disturbance of soil during construction could result in soil erosion and sedimentation. Construction of Segment 7 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix P, Table 3.3-5 for temporary and permanent disturbance estimates for Segment 7):

- Installation of approximately 79 new LSTs and 2 double-circuit 500 kV TSPs. Permanent ground disturbance would include grading and excavation needed for level tower sites.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling.
- Existing access road improvements as needed to facilitate temporary construction access as well as permanent maintenance access along the length of the route.

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Exposed and/or eroding sediment could be washed into surrounding ephemeral waterways and their downstream tributaries, including: San Gabriel River, Whittier Narrows Flood Control Basin, Rio Hondo, and Sycamore Canyon and multiple ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a precipitation event.

Approximately 142 acres of total land disturbance would occur due to the proposed Segment 7 construction. Although approximately 139 acres of the total disturbed area would be restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level. The construction SWPPP for Segment 7 would address construction related water quality concerns associated with the 303(d) water quality impairment listings of the Santa Fe Dam Park, San Gabriel River (Reach 3), San Jose Creek (Reach 1) and Legg Lake.

Surface water and groundwater quality could be affected through the accidental release of hazardous materials during Project-related construction activities. Any of the waterways listed in Table 4.9-5 traversed by Segment 7 could be affected by this impact. In addition, tributaries of these waterways could also be affected, depending on the severity of the spill. Implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described above in Section 4.9.6.6 (Groundwater), Segment 7 traverses the San Gabriel Groundwater Basin. Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation would not be expected to result in the disturbance of existing groundwater resources. However, if groundwater resources are encountered during excavation activities or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 would reduce potential impacts to less-than-significant levels.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase**

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**the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

New impervious surfaces would be introduced during construction of Segment 7; however, these areas would have negligible impact on increased surface water runoff. Any new impervious areas associated with temporary construction access ways, laydown areas, and marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction. Impacts would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main category of Segment 7 features that could potentially affect a local stormwater drainage system includes construction of 79 LSTs and 2 TSPs. As discussed above, permanent impervious area would be introduced from transmission tower footings for Segment 7. Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segment 7 would traverse or be adjacent to the Cities of Duarte, Monrovia, Irwindale, Baldwin Park, Industry, Rosemead, El Monte, South El Monte, Montebello, and Monterey Park which have separate municipal stormwater drainage systems in place. The potential runoff generated by permanent Project features such as the transmission towers is expected to be minimal due to the inclusion of drainage features in Project design, and impacts would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

As described previously in Section 4.9.6.6.2 (Surface Water), the proposed Segment 7 transmission line route would traverse one FEMA designated Flood Hazard Area, the Whittier Narrows Flood Control Basin (including San Gabriel River and Rio Hondo). With the implementation of APM HYD-7, potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 7 would not expose people or structures to a significant risk of loss, injury, or death involving flooding because, as indicated above, none of the infrastructure associated with Segment 7 would be situated within a watercourse. Segment 7 construction activities do not have the potential to cause the failure of a levee or dam. Segment 7 and the

existing Rio Hondo substation are located within the Santa Fe Dam failure inundation area with average overbank flood depths from 2 to 12 feet (USACE, 1985b). Dam failure, although a remote possibility, could pose a significant risk to facilities located within the dam failure inundation limits. However, due to the remoteness of such a failure, the risk is considered less than significant, and mitigation measures are not proposed.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 7. There is a low potential that mudflows and associated hazards or impacts could result from the construction of Segment 7. Segment 7 is located predominately within developed areas so the potential for mudflow is limited to existing floodplain areas and is not considered a significant hazard. Implementation of APM HYD-1 and APM HYD-7 and appropriate Geology and Soils-related APMs would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 7 is analogous to that of Segment 4 because both are constructed within existing R-O-W, and because similar engineering, use of materials, BMPs, APMs, and operation and maintenance procedures apply. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.4.3 Mitigation Measures.** The aforementioned APMs have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.4.4 Impact Significance After Mitigation Measure Application.** The potential impacts from to hydrology and water quality associated with construction and operation of Segment 7 are considered to be less than significant.

**4.9.7.5 Segment 8**

**4.9.7.5.1 Environmental Setting.** Segment 8A traverses the Los Angeles and San Gabriel Watersheds and the Santa Ana River Watershed. Segments 8B and 8C traverse the Santa Ana River Watershed. The Hydrologic Areas traversed by Segment 8A include the Los Angeles HA, Raymond HA, Upper and Lower San Gabriel HAs, Anaheim HA, and the Lower and Middle Santa Ana River HAs. Segments 8B and 8C traverse the Middle Santa Ana Hydrologic Area. Additionally, Segment 8A traverses the San Gabriel Valley and Upper Santa Ana Valley (Chino sub-basin) Groundwater basins. Segments 8B and 8C traverse the Upper Santa Ana Valley (Chino sub-basin) Groundwater basin. The climate for Segments 8A, 8B, and 8C is predominately the same as that described for Segment 6, although

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Segments 8A, 8B, and 8C are generally at lower elevations than significant portions of Segment 6, so average annual rainfall amounts along Segments 8A, 8B, and 8C would be less than portions of Segment 6 that lie within the San Gabriel Mountains. Following are descriptions of surface water and groundwater along Segments 8A, 8B, and 8C. (See also Section 3.0 for a detailed description of Segment 8.)

**Surface Water.** Segment 8A lies within the Los Angeles-San Gabriel Watershed and the Santa Ana River Watershed. Segments 8B and 8C lie within the Santa Ana River Watershed.

**Lakes, Reservoirs, and Aqueducts.** Segment 8A traverses the Whittier Narrows Dam Flood Control Basin from S8A MP 2.2 to 4.3. Segment 8A does not traverse any lakes or aqueducts, but parallels Legg Lake within the Whittier Narrows Dam Flood Control Basin from S8A MP 2.8 to 3.0. Segments 8B and 8C do not traverse any lakes, reservoirs or aqueducts.

**Rivers and Streams.** Segment 8A traverses the following major rivers and streams: Rio Hondo at S8A MP 2.3; San Gabriel River at S8A MP 3.7; Brea Canyon S8A MP 17.1; Tonner Canyon at S8A MP 18.5; Carbon Canyon at S8A MP 22.4; Chino Creek at S8A MP 26.0; and Cucamonga Creek at S8A MP 32.9. Segments 8B and 8C traverse Cucamonga Creek at S8B MP 4.5 and S8C MP 4.5, respectively.

**Floodplains.** Segment 8A traverses the following designated Flood Hazard Areas, which are listed in geographic order from north to south and west to east: Whittier Narrows Flood Control Basin (including San Gabriel River and Rio Hondo), Little Chino Creek, Carbon Canyon, Chino Creek, Cypress Channel, and Cucamonga Creek. Segments 8B and 8C traverse the Cypress Channel and Cucamonga Creek Flood Hazard Areas. Figure 4.9-4 shows FEMA's predicted 100-year flood boundaries for the Flood Hazard Areas listed above. Although Segments 8A, 8B, and 8C traverse multiple Flood Hazard Areas, none of the substation facilities associated with the proposed Project would be located in a FEMA designated Flood Hazard Area. Segment 8A would traverse areas subject to dam failure inundation from Santa Fe Dam Flood Control Basin from S8A MP 2.0 to 4.5 (USACE, 1985a, 1985b). Segment 8A east of Chino Creek, Segments 8B and 8C, and the existing Chino and Mira Loma substations are within areas subject to 2-foot average overbank flooding dam failure inundation from San Antonio Dam (USACE, 1986).

**Groundwater.** Segment 8A lies within the San Gabriel Valley and Upper Santa Ana Valley groundwater basins. Segments 8B and 8C lie within the Upper Santa Ana Valley groundwater basin.

**Water Quality.** The water quality setting of surface water and groundwater along Segments 8A, 8B, and 8C within the San Gabriel Watershed and the Santa Ana River Watershed is discussed in Sections 4.9.6.2 and 4.9.6.6.

**4.9.7.5.2 Impact Analysis.** Detailed discussion of each impact and APMs are provided in the following sub-sections. Reference to Segment 8 in the analysis below includes Segments 8A, 8B, and 8C unless otherwise noted.

**Construction.**

**Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Disturbance of soil during construction could result in soil erosion and sedimentation. Construction of Segment 8 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix P, Table 3.3-6 for temporary and permanent disturbance estimates for Segment 8):

- Installation of approximately 154 new LSTs, 67 TSPs, and 5 three-pole dead-end structures. Permanent ground disturbance would include grading and excavation needed for level tower sites.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling.
- Existing access road improvements as needed to facilitate temporary construction access as well as permanent maintenance access along the length of the route.

Exposed and/or eroding sediment could wash into surrounding waterways and their downstream tributaries, including: Sycamore Canyon, Whittier Narrows Flood Control Basin, San Gabriel River, San Jose Creek, Turnbull Canyon, La Canada Verde Creek, Brea Canyon, Tonner Canyon, Carbon Canyon, Little Chino Creek, Chino Creek, Cucamonga Creek and multiple ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a precipitation event.

Approximately 350 acres of total land disturbance would occur due to the proposed Segment 8 construction. Although approximately 335 acres of the total disturbed area would be restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

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Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 traversed by Segment 8 could be affected by the accidental release of hazardous materials during Project-related construction activities. However, implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described in Section 4.9.6.6 (Groundwater), Segment 8 traverses the San Gabriel Groundwater Basin. Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation is not expected to result in the disturbance of existing groundwater resources. However, if groundwater resources were encountered during excavation activities or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 the potential impacts would be reduced to a less-than-significant level.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

New impervious surfaces would be introduced during construction of Segment 8, however these areas would have negligible impact on increased surface water runoff. Any new impervious areas associated with temporary construction access ways, laydown areas, and marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction. Impacts would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main aspects of Segment 8 features that could potentially affect a local stormwater drainage system include construction of approximately 154 LSTs, 67 TSPs, and 5 three-pole dead-end structures. As discussed above, permanent impervious areas would be introduced from transmission tower footings. Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segments 8A, 8B, and 8C would traverse or

be adjacent to the cities and communities of Monterey Park, Montebello, Pico Rivera, Whittier, La Habra Heights, Diamond Bar, Rosemead, Hacienda Heights, Rowland Heights, Industry, Chino Hills, Chino, and Ontario (Figure 3.1-2), most of which have municipal separate stormwater drainage systems in place. The potential runoff generated by permanent Project features such as the transmission towers is expected to be minimal due to the inclusion of drainage features in Project design. This impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

Segment 8 would traverse six Flood Hazard Areas including: Whittier Narrows Flood Control Basin (including San Gabriel River and Rio Hondo), Little Chino Creek, Carbon Canyon, Chino Creek, Cypress Channel and Cucamonga Creek. With the implementation of APM HYD-7 potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 8 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with the Segment 8 would be situated within a watercourse. Nor would construction activities have the potential to cause the failure of a levee or dam. Portions of Segment 8A east of Chino Creek, Segments 8B and 8C, and the existing Chino and Mira Loma substations are located within areas subject to San Antonio Dam failure inundation by up to 2 feet of overbank flooding. However, due to the remoteness of such a failure, the risk is considered less than significant, and mitigation measures are not proposed.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis do not pose hazards to Segment 8. It is highly unlikely that portions of Segment 8 within the Whittier Narrows Flood Control Basin would be subject to a seiche. No mitigation beyond that identified for APM HYD-7 is proposed to mitigate for seiches.

There is a low potential that mudflows and associated hazards or impacts could result from the construction of Segment 8. Segment 8 is located predominately within developed areas so the potential for mudflow is limited to existing floodplain areas and is not considered to present a significant hazard. Implementation of APM HYD-1 and APM HYD-7 and

appropriate Soils and Geology related APMs would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 8 is analogous to that of Segment 4 because similar engineering, use of materials, BMPs, APMs, and operation and maintenance apply. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.5.3 Mitigation Measures.** The aforementioned APMs have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.5.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 8 are considered to be less than significant.

#### **4.9.7.6 Segment 9**

**4.9.7.6.1 Environmental Setting.** Segment 9 involves construction activities at a variety of substations that lie within the jurisdiction of the LRWQCB, LARWQCB, and the SARWQCB. Table 4.9-11 provides a summary of the substations associated with Segment 9 along with the various RWQCBs, hydrologic regions and subareas. Environmental setting characteristics for the substations are discussed in the other sections for the various Segments that enter the substations as noted in Table 4.9-11. See Section 3.0 for detailed descriptions of the Project components that comprise Segment 9.

**4.9.7.6.2 Impact Analysis.** Detailed discussion of each impact and APMs are provided in the following sub-sections.

#### **Construction.**

**Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Construction of Segment 9 would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Section 3.0, Table 3.3-9 for detailed estimates of construction and operation-related land disturbances):

- Grading and excavation at the proposed new Whirlwind Substation site

**TABLE 4.9-11**  
**SEGMENT 9 HYDROLOGIC REGIONS AND SUBAREAS**

Substation	Hydrologic Region (HR)	Hydrologic Unit (HU)	Hydrologic Area (HA)	Hydrologic Subarea (HSA)	RWQCB	Environmental Setting Discussion Sections
Whirlwind	South Lahonton	Antelope Valley	Neenach	Neenach	Lahonton	Segment 4 Section 4.9.7.1.1
Antelope	South Lahonton	Antelope Valley	Lancaster	Lancaster	Lahonton	Segment 4 Section 4.9.7.1.1
Vincent	South Coast	Santa Clara-Calleguas	Upper Santa Clara	Acton	Los Angeles	Segments 5, 6, and 11 Sections 4.9.7.2.1, 4.9.7.3.1, and 4.9.7.8.1
Gould	South Coast	Los Angeles-San Gabriel	Raymond	Monk Hill	Los Angeles	Segment 11 Section 4.9.7.8.1
Mesa	South Coast	Los Angeles-San Gabriel	Los Angeles	Central HSA Split	Los Angeles	Segments 7, 8, 11 Sections 4.9.7.4.1, 4.9.7.5.1, 4.9.7.8.1
Mira Loma	South Coast	Santa Ana	Santa Ana River	Cucamonga Creek	Santa Ana	Segment 8 Section 4.9.7.5.1

- Upgrades to the Antelope Substation, including grading and excavation for installation of new infrastructure
- Upgrades to the Vincent Substation, including grading and excavation as needed for the installation of new infrastructure

Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries listed in Tables 4.9-4 and 4.9-5. Implementation of APM HYD-1, APM HYD-2, and APM HYD-8 would reduce this potential impact to a less-than-significant level. The proposed substation work at Gould, Mesa, and Mira Loma substations would result in minimal soil disturbance, so impacts are anticipated to be less than significant (see Appendix P for estimated land/soil disturbance amounts).

Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 traversed or immediately adjacent to Segment 9 could be affected by the accidental release of hazardous materials during Project-related construction activities. However, implementation of APM HYD-1 through APM HYD-4 and APM HYD-8 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

Segment 9 is located in a number of groundwater basins. Excavation activities associated with the Segment 9 would be largely associated with construction of the Whirlwind Substation and upgrades to the Vincent Substation. Project-related excavation is not expected to result in the disturbance of existing groundwater resources. With the implementation of APM HYD-1, APM HYD-2, and APM HYD-6 the potential impacts would be reduced to a less-than-significant level.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

Construction and upgrades at the substations associated with the Segment 9 would introduce new impermeable areas. New facilities within existing and new and expanded substation sites would be constructed on concrete pads and foundations as needed, thus introducing new impermeable areas that could increase surface water runoff. However, the new Whirlwind Substation site and the Antelope and Vincent substation expansion areas would be graded, fenced, and covered with a layer of crushed rock in all areas where other materials such as concrete would not be required. The crushed rock material would increase permeability of the graded site and facilitate infiltration of surface water runoff. Upgrades at the other Segment 9 substations are not expected to introduce substantial new impermeable areas that could increase surface runoff because they would maintain the same surface materials currently present at the substation sites. Also the amount of new impermeable areas will have a negligible impact on surface water runoff volumes and rates. Therefore, this potential impact is considered to be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

Segment 9 would include construction, expansion and upgrading of substation sites. These new facilities would include the installation of some areas of paved concrete or asphalt surfaces, which would potentially increase the quantity of surface water runoff. The Whirlwind and Antelope substation sites are located in relatively flat areas. This land surface

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would allow for the infiltration of surface water runoff not captured by the substation drainage features. The Vincent Substation site is located in an area with more relief than the Whirlwind and Antelope substations, and therefore, runoff conveyance is potentially more of a concern. However, the proposed grading and drainage system design would convey and direct surface runoff in a manner that would not overwhelm existing drainage features. In addition, the substation sites would typically be covered with a crushed rock material rather than be paved, as described above, thus allowing for infiltration of surface water runoff. Furthermore, the proposed and alternative Whirlwind substation sites are located in a rural area where there is not a stormwater drainage system in place. This potential impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

Segment 9 substation construction and upgrades would predominately be located outside of FEMA designated Flood Hazard Areas. Exceptions are the proposed Whirlwind Substation Alternatives A and C which are located wholly or partially in a Flood Hazard Area. As indicated previously, Alternative A is located entirely within a FEMA designated Flood Hazard Area, and approximately 5 acres of the southeasterly corner of Alternative C site is located in a FEMA designated Flood Hazard Area. Alternative A lies within a proposed groundwater recharge field as identified in Kern County Antelope Valley Water Bank Project Draft EIR (KCPD, 2006).

The Vincent Substation is adjacent to the Soledad Canyon and Kentucky Springs Canyon Flood Hazard Areas. Expansion of the Vincent Substation has the potential to impact these floodplains. Without the implementation of appropriate APMs, this impact has the potential to be significant. However, Project construction within flood hazard areas would comply with applicable floodplain development guidelines and, with the implementation of APM HYD-7, potential impacts resulting from substation construction would be reduced to less-than-significant levels.

**Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 9 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with the proposed Project would be situated within a watercourse. Construction activities do not have the potential to

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cause the failure of a levee or dam. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 9. There is little chance that Segment 9 would cause mudflows and associated hazards. Portions of Segment 9 are adjacent to areas that may be subject to mudflow events, particularly the Vincent Substation. The Vincent Substation lies between Soledad Canyon and Kentucky Springs Canyon, which are natural drainages that carry runoff from the surrounding mountains and, therefore, have the potential to convey mudflows. However, the proposed Vincent Substation upgrades are located outside of the floodplain, and implementation of APM HYD-1 and APM HYD-7 would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 9 could pose a threat to water quality due to release of hazardous materials or hazardous wastes. Spills and leaks of hazardous materials during these activities could potentially result in impacts to surface water or groundwater. This potentially significant impact would be reduced by the implementation of APM HAZ-5 to a less-than-significant level.

**4.9.7.6.3 Mitigation Measures.** The aforementioned APM has been incorporated into the Project design; therefore, any potentially significant impacts have been avoided or reduced to a less-than-significant level, and no mitigation is required.

**4.9.7.6.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 9 are considered to be less than significant.

**4.9.7.7 Segment 10**

**4.9.7.7.1 Environmental Setting.** Segment 10 (including alternatives 10A and 10B) traverses the Chafee and Willow Springs HSAs within the Antelope Valley Watershed. A discussion of Antelope Valley Watershed climate, surface water, groundwater, and water quality are provided in Section 4.9.6. Figure 4.9-2 indicates the Hydrologic Areas within the Antelope Valley Watershed. See Section 3.0 for a detailed description of the Project features of Segment 10 and Alternatives 10A and 10B.

**Lakes, Reservoirs, and Aqueducts.** Segment 10 and alternatives 10A and 10B do not cross any lakes or reservoirs. Segment 10 crosses the Los Angeles Aqueduct at approximately S10

MP 6.8. Segment 10 would not cross any lakes or reservoirs. Alternative Segment 10A does not cross an aqueduct. Alternative Segment 10B crosses the Los Angeles Aqueduct at approximately S10B MP 0.2 and 4.9.

**Rivers and Streams.** Segment 10 would cross approximately 27 ephemeral waterways or desert washes including: Oak Creek at S10 MP 2.0 and Cottonwood Creek at S10 MP 15.0. Alternative 10A would cross approximately 18 ephemeral desert washes including Cottonwood Creek at S10A MP 8.2. Alternative 10B would cross approximately 10 ephemeral desert washes. A summary of the major waterways traversed by the Project within the South Lahontan Hydrologic Region is provided in Table 4.9-4.

**Floodplains.** Segment 10 traverses the following FEMA designated Flood Hazard Areas, which are listed in geographic order from north to south: Oak Creek at S10 MP 2.0 and the Los Angeles Aqueduct including Cottonwood Creek from S10 MP 6.8 to 16.8. Alternative 10A traverses a Zone A floodplain along its entire length south of the Los Angeles Aqueduct. Alternative 10B traverses Zone A floodplains at approximately S10B MP 0.0 to 0.3, MP 1.2 to 1.3, MP 1.8 to 1.9, MP 2.1 to 2.2, and MP 4.9 to 5.0. Figure 4.9-3 shows FEMA's predicted 100-year flood boundaries for the FEMA designated Flood Hazard Areas listed above. As indicated above, significant portions of Segment 10 and Alternative 10A would traverse FEMA designated Zone A 100-year floodplains, and would be subject to FEMA floodplain development guidelines. The proposed Project design includes elevating tower foundations approximately 3 feet above ground surface.

**4.9.7.7.2 Impact Analysis.** Detailed discussions of each impact and APMs are provided in the following sub-sections. Reference to Segment 10 in the analysis below includes Alternatives 10A and 10B unless otherwise noted.

**Construction.**

**Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Disturbance of soil during construction would potentially result in soil erosion and sedimentation. Construction of the proposed Segment 10 T/L would include the following land-disturbing activities that could result in soil erosion and sedimentation (see Appendix A, Table 3.3-7 for detailed descriptions of land disturbance related to Segment 10.; Table 3.3-7A for land disturbance related to Alternative 10A; and Table 3.3-7B for land disturbance related to Alternative 10B) :

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- Installation of approximately 96 new LSTs. Permanent ground disturbance would include grading and excavation needed for level LST pads.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling yards.
- Road construction and improvements as needed to provide temporary construction access as well as permanent maintenance access along the length of the route.

Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries, including: Oak Creek, Los Angeles Aqueduct, Cottonwood Creek and multiple other ephemeral waterways in the area, any of which could be affected by soil erosion and sedimentation in the case of a large, intense precipitation event.

Approximately 91 acres of total land disturbance would occur associated with the construction of proposed Segment 10. Although approximately 67 acres of the total disturbed area would be restored, thereby reducing permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 traversed by Segment 10 could be affected by the accidental release of hazardous materials during Project-related construction activities. However, implementation of APM HYD-1 through APM HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described above in Section 4.9.6.6 (Groundwater), Segment 10 traverses the Antelope Valley Groundwater Basin. Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation is not expected to result in the disturbance of existing groundwater resources. With the implementation of APM HYD-1, APM HYD-2, and APM HYD-6 the potential impacts would be reduced to a less-than-significant level.

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**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

Construction of the approximately 96 LSTs associated with the Segment 10 would introduce new impermeable areas through the construction of tower footings. However, the new impermeable areas would have a negligible impact on surface water runoff volumes and rates. Therefore, this impact would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main aspect of Segment 10 features that could potentially affect a local stormwater drainage system includes the construction of 96 LSTs. Each new transmission tower would be designed and engineered to facilitate natural drainage patterns. Segment 10 would not traverse any established communities or cities so the potential to overload local stormwater drainage systems is minimal. The potential runoff generated by permanent Project features such as the transmission towers is non-existent. This potential impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

As described in Section 4.9.6.2 (Surface Water), Segment 10 would traverse two individual FEMA designated Flood Hazard Areas, including Oak Creek and an area potentially subject to flooding south of the Los Angeles Aqueduct. The placement of towers in Flood Hazard Areas would not be expected to cause diversion of flows or increased flood risk for adjacent property. None of the infrastructure associated with Segment 10 of the proposed Project would be situated within a watercourse. Although the proposed route does span multiple waterways, as indicated in Table 4.9-4, towers would be located on upland areas and other land areas, and engineered to withstand stresses associated with their proximity to the waterways. Without the implementation of appropriate APMs, this impact has the potential to be significant due to differences in site-specific tower locations and the associated stresses such conditions could impose upon aboveground infrastructure. However, with the implementation of APM HYD-7 potential impacts resulting from the placement of

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transmission towers in a Flood Hazard Area along Segment 10 would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 10 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with the proposed Project would be situated within a watercourse. In addition, construction activities would not have the potential to cause the failure of a levee or dam. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

**Would the project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 10 Project facilities. There is little chance that mudflows and associated hazards or impacts would impact Segment 10. Mudflow events occur due to a combination of soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location in a mudflow event. Segment 10 is located predominately within the relatively flat Antelope Valley and, therefore, slope stability concerns, such as the potential for a mudflow is not considered to be a significant hazard within the flat valley areas. Implementation of APM HYD-1 and APM HYD-7 would reduce this potential impact to a less-than-significant level.

***Operation.*** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 10 is analogous to that of Segment 4, because both would involve use of similar engineering, materials, BMPs, APMs, and operation and maintenance procedures. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.7.3 Mitigation Measures.** The aforementioned APMs have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.7.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 10 are considered to be less than significant.

**4.9.7.8 Segment 11**

**4.9.7.8.1 Environmental Setting.** Segment 11 traverses four major surface Hydrologic Areas and three groundwater basins: the northern end of Segment 11 near the Vincent Substation is located in the Upper Santa Clara River Hydrologic Area; the middle of Segment 11 is located in the San Fernando Hydrologic Area; and the southern end of Segment 11 is located in the Raymond and Los Angeles Hydrologic Areas. Portions of Segment 11 would traverse the Antelope Valley, Upper Acton Valley, and the San Gabriel groundwater basins. Figures 4.9-1 and 4.9-2 show the HUs and HAs, respectively, and Figure 4.9-5 shows the respective groundwater basins. See Section 3.0 for detailed descriptions of this segment.

**Surface Water.**

**Watersheds.** Segment 11 traverses the Upper Santa Clara River Hydrologic Area (Santa Clara River Watershed) from S11 MP 0.0 to 7.9, the San Fernando Hydrologic Area (Los Angeles River Watershed) from S11 MP 7.9 to 15.5, and the San Gabriel HA (San Gabriel River Watershed) from S11 MP 15.5 to 36.2 (Mesa Substation).

**Lakes, Reservoirs, and Aqueducts.** Segment 11 would cross the upstream end of the Big Tujunga Dam reservoir at S11 MP 13.1 and Eaton Wash Dam at S11 MP 25.9 to 26.1. Segment 11 would not cross any lakes or aqueducts.

**Rivers and Streams.** Segment 11 would cross approximately 48 waterways and ephemeral drainages. A summary of the major waterways traversed by Segment 11 is provided in Tables 4.9-4 and 4.9-5.

**Floodplains.** Segment 11 traverses the FEMA designated Kentucky Springs Canyon Flood Hazard Area. Figure 4.9-3 shows FEMA's predicted 100-year flood boundaries for the Kentucky Springs Canyon Flood Hazard Area, which is located to the south and west of the Vincent Substation relative to Segment 11 (approximately S11 MP 0.0 to 0.4).

**Groundwater.** Segment 11 lies predominately within the Antelope Valley and San Gabriel Valley groundwater basins. Groundwater sub-basins traversed by Segment 11 include the Acton sub-basin (Upper Santa Clara) and the Raymond sub-basin (San Gabriel Valley).

**Water Quality.** General water quality characteristics of the watersheds traversed by Segment 11 are provided in Section 4.9.6.

**4.9.7.8.2 Impact Analysis.** Detailed discussions of each impact and APMs are provided in the following sub-sections.

**Construction.**

**Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?**

Disturbance of soil during construction could result in soil erosion and sedimentation. Construction of Segment 11 would include the following land-disturbing activities that could result in soil erosion and sedimentation: New transmission line construction would occur north of the existing Gould Substation. There would be no permanent land disturbance along Segment 11 from the Gould to the Mesa substations since this portion of Segment 11 would involve stringing conductor on vacant positions on existing T/L structures. (See Appendix A, Table 3.3-8 for description of land disturbance associated with construction and operation of Segment 11.)

- Installation of approximately 74 new LSTs and 2 single-circuit 220 kV poles. Permanent ground disturbance would include grading and excavation needed for level tower sites.
- Grading and clearing as needed for temporary pulling and splicing locations, set-up locations, and marshalling.
- Existing access road improvements as needed to facilitate temporary construction access as well as permanent maintenance access along the applicable portions of the route.

Exposed and/or eroding sediment could wash into surrounding ephemeral waterways and their downstream tributaries, including: Kentucky Springs Canyon, Aliso Canyon, North Fork Mill Creek, Fall Creek, Big Tujunga Creek, Josephine Creek, Clear Creek, Dark Canyon, Twin Canyon, Brown Canyon, Falls Canyon, and Agua Canyon. All of the aforementioned waterways could be affected by soil erosion and sedimentation in the case of an intense precipitation event.

Approximately 106 acres of total land disturbance would occur due to the proposed Segment 11 construction. Although approximately 67 acres of the total disturbed area would be restored to minimize permanent land disturbance, potential impacts to water quality from soil erosion and sedimentation are dependent upon the total area disturbed during construction. Implementation of APM HYD-1 and APM HYD-2 would reduce this potential impact to a less-than-significant level.

Any of the waterways and their tributaries listed in Tables 4.9-4 and 4.9-5 traversed by Segment 11 could be affected by the accidental release of hazardous materials during

Project-related construction activities. However, implementation of APMs HYD-1 through HYD-4 (see Table 4.9-1) would reduce this potential impact to a less-than-significant level.

**Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

As described above in Section 4.9.6.6 (Groundwater), Segment 11 traverses the Antelope Valley Groundwater Basin (S11 MP 0.0 to MP 3.2), the Acton Valley Groundwater Basin (S11 MP 3.2 to 6.4), the Raymond Groundwater Basin (S11 MP 22.5 to 30.0), and the San Gabriel Valley Groundwater Basin (S11 MP 30.0 to 35.2). Excavation activities associated with the proposed Project would be largely associated with tower and access road construction, including drilling for the installation of new transmission tower foundations. Project-related excavation would not be expected to result in the disturbance of existing groundwater resources. However, if groundwater resources were encountered during excavation activities or other Project-related construction activities, implementation of APM HYD-1, APM HYD-2, and APM HYD-6 would reduce potential impacts to less-than-significant levels.

**Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?**

New impervious surfaces would be introduced during construction of Segment 11; however, these areas would have negligible impact on increased surface water runoff. Any new impervious areas associated with temporary construction access ways, laydown areas, and marshalling yards would be returned to existing conditions (to the extent possible) after the completion of Project construction. Impacts would be less than significant.

**Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

The main category of Segment 11 features that could potentially affect a local stormwater drainage system includes construction of 74 LSTs and 2 single-circuit 220 kV poles. As discussed above, permanent impervious area would be introduced from transmission tower footings within Segment 11. Each new transmission tower would be designed and engineered

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to facilitate natural drainage patterns. Segment 11 would traverse or be adjacent to the Cities of East Pasadena, East San Gabriel, Pasadena, Rosemead, San Gabriel, and South San Gabriel, which have separate municipal stormwater drainage systems in place. The potential runoff generated by permanent Project features such as the transmission towers is expected to be minimal due to the inclusion of drainage features in Project design. This potential impact would be less than significant.

**Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

As described in Section 4.9.6.2 (Surface Water), the proposed Segment 11 T/L route would traverse one Flood Hazard Area along Kentucky Springs Canyon. Due to the relatively narrow canyon and associated floodplain, it is not anticipated that towers would be placed in the floodplain along Kentucky Springs Canyon. With implementation of APM HYD-7 potential impacts resulting from the placement of transmission towers in a Flood Hazard Area would be reduced to a less-than-significant level.

**Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Construction of Segment 11 would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because as indicated above, none of the infrastructure associated with Segment 11 would be situated within a watercourse. Construction activities would not have the potential to cause the failure of a levee or dam. Segment 11 crosses the upstream area of Big Tujunga Dam at S11 MP 13.1, but Segment 11 facilities would not be placed in areas subject to inundation. Implementation of APM HYD-7 would reduce potential impacts to a less-than-significant level.

**Would the Project result in or be subject to inundation by seiche, tsunami, or mudflow?**

Tsunamis and seiches do not pose hazards to Segment 11. Without appropriate mitigation, there is a potential that mudflows and associated hazards or impacts could result from the construction of Segment 11. Segment 11 is located predominately within the Angeles National Forest, therefore, slope stability concerns, such as the potential for a mudflow are considered a potentially significant hazard. However, implementation of APM HYD-1 and APM HYD-7 and appropriate Soils and Geology related APMs would reduce this potential impact to a less-than-significant level.

**Operation.** With respect to hydrology and water quality impacts, the operation and maintenance of Segment 11 is generally analogous to that of Segment 4 because both are constructed within existing R-O-W, and because similar engineering, use of materials, BMPs, and APMs apply. No additional impacts are identified for this segment, and impacts would be less than significant.

**4.9.7.8.3 Mitigation Measures.** The aforementioned APMs have been incorporated into the Project design, and potentially significant impacts have been avoided or reduced to a less-than-significant level; thus, no mitigation is required.

**4.9.7.8.4 Impact Significance After Mitigation Measure Application.** The potential impacts to hydrology and water quality associated with construction and operation of Segment 11 are considered to be less than significant.

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