SECTION 4.11
HYDROLOGY AND WATER QUALITY

This section describes federal, state and local regulations applicable to hydrology and water quality. It also describes the regional hydrologic setting, existing hydrology/drainage (on-site and off-site), and existing flood hazards in the vicinity of the project site. Water quality is also described in terms of groundwater beneath the project site and surface waters in the region and the Imperial Valley.

This section also describes effects on hydrology and water quality that would be caused by implementation of the proposed project based on the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis* prepared by Fuscoe Engineering (Fuscoe, 2012). This document is provided on the attached CD of Technical Appendices as **Appendix I** of this EIR.

4.11.1 REGULATORY FRAMEWORK

A. FEDERAL

Federal Emergency Management Agency

Imperial County is a participant in the National Flood Insurance Program (NFIP), a federal program administered by the Federal Emergency Management Agency (FEMA). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted, as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of one in 100 years, although such a flood may occur in any given year. Imperial County is occasionally audited by the Department of Water Resources (DWR) to ensure the proper implementation of FEMA floodplain management regulations. The project site is located on Flood Insurance Rate Map (FIRM) community-panel number 06025C2050C and 06025C1700C, dated effective September 26, 2008.

B. STATE

The Porter-Cologne Water Quality Control Act

California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Board's (RWQCB) power to protect water quality and to adopt water quality criteria to protect Waters of the State. Such waters are defined in Section 13050 of the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." Water quality criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures. Reporting requirements for waste discharge to waters of the State are set forth in Section 13260. The RWQCBs are authorized to issue Waste Discharge Requirements specifying conditions for protection of water quality in Section 13263. Section 13181 of the Act requires the SWRCB to develop water quality reports and lists required under Section 303(d) of the Federal Clean Water Act.

State Water Resources Control Board Construction General Permit Order No. 2010-0014-DWQ

The SWRCB regulates stormwater discharges from projects during construction in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (NPDES No. CAS000002). Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction

Activity (Construction General Permit Order 2010-2014-DWQ, effective February 14, 2011) (SWRCB, 2011a).

Construction activity subject to a Construction General Permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Program (SWPPP). The SWPPP should contain a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the proposed project. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment (SWRCB, 2011a).

Water Quality Control Plan Colorado River – Region 7

The Water Quality Control Plan (also known as the Basin Plan) establishes beneficial uses in the Colorado River Basin. The Basin Plan also identifies water quality objectives that protect the beneficial uses of surface water and groundwater; describes an implementation plan for water quality management in the Colorado River Region; and describes measures designed to ensure compliance with statewide plans and policies. Overall, the Basin Plan provides comprehensive water quality planning in Region 7 which encompasses all of Imperial County as well as portions of San Bernardino, Riverside and San Diego Counties.

C. LOCAL

Imperial County General Plan

The Water Element and the Conservation and Open Space Element of the Imperial County General Plan contain policies and programs, created to ensure water resources are preserved and protected. **Table 4.11-1** identifies General Plan policies and programs for water quality and flood hazards that are relevant to the project and summarizes the project's consistency with the General Plan. While this report analyzes the project's consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

TABLE 4.11-1
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Policies	Consistent with General Plan?	Analysis
Conservation And Open Space Element		
Preservation of Visual Resources		
Objective 8.4 Ensure the use and protection of the rivers and other waterways in the County. Ensure proper drainage and provide accommodation for storm runoff from urban and other developed areas in manners compatible with requirements to provide necessary agricultural drainage.	Yes	To ensure proper drainage and accommodate stormwater runoff, the proposed project would rely on existing drainage patterns coupled with proposed detention basins located outside of the solar arrays and shallow ponded basins under the arrays. The Conceptual Drainage Study and Storm Water Quality Analysis (Fuscoe, 2012) confirmed the adequacy of drainage for the proposed project. Final limits of the detention basins and shallow ponding will be determined at the time of final design approval to satisfy County requirements. Therefore, the proposed project is consistent with this objective.
Objective 8.5 Protect and improve water quality and quantity for all water bodies in Imperial County.	Yes	The proposed project would protect water quality during construction through compliance with NPDES General Construction Permit, SWPPP, and BMPs. Design features and BMPs have also been identified to address water quality for the project. Water quantity would be maintained for the proposed project by retaining the majority of the project site with pervious surfaces. Although the proposed project may not improve water quality and quantity, it would protect existing conditions and satisfy County requirements. Therefore, the proposed project is consistent with this objective.
Program: Structural development normally shall be prohibited in the designated floodways. Only structures which comply with specific development standards should be permitted in the floodplain.	Yes	The proposed project site is located in Flood Zone "X" (Refer to Figure 4.11-2, FEMA Flood Zone Map). Zone "X" is defined by the FEMA as: areas determined to be outside of the 0.2 percent annual chance floodplain. Therefore, the proposed project is consistent with this Program (FEMA, 2008).

TABLE 4.11-1
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Policies	Consistent with General Plan?	Analysis
Water Element		
Protection of Water Resources from Hazardous Materials		
Program: The County of Imperial shall make every reasonable effort to limit or preclude the contamination or degradation of all groundwater and surface water resources in the County.	Yes	A Conceptual Drainage Study and Storm Water Quality Analysis has been prepared for the proposed project. As noted under Objective 8.5, the project includes design features and BMPs in addition to required compliance with a general NPDES permit and SWPPP during construction and with BMPs during operation. Therefore, the proposed project would not significantly contaminate ground or surface waters. However, conversion of the site from agricultural uses to a solar generation facility may improve runoff quality by eliminating use of fertilizers and pesticides on the project site. Therefore, the proposed project is consistent with this program.
Program: All development proposals brought before the County of Imperial shall be reviewed for potential adverse effects on water quality and quantity, and shall be required to implement appropriate mitigation measures for any significant impacts.	Yes	No adverse effects on water quality are anticipated in association with implementation of the proposed project. Therefore, the proposed project is consistent with this program. Refer to analysis for Objective 8.5.

County of Imperial Land Use Ordinance, Title 9

Division 16 of the Land Use Ordinance addresses Flood Damage Prevention Regulation. The purpose of this division is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provision of design to protect human life and minimize damage. Division 16 of the Land Use Ordinance restricts floodplain uses; requires that floodplain uses be protected against flood damage; controls alteration of floodplains and stream channels; controls filling and grading in floodplains; and prevents diversion of flood flows where these would increase flood hazards in other areas.

Division 22 of the Land Use Ordinance addresses groundwater. The focus of this division is to preserve, protect and manage the groundwater within the County.

County of Imperial Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvements, Drainage and Grading Plans within Imperial County

The *County of Imperial Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvements, Drainage and Grading Plans within Imperial County, Adopted December 9, 2008 and Revised September 15, 2008* provides drainage design standards for development throughout the County. Specific standards applicable to the project include:

- Retention volume of 3 inches of rainfall with no assumed infiltration or evaporation for development impervious areas. Retention basins are to empty within 72 hours after receiving water.
- Finished pad elevations for buildings shall be at or above the 100-year flood elevation. Finished floors shall be 6 inches above the 100-year flood.
- Drainage report required for all developments.

Imperial Irrigation District

IID's Water Department has been serving the Imperial Valley's water needs for 100 years. The district provides raw Colorado River water for irrigation and also for non-potable residential and industrial use. IID receives an average of 3.1 million acre-feet of water each year from the Colorado River. The Imperial Dam, located north of Yuma, Arizona, serves as a diversion structure for water deliveries throughout southeastern California, Arizona and Mexico. The operations of IID's River Division Office at Imperial Dam, as well as system wide water distribution, all fall under the direction of the United States Bureau of Reclamation (IID, 2011).

Water diverted at Imperial Dam for use in the Imperial Valley first passes through one of three de-silting basins, used to remove silt and clarify the water. From the de-silting basins, water is then delivered to the Imperial Valley through the 80-mile long All-American Canal. To facilitate its delivery, IID operates more than 230 miles of main canals, 1,438 miles of canals and laterals, and 1,406 miles of drainage ditches in the Imperial Valley. IID also maintains approximately 1,456 miles of drainage ditches used to collect surface runoff and subsurface drainage from the 32,227 miles of tile drains underlying 426,202 acres of farmland. Most of these drainage ditches ultimately discharge water into either the Alamo River or the New River (IID, 2011).

Three main canals, East Highline, Central Main and Westside Main, receive water from the All-American Canal and are used to deliver water to many canals that exist throughout Imperial Valley. Farmers then divert water directly from these canals to irrigate approximately 479,000 acres of farmland within IID's boundaries. Another important component of IID's distribution system is the seven regulating reservoirs and three interceptor reservoirs that have a total storage capacity of more than 3,300 acre-feet of water (IID, 2011).

As a part of its operating system, IID maintains an extensive gravity flow drainage system. The lateral drain system is laid out to provide a drainage outlet for each governmental subdivision of approximately 160 acres and, as such, the drains usually parallel the canals. There are over 1,456 miles of surface drains that can be divided into three main areas: Alamo River System, New River System and drains that flow directly into the Salton Sea. Approximately 430 control structures are installed along the drainage system. The district is obligated to provide its drains at sufficient depth (generally 6 to 10 feet deep) to accept tile drain discharge. Where the drain cannot be maintained at sufficient depth, a sump and pump are provided and maintained by IID. These drains are used to collect excess surface flow (tailwater) from agricultural fields, subsurface tile discharges and operational discharge from canals and laterals.

The project site is crossed or bordered by several IID features including the Diehl Drain, Dixie Drain 3, Dixie-Drain 3-A, Dixie-Drain 3-C, Dixie Lateral 1, Fern Canal, Fern Lateral 3, Fern Sidemain, Fig Canal, Fig Drain, Forget-Me-Not Lateral 1, Westside Drain, Westside Main Canal, Wixom Drain, Wormwood Canal, Wormwood Drain, and Wormwood Lateral 7. In addition, the project site is near several IID trust lands.

Any proposed improvements or alterations to IID infrastructure will require coordination with IID. The Applicant will require encroachment permits from IID to construct across IID canals. Likewise, the project will require an industrial service water agreement with the IID to receive industrial supply water and also a separate agreement to provide construction water.

4.11.2 ENVIRONMENTAL SETTING

Information contained in this section is summarized from the *Conceptual Drainage Study and Storm Water Quality Analysis* prepared by Fuscoe Engineering (Fuscoe, 2012).

A. SOLAR GENERATION FACILITY

Hydrologic Setting

The project site is located within the Imperial Hydrologic Unit of the Salton Sea watershed in the Colorado River region. The hydrologic unit code is 18100200 of the USDA National Resources Conservation Services (NRCS). The Salton Sea Watershed encompasses an area of approximately 8,000 square miles that extends from San Bernardino County in the north to the Valley of Mexicali (Republic of Mexico) in the south (**Figure 4.11-1**). The Salton Sea lies at the lowest point in the watershed (approximately 270 feet below mean sea level) and collects runoff and agricultural drainage from most of Imperial County, a considerable portion of Riverside County, small portions of San Bernardino and San Diego Counties, as well as the northern portion of the Valley of Mexicali. The principal sources of inflow to the Salton Sea include: the Alamo River, New River, Whitewater River/Coachella Valley Storm Channel, direct drainage from Imperial and Coachella Valleys, subsurface inflow from groundwater, San Felipe Creek, Salt Creek, other smaller local drainages, and direct precipitation.

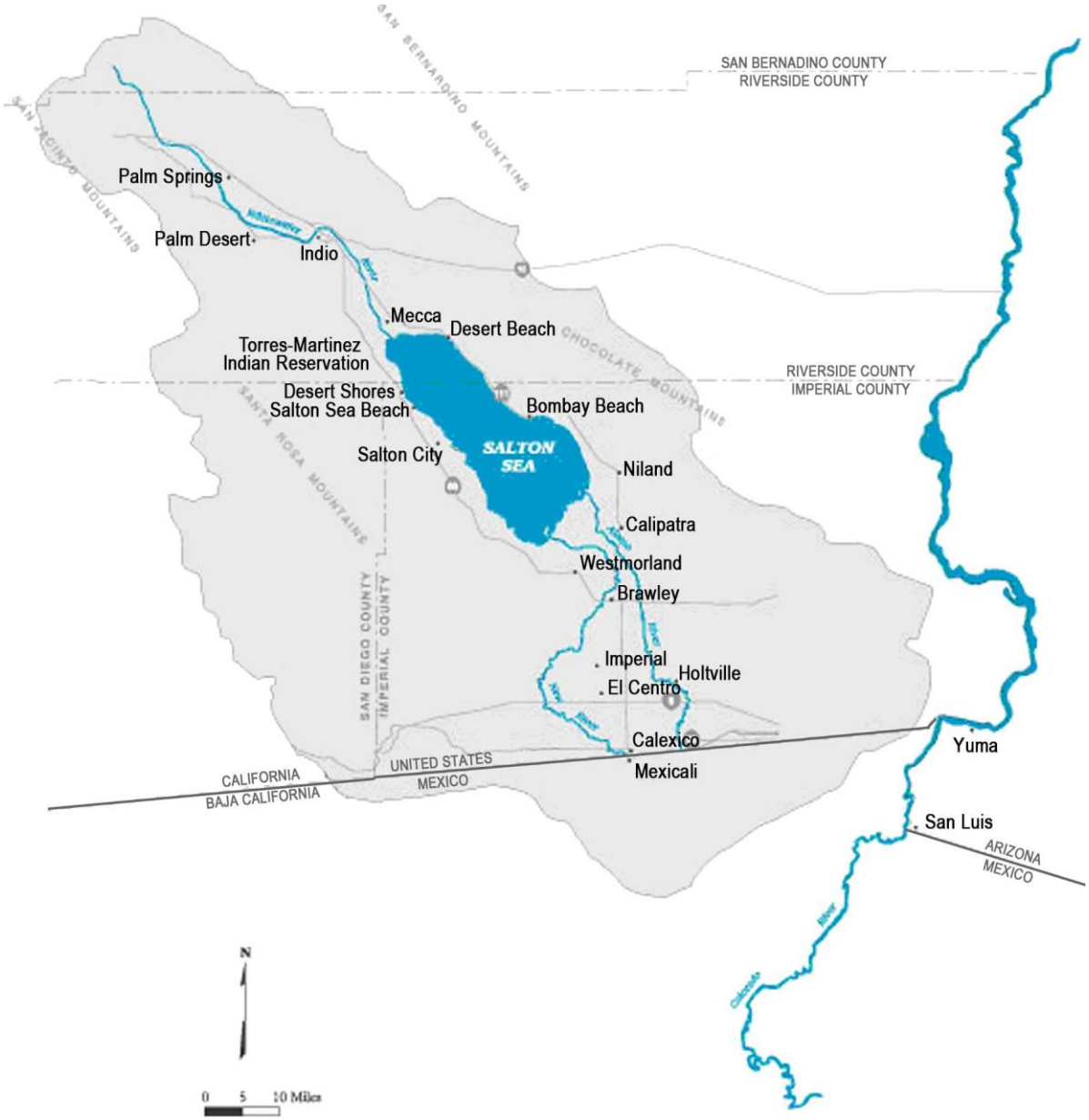
Existing Hydrology/Drainage

The project site is comprised of approximately 1,990 acres of land, approximately 1,822 acres are important farmland cultivated as part of the ongoing active agricultural production. The project site is divided in fields that currently serve, and will continue to serve, as detention basin areas. The project site is comprised of 25 drainage basins associated with the individual project parcels (Fuscoe, 2012).

On-Site Drainage

The project site is currently agricultural land. As a result, it is undeveloped, unpaved and highly pervious. Based on these characteristics, the majority of rainfall is usually absorbed by the soil, intercepted by subsurface tile drains, or percolates into the groundwater table. Current drainage patterns on the project site generally direct storm water runoff through the agricultural fields and convey all tributary storm water runoff via existing outlet structures to IID drains located throughout the project site. IID facilities that accept flow from the project lands include the Dixie Drain #3, Dixie Drain #3A, Wixom Drain, Diehl Drain, and Fig Drain.

Under existing conditions, two types of flow, agricultural and storm water, is discharged to the IID drains. During the life of the proposed project, agricultural runoff from the parcels that comprise the solar generation facility to the drains will cease and the drains will only receive storm water runoff.



Source: DWR, 2011.

FIGURE 4.11-1
SALTON SEA WATERSHED MAP

Flow discharged to the IID Drain system is conveyed from the project parcels through three drains, the Dixie Drain #3, Wixom Drain, and the Fig Drain. Dixie Drain #3 discharges to the Salt Creek approximately 1.2 miles north of the project. Flow is conveyed in Salt Creek approximately 6.25 miles before ultimately discharging to the New River. The Wixom and Fig drains discharge to the Fig Evaporation Pond immediately north and east of the project site, which then discharges to the New River approximately 5,800 feet from the site.

The IID Drain system was not designed to convey runoff from large storm events. Rather, the historical purpose of the drains is to convey agricultural runoff. The drains typically have the capacity to convey flow from the 5-year to 10-year storm event. Runoff from larger storm events (for example the 100-year event) is detained within low lying areas of the fields until the peak of the storm has passed, after which the detained runoff is slowly discharged to the drains via pipe connections that are typically 12 inches in diameter or less (Fuscoe, 2012).

Off-site Drainage

Surrounding roads, canals, and drains isolate the project site from runoff generated from offsite properties. Therefore offsite runoff does not affect the site.

Existing Flooding

According to FEMA FIRM (community-panel number 06025C2050C and 06025C1700C, September 26, 2008), project site is located in Flood Zone X (**Figure 4.11-2**). Zone X is defined by FEMA as areas determined to be outside of the 0.2 percent annual chance floodplain (FEMA, 2008).

Groundwater

The project site is within the Imperial Groundwater Basin. This basin is bounded on the east by the Sand Hills and on the west by the impermeable rocks of the Fish Creek and Coyote Mountains. To the north, the basin is bounded by the Salton Sea, which is the discharge point for groundwater in the basin. Major hydrologic features include the Alamo and New Rivers, which flow north towards the Salton Sea (Fuscoe, 2012).

Per Table 2-5 of the Colorado River Basin Water Quality Control Plan (WQCP), beneficial uses of groundwater within the Imperial Hydrologic Unit include: MUN – Municipal and Domestic Supply and IND – Industrial Service Supply (Fuscoe, 2012). The MUN beneficial use for groundwater within the Imperial Hydrologic Unit is limited to only a small portion of the ground water unit. Within the project area, groundwater is not used for municipal uses. Rather, all municipal and domestic water supply is obtained from the canal system stemming from the Colorado River. Wells do not exist in the area surrounding project site. Per Table 2-1 of the WQCP, IND is defined as a use of water for industrial activities that do not depend on water quality (Fuscoe, 2012).

Groundwater was encountered at depths ranging from 10 feet to 15 feet below ground surface based on 25 soil borings conducted as part of the *Preliminary Geotechnical Investigation: Proposed Mount Signal Solar Farm and Associated Structures West of Drew Road and South of Interstate 8 Imperial County, California* prepared by EGA Consultants conducted for the project site (EGA, 2011).

Existing Water Quality

Surface Water Quality

The following description of surface water quality was taken from the Imperial County General Plan Water Element (Imperial County, 1993a). While surface waters are not anticipated to be impacted by the project or used as a water supply source, the discussion of surface water quality provides context on the condition of surface waters in the region and the Imperial Valley.

Three general categories describe the surface water in Imperial County: freshwater, brackish water, and saline water. Freshwater (with total dissolved solids [TDS] generally less than 1,000 parts per million [ppm]) include the All-American Canal and other canals and laterals which deliver irrigation water to the agricultural fields within the County. The brackish waters (with TDS in the range of 2,000 to 4,000 ppm) include the Alamo River, New River and the agricultural drains that flow into these rivers or directly into the Salton Sea. The saline water category is represented by the Salton Sea. Salinity concentrations are currently slightly higher than those of ocean water (the Salton Sea's current TDS is approximately 44,000 ppm) (Imperial County, 1993a, p. 9).

Colorado River

The surface waters of the Imperial Valley depend primarily on the inflow of irrigation water from the Colorado River via the All-American Canal. Excessive salinity concentrations have long been one of the major water quality problems of the Colorado River, a municipal and industrial water source to millions of people, and a source of irrigation water for approximately 700,000 acres of farmland (Imperial County, 1993a, p. 39). The heavy salt load in the Colorado River results from both natural and human activities.

In 1975, the seven Colorado River Basin States (California, Arizona, Nevada, Utah, Wyoming, Colorado and New Mexico), with the Environmental Protection Agency's approval, adopted water quality standards for river salinity. Although Lower Colorado River water still has a relatively high total of dissolved solids when compared to its headwaters, the water quality of the water supplied to the Imperial Valley is fairly good (Imperial County, 1993a, p. 39).

Salt buildup also occurs as the water flows through the Colorado River system for agricultural and other beneficial uses. Erosion of the banks of the Colorado River and its tributaries has also resulted in a large sediment load.

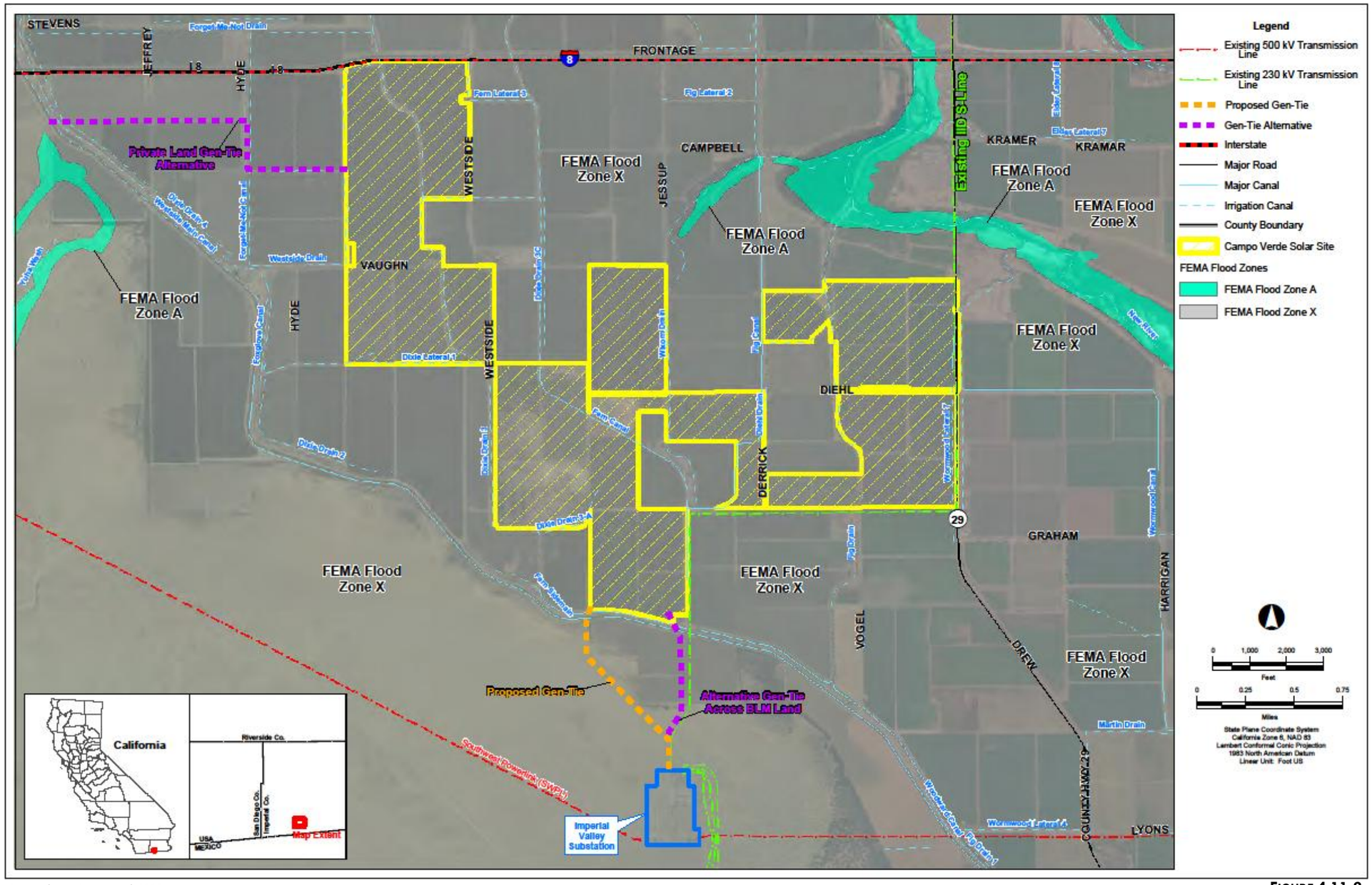
All American Canal

At the Imperial Dam, water is diverted west to the All-American Canal, which conveys water to the Bard Valley in California, and to the agricultural areas of the Imperial and Coachella Valleys. The salinity of the water in the All-American Canal fluctuates from a low of 737 ppm (1.00 ton per acre-foot of water) to a high of 958 ppm (1.30 tons per acre-foot of water) (Imperial County, 1993a, p. 43). Without salinity control projects in the Colorado River basin, the salt concentration of this water would increase.

However, water quality data for the All-American Canal indicate water suitable for continued agricultural use. All-American Canal flows are considered freshwater.

Alamo River

The Alamo River flows into Imperial County from Mexico carrying brackish water with TDS in the range of 2,000 to 4,000 ppm. Field erosion and dredging activities contribute to siltation in the Alamo River and ultimately, the Salton Sea. Presently, the Alamo River is very small as it crosses into the United



Source: kp environmental, 2012.

FIGURE 4.11-2
FEMA FLOOD ZONE MAP

States and carries agricultural water coming from agricultural fields in Mexico (Imperial County, 1993a, p. 14). The main pollutants in the water are pesticides which get drained into the Alamo River during irrigation. However, the potential for polluting the Alamo River could increase not only from the pesticides contained in the water but from potential development at or near the Alamo River at the International Boundary.

New River

The New River flows into the Imperial Valley from Mexico with a significantly high waste load. Seasonal variations in contaminant loads correspond to a late winter planting and irrigation, and a fallow fall season. The contaminant load indicates the intensive use of this water for irrigation in Mexico and the presence of municipal wastewater from Mexicali (Imperial County, 1993a, p. 43). As this drainage flows through the County, the flow increases dramatically as a result of drainage from the agricultural lands in the Imperial Valley. New River water is considered brackish.

Salton Sea

The historic data on the Salton Sea shows a gradual increase in the concentration of dissolved salts. This increase has resulted from the high evaporation rates and continual inflow of drainage waters with high salt loads from canals and laterals in Imperial Valley and from agricultural activity in Mexico. The Salton Sea has no outlet, occurring in a fault-controlled sub-sea level basin. Waters in the Salton Sea are considered saline.

At present, the primary water quality problem facing the Salton Sea continues to be increasing salinity and associated selenium buildup. Approximately five million tons of salt per year are carried into the Salton Sea. Selenium entering the Salton Sea originates from the Colorado River which contains approximately one to two part per billion (ppb) of selenium (Imperial County, 1993a, p. 56). As the Colorado River water is brought into Imperial Valley by various canals, the selenium becomes concentrated due to the evaporation and evapotranspiration that occurs during farming of agricultural fields. The agricultural drains then carry this selenium enriched water into the Salton Sea. The New and Alamo Rivers contain approximately seven to eight parts per billion of selenium (ppb) when they reach the Sea. The selenium is taken up and concentrated by small organisms (e.g. fish), which in turn, are eaten by larger organisms (e.g. birds).

Groundwater Quality

The following description of groundwater quality was taken from Bulletin 118, California's Groundwater, Imperial Valley Groundwater Basin (Bulletin 118, 2004). While groundwater is not anticipated to be impacted by the project or used as a water supply source, the discussion of groundwater quality provides context on the condition of groundwater in the region and the Imperial Valley.

Characterization

Water quality varies extensively throughout the basin. Total Dissolved Solids (TDS) content ranges from 498 to 7,280 mg/L in the basin (Bulletin 118, 2004). Department of Health Services data from five public supply wells show an average TDS concentration of 712 mg/L and a range from 662 to 817 mg/L.

Impairments

In general, groundwater beneath the basin is unusable for domestic and irrigation purposes without treatment. TDS values typically exceeding 2,000 mg/L are reported from a limited number of test wells

drilled in the western part of the basin. Groundwater in areas of the basin has higher than recommended levels of fluoride and boron (Bulletin 118, 2004).

Approximately 7,000 acre-feet per year of groundwater is estimated to recharge the basin from the New River which drains the Mexicali Valley (Bulletin 118, 2004). This groundwater is related to surface flow from the highly polluted New River and negatively affects groundwater quality in the basin (Bulletin 118, 2004).

B. GEN-TIE

The portion of the gen-tie to be located on lands under the jurisdiction of the BLM is undergoing separate environmental analysis under NEPA. However, the following details are provided based on available information for the region and the project area.

The proposed gen-tie is located within the same watershed and hydrologic unit as the project site (Imperial Hydrologic Unit of the Salton Sea watershed in the Colorado River region). The proposed gen-tie would cross the Westside Main Canal and would cross approximately 0.9 miles of BLM land to its termination at the Imperial Valley Substation.

The proposed gen-tie route is located entirely within a BLM-designated utility corridor and is primarily undeveloped desert land. Portions of this land have been previously disturbed by roads and berms. This land is generally flat and there are no significant surface water drainages. It is assumed the majority of stormwater that falls on this area is absorbed by the soil or percolates into the groundwater table.

Like the solar generation facility site, the proposed gen-tie alignment is located in Flood Zone X, defined by FEMA as areas determined to be outside of the 0.2 percent annual chance floodplain (FEMA, 2008).

Depth to groundwater along the gen-tie alignment is most likely deeper than the 10 to 15 feet encountered at the project site. This is because the groundwater level on the undeveloped desert land crossed by this route is not influenced by the ongoing application of irrigation water on the agricultural lands making up the site.

4.11.3 IMPACTS AND MITIGATION MEASURES

A. STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines, as listed in Appendix G. The project would result in a significant impact to hydrology and water quality if it would result in any of the following:

a) Violate any water quality standards or waste discharge requirements?

b) 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.q., 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)?

c) 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?

d) Substantially alter the existing drainage patterns 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 offsite?

e) 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?

f) Otherwise substantially degrade water quality?

g) Place housing within a 100-year flood hazard area as mapped on a Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

h) Place within a 100-year flood hazard area structures which would impede or redirect the flood flows?

i) 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?

j) Inundation by seiche, tsunami, or mudflow?

B. Issues Scoped Out as Part of the Initial Study

Several criteria were scoped out as part of the Initial Study. Criterion "b" was scoped out because the proposed project does not intend to use groundwater. Following implementation of the proposed project, water will continue to percolate through the ground as a majority of the surfaces on the project site will remain pervious. No impact is identified for this issue area and it will not be discussed further in this section.

Criterion "g" and "h" both deal with development within the 100-year floodplain. According to the FEMA FIRM, all of the project site is in Zone X, which is an area determined to be outside of the 0.2 percent annual chance of a flood. Thus, no impact is identified for these issue areas and they are not discussed further in this section.

Criterion "i" was scoped out because no levees or dams are in the vicinity of the project site which would present a significant risk of flooding.

Lastly, criterion "j" was scoped out because no bays or lakes are within a two-mile radius of the project site and the project site is over 100 miles from the Pacific Ocean. Therefore, there is no potential for the project site to be inundated by seiches or tsunamis. In addition, the project site is relatively flat and level eliminating the potential for exposure to mudflows. Thus, no impact is identified for these issues and they are not discussed further in this section.

C. Methodology

The analysis of impacts to hydrology and water quality were based on the results from the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis* (Fuscoe, 2012) and the physical characteristics of the Salton Sea and its watershed. Comparisons and analysis were made between the amount of runoff generated from the 100-year storm event for the solar generation facility site and the percent contribution to the Salton Sea. Groundwater impacts were assessed based on the geotechnical report (EGA, 2011) and reported excavation depths.

D. PROJECT IMPACTS AND MITIGATION MEASURES

Violate Water Quality Standards or Waste Discharge Requirements

Impact 4.11.1 Implementation of the proposed project would generate small amounts of runoff during construction, and operation and maintenance. This impact is considered **less than significant**.

Construction

The project site is relatively flat and requires minimal grading to accommodate construction of the project (the PV fields and foundations for equipment and buildings). The Applicant has also identified BMPs to reduce potential for fuel spills and transport of polluted runoff as described in **Table 2.0-5** in Section 2.0, Project Description.

The project will excavate a series of foundations for the gen-tie pole structures to depths that vary from 15 to 45 feet deep. Current geotechnical data indicates groundwater depths vary from 10 to 15 feet deep. There is the potential need to pump groundwater out of the excavations during construction of the foundations. If this is required the amount of water removed via pumping will be minimal and is anticipated to be retained on-site. Groundwater depths are anticipated to be deeper than those reported in the geotechnical report (Fuscoe, 2012) because data for the report were collected during the irrigation season. The current agricultural practice applies irrigation water to the crops. The application of irrigation waters tends to artificially elevate local groundwater levels. Since no irrigation waters will be applied throughout the course of the proposed project's operational life, groundwater levels are expected to drop. Actual groundwater levels will be based on a future, site-specific, geotechnical study to be completed prior to the beginning of construction activities. Any groundwater that is encountered will be pumped to the surface and discharged onto the existing soil surface. It is anticipated that all groundwater discharges can be fully contained within the project boundaries either through infiltration at the soil surface or retained in the on-site retention basins. Therefore, **less than significant** impacts would occur relative to violating water quality standards and degrading water quality during construction of the project.

As a result of the recommended site design and source control measures, and the construction of the required detention basins, water quality exceedences are not anticipated and pollutants are not expected within project runoff that would adversely affect beneficial uses in downstream receiving waters. Although specific Imperial County regulations regarding storm water NPDES and new development do not exist, the project plans to institute controls designed to limit discharges to the appropriate standard. The project would comply with the requirements of the State Regional Water Quality Control Board concerning coverage under the General Construction Permit. Therefore, the project would result in a **less than significant** impact to water quality.

Operations

The Applicant does not anticipate washing the solar panels associated with the project. It is expected that rainfall will likely be enough to keep the panels sufficiently clean. However, the Applicant is permitting for 20 acre-feet of water per year from IID to wash the panels one to two times per year, if necessary.

Panel washing activities (if they occur) are not anticipated to generate runoff or contain pollutants (e.g. grease, heavy metals) other than dust and perhaps trace amounts of pesticide drift that may have accumulated on the panels. Any runoff from panel washing would evaporate or percolate through the

ground, as a majority of the surfaces in the solar field will remain pervious. Therefore, **less than significant** impacts would occur relative to violating water quality standards and degrading water quality during operations and maintenance of the project.

Although no significant impacts with regard to water quality would occur, the project owner will be responsible for operation and maintenance of site design, source control, and treatment control Best Management Practices (BMPs). The owner will also be responsible for long-term funding for BMP maintenance. In addition, the County of Imperial will be granted access to the property for inspection through a formal agreement to ensure that the owner is properly carrying out the BMPs over the life of the project.

Mitigation Measures

None required.

Significance after Mitigation

No significant impacts to water quality are expected due to increased runoff or dewatering as a result of foundation excavation during the construction phase. Likewise, no substantial water impairments are anticipated with development of the project SWPPP and adherence to site design, source control, and treatment control BMPs during operation and maintenance.

Result in Substantial Erosion or Siltation On- or Off-site

Impact 4.11.2 Implementation of the proposed project could generate erosion during construction. Compliance with the provisions of the Construction General Stormwater Permit and Stormwater Pollution Prevention Plan would address erosion or siltation on or off-site. Therefore, this impact is considered **less than significant**.

Construction

Because the site would require minimal earthwork associated with site preparation and installation of PV structures, the potential for erosion and sediment is limited. Soil erosion, sedimentation and pollutants in runoff (e.g. grease, oils, sediment, and heavy metals) would be controlled during construction in accordance with the Construction General Stormwater Permit, which regulates storm water discharges from construction sites that disturb one or more acres of land. The Construction General Permit would also cover stormwater discharges associated with construction of IID crossings. A Stormwater Pollution Prevention Plan (SWPPP) would also be required. The SWPPP would be prepared by a Qualified SWPPP Developer (QSD) and implemented by a Qualified SWPPP Practitioner (QSP). Soil erosion and sedimentation during construction would be controlled. The SWPPP must be designed to ensure that the following requirements are met:

- All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;
- Site Best Management Practices (BMPs) are effective and result in the reduction or elimination of pollutants in storm water discharges from construction activity;

- Calculations and design details as well as BMP controls for site run-on are complete and correct, and;
- Stabilization BMPs installed to reduce or eliminate pollutants after construction is completed

Typical soil erosion and sedimentation BMPs expected to be employed in the SWPPP include, but are not limited to, straw wattles, check dams, fabric blankets, and silt fencing. BMPs proposed by the Applicant include allowing only trained personnel to refuel vehicles in designated areas and properly maintaining vehicles to minimize potential for leaks. These practices would help reduce likelihood for pollutants entering storm water runoff. Based on implementation of the requirements summarized above, construction of the proposed project would result in no impacts with regard to soil erosion, sedimentation or runoff pollutants.

Additionally, measures are proposed that include the application of advanced, environmentally safe, polymer emulsion dust control palliatives that produce highly effective dust control, erosion control and soil stabilization. These measures will reduce airborne dust and the mobilization of soil particles by water. The effect these materials would have on site hydrology would depend on the amount and method of application. It is expected that they would be applied in a manner where the site would maintain its permeability and infiltration so moisture from storm events would infiltrate into the soil. However, to ensure that even if the application of dust and erosion control products did result in zero permeability or infiltration into the soil, the hydrology study analyzed the worst-case scenario of 100% runoff because Imperial County requires 100% retention of the runoff associated with the site assuming zero percolation into the ground. The on-site retention basins are sized to capture the stormwater as if none of it would penetrate into the ground. Consequently, any erosion associated with stormwater runoff would be captured in the on-site retention basins. Therefore, **less than significant** impacts under CEQA would occur relative to erosion and siltation during construction of the project.

Operation

The existing site grade and drainage will be retained or improved as part of the project. Erosion and soil runoff would be controlled by limiting drainage to detention basins and existing IID drains. Because of the flat topography of the project site, erosion is a concern only where runoff flow enters detention basins. On-site detention basins would be constructed with 8:1 side slopes. Stabilization would be evaluated at final engineering (see Preliminary Infiltrations Tests prepared by Landmark included as Appendix A of **Appendix I** of this EIR).

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Result in Substantial Flooding On- Or Off-Site/Create or Contribute Runoff Exceeding Capacity

Impact 4.11.3 Implementation of the proposed project would generate on-site runoff. Existing drainage patterns would be maintained and the site would remain pervious. Sufficient capacity is available in receiving IID drains. Therefore, impacts associated with flooding or exceedance of existing drainage capacity are considered **less than significant.**

Construction

The project site is made up of flat, flood-irrigated agricultural fields. Based on the site's topography, minimal grading would be necessary during construction of the project site to support the PV solar fields, internal roads, and foundations for equipment and buildings. Any remaining crop residues, weedy growth or miscellaneous vegetation requiring removal will be removed if necessary. Excavation would be required to install underground wiring and cables, electric poles, equipment pads, and common service area facilities (O&M building, septic system, etc). No excavation will be needed to accommodate PV structures as driven piles will be used. Depth for piles would vary from 6 to 11 feet. The existing topography would generally be maintained and the site would remain largely pervious (e.g. no major paved surfaces or structures). Therefore, **less than significant** impacts to on- and off-site drainage and flooding would occur during construction of the project.

Operations and Maintenance

The existing drainage pattern on each project parcel would be maintained following construction. No new access roads are proposed as part of the project. Existing dirt roads throughout the project site would be used for transportation during construction and operation of the project.

The project site has been delineated into tributary drainage basins for the existing and proposed conditions (see Appendix E of the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis* for Basin Maps). Ultimate points of discharge for the existing and proposed conditions are the same. However, some of the smaller existing drainage sub-basins would be combined into larger drainage basins where appropriate.

The project site will be divided into three watersheds that are tributary to four distinct IID drains: the Dixie Drain #3 (for which basins are noted with a "D"); the Wixom Drain (for which basins are noted with a "W"); the Diehl Drain (for which basins are noted with a "L"); and the Fig Drain (for which basins are noted with a "F").

Table 6 of the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis* provides a summary of the drainage basin and sub-basin areas for the existing and proposed conditions. Note that flow from the Diehl Drain is discharged to the Fig Drain within the project limits. As such, the drains conveying flow from the project to ultimate receiving waters are the Dixie Drain #3, Wixom Drain, and the Fig Drain. Table 6 also assumes that flow is detained and discharged into receiving drains. As discussed in Section 2.3.2.b of the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis*, preliminary infiltration tests show that the site has the potential to infiltrate runoff, thus limiting discharge to the drain system.

As proposed, some of the drainage sub-basins will be combined into larger drainage basins. In three instances flows would be routed from one IID Drain tributary basin to another IID Drain tributary area:

- Flow from Basin W2 will be routed/combined with flow from Basin D7
- Flow from Basin L1 will be routed/combined with flow from Basin W3
- Flow from Basin L2 will be routed/combined with flow from Basin F1

Although there is a rerouting of flow from one IID Drain to another, because the project proposes to infiltrate runoff, there will not be an impact to the receiving drain. In addition, the routing of flow described above would result in a net decrease in area potentially contributing flows to the Fig Drain, Diehl Drain, and the Wixom Drain when compared to the existing condition. This is because the flows

would be retained in areas where soils have high rates of infiltration. As a result, flow stored in the detention basin would be able to percolate in less than 6 hours.

To determine capacity of the basins, a series of hydrologic calculations were conducted to determine the levels of inundation for each detention basin based on a 100-year storm event as a minimum. The existing and proposed conditions for storm water runoff at each of the basins are presented in Tables 7 and 8 of the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis*. The calculations demonstrate that each individual basin is designed with the capacity to detain a 100-year storm event.

The project also proposes to detain the estimated runoff from the 100-year storm event in 3-foot deep detention basins located on-site but outside the footprint of the PV solar arrays. Additional detention of runoff necessary to comply with the County standard to store 3 inches of runoff would occur under the arrays as necessary to a depth less than 12 inches. Locations of proposed detention basins are provided for reference on the Proposed Conditions Basin Map of the *Campo Verde Solar Conceptual Drainage Study and Storm Water Quality Analysis* (**see Figure 4.11-3**). The final location/sizes of detention basins will be determined during final design as part of the final hydrology study.

Based on the proposed drainage design described above, the project would not have a substantial impact on the hydrology of the surrounding area or of the IID Drain system. Peak flow runoff from the project would be infiltrated in designated detention basins and there is no potential for increased flooding potential onsite or in offsite IID drains. The County requirement to provide 3 inches of detention per tributary acre would be met and detained runoff would be infiltrated into the underlying soil. Therefore, on- and off-site flooding impacts would be **less than significant**.

Mitigation Measures

None required.

Significance after Mitigation

Not applicable.

4.11.4 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

A. CUMULATIVE SETTING

The cumulative setting for hydrologic resources is within the Imperial Hydrologic Unit of the Salton Sea watershed in the Colorado River region. The hydrologic unit code is 18100200 of the USDA National Resources Conservation Services (NRCS). The Salton Sea Watershed encompasses an area of approximately 8,000 square miles that extends from San Bernardino County in the north to the Valley of Mexicali (Republic of Mexico) in the south (see **Figure 4.11-1**). The Salton Sea lies at the lowest point in the watershed (approximately 270 feet below mean sea level) and collects runoff and agricultural drainage from most of Imperial County, a considerable portion of Riverside County, small portions of San Bernardino and San Diego Counties, as well as the northern portion of the Valley of Mexicali. The principal sources of inflow to the Salton Sea include: the Alamo River, New River, Whitewater River/Coachella Valley Storm Channel, direct drainage from Imperial and Coachella Valleys, subsurface inflow from groundwater, San Felipe Creek, Salt Creek, other smaller local drainages, and direct precipitation. One third of the water delivered to agricultural users in the Imperial Valley is discharged into the IID's drainage system. Based on a review of the cumulative projects listed in Table 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Used, 15 projects including

the proposed project would result in the conversion of agricultural lands to other non-water intensive uses thus contributing to reductions in the amount of agricultural runoff inflows to the Salton Sea. The projects and their acreages are summarized in **Table 4.11-2**. The projects would result in the conversion of a total of 12,343 acres of agricultural lands to other uses. The proposed project represents 1,852 acres or 15 percent of the total.

TABLE 4.11-2
CONVERSION OF AGRICULTURAL LANDS REDUCING RUNOFF TO THE SALTON SEA

Projects	Acreage
Linda Vista Tentative Subdivision Map	6
County Center II Expansion	240
Imperial Solar Energy Center South	950
Mount Signal Solar Farm	1,375
Centinela Solar Energy	2,067
Mayflower Solar Farm Project	482
Arkansas Solar Farm	481
Sonora Solar Farm	488
Alhambra Solar Farm	482
Calexico 1A	693
Calexico IB	666
Calexico IIA	733
IIB	732
Silverleaf Solar Energy	1,096
Campo Verde Solar Project	1,852
TOTAL	**12,343**

Source: Table 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Use.

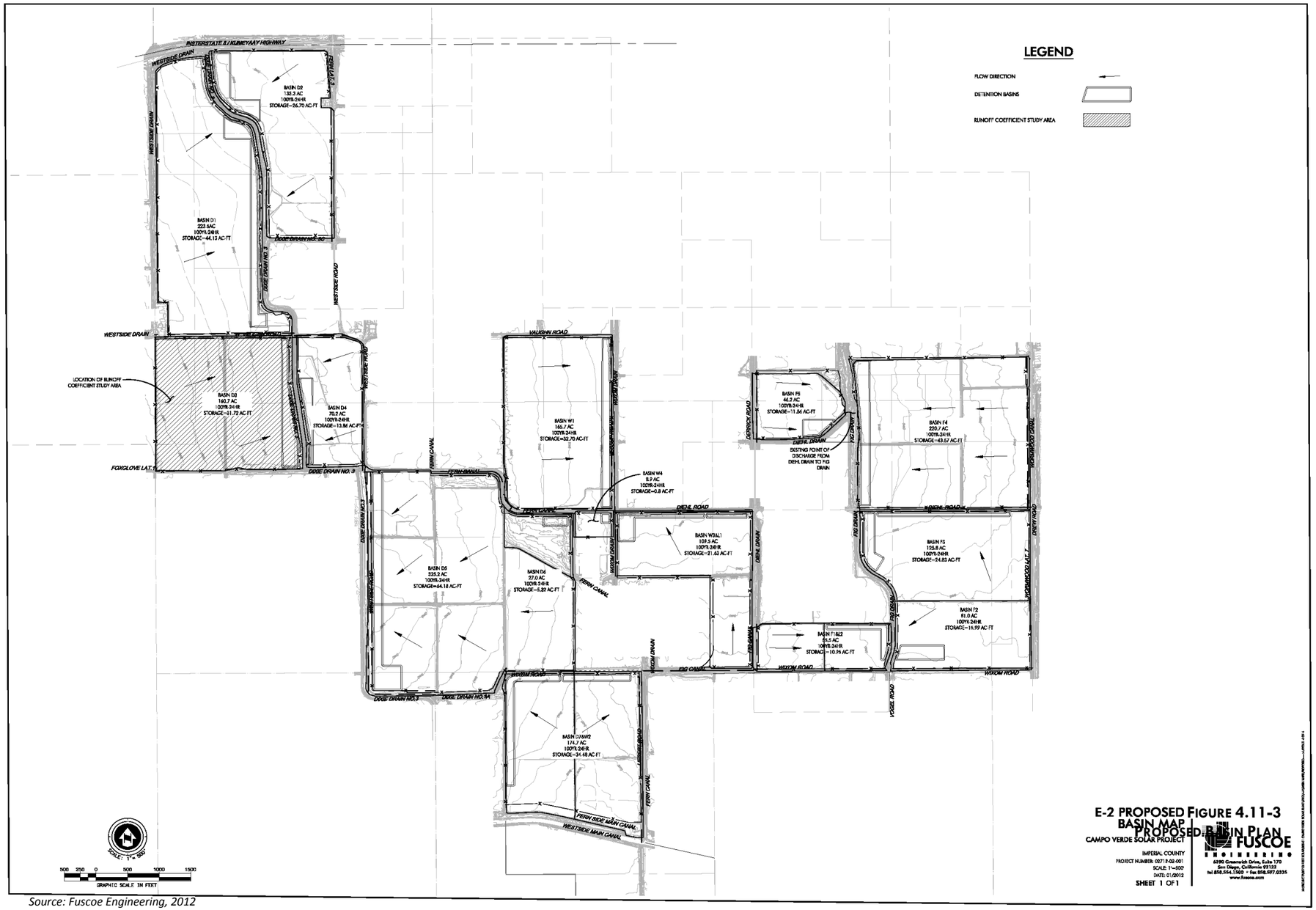
Projects listed above are based on the cumulative projects listed in Table 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Used, and involve conversion of agricultural lands to other non- water intensive uses.

B. CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Hydrology and Water Quality

Impact 4.11.4 The proposed project, in combination with approved, proposed and other reasonably foreseeable projects in the Salton Sea watershed would contribute to the cumulative effects of degradation of water quality and changes in runoff patterns ultimately discharging to the Salton Sea. This impact is considered **less than cumulatively considerable**.

One third of the water delivered to agricultural users in the Imperial Valley is discharged into the IID's drainage system. Reduction in field drainage due to land use conversion has an incremental effect on both drain water quality and the volume of runoff in impacted drains and the subsequent drainage path to the Salton Sea.



Source: Fuscoe Engineering, 2012

Reduction in Water Quantity and Quality

As described above, surface waters in the Imperial Valley ultimately drain into the Salton Sea via the New and Alamo rivers as well as via irrigation drains and canals. Until recently, the amount of water entering the Salton Sea was roughly balanced by the amount of water evaporating from its surface. However, due to increased demand for water supplies in the region and recent IID water transfer agreements increasing amounts of water are being consumed in Imperial Valley as well as transferred out of the valley to population centers such as San Diego County, thus reducing inflows to the Salton Sea. Implementation of the proposed project and the projects listed in **Table 4.11-2** would contribute to this cumulative diversion of water from the Salton Sea. This would occur through the conversion of irrigated agricultural land that previously drained to the sea (PMC, 2011).

Agricultural runoff contributes significantly to total inflows to the Salton Sea. As irrigated agricultural land is converted to nonagricultural use, the associated runoff ceases to drain into the New and Alamo rivers, ultimately reducing the sea's total inflows. As described above, the proposed project will convert approximately 1,852 acres of active farmland. The projects listed in **Table 4.11-2** contain a total of approximately 12,343 acres of irrigated agricultural land. The average annual water consumption per-acre within the Imperial Irrigation District is 4.63 acre-feet, per acre, per year (IID, 2011). For the project site, total water consumption based on the average annual usage is 8,575 acre-feet of water. One third of the applied irrigation water (2,830 acre-feet) is returned to the drainage system and ultimately the Salton Sea. The total drainage area for the Salton Sea is 8,360 square miles. The Sea has a total volume of approximately 7,500,000 acre-feet and a surface area of 240,639 acres. Under average irrigation practices the removal of the Campo Verde project area from agricultural production represents a reduction of less than one-tenth of one percent (0.04%) in the amount of water reaching the Salton Sea. Under normal precipitation conditions the reduction is 0.0001%. Neither reduction would be noticeable.

Based on the assumption that an average acre of agricultural land uses 4.63 acre-feet per year and assuming a worst-case scenario in which implementation of all the projects listed in **Table 4.11-2** results in the conversion of the entire 12,343 acres, under average irrigation practices this represents a total water consumption of 57,148 acre-feet of water. Again, one third of this (18,859 acre-feet) is returned to the drainage system and ultimately the Salton Sea. The removal of these 12,343 acres of agricultural land would result in a reduction of less than three-tenths of one percent (0.25%) in the amount of water reaching the Salton Sea. This estimate is considered conservative because the estimate assumed all project acreage was in agricultural production. Small percentages of each project contain land that is not in agricultural production. Therefore, the cumulative water quantity and quality impacts to the Salton Sea are considered **less than significant**, and the project's contribution to these impacts is considered to be less than cumulatively considerable. It should be noted that the reduction in agricultural runoff would result in an incremental improvement in water quality due to the reduced amount of agriculture related pollutants.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

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