3.8 HYDROLOGY AND WATER QUALITY

This section describes the environmental and regulatory setting for hydrology and water quality. It also describes impacts on hydrology and water quality that would result from implementation of the proposed project and mitigation measures for significant impacts.

3.8.1 Existing Conditions

3.8.1.1 Regulatory Setting

Numerous federal, State, and local laws and policies regulate water quality in relation to the proposed project. The federal CWA, managed by the EPA, regulates water quality in California. Implementation of CWA regulations is the responsibility of the SWRCB and the nine RWQCBs. Water quality at the project site is primarily regulated by the Lahontan RWQCB. The Federal Emergency Management Agency (FEMA) is responsible for flood protection guidance and information, which is implemented at the State and local level through state legislation and local flood protection ordinances. The following laws and regulations provide the water quality requirements applicable to the proposed project.

Federal

Clean Water Act

The EPA serves as the lead federal agency responsible for water quality management. The CWA of 1972 is the primary federal law that governs and authorizes water quality control activities by the EPA and the individual states. Various elements of the CWA address water quality, as addressed below. Wetland protection elements, including permits to allow for dredge or fill activities, are administered by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA.

Under Section 401 of the CWA, applying for a Section 404 permit to discharge dredge or fill material into Waters of the United States requires obtaining certification from the appropriate State agency stating that the dredge or fill materials are consistent with the State's water quality standards and criteria. In California, the authority to grant water quality certification or waive the requirement is delegated by the SWRCB to the nine RWQCBs.

Under federal law, the EPA has published water quality regulations within Volume 40 of the CFR. Section 303 of the CWA requires individual states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question and (2) criteria that protects the designated uses. Section 304(a) requires the EPA to publish advisory water quality criteria that reflects the latest scientific knowledge regarding the potential effects on public health and welfare related to the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. In California, the EPA has designated the SWRCB and its RWQCBs with the authority to identify beneficial uses and adopt water quality criteria.

National Pollutant Discharge Elimination System (NPDES)

Section 402 of the CWA established the NPDES to control water pollution by regulating point sources that discharge pollutants into Waters of the United States. In the State of California, the EPA has authorized the SWRCB as the permitting authority to implement the NPDES program. The SWRCB issues two baseline general permits: one for industrial operations and the other for construction activities (General Construction Permit [GCP]). Additionally, the NPDES program includes the regulation of stormwater discharges from cities, counties, and other municipalities under Order No. RS-2009-0030 (waste discharge requirements for stormwater).

Industrial Operations

Various types of industrial activities are covered under the NPDES General Permit for Discharges of Storm Water Runoff Associated with Industrial Activity (General Industrial Permit). These activities include manufacturing operations, transportation facilities where vehicles are maintained (including fueling and washing), landfills, hazardous waste sites, and other similar operations. The General Industrial Permit requires that each facility file a Notice of Intent (NOI) with the RWQCB, prepare and implement a SWPPP, and monitor to determine the amount of pollutants leaving the site. The SWPPP does not have to be submitted to the RWQCB, but it must be available for review at each Industrial facility.

General Construction Permit

Under the General Construction Permit, construction sites with one or more acres of disturbance are required either to obtain individual NPDES permits for stormwater discharges or to be covered by the GCP. Coverage under the GCP is accomplished by completing and filing a NOI with the SWRCB. Each applicant under the GCP is required to prepare both a SWPPP prior to the commencement of grading activities and to ensure implementation of the SWPPP during construction activities. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction activities. BMPs may include programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution. The SWPPP would also address BMPs developed specifically to reduce pollutants in stormwater discharges following the completion of construction activities.

The BMPs are directed at implementing both sediment and erosion control measures and other measures to control potential contaminants. Examples of construction BMPs identified in SWPPPs include using temporary mulching, seeding, or other stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers, such as fiber rolls and silt fencing, to minimize the amount of uncontrolled runoff that could enter drains or surface water.

Federal Emergency Management Agency (FEMA)

Congress passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 in response to increasing costs of disaster relief. These acts reduce the need for large publicly funded flood control structures and disaster relief by providing flood insurance and restricting development on floodplains, respectively. FEMA administers the National Flood Insurance Program (NFIP), which was created by the National Flood Insurance Act of 1968, to provide subsidized flood insurance for those communities that comply with FEMA regulations. FEMA issues flood insurance rate maps (FIRMs) that delineate flood hazard zones in the community and show which areas are prone to flooding.

FEMA established the design standard for flood protection, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (AEP) event (i.e., the 100-year flood event).

State

Porter-Cologne Water Quality Control Act of 1969 & State Water Resources Control Board

The State Porter-Cologne Act (California Water Code [CWC] Section 13000 et seq.) is California's statutory authority for water quality regulation in the State. The Act requires a "report of water discharge" for any discharge of water (liquid, solid, or otherwise) to land, surface waters, or groundwaters that may impair a beneficial use of any groundwater or surface water in the State.

The Act established the SWRCB as the primary State agency responsible for protecting the quality of the State's surface and groundwater supplies and ensuring compliance with the federal CWA and the Porter-Cologne Act. The Act also divided the state into nine regions and established nine RWQCB to oversee the regions. The project site is under the jurisdiction of the Lahontan RWQCB.

The SWRCB and the RWQCB must adopt water quality policies, plans, and objectives to protect the State's waters for use and enjoyment by the people of California. Basin Plans are the regional water quality control plans required by both the CWA and the Porter-Cologne Act in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The act also requires waste dischargers to notify the Regional Boards of their activities through the filing of reports of waste discharge (RWD) and authorizes the SWQCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to RWD/WDRs for broad categories of low threat discharge activities that have minimal potential for adverse water quality effects when implemented according to prescribed terms and conditions. In addition to the SWRCB and RWQCB, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as city and county governments, and requires the coordinated efforts of these various entities.

Lahontan Regional Water Quality Control Board (RWQCB)

The project site is within the jurisdictional boundaries of the Lahontan RWQCB. In March 1995, a Water Quality Control Plan for the Lahontan Region, North and South Basins (Basin Plan) was adopted by the RWQCB. The Basin Plan incorporates language from and replaces three earlier plans: the Lahontan Regional Board's 1975 North and South Lahontan Basin Plans, as amended through 1991, and the SWRCB's1980 Lake Tahoe Basin Water Quality Plan, as amended through 1989. The earlier plans were combined into a single plan which was adopted by the Lahontan Regional Board in November 1994 and which took effect upon approval by the California Office of Administrative Law in March 1995. The current version of the Basin Plan, incorporating amendments approved since 1995, is available online.

California State Non-degradation Policy

In 1968, as required under the federal anti-degradation policy, the SWRCB adopted a non-degradation policy aimed at maintaining high quality for waters in California. The non-degradation policy states that the disposal of wastes into State waters shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the State and to promote the peace, health, safety, and welfare of the people of California. The policy can be summarized as follows.

1. Where the existing water quality is better than required under existing water quality control plans (basin plans), such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

2. Any activity that produces waste or increases the volume or concentrations of waste and which discharges to existing high-quality waters would be required to meet WDRs which would ensure (1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the State would be maintained.

Non-Point Source Pollution (NPS) Control Program

The purpose of the NPS Control Program (NPS Program Plan) is to improve the State's ability to effectively manage NPS pollution and conform to the requirements of the CWA and the Federal Coastal Zone Act Reauthorization amendments of 1990. These documents were developed by staff of the SWRCB's Division of Water Quality and the California Coastal Commission (CCC), in coordination with the RWQCBs and staff from over twenty other State agencies.

California Department of Fish and Game Code

The California Lake and Streambed Alteration Program, Section 1602 of the California Fish and Game (CDFG) Code, regulates activities that would "substantially divert or obstruct the natural flow of, or substantially change the bed, channel, or bank of, or use material from the streambed of a natural watercourse" that supports wildlife resources. The CDFW has authority to review and regulate all proposed alterations of streambeds.

Assembly Bill 3030

In 1992, the California Legislature approved AB 3030 to allow local agencies whose service areas overlie a state designated groundwater basin to develop and implement groundwater management plans (GMP). The law also stated that a local agency might not manage groundwater pursuant to AB 3030 within a service area of another local agency without the agreement of that entity. In effect, the purpose of the GMP was two-fold:

- Outline the role of the local agency in managing the local groundwater resource; and
- Maximize the water supply and to protect the quality of the supply.

Components of the GMP include the following:

- Control of saline water intrusion;
- Identification and management of wellhead protection areas and recharge areas;
- Regulate migration of contaminated ground water;
- Administer well abandonment and destruction programs;
- Mitigate overdraft conditions;
- Replenish ground water extracted by producers;
- Monitor ground water levels and storage;
- Facilitate conjunctive uses;
- Identify policies for well construction;
- Construct/operate contaminated ground water remediation, recharge, storage, conservation, water recycling and extraction;
- Develop/maintain relationships with state/federal regulatory agencies; and
- Review land use plans and coordinate with land use planning agencies to assess activities that may create a risk of contaminating ground water.

Regional

Antelope Valley Integrated Regional Water Management Plan

The Antelope Valley Integrated Regional Water Management Plan (IRWMP), is a multi-county collaboration effort developed to address regional concerns about water supply reliability, water quality, flood protection, environmental resources and land use management in the Antelope Valley. The 2007 Antelope Valley IRWMP provided a mechanism for: 1) coordinating, refining and integrating existing planning efforts within a comprehensive, regional context; 2) identifying specific regional and watershed-based priorities for implementation projects; and 3)

providing funding support for the plans, programs, projects and priorities of existing agencies and stakeholders. The IRWMP was most recently updated in 2013.

Local

City of Lancaster General Plan 2030

The Plan for The Natural Environment of the City of Lancaster General Plan 2030 identifies policies related to hydrology and water quality. Policies that are applicable to the proposed project are listed below:

Policy 4.2.1: Manage flood hazards to ensure an acceptable level of risk and to facilitate rapid physical and economic recovery following a flood through the identification and recognition of potentially hazardous conditions and implementation of effective standards for location and construction of development.

Policy 15.1.3: Ensure that adequate flood control facilities are provided, which maintain the integrity of significant riparian and other environmental habitats in accordance with Biological Resources policies.

Policy 15.1.4: Ensure that mitigation is provided for all development in recognized flood prone areas. Any mitigation of flood hazard in one area shall not exacerbate flooding problems in other areas.

City of Lancaster Master Plan of Drainage

In 1992 the City adopted its Master Plan of Drainage based on the Antelope Valley Comprehensive Plan. The current version of the Master Plan of Drainage contains updated facilities and drainage fee schedules. The Master Plan of Drainage update addresses runoff problems that have occurred due to the construction within the City of Lancaster as well as within the City of Palmdale and unincorporated Los Angeles County.

City of Lancaster funds all Master Plan of Drainage facilities through the Drainage Impact fees and Drainage Maintenance Fees. As undeveloped lands are covered or paved over, their natural absorption capabilities are reduced and the amount of runoff is increased. Even small amounts of rain in the Lancaster area can cause flooding problems because of the general lack of sufficient improved storm drain facilities. Given the proposed use, the review standards associated with the City's Master Drainage plan would not apply to the proposed project.

City of Lancaster Stormwater Management Plan

The City of Lancaster has been designated a regulated Small Municipal Separate Storm System (MS4) by the EPA pursuant to 40 CFR 122.322(a)(1). The City of Lancaster filed a NOI to comply with the SWRCB Small MS4 General Permit in lieu of obtaining an individual permit. On April 20, 2003, NPDES General Permit No. CAS000004 was adopted. The objective of the City's Storm Water Management Plan (SWMP) is to establish ordinances, policies, procedures, and practices to manage and control the quality of stormwater runoff in the City of Lancaster.

City of Lancaster Water Quality Requirements

The City of Lancaster Engineering Design Guidelines requires:

- Coverage under the NPDES General Permit be obtained from the California State Water Resources Control Board for a site development of one acre or greater in area.
- Applicants prepare and submit a NOI to comply with the Construction General Permit to the California State Water Resources Control Board.
- All dischargers prepare, retain at the Construction site, and implement a SWPPP. This report shall conform to the NPDES permit.
- Clarifiers for all non-residential projects to treat the first flush.

3.8.2 Environmental Setting

Site Setting

The project site lies at the edge of Antelope Valley at the northern base of the San Gabriel Mountain Range, specifically the Portal Ridge and the Sierra Pelona Mountains. The land is characterized by broad, gently sloping alluvial fan surfaces. The California Aqueduct borders the southern boundary of the project site along the base of Portal Ridge. The land slopes up gradually from north to south until it reaches the California Aqueduct. Elevations on the project site range from about 2,480 feet above msl in the northeast portion of the project site to about 2,920 feet msl in the southwestern portion of the project site.

Average daytime high temperatures in the summer are around 95°F and decrease to an average of 58°F in the winter. Precipitation averages 7 inches annually, in years not affected by drought conditions. Most of the rainfall occurs between November and April (Weather 2014).

The project site is mapped by FEMA as Zone X, which are areas determined to be outside the 0.2% annual chance (or 500-year) floodplain and the 100-year floodplain (Federal Emergency Management Agency 2013).

Site Hydrology

Surface Water

The project site is located within the Antelope Valley Watershed, a closed basin situated within the Western Mojave Desert (USACE 2013 and 2014). More specifically, the project site is within the predefined Antelope Valley Watershed Hydrologic Unit Code (HUC): 1809020614 Amargosa Creek Watershed. Rosamond, Buckhorn, and Rogers Dry Lakes are the central terminus point for surface waters within the Antelope Valley Watershed.

During heavy rainstorms, runoff from the San Gabriel Mountains creates streams (or washes). Another source of stream flow is the melting of snowpack from the local mountains. Once the water reaches the valley floor, the runoff percolates into the ground, continues on as temporary

streams, or results in sheet flow. No perennial streams exist within the Antelope Valley. There are no significant sources of surface water in the immediate vicinity of the project site.

Site Runoff Characteristics

The two primary soil types at the project site are Hanford coarse sandy loam and Greenfield sandy loam. Hanford sandy loam (43.8% of the project site) is well drained with negligible to low runoff and moderately rapid permeability. Hanford sandy loam is within hydrologic soil group A, characterized as having a moderate infiltration rate when thoroughly wet and moderate rate of water transmission (National Cooperative Soil Survey 2013).

The second most common soil type is Greenfield sandy loam (48.9% of the project site), which is well drained with a slow to medium runoff and moderately rapid permeability. The Greenfield sandy loam is within hydrologic soil group A, characterized as having a moderate infiltration rate when thoroughly wet and moderate rate of water transmission (National Cooperative Soil Survey 2013).

Groundwater

The project site is located in the Antelope Valley Groundwater Basin of the South Lahontan Hydrologic Region (DWR 2003). The Antelope Valley Groundwater Basin underlies an extensive alluvial valley in the western Mojave Desert. 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 Andreas Fault zone at the base of the San Gabriel Mountains.

Perennial runoff from the surrounding mountains and hills is the primary source of recharge to the basin. Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems.

The primary water-bearing materials are Pleistocene and Holocene age unconsolidated alluvial and lacustrine deposits that consist of compact gravels, sand, silt, and clay. These deposits are coarse and rich in gravel near mountains and hills, but become finer grained and better sorted toward the central parts of the valley (Duell 1987). Coarse alluvial deposits form the two main aquifers of the basin; a lower aquifer and an upper aquifer. Most of the clays were deposited in large perennial lakes during periods of heavy precipitation. These clays are interbedded with lenses of coarser waterbearing material as thick as 20 feet; in contrast, the clay beds are as thick as 400 feet. The lake deposits form a zone of low permeability between the permeable alluvium of the upper aquifer and that of the lower aquifer, although leakage between the two aquifers may occur (Planert and Williams 1995). The upper aquifer, which is the primary source of groundwater for the valley, is generally unconfined whereas the lower aquifer is generally confined. Specific yield of these deposits ranges from 1 to 30 percent (KJC 1995), and wells typically have a moderate to high ability for water well production. The depth to groundwater in the upper aquifer is 100 feet or more below the ground surface (City of Lancaster MEA 2009).

3.8.3 Environmental Impacts

This section analyzes the proposed project's potential to result in significant impacts related to stormwater runoff patterns, groundwater conditions, and water quality. When an impact is

determined to be significant, mitigation measures have been identified to reduce or avoid the impact.

Methodology for Analysis

Evaluation of potential hydrologic and water quality impacts was based on a review of existing information from previously completed documents that address water resources in the project vicinity, including the City of Lancaster General Plan 2030 Master Environmental Assessment and reports published by the DWR. In addition, this evaluation is based on the November 21, 2014 Phase 1 Environmental Site Assessment (Appendix F) and the November 16, 2007 Preliminary Geotechnical Evaluation (Appendix E). The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section.

Water quality impacts associated with temporary construction activities were assessed in a qualitative manner. The potential short-term, construction-related effects of grading and land disturbance were assessed based on the probability of seasonal exposure to rainfall and runoff, routes of exposure for contaminants to enter surface water, and the magnitude and duration of construction relative to the potential water quality parameters expected to be affected by the activity.

Regarding operational impacts, it is assumed that solar panels would function similar to or the same as a tree canopy, by temporarily intercepting precipitation above ground but not altering the volume of precipitation reaching the ground or changing runoff patterns.

Thresholds of Significance

According to the CEQA Guidelines' Appendix G Environmental Checklist, the following questions were analyzed and evaluated to determine whether impacts to hydrology and water quality were significant. Would the proposed project:

- Violate any water quality standard 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 that would result in substantial erosion or siltation on- or off-site?
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?

- 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 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?
- Inundation by seiche, tsunami, or mudflow?

The following question was determined to have no impact during the Notice of Preparation Scoping. This issue is summarized in Section 4, Effects Found Not To Be Significant, and is not discussed further in this section.

- 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?

3.8.3.1 Project Impact Analysis and Mitigation Measures

Water Quality Standards and Requirements

Impact HYD-1	**The proposed project could potentially violate any water quality standards or waste discharge requirements.**

Impact Analysis

Construction activities have the potential to create short-term discharge of sediment, erosion material, and other nonpoint source pollutants into onsite stormwater that could drain to offsite areas and degrade the local water quality, thereby potentially violating water quality standards or WDRs.

Approximately 1,085 acres of permanent disturbance are assumed for inverter pads, the switching station, roads, panel arrays, and other improvements. Soil compaction, soil strengthening agents, or geo fabric may be used for access and circulation roads. Compaction may also be required for the construction of inverter pads and switching stations. Road construction may require soil conditioning to achieve proper compaction. Roads and other work areas would be periodically sprayed with water or other soil stabilizers to control dust.

Construction is proposed to begin in 2015 and would be scheduled for completion no earlier than late-2016; however, construction of the entire site is anticipated to take 24 months. Depending on scheduling, construction could potentially occur during two rainy seasons (November through April). Because of the increase in exposed surfaces and the earth-moving activities, the potential for erosion and sedimentation runoff is higher during the rainy season.

Construction activities would create the potential for soil erosion and possibly increase sedimentation, both onsite and downstream of the project site. Construction activities also increase the potential for accidental release of pollutants that could affect not only surface waters, but the beneficial uses associated with them. Such pollutants include oil and gas from machinery, and chemicals associated with construction (e.g. paints, lubricants, and greases). In addition, PV modules used for the proposed project may be amorphous silicon, cadmium telluride, copper indium gallium selenide (CIGS) thin filament, and/or multi-silicon filament. If accidentally released, these construction-related pollutants have the potential to degrade water quality by increasing constituent levels in surface waters and could lead to an exceedance of water quality standards.

Because implementation of the proposed project could result in the introduction of sediment and other nonpoint source pollutants into onsite drainage channels and ultimately offsite drainage channels as a result of temporary construction activities, short-term, construction-related water quality degradation would be considered a potentially significant impact.

Implementation of Mitigation Measure HYD-1 would reduce the temporary, short-term construction-related drainage and water quality impacts to a less than significant level. The preparation and implementation of an approved SWPPP and applicable BMPs would maintain water quality conditions in known waters of the state onsite (i.e. drainages) and downstream that receive discharge or runoff from the project site.

Long-term operation of the proposed project would not adversely affect water quality or lead to violation of water quality standards. Once operational, onsite activities would be limited to operation, inspection, and maintenance of the solar arrays and their supporting infrastructure. Project operation and maintenance (O&M) activities would include washing dust particles from the solar panels (panel washing) up to two times per year. Any excess wash water would run off the panels and infiltrate into the ground, and not cause sedimentation or other water quality concerns.

The relatively flat existing topography found on the project site would require minimal grading, and thus, this current onsite topography would not substantially change as a result of the proposed project. As a result, the project site's natural drainage patterns would not be significantly altered. Any excess water from panel cleaning or the majority of surface runoff from storm events would remain on the project site and either would evaporate or percolate into the ground, or would be conveyed via the pre-existing natural onsite drainage patterns.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM HYD-1: Prior to the issuance of any construction related permits, the applicant shall prepare and submit an NOI to the State Water Board and prepare a SWPPP in compliance with the NPDES GCP requirements. The final drainage plan shall demonstrate the ability of the planned onsite storm drainage to adequately collect onsite stormwater flows in accordance with all applicable standards and requirements by: minimizing impervious surfaces, and directing flows to BMPs; integrating appropriately sized BMPs to minimize impact on local water quality by

controlling runoff from erosion and potential contaminants; and incorporating bio-retention in combination with site planning, and dispersion of runoff to meet Low Impact Development (LID) requirements.

Level of Significance After Mitigation

Less Than Significant Impact.

Groundwater Supplies and Recharge

Impact HYD-2	**The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of 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.**

Impact Analysis

During construction, the proposed project is anticipated to utilize approximately 322 acre-feet (104,900,000 gallons) for soil conditioning, dust control, single panel wash, and other uses. After construction, the proposed project would require approximately 3.069 acre-feet (1 million gallons) of water annually to clean the panels. An additional 2.0 acre-feet of water would be required for irrigation use, and 3.9 acre-feet would be used for dust control, if needed. Water for irrigation would only be needed until the landscaping is established (approximately 2 years).

In accordance with the California Urban Water Management Planning Act, two reports were prepared in 2010 that studied the supply availability in the Antelope Valley. The Antelope Valley East Kern Water Agency (AVEK) prepared a 2010 Urban Water Management Plan (UWMP) that evaluated the quantity of water supply, efficient use of water and potential demand management measures. As the retailer of imported water from the State Water Project, the AVEK UWMP focused on the agency's ability to provide reliable supply to each of its customers in the Antelope Valley. In 2010 the Los Angeles County Waterworks Division (LACWWD) also prepared an Urban Water Management Plan. As a water purveyor and customer of AVEK, the LACWWD UWMP evaluated the agency's ability to utilize current supply sources, recycled water use and demand management measures to meet the future demands of its service area and sphere of influence.

In early 2006 Los Angeles County Waterworks underwent an effort to develop the Antelope Valley Region Integrated Regional Water Management Plan (IRWMP). The IRWMP was developed to serve as a regional water management planning document. It was created through a collaborative effort, and outlines the necessary improvements and facilities required to meet future demands in the Antelope Valley. The Antelope Valley groundwater basin stores subsurface water that is extracted by the wells of various agencies as a source of supply. Elevations across the valley floor range from 2,300 to 3,500 feet above mean sea level. Bounding the basin are the Garlock fault zone to the northwest at the base of the Tehachapi Mountains and the San Andreas fault zone at the base of the San Gabriel Mountains.

Water for construction and operation of the proposed project would be obtained through agreements with private landowners to use existing wells or supplied by the City of Lancaster Recycled Water Program and trucked to the project site. Since there would be approximately 1,085 acres of disturbed area, each washing event using 500,000 gallons (1.53 acre-feet) of water would result in runoff of approximately 460 gallons of water per acre. Given seasonal temperatures, much of this runoff would evaporate or infiltrate into the ground as it runs off the solar panels.

The rate and amount of recharge and surface runoff is determined by multiple factors, including the following: amount and intensity of precipitation; amount of other imported water that enters a watershed; and amount of precipitation and imported water that infiltrates to the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the intensity of rainfall over a given period of time. Changes in groundwater recharge alter the quantity of groundwater available to the environment, existing users, and proposed projects. Projects that grade the land surface, remove vegetation, alter the conveyance and control of runoff, or cover the land with impervious surfaces alter the relationships between rainfall, runoff, infiltration and evapotranspiration. Total project acreage is an indicator of the magnitude of the land surface disturbance and potential to alter runoff, infiltration and transpiration. The proposed project would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported from outside of the region into the project site.

Construction of the proposed project would create some impervious land within the project site. Access roads constructed within the project site would be composed of compacted soils which would become impervious to water infiltration. While the posts constructed to support the solar panels would add a minor amount of additional impervious coverage, the solar panels themselves would not function as impervious coverage, but instead would function similarly to a tree canopy. Rainwater would be intercepted by the panels and ultimately run-off the panel and onto the ground. Please refer to Impact HYD-3, for a more detailed discussion.

Likewise, most of the rainwater that runs off the impervious project facilities (i.e., concrete pads or other impervious improvements) would also runoff onto the neighboring soils and infiltrate into the ground. Thus, the amount of land converted to impervious surfaces that would reduce water infiltration and potentially increase erosion and siltation would be minimal. These areas comprise of less than 3% of the approximately 1,191 acre project site, conservatively estimated. Consequently, the additional impervious cover being produced by the proposed project is not combined in any one location, such as a parking lot, which would create a "blanket of impervious cover" which could impact recharge. Conversely, the proposed project's impervious improvements would be dispersed throughout the project site.

Given that the amount of new impervious cover created by the proposed project would be minimal, it would not substantially interfere with groundwater recharge. Water identified for the proposed project is currently being used and sourced from within the project area and watershed, either by way of agricultural uses or through the City's recycled water program. In addition, water used on-site is expected to infiltrate into the subsurface not run off site. As such, the proposed project will not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a

lowering of the local groundwater table; resulting in a less than significant impact. No mitigation is required.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Drainage Pattern: Erosion or Siltation

Impact HYD-3	**The project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.**

Impact Analysis

A recent study completed at the University of Maryland (Cook and McCuen 2011) investigated the impact of solar projects on peak flows and runoff volume. The results of the study indicate that solar modules mounted on metal piles and raised above the ground (as with the proposed project) produce less than a 1% increase in peak flows and volumes, regardless of module angle, ground slope, storm magnitude, soil type, and storm duration. Further, results of the study indicate that changes in ground cover from pre- to post-project scenarios can cause increases in flows: 4% to 7% increase in volume and 42% to 100% increase in peak flow rates.

These changes can result from clearing existing vegetation prior to construction and not maintaining vegetation underneath the modules or between rows. Where not addressed through project design measures or mitigation, the removal of vegetation reduces initial rainfall capture and increases overland flow velocities, decreasing infiltration into the soil. The conclusion of the study is that the modules themselves do not substantially impact runoff volumes or peak flow rates, but unmitigated changes in ground cover and other substantial changes to the site such as the creation of large-scale impervious surfaces can have a significant impact. In addition, as another point of reference, the State of New Jersey passed a law in 2010 classifying solar modules as pervious area, as runoff will continue to flow underneath adjacent overhanging modules.

The proposed project is not anticipated to substantially affect runoff since the proposed project includes minimal changes in existing natural landforms, ongoing vegetation maintenance efforts during construction and operation, and limited areas of compaction. These measures would establish a consistent hydrologic response that is similar to the natural condition. A small amount of flow concentration would be expected to occur where the runoff falls from each panel (the "drip line"), but this runoff is expected to disperse beneath the adjacent down slope modules. Therefore, the proposed solar modules are not expected to increase runoff on the project site.

Construction of project facilities would create some impervious areas of land on the project site. While the posts that support the solar panels would add a minor amount of additional impervious coverage, the solar panels themselves would not function as impervious coverage, but instead would function similarly to a tree canopy. Rainwater would be intercepted by the panels and ultimately run-off the panel and onto the ground. Thus, the amount of land converted to impervious surfaces that would reduce water infiltration and potentially increase erosion and siltation is minimal.

The relatively flat topography found on the project site would require minimal grading. Therefore, the current onsite topography would not substantially change as a result of the proposed project. The minimal amounts of grading on the project site would create minor modifications to existing drainage paths.

Most of the roads and panel arrays would be setback approximately 7 feet from the edge of the existing drainages. However, some of the interior roadways would require crossings over some of the drainages and these crossings would be designed to allow for the flow patterns of the channels to remain undisturbed.

The minimal amount of new impervious cover created by the proposed project would not substantially alter existing drainage patterns and increase erosion or siltation onsite or offsite. Therefore, the impact would be less than significant. No mitigation is required.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Drainage Pattern: Flooding

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

Impact Analysis

With the limited amount of impervious area and as discussed above in Impact HYD-3, implementation of the proposed project is not expected to significantly alter the existing natural drainage patterns. Any excess water from panel cleaning or the majority of surface runoff from storms events would percolate into the ground or evaporate.

The proposed project would not alter runoff volumes or alter existing drainage patterns in a manner that would result in flooding onsite or offsite. Therefore, the impact would be less than significant. No mitigation is required.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Runoff Water and Drainage Systems

Impact HYD-5	**The proposed project would not 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.**

Impact Analysis

Runoff from the project site drains into intermittent drainages that eventually infiltrate into the ground and are not tributary to other receiving water bodies or stormwater treatment facilities. No new stormwater facilities are planned for construction outside of the project site on the intermittent drainages that originate within the project boundary. As discussed in Impacts HYD-3 and HYD-4, the volume of water available as surface water runoff is not expected to differ from existing conditions, nor do annual rain events in the region necessitated onsite infrastructure to accommodate stormwater flows.

The proposed project would require approximately 9.0 acre-feet of water (3.0 acre-feet for washing and 6.0 acre-feet for landscaping and dust control, if needed). Annual use levels would decrease after two years, when the proposed native landscape is rooted and does not require additional water. Approximately 3.00 acre-feet per year used would be for washing the panels two times per year. Since there would be approximately 1,085 acres of permanently disturbed land, each washing event using 500,000 gallons (1.53 acre-feet) of water would result in runoff of approximately 460 gallons of water per acre. Much of this runoff would infiltrate into the ground as it runs off the solar panels and would not create additional surface water runoff that would exceed drainage systems.

Surface flows would either be contained to the project site or conveyed via the natural onsite drainage patterns and slope into the existing drainage features, and no new or expanded drainage facilities are anticipated to be required as a result of the proposed project. Therefore, impacts associated with stormwater drainage capacity are less than significant. No mitigation is required.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Degrade Water Quality

Impact HYD-6	**The proposed project would not otherwise substantially degrade water quality.**

Impact Analysis

The proposed project would not create any potential water quality impacts not previously addressed in Impacts HYD-1, HYD-3, and HYD-5. The project construction and operations would not affect any public or known private water supplies. Nearly all water used on site would either evaporate at the surface or infiltrate into the ground. There are no downstream surface water bodies that would receive runoff from the site under normal operating conditions or average storm events. Incidental contaminants in stormwater running off project infrastructure (e.g. metals, oils) would be filtered via infiltration before reaching subsurface aquifers. Therefore, the impact to water quality is anticipated to be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Structures: Flood Hazard Area

Impact HYD-7	**The proposed project would not place within a 100-year flood hazard area structures which would impede or redirect flood flows.**

Impact Analysis

The project site is designated as Zone X which is outside both the 100-year and 500-year floodplain. No FEMA designated Special Flood Hazard Areas or mapped regulatory floodways exist on the project site (FEMA 2013). Therefore, there would be no impact.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Flooding

Impact HYD-8	**The proposed project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.**

Impact Analysis

The project site is not located within the inundation area of any levees or dams. Therefore, there would be no impact. In the event of catastrophic failure to the Aqueduct above the project site, there is a possibility to have severe effects on project infrastructure and personnel on-site; however, no such incident is expected as the Aqueduct is highly monitored and maintained by the California Department of Water Resources and no such previous incidents have been recorded. Therefore, there would be no impact.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Seiche, Tsunami, or Mudflow

Impact HYD-9	**The proposed project would not be subject to inundation by seiche, tsunami, or mudflow.**

Impact Analysis

Seiche

Seiches occur from the movement of water in lakes or reservoirs that are set in motion by earthquakes. They can inundate the adjacent shoreline and adjacent landscape causing flooding and infrastructure damage. The only body of water in the vicinity of the proposed project is the California Aqueduct. Based on the relatively small cross section of the California Aqueduct, seiche-related hazards in the vicinity of the aqueduct are considered to be small.

Mudflow

As noted under Static and Seismically Induced Slope Failures, in Section 3.6, Geology and Soils, there is minimal potential for local slope instability from mudflows at the project site.

Other Hazards

Other geologic and seismic hazards (land subsidence, volcanic activity, and tsunami) that could be experienced in the larger region are unlikely to affect the project site. The project site is underlain by bedrock which is not susceptible to subsidence. There are no active volcanoes in close proximity to the project site. The project area is not adjacent to an ocean coastline or bay and therefore would not be subject to tsunamis.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

3.8.4 Cumulative Impacts

The geographic scope of the cumulative hydrology and water quality analysis is the vicinity of the project site and watershed. Hydrologic and water quality impacts tend to be localized; therefore, the areas near the project site would be most affected by project activities.

Consistent with the SWPPP, project-specific SWPPPs that would include site-specific BMPs and any other necessary site-specific waivers under the Porter Cologne Act would be prepared for each project in the City to sufficiently reduce the potential cumulative surface water quality impacts of these construction projects. Specifically, the City would require the applicant to incorporate post-construction BMPs, and low-impact development stormwater management principles for operation of the proposed project, which would provide some treatment of pollutants and would maintain the site's pre-project stormwater runoff. Therefore, project construction and operation and the construction and operation of related projects would reduce site-specific water quality impacts to close to zero such that cumulatively adverse hydrology and water quality impacts would not occur. This would be a less than significant cumulative impact.

Development in the project vicinity may have the potential to increase impervious surfaces and, therefore, may result in increased runoff. The projects listed in Table3-3 would be required to adhere to existing regulations and standards related to drainage facilities in accordance with the City's Municipal Code. It is reasonable to assume that other related projects would be required to implement stormwater quality protection and drainage plans that would reduce potential impacts to waterways to a less than significant level. Therefore, the proposed project, in conjunction with other related projects, would not have a cumulatively considerable impact on hydrology and water quality.