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 Project area. Water quality is also described in terms of groundwater beneath the Project area 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 "Seville Solar Project Jurisdictional Delineation," prepared by HELIX Environmental Planning, Inc. (HELIX 2014a); the "Phase I ESA Report Seville Solar Farm 1791 W. Hwy 78 Westmorland, California," prepared by GS Lyon Consultants, Inc. (GS Lyon 2013); the "Federal Emergency Management Agency (FEMA) Flood Hazard Map" (FEMA n.d); the "Preliminary On-Site and Off-Site Hydrology and Flood Hazard Analysis for Allegretti Farms Solar Project Site," prepared by AEI-CASC Engineering (AEI CASC, 2013); the "Infiltration Test Results, Seville Solar Site, Ocotillo Wells Area of Imperial County, California," prepared by PETRA Geotechnical, Inc. (PETRA 2012b); the "Preliminary Geotechnical Investigation, Proposed Seville Solar Energy Facility, Allegretti Farms Site, Located East of Ocotillo Wells and South of SR-78, Imperial County, California," prepared by PETRA Geotechnical, Inc. (PETRA 2012a); the "Memorandum RE: San Felipe Creek/Seville Solar Complex Response," prepared by Rick Sidor of AEI-CASC Engineering (Sidor 2013), and the *Water Supply Assessment, Seville Solar Farm Complex*, prepared by Todd Engineering (Todd 2013). These documents are included as **Appendix J** of the Technical Appendices of this EIR on the attached CD.

Because no major change in drainage would occur in association with the transmission line overbuild or Anza substation expansion, the analysis in this section focuses on the Property and Solar Farm Complex site.

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 solar farm complex site is located on Flood Insurance Rate Map (FIRM) community-panel numbers 06025C0925C and 06025C0950C. A portion of the solar farm complex site is within Flood Zone A, defined as those areas with a one percent annual chance of flooding (and a 26 percent chance of flooding over the life of a 30-year project). The remainder of the solar farm complex site is located in Flood Zone X, an area of moderate flood hazard, between the limits of the 100-year and 500-year floods (**Figure 4.11-3**).

B. STATE

The Porter-Cologne Water Quality Control Act

California established its regulations to comply with the Clean Water Act (CWA) 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 Boards (RWQCBs) power to protect water quality and to adopt water quality criteria to protect Waters of the State (WS). 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 WS are set forth in Section 13260. The RWQCBs are authorized in Section 13263 to issue Waste Discharge Requirements specifying conditions for protection of water quality. Section 13181 of the Act requires the SWRCB to develop water quality reports and lists per 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 2012).

Construction activity subject to a Construction General Permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation. A Construction General Permit 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 the 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 2012).

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. The Project area is located within the Ocotillo-Clark Valley Basin of the Colorado River Hydrologic Region (SWRCB 2006).

C. LOCAL

Imperial County General Plan

The Imperial County General Plan contains goals, objectives, policies and programs created to ensure water resources are preserved and protected. **Table 4.11-1** identifies applicable General Plan goals, objectives, policies and programs from the Conservation and Open Space Element for water quality and flood hazards that are relevant to the proposed Project. In addition, two programs from the Water Element that directly relate to the proposed Project are also analyzed. While this EIR analyzes the

proposed 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 Goals, Objectives, Policies and Programs	Consistent with General Plan?	Analysis
CONSERVATION AND OPEN SPACE ELEMENT		
Preservation of Water Resources		
Goal 8: The County will conserve, protect, and enhance the water resources in the planning area.	Yes	All County projects are required to protect water during construction through compliance with an NPDES General Construction Permit, SWPPP, and BMPs. The proposed Project would be required to comply with these provisions and is therefore consistent with the intent of this goal.
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 to be located within each solar farm project site. The Preliminary On-Site and Off-Site Hydrology and Flood Hazard Analysis (AEI-CASC 2013) prepared for the proposed Project analyzed a worst-case scenario assuming 100 percent runoff with on-site storm water retention basins sized to fully retain the 100-year 24-hour peak flood volume resulting from precipitation. 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 (AEI-CASC 2013). In addition, only one small area of the Property is in active agricultural use, and surrounding areas consist of vacant desert lands. Current and previous agricultural activities utilized groundwater for crop irrigation, which then percolated back into the ground or was collected in on-site detention basins. As such, the Property is not reliant upon or connected to IID canals and drains typically associated with agricultural land within the County. Therefore, the proposed Project is consistent with this objective.

TABLE 4.11-1
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Goals, Objectives, Policies and Programs	Consistent with General Plan?	Analysis
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 an NPDES General Construction Permit, SWPPP, and BMPs. Design features and BMPs have also been identified to address water quality for the proposed Project. Water quantity would be maintained by retaining the majority of the Project area 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	Portions of the Property are located in Flood Zone X and A (Refer to **Figure 4.11-3**, FEMA Flood Zone Map). However, current FEMA maps do not reflect and existing 7-foot high earthen berm along the western boundary of the Property. This berm directs flows from San Felipe Creek south, thereby blocking its flow through the Property. In addition, all habitable structures would be located outside the FEMA 100-year flood zone. All habitable structures and inverters, transformers, and switch gear would be constructed on foundations raised above the projected maximum flood levels and above the 100-year floodplain. The only proposed Project features to be constructed within Flood Zone A would be internal roads, PV modules and power inverters (AEI-CASC 2013). Therefore, the proposed Project is consistent with this Program.
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 Preliminary On-Site and Off-Site Hydrology and Flood Hazard Analysis (AEI CASC, 2013), Preliminary Geotechnical Investigation *(*PETRA 2012a), and infiltration tests (PETRA 2012b), have been prepared for the proposed Project. As noted in the discussion of Conservation and Open Space Element, Objective 8.5, the

TABLE 4.11-1
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Goals, Objectives, Policies and Programs	Consistent with General Plan?	Analysis
		proposed Project includes design features and BMPs in addition to required compliance with a general NPDES permit and SWPPP during construction and BMPs during operation. Technical analysis of proposed drainage features indicate all runoff would be contained in on-site detention basins or percolating into the ground. In addition, the onsite wastewater system would be designed to meet all federal and state requirements (i.e. SWRCB's Water Quality Control Policy for siting, design, operation, and maintenance of onsite wastewater treatment systems) as well as Imperial County Public Health Department, Division of Environmental Health standards. Proper design of the wastewater system would ensure that groundwater is protected. Therefore, the proposed Project would not significantly contaminate ground or surface waters. Conversion of the solar farm complex site from previous agricultural uses to a solar farm complex may improve runoff quality by eliminating use of fertilizers and pesticides on the solar farm complex 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 also to analysis of Conservation and Open Space Element, 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 requires an application for development in the floodplain to be submitted to the County's Floodplain Administrator. This division 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.

In 1998, the County adopted a comprehensive Groundwater Management Ordinance for the express purpose of preserving and managing groundwater resources within the County (Chapter 1 of Title 9). The Groundwater Management Ordinance is implemented by the Planning Commission acting upon the direction of the Board of Supervisors.

The Commission, charged by the Board of Supervisors with the regulation of groundwater, can request preparation of an annual report on groundwater supplies and conditions, determine the need for and recommend groundwater management activities (see Section 92202.00), recommend groundwater extraction standards and charges, and establish standards for artificial recharge, among other things.

The Groundwater Ordinance provides the County with various regulatory tools that are designed to avoid or minimize the impact of existing and proposed groundwater extraction activities on groundwater resources and other users. For example, Section 92201.13 provides a remedy for water users who are aggrieved by well interference (defined as a substantial water level decline in a short time period in a localized area caused by extraction) or other impairment or infringement of the groundwater use caused by the extraction activities of another party. In such cases, the Commission may issue any order that it determines necessary to provide the petitioning water user with an adequate remedy. The Groundwater Ordinance also requires that existing extraction facilities be registered with 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" (Imperial County 2008d) provides drainage design standards for development throughout the County. Specific standards applicable to the proposed Project include:

- Retention volume of 3 inches of rainfall with no assumed infiltration or evaporation for developed 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

The Imperial Irrigation District's (IID) Water Department has been serving the Imperial Valley's water needs for 100 years. The IID provides raw Colorado River water for irrigation and also for non-potable residential and industrial use. The Project does not propose the use of IID water, and no IID water infrastructure is available within the Property.

4.11.2 ENVIRONMENTAL SETTING

A. SOLAR FARM COMPLEX

Hydrologic Setting

The Project area is located within the Anza Borrego 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 227 feet below mean sea level (msl), 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

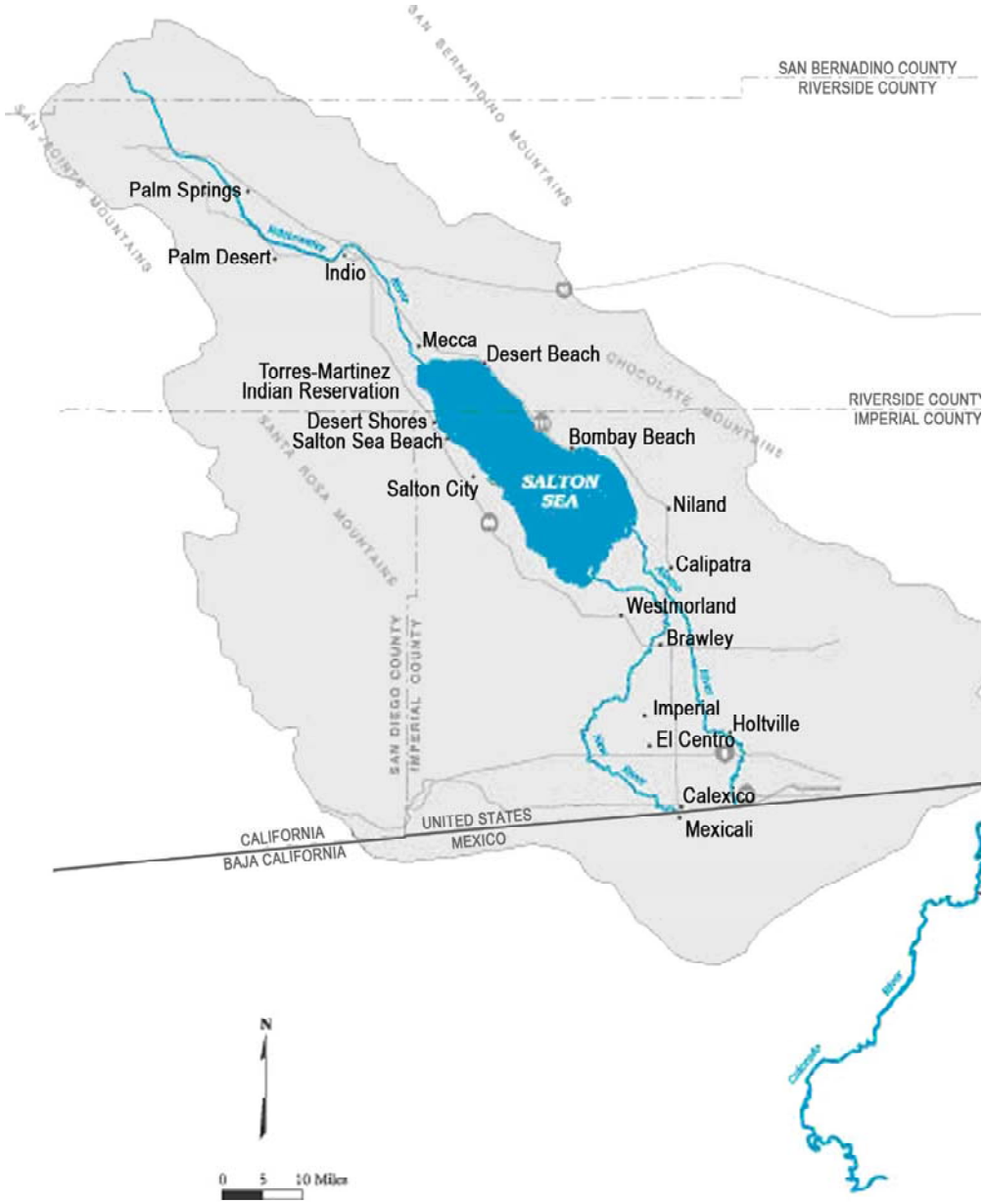
The solar farm complex site is comprised of flat-lying, very low gradient former agricultural fields that are separated by dirt access roads or rows of mature tamarisk trees that serve as a windbreak. The solar farm complex site has an overall slope to the southeast at an estimated average low gradient of 0.4 percent. Elevations across the solar farm complex site range from a high of approximately five feet below msl at the northwest corner to a low of approximately 40 feet below mean sea level at the southeast corner (PETRA 2012a, p.2).

San Felipe Creek, in its natural state, previously flowed through the southern third of the solar farm complex site in a southeasterly direction. The former San Felipe Creek bottom was filled to create a near level surface for use as agricultural fields. In the 1970's, a berm approximately 7-feet high was constructed along the western boundary of the Property in the center of Section 22 and the north half of Section 27. This berm protected farmlands in the southeastern quarter of Section 22 and the north half of Section 26 from storm water flowing down washes and arroyos from the northwest, including San Felipe Creek. The berm diverted these waters to the south of the Property into Fish Creek Wash in Section 27, T12S, R9E, SBBM. Fish Creek Wash then aligns east-southeast approximately five miles before joining the San Felipe Creek channel in Section 32, T12S, R10E (EMA 2013a). An existing berm also runs along the north side of the Property.

Six soil types are found within the solar farm complex site: Glenbar Complex, Indio Loam, Indio-Vint Complex, Rositas fine sand (0 to 2 percent slopes), Rositas sand (0 to 2 percent slopes), and Vint Find Sandy Loam (refer to Table 4.6-3 in Section 4.3, Geology & Soils). Based on the Unified Soil Classification System, the permeability of these soils ranges from high to medium (GS Lyon 2013, p 6).

On-Site Drainage

The solar farm complex site was formerly used for agricultural cultivation and is in the process of reverting to open desert. It is largely undeveloped and unpaved. Fish Creek Wash is to the south of the proposed solar farm complex site. Tarantula Wash crosses the proposed transmission line alignment and the northeastern corners of proposed Lots 5 and 8 in a generally north-to-south direction. San Felipe Creek previously bisected the Property, but is now diverted south by an existing 7-foot high earthen flood control berm along the western Property boundary as described above (PETRA 2012a, p. 2).



Source: DWR, 2011.

FIGURE 4.11-1
SALTON SEA WATERSHED MAP

Previous agricultural operations at the solar farm complex site resulted in an infrastructure of seven wells, buried irrigation pipes, reservoirs, concrete-lined irrigation ditches, and unlined drainage ditches (**Figure 4.11-2**). The irrigation pipes were buried and were sized between 10-inch and 15-inch diameter pipes. These distributed well water throughout the solar farm complex site. Three reservoirs occur on the solar farm complex site. These were used to capture and reuse irrigation water that drained off of the farmed areas. One straight irrigation ditch aligns east-west just north of the largest reservoir. The drainage ditches range in size from less than 3 feet to approximately 15 feet wide and align throughout the solar farm complex site (HELIX 2014a, p.5).

Water supply to the solar farm complex site is pumped from on-site groundwater wells. Excess water does not flow off of the solar farm complex site. It is piped or channeled into several existing, on-site detention basins and percolates into the ground. This combination of well water and detention basins hydrologically isolates the solar farm complex site from draining to the Salton Sea (HELIX 2014a, p.7).

Off-site Drainage

The solar farm complex site is situated between Tarantula Wash and San Felipe Creek. Two historic branches of the San Felipe Creek are shown to cross northwest to southeast over the central portion and southwestern corner of the Property. In its natural state, San Felipe Creek previously flowed through the southern third of the Property in a southeasterly direction. As described above, San Felipe Creek is currently diverted south of the solar farm complex site by an existing 7-foot high earthen berm along the western boundary of the Property.

Existing Flooding

The solar farm complex site is located on FEMA FIRM community-panel numbers 06025C0925C and 06025C0950C (Regenerate 2013). Historic portions of San Felipe Creek that previously crossed the solar farm complex site are within a FEMA area designated as Flood Zone A (100-year flood zone) (**Figure 4.11-3**). Flood Zone A is defined as those areas with a one percent annual chance of flooding (and a 26 percent chance of flooding over the life of a 30-year project). The remainder of the solar farm complex site is within Flood Zone X, an area of moderate flood hazard, between the limits of the 100-year and 500-year floods. As noted above, an existing 7-foott high earthen flood control berm running along the western boundary of the Property diverts flows from the historic creek flood zone away from the solar farm complex site.

Groundwater

The Project area is within the Ocotillo Valley Groundwater Basin (Groundwater Basin Number 7-25), which covers 223,000 acres (348 square miles) underlying the Clark and Ocotillo Valleys in eastern Imperial and western San Diego Counties (**Figure 4.11-4**). The Basin is bounded by the Santa Rosa Mountains on the north and northeast, the Coyote Creek and Superstition Mountains on the west and south, and the Salton Sea and surface drainage divides on the east. Clark Valley drains internally toward Clark (dry) Lake and the remainder of the valley drains to the Salton Sea. Average annual precipitation in the Ocotillo Valley Groundwater Basin area is approximately five inches (DWR 2004).

The Ocotillo Valley Groundwater Basin is an alluvium-filled valley and is underlain by non-water-bearing crystalline bedrock. The valley fill in Clark Valley and upper Ocotillo Valley is likely similar to that of Borrego Valley, which has been more thoroughly studied. The water-bearing sediments are likely Pliocene to Holocene stream, alluvial fan, lake and eolian deposits. In the adjacent Borrego Valley Groundwater Basin, these deposits form three aquifers that can reach more than 1,800 feet thick (DWR 2004).

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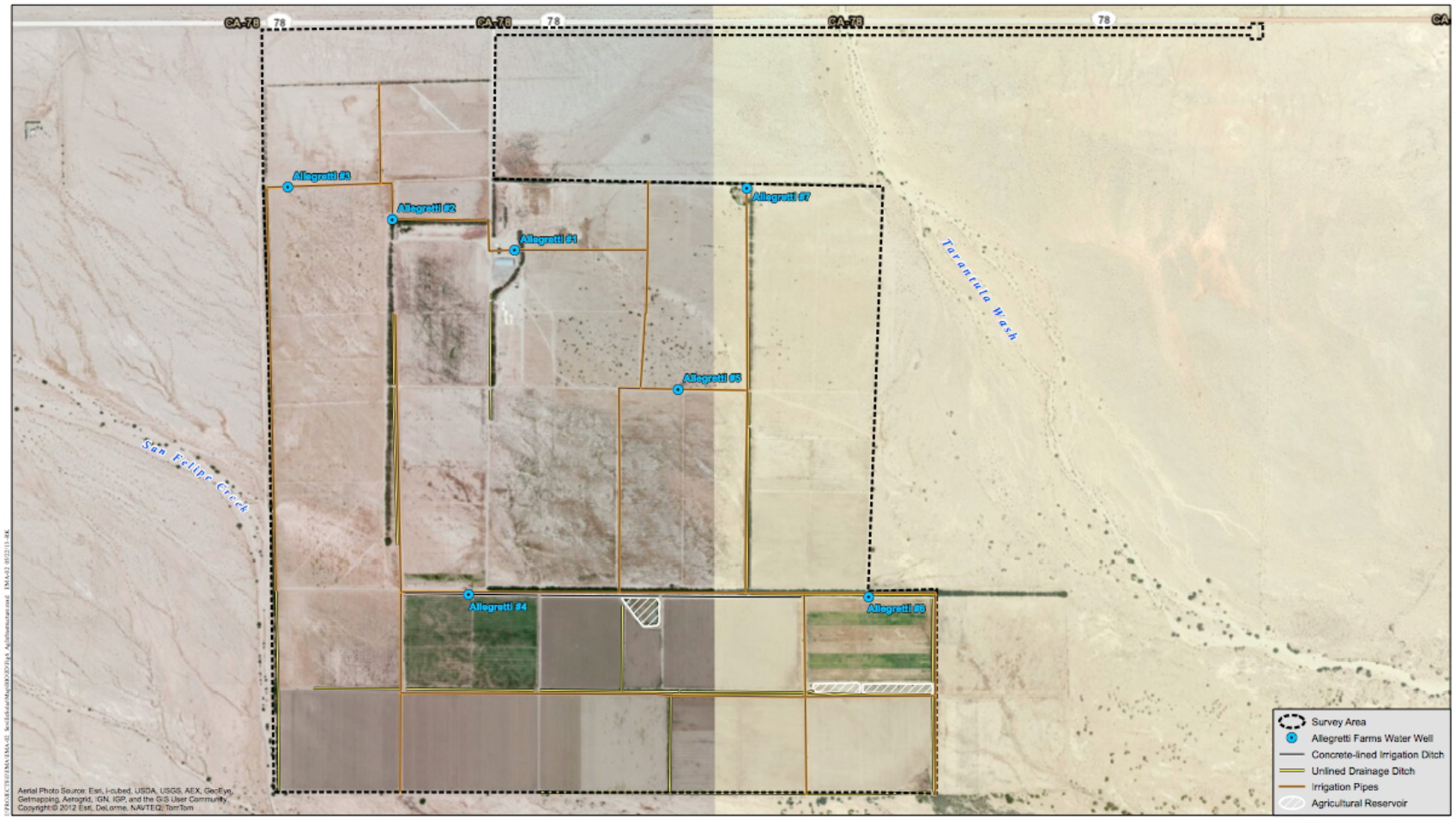

Source: HELIX 2014a.

FIGURE 4.11-2
SEVILLE SOLAR PROJECT AGRICULTURAL INFRASTRUCTURE