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5.15 WATER RESOURCES

5.15.1 Introduction

This Application for Certification (AFC) for the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF or Project) has been prepared in accordance with the California Energy Commission's (CEC) Power Plant Site Certification Regulations (CEC-140-2008-001-REV1, current as of July 2008). In addition, this AFC includes elements necessary for the United States (U.S.) Bureau of Land Management (BLM) to permit the Project through the National Environmental Policy Act (NEPA). The "Applicant" for purposes of this AFC comprises Rio Mesa Solar I, LLC, Rio Mesa Solar II, LLC, and Rio Mesa Solar III, LLC, owners of the three separate solar plants and certain shared facilities being proposed. These three Delaware limited liability companies will hold equal one-third shares in the ownership of shared facilities and will separately own their respective plants. They are wholly owned by Rio Mesa Solar Holdings, LLC (a Delaware limited liability company) which is in turn wholly owned by BrightSource Energy, Inc. (BrightSource) a Delaware corporation and the ultimate parent company. The Applicant will use BrightSource's solar thermal technology for the Rio Mesa SEGF.

The proposed project site is situated on the Palo Verde Mesa in Riverside County, California, 13 miles southwest of the City of Blythe, and is located partially on private land and partially on public land administered by BLM. The project will include three solar concentrating thermal power plants and a shared common area to include shared systems. The first plant, a 250 megawatt (MW) (nominal) facility known as Rio Mesa I, will be constructed at the south end of the project and owned by Rio Mesa Solar I, LLC. The second plant, another 250 MW (nominal) facility known as Rio Mesa II, will be located in the central portion of the project site and owned by Rio Mesa Solar II, LLC. Rio Mesa III, a third 250 MW (nominal) facility, will be constructed in the northern portion of the project site and owned by Rio Mesa Solar III, LLC.

Each plant will utilize a solar power boiler (referred to as a solar receiver steam generator or SRSG), located on top of a dedicated concrete tower, and solar field based on proprietary heliostat mirror technology developed by BrightSource. The reflecting area of an individual heliostat (which includes two mirrors) is about 19 square meters (205 square feet [sq. ft.]). The heliostat (mirror) fields will focus solar energy onto the SRSG which converts the solar energy to superheated steam. In each plant, a Rankine cycle non-reheat steam turbine receiving this superheated steam will be directly connected to a rotating generator that generates and pushes the electricity onto the transmission system steam. Each plant will generate electricity using solar energy as its primary fuel source. However, auxiliary boilers will be used to operate in parallel with the solar field during partial load conditions and occasionally in the afternoon when power is needed after the solar energy has diminished to a level that no longer will support solar generation of electricity. These auxiliary boilers will also assist with daily start-up of the power generation equipment and night time preservation.

This section is organized as follows:

Section 5.15.2 describes the water resources laws, ordinances, regulations and standards (LORS) that apply to the Project. A discussion of existing water resources in the project area (affected environment) is included in Section 5.15.3. The environmental analyses to determine potential impacts and potential

cumulative impacts to water resources due to construction and operation of the Project are provided in Sections 5.15.4 and 5.15.5, respectively. Mitigation measures proposed for the Project are provided in Section 5.15.6. Agencies and agency contacts are included in Section 5.15.7. Lastly, pertinent permits and schedules for the Project, and the references cited in this section are listed in Sections 5.15.8 and 5.15.9, respectively. Waters of the U.S, including wetlands and jurisdictional washes, are addressed in Section 5.2, Biological Resources.

5.15.2 Laws, Ordinances, Regulations, and Standards

This subsection describes the applicable LORS related to water resources, and the environmental setting of the Project. Federal, state, and local LORS applicable to water resources and anticipated compliance are discussed in this section and are summarized in Table 5.15-1.

Table 5.15-1
Laws, Ordinances, Regulations, and Standards for Water Resources

LORS	Requirements/Applicability	AFC Section Explaining Conformance
Federal		
National Environmental Policy Act (NEPA) of 1969	NEPA establishes a public, interdisciplinary framework for federal decision-making and ensures that Federal agencies take environmental factors into account when considering federal actions.	Section 5.15.2.1
Federal Clean Water Act (CWA) of 1977 (as amended)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Applies to all point-source discharges, including industrial wastewater and stormwater runoff, during both construction and operation.	Section 5.15.2.1
CWA § 401 (33 U.S.C. §1251 et seq.)	Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the RWQCB.	Section 5.15.2.1
Resource Conservation and Recovery Act (RCRA) (40 CFR §§ 260, et seq.)	RCRA endeavors to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.	Section 5.15.2.1
State		
Warren-Alquist State Energy Resources Conservation and Development Act, California Public Resources Code, §§ 25000, et seq.	Gives the California Energy Commission (CEC) licensing authority in lieu of state, regional, and local permits and requirements.	Section 5.15.2.2

Table 5.15-1
Laws, Ordinances, Regulations, and Standards for Water Resources

LORS	Requirements/Applicability	AFC Section Explaining Conformance
California Environmental Quality Act (CEQA) California Public Resources Code, Division 13, §§21000-21177, as amended 2010.	Requires all agencies of State government that regulate activities of private individuals, corporations, and public agencies, which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage.	Section 5.15.2.2
Federal CWA (implemented by State of California)	Implements and enforces the Federal NPDES permit program. Requires Construction and Industrial Stormwater Pollution Prevention Plans.	Section 5.15.2.2
Federal RCRA (implemented by State of California)	DTSC implements and enforces hazardous waste requirements in California. DTSC is the primary authority enforcing RCRA hazardous waste requirements in California. RCRA Subtitle C establishes standards for the generation, transportation, treatment, storage, and disposal of hazardous waste.	Section 5.15.2.2
Porter-Cologne Water Quality Control Act	Requires the SWRCB and RWQCBs to adopt water quality criteria to protect state waters. These standards are typically applied to projects through Waste Discharge Requirement (WDR) permits as necessary. Establishes beneficial water uses for both surface and groundwater.	Section 5.15.2.2
California Water Code Section 13751	Requires completion report to be filed with the State for well construction, alternation, or destruction.	Section 5.15.2.2
California Code of Regulations, Title 22 §§ 64400.80 through 64445	Requires periodic monitoring of water quality for potable water wells.	Section 5.15.2.2
California Code of Regulations, Title 27	Outlines standards for waste disposal classification and management.	Section 5.15.2.2
California Water Code §§ 461, 13550, and 13551	Discourages use of potable water for non-potable uses, including industrial applications, unless alternatives would cause an adverse environmental impact or be economically or otherwise infeasible.	Section 5.15.2.2
Local		
Riverside County ordinances related to building, grading, and stormwater and erosion control	Describes ordinances for grading; soil erosion control; and stormwater compliance for construction activities.	Section 5.15.2.3
Riverside County Flood Hazard Zone Ordinance Code 458.13	Requires a development permit prior to any construction or other development within any area of special flood hazards and requires that flood capacity of any altered watercourse be maintained.	Section 5.15.2.3

Table 5.15-1
Laws, Ordinances, Regulations, and Standards for Water Resources

LORS	Requirements/Applicability	AFC Section Explaining Conformance
Riverside County ordinances related to building, grading, and stormwater and erosion control	Requirements for grading; erosion control; and stormwater compliance for construction activities.	Section 5.15.2.3
Riverside County ordinances related to well installation	Requirements for well installation.	Section 5.15.2.3

CWA = Clean Water Act
CFR = Code of Federal Regulations
DTSC = California Department of Toxic Substances Control
EPA = United States Environmental Protection Agency
NPDES = National Pollutant Discharge Elimination System
RCRA = Resource Conservation and Recovery Act
RWQCB = Regional Water Quality Control Board
SWRCB = California State Water Resources Control Board
USC = United States Code

5.15.2.1 Federal

National Environmental Policy Act of 1969

NEPA establishes a public, interdisciplinary framework for Federal agencies reviewing projects under their jurisdiction to consider environmental impacts. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

The BLM, as lead Federal agency for the Project, is responsible for preparation of an Environmental Impact Statement (EIS) in compliance with NEPA to evaluate the environmental impacts of the portions of the Rio Mesa SEGF on Federal lands. The Rio Mesa Solar III plant and the Project gen-tie line are located on lands administered and managed by the BLM. NEPA compliance is required for these portions of the Project through preparation of a Draft and Final EIS. BLM is also responsible for Native American consultation, including government to government consultation.

Federal Clean Water Act of 1977, 33 United States Code (USC) §1251 et seq. (as amended)

The Clean Water Act (CWA) authorizes the United States Environmental Protection Agency (EPA) to issue National Pollutant Discharge Elimination System (NPDES) permits and to set pretreatment standards for the purpose of regulating discharges of wastewater and stormwater into surface waters. The California State Water Resources Control Board (SWRCB) acts through its Regional Water Quality Control Boards (RWQCBs) to implement these permits in accordance with a Memorandum of

Understanding (MOU) with the EPA. Therefore, relevant NPDES permits are discussed below under State LORS.

CWA Section 401, 33 USC §1251 et seq.

Every applicant for a federal permit or license for any activity that may result in a discharge to waters of the United States is subject to the Section 401 of the CWA and must obtain State Water Quality Certification confirming that the proposed activity will comply with state water quality standards.

Federal Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste, including the generation, transportation, treatment, storage, and disposal of hazardous waste. In order to prevent surface and groundwater contamination, RCRA sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes. EPA authorizes the California Department of Toxic Substances Control (DTSC) to implement RCRA in the state.

5.15.2.2 State

Warren-Alquist Act

The California Public Resources Code (PRC) establishes the CEC as the decision-making authority over land use decisions and environmental determinations during the AFC process. This is in accordance with the Warren-Alquist Act, codified in §§ 25000 et seq. of the PRC. The CEC has exclusive jurisdiction over thermal power plant siting (50 MW or greater), including CEQA implementation. The Project will demonstrate conformity with state, regional, and local laws, including land use laws.

Under the Warren-Alquist Act, the CEC's licensing process is legally equivalent to CEQA and is guided by CEQA regulations.

California Environmental Quality Act

The CEC will be the lead agency enforcing CEQA for the Project. Under California law, the CEC is responsible for reviewing the AFCs filed for projects, and also has the role of lead agency for the environmental review of these projects under CEQA (PRC, §§ 25500 et seq; PRC, §§21000 et seq.). The CEC conducts this review in accordance with the administrative adjudication provisions of the Administrative Procedure Act (5 United States Code, §§ 500 et. seq.) and its own regulations governing site certification proceedings (CCR, Title 20, §§ 1701 et seq.). These provisions require the staff to conduct an independent analysis of AFCs and prepare an independent assessment of a project's potential environmental impacts, feasible mitigation measures, and alternatives as part of this process.

The CEC considers the Staff Assessment(s), along with the environmental analysis provided by the Applicant, as well as input from interested local, regional, State, and Federal agencies, intervenors, and interested Native American tribes, in developing its final decision on whether to issue a license for a proposed project. The CEC has a certified regulatory program under CEQA that exempts the agency

from having to draft an Environmental Impact Report (EIR) and, instead, requires a Final Staff Assessment (FSA), evidentiary hearings, and a decision based on the hearing record, which includes the staff's and other parties' assessments.

Federal Clean Water Act

As described above, the SWRCB acts through its RWQCBs to implement the CWA permit consistent with a MOU with the EPA. The relevant NPDES permits are discussed below.

SWRCB Construction and Land Disturbing Activities General Permit Order No. 2010-0014-DWQ

The SWRCB implements regulations under the CWA, which requires stormwater discharge associated with construction and land disturbance activities to be regulated by an NPDES permit. The SWRCB is the state's permitting authority and has adopted Order 2010-0014-DWQ, a statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit) that applies to projects resulting in one or more acres of soil disturbance. The Project will disturb more than one acre of soil; therefore, the Project will need to comply with the Construction General Permit. This includes the preparation of a SWPPP that specifies site management activities to be implemented during site development. These management activities include construction stormwater best management practices (BMPs), dewatering runoff controls, and construction equipment decontamination. The Colorado River RWQCB requires that a Notice of Intent be filed prior to construction activities, unless an exemption is obtained from the SWRCB, and that the SWPPP must be maintained on site during construction.

SWRCB Industrial Storm Water General Permit Order No. 97-03 DWQ

The CWA also requires stormwater discharges that drain to Waters of the United States or that are associated with specific industrial activities to be regulated by an NPDES permit (SWRCB 1997). The SWRCB has issued Order 97-03-DWQ, a statewide General Permit and Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities (such as the proposed Project), excluding construction activities. The Standard Industrial Classification (SIC) associated with the Project is SIC code #4911, which pertains to electrical power generation, distribution, or transmission. To comply with Order 97-03-DWQ, an industrial operations SWPPP and monitoring plan, including good housekeeping practices and BMPs would be in place during operation of the Project. The Colorado River Basin RWQCB requires a Notice of Intent (NOI) to be filed for industrial activities to be covered under the statewide General Permit (SWRCB Order No. 97-03-DWQ). This permit has expired and its draft replacement is undergoing public review in 2011. The Project will be required to comply with the requirements of the new permit once it is adopted.

SWCRB Permit for Low Threat Discharges to Surface Waters within the Colorado River Basin Region, Order No. R7-2009-0300

This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping and hydrostatic test water. These activities may be covered under the Construction General Permit Order No. 2010-0014-DWQ. The Colorado River Basin

RWQCB requires a NOI to be filed for low threat discharges if they are not already covered by the Construction General Permit.

Federal RCRA

As described above, the DTSC is authorized by the EPA to implement RCRA. In 1992, DTSC received authorization from the EPA to implement the RCRA Subtitle C requirements and the associated regulations. Receiving authorization from the EPA means that DTSC is the primary authority enforcing the RCRA hazardous waste requirements in California. RCRA Subtitle C establishes standards for the generation, transportation, treatment, storage, and disposal of hazardous waste in the U.S.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the SWRCB, and divided the state into nine regional basins, each with a separate RWQCB. The SWRCB is the primary State agency responsible for protecting the quality of the state's surface and groundwater supplies, and enforcing the CWA and state water quality laws and regulations. Administration is delegated to the nine RWQCBs; the Colorado River Basin RWQCB (SWRCB Region 7) regulates water quality in Riverside County.

The Porter-Cologne Water Quality Control Act authorizes the SWRCB to draft state policies regarding water quality. It requires that the SWRCB, or the appropriate RWQCB, adopt water quality control plans (or Basin Plans) for the protection of water quality. Each Basin Plan contains the following:

- beneficial uses of water to be protected,
- water quality objectives for the reasonable protection of the beneficial uses, and
- a program of implementation for achieving the water quality objectives.

The Colorado River Basin RWQCB adopted the most recent version of its Water Quality Control Plan in 2006 (Colorado River RWQCB 2006).

California Water Code §13751

California Water Code § 13751 requires that anyone who constructs, alters, or destroys a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well, file a well completion report with the California Department of Water Resources (DWR). Reports must be filled within 60 days of well completion.

California Code of Regulations (CCR), Title 22 §§ 64400.80 through 64445

This section of the California Water Code requires monitoring for potable water wells, defined as non-transient, non-community water systems (serving 25 people or more for more than 6 months). Regulated wells must be sampled for bacteriological quality once a month and the results submitted to the State Department of Health Services (DHS). If no exceedances were found in the prior 12 months, the well operator may request a reduction in monitoring frequency to quarterly. The well must also be monitored for inorganic chemicals annually and organic chemicals quarterly. The operator may apply for a

monitoring waiver for organic chemicals if it can be documented that the chemical has not been previously used, manufactured, transported, stored, or disposed of within the watershed or zone of influence and, therefore, that the source can be designated nonvulnerable. If previous use of the chemical locally is unknown or the chemical is known to have been used previously and the source cannot be designated nonvulnerable, the operator may still be eligible for a waiver based on a review related to susceptibility to contamination.

California Code of Regulations, Title 27

Title 27 applies to all disposal sites including active, inactive, closed, or abandoned sites. These regulatory standards were promulgated by the California Integrated Waste Management Board (CIWMB) and implemented by the SWRCB. The purpose of the regulations is to promote the health, safety and welfare of the people of the State of California, and to protect the environment by establishing minimum standards for the handling and disposal of solid wastes at disposal sites. The regulations establish waste and site classifications and waste management requirements for the treatment, storage, or disposal of solid waste in landfills, surface impoundments, waste piles, and land treatment units. The Project will use evaporation ponds for wastewater that can no longer be recycled.

California Water Code §§ 461, 13550, and 13551

California Water Code §§ 461, 13550, and 13551 encourage the conservation of potable water resources and the maximum reuse of wastewater to conserve potable water, particularly in areas where recycled water of adequate quality is available at a reasonable cost.

5.15.2.3 Local

Riverside County Ordinances for Grading, Stormwater, and Erosion Control

Construction requirements relevant to building, grading, and erosion and sediment control are found in Riverside County Ordinance 457.103, which applies to all unincorporated areas of Riverside County, unless specifically exempted. The CEC will assign a delegate Chief Building Official (CBO) who will be responsible for implementing these code requirements for the Project. Ordinance 457 amends the County's incorporation and adoption of the 2001 California Building Code, which is based on the 1997 edition of the Uniform Building Code. The sections of Ordinance 457, amending Chapter 33 of the 1997 Uniform Building Code, that pertain to the Project are summarized below.

- Section 4.J.2.7 requires that grading activities in excess of 50 cubic yards be performed in accordance with an approved grading plan.
- Section 4.J.7 requires that the grading plan application include plans and information related to proposed road work when the Project includes grading for private roads not offered for public dedication. Plan review, permit, and inspection fees are associated with all grading permits.
- Section 4.J.10 requires stockpiles to be placed temporarily on a site for a period not to exceed 12 months. Stockpiles may not obstruct or divert natural drainage or water courses. Erosion and dust

control measures must be implemented and stockpiles cannot cause any adverse effect on adjacent properties.

- Section 4.J.14 requires construction sites to minimize runoff of sediment from the site and into waters of the U.S. If practical, phased grading is to be conducted. This section requires construction activities greater than 1 acre in size to file a Notice of Intent (NOI) to seek coverage under the SWRCB's General Construction Permit for discharges of stormwater from construction sites. It also requires development and implementation of a site-specific SWPPP and monitoring program, pursuant to requirements of that permit.
- Section 4.J.15 requires that a soils grading report be prepared for all permitted grading projects in compliance with the guidelines set forth in Riverside County *Technical Guidelines for Review of Geotechnical and Geologic Reports*.

Construction requirements relevant to stormwater and urban runoff management and discharge controls are found in Riverside County Ordinance 754.2. The intent of this ordinance is to "protect and enhance the water quality of County watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with applicable requirements contained in the Federal Clean Water Act, Porter-Cologne Water Quality Act, and any applicable state or federal regulations promulgated thereto, and any related administrative orders or permits issued in connection therewith."

Article II, Section 1.C of Ordinance 754.2 requires new development or redevelopment sites to control stormwater runoff to prevent deterioration of water quality. To prevent such deterioration, the Director of the County Transportation and Land Management Agency may establish BMPs and may identify the manner of implementation.

Article II, Section 1.E of Ordinance 754.2 requires commercial and industrial facilities to comply with this and other ordinances [including 457 (outlined above) and 857 (not applicable to this section)], and establishes that these types of facilities may be subject to a regular program of inspection.

Copies of the Riverside County Flood Control District Hydrology Manual and Stormwater Quality Design Handbook can be provided upon request.

Regulating Flood Hazard Areas: Riverside County Ordinance Code 458.13

The Riverside County Flood Hazard Zone Ordinance requires a permit for development activity within a designated flood zone. The ordinance requires that the flood carrying capacity of the altered or relocated portion of any watercourse or floodplain shall be maintained. A study of hydrologic conditions at the project site has been performed by the Applicant to assess the existing drainage flow conditions (VTN 2011). The study indicates that the project area lies within a DWR 100-year awareness floodplain as shown on Figure 5.15-6. Based on conversations between VTN and Riverside County, Riverside County Flood Control will treat awareness floodplains as 100-year floodplains for the purposes of development. The hydrology/drainage report for existing conditions is provided in Appendix 5-15A.

Riverside County Building, Grading, and Erosion Control Ordinances

Construction requirements relevant to building, grading and erosion and sediment control are found in Riverside County Ordinance 457, which applies to all unincorporated areas of Riverside County, unless specifically exempted. Section J.10 of Ordinance 457 requires stockpiles to be placed temporarily on a site for a period not to exceed 12 months. Stockpiles may not obstruct or divert natural drainage or watercourses. Erosion and dust control measures must be implemented, and the stockpile cannot cause any adverse effect on adjacent properties.

Section J.14 of Ordinance 457 requires construction sites to minimize the runoff of sediment off site and into waters of the U.S. If practical, phased grading is to be conducted. This section requires that a NOI be filed to seek coverage under the state's NPDES Construction General Permit for discharges of stormwater on construction sites more than 1 acre in size. The ordinance also requires development and implementation of a site-specific SWPPP and monitoring program pursuant to requirements of that permit. Construction requirements relevant to stormwater and urban runoff management and discharge controls are found in Riverside County Ordinance 754.2. The intent of this ordinance is to "protect and enhance the water quality of County watercourses, water bodies, ground water, and wetlands in a manner pursuant to and consistent with applicable requirements contained in the Federal Clean Water Act, Porter-Cologne Water Quality Act, and any applicable state or federal regulations, related administrative orders or permits." Section 1.C of Ordinance 754.2 requires the control of stormwater runoff on all new development or redevelopment sites to prevent deterioration of water quality. To prevent such deterioration, the Director of the County Transportation and Land Management Agency may establish BMPs and may identify the manner of implementation. Section 1.E of Ordinance 754.2 requires commercial and industrial facilities to comply with this and other ordinances (including 457), and establishes that these types of facilities may be subject to a regular program of inspection.

Riverside County Well Installation

The Riverside County Department of Environmental Health requires a well permit to be obtained prior to construction, reconstruction, or deconstruction of wells. The permit requires the well installer notify the Department forty-eight (48) hours in advance to make an inspection of the following operations:

- Prior to sealing of the annular space or filling of the conductor casing;
- Verify the depth of the conductor (outer) casing prior to further drilling and installation of the inner casing; and
- After installation of the surface protective slab and pumping equipment.

5.15.3 Affected Environment

The following sections describe the hydrologic setting of the project area, stormwater runoff and drainage patterns, and the water supply, use, and wastewater discharges and disposal activities associated with the proposed Project.

5.15.3.1 Hydrologic Setting

The Project site and the transmission line proposed as part of the Project are located in the Colorado River Hydrologic Region within the Palo Verde Hydrologic Area (715.40), which covers 373,294 acres (RWQCB 2006), as shown on Figure 5.15-1. The end of the transmission line and substation are located within the Ford Hydrologic Area. Within the Colorado River Basin RWQCB, the project site is within the East Colorado River Basin Planning Area. This hydrologic region has a subtropical desert climate with hot summers and short, mild winters.

Precipitation

Annual rainfall amounts in the Colorado River Hydrologic Region range from less than 3 to approximately 6 inches. Most of the precipitation for the region occurs in the winter and spring. However, monsoonal thunderstorms, created by the movement of subtropical air from the south, do occur in the summer and have generated significant rainfall in some years. Higher annual rainfall and milder summer temperatures occur in the mountains to the north and west of the hydrologic region. Clear and sunny conditions typically prevail, and the region receives 85 to 90 percent of the maximum possible sunshine each year; the highest value in the U.S. Table 5.15-2 provides average historical rainfall from the meteorological station at the Blythe Airport weather station, approximately 10 miles northeast of the project site.

Table 5.15-2
Rainfall near the Proposed Project Site (1948-2010)

Precipitation (inches)	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	3.54	0.49	0.44	0.36	0.15	0.02	0.02	0.23	0.62	0.35	0.26	0.19	0.41
Maximum	9.16	2.48	3.03	2.15	3.00	0.22	0.91	2.44	5.92	2.14	1.89	1.84	3.33
Minimum	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Western Regional Climate Center, 2010

The mean annual precipitation (1948 to 2010) recorded at the Blythe Airport weather station is 3.54 inches per year. The minimum and maximum annual precipitation for the period of record is 0.59 inches and 9.16 inches, respectively. According to the *National Oceanic and Atmospheric Administration Atlas 14 for Southeastern California* (2003), between 3 and 3.5 inches of rain are expected to fall in a 100-year, 24-hour storm event.

Surface Water

Surface water management and use fall under the jurisdiction of Riverside County Department of Public Works, the Colorado River Basin RWQCB, the United States Army Corps of Engineers, the United States Bureau of Reclamation (USBR), and local water districts and agencies. The use of water in the Lower Colorado River Basin is regulated by a series of compacts and Supreme Court decrees regarding its

apportionment. The nearest water district, the Palo Verde Irrigation District (PVID) is located immediately east of the project site.

The project site generally slopes to the east. The average slope is approximately 1 percent. Sparse desert vegetative brush covers most of the area within the project site, with the exception of barren, hilly areas located along the north-western boundary of the site. The project site and tributary area runoff discharges east through several ephemeral washes on site. The washes convey runoff to Hodges Drain (a man-made drainage canal), which borders the project site to the east. Hodges Drain conveys runoff approximately two miles south to the Palo Verde Outfall Drain. Runoff continues south approximately 6.5 miles within the Palo Verde Outfall Drain where it discharges to the Colorado River. No dams or levees are located upstream of the project site. With the exception of Hodges Drain and Palo Verde Outfall Drain, there are no other identified large scale existing or proposed offsite flood control projects in the vicinity of the Rio Mesa SEGF.

No water quality data are available for the ephemeral washes located on or near the project site. These washes are not listed on the 303(d) list of impaired water bodies for the Colorado River Basin. However, the Palo Verde Outfall Drain is on the 303(d) list. A brief discussion of this drain is provided within the Water Quality subsection of Section 5.15.4.2. Beneficial uses for surface waters in the Colorado River Basin include agricultural use, municipal and industrial uses, and recreational use (Colorado RWQCB 2006).

Groundwater

The project site, located in Palo Verde Mesa, is underlain by the Palo Verde Mesa Groundwater Basin (PVMGB), as shown on Figure 5.15-2.

Hydrogeologic Setting

The project site and PVMGB lie on a mesa at a higher elevation than the Colorado River floodplain. The boundary between the PVMGB and the Palo Verde Valley Groundwater Basin (PVVGB) is not a barrier, but appears to be defined based on surface water flow and topography. The PVMGB is bounded by non-water-bearing rocks of the Big Maria and Little Maria Mountains on the north, the McCoy and Mule Mountains on the west, the edge of the Palo Verde Mesa on the east, and the Palo Verde Mountains on the south. The northwest boundary and parts of the western boundary are drainage divides (Metzger et al. 1973; Jennings 1967). Groundwater is derived primarily from a surficial alluvial aquifer that is connected to the Colorado River. In the PVMGB, groundwater is also derived from the surficial alluvial aquifer and older Tertiary deposits, including Miocene-age fanglomerate and the Bouse Formation.

Groundwater Flow and Gradient

Groundwater flow in the PVMGB is generally toward the southeast to Palo Verde Valley. Depth to groundwater on site ranges from about 140 to 160 feet below the ground surface (bgs) based on information in the National Water Information System (NWIS) database (USGS 2010-2011). This corresponds with groundwater elevations ranging from approximately 224 to 232 feet above mean sea level (amsl).

The main project site is not located within the service area of any municipal or commercial water supplier. According to the "Law of the River", which includes several compacts, agreements, court decisions, decrees, contracts and regulatory guidelines, consumptive use of Colorado River water can occur through direct diversions of surface water, as well as through withdrawal of water from the river by underground pumping. To enable the USBR to properly account for the use of lower Colorado River water, and to ensure that existing and future use of the water is consistent with federal law, the United States Geological Survey (USGS), in cooperation with USBR, is developing a rule that establishes procedures for making determinations of unlawful use of lower Colorado River water. The proposed rule will:

- adopt an " Accounting Surface" defined by groundwater levels that would occur if the Colorado River were the only source and sink for water in an aquifer that is hydraulically connected to the Colorado River floodplain;
- address under what circumstances an entitlement would be required for water pumped from underground wells near the Colorado River in order to identify groundwater wells outside the lower Colorado River floodplain that yield water that will be replaced by water from the Colorado River;
- provide options for unlawful users to legitimize their lower Colorado River water use;
- establish the criteria water users must satisfy to demonstrate that their wells do not pump water that would be replaced by lower Colorado River water;
- establish a process for water users to appeal USBR determinations that specific wells pump Colorado River water; and
- provide for public review and comment on the rule and methodology.

A notice of the proposed rule was published in the Federal Register on August 18, 2006, and the draft rule was published in the Federal Register on July 16, 2008. However, the Accounting Surface Method was withdrawn and has neither been acted upon, nor included as part of the Law of the River. The processes related to this action are continuing.

The Project site is located within the Colorado River Accounting Surface (Accounting Surface), as it is currently described by the USBR. The Accounting Surface extends to the margins of the Colorado River Aquifer which currently includes the PVMGB and PVVGB. The Accounting Surface elevation within the Metropolitan Water District of Southern California (MWD) portion of the project site ranges from 223 to 231 feet amsl. Note that the Accounting Surface elevation at the common area is approximately 225 feet amsl. The existing groundwater elevations without pumping are at or within approximately 2 feet above the Accounting Surface. USGS defines static water-level as the level to which water will rise in a tightly cased well under its full pressure head when it is not being affected by groundwater withdrawal (Weile et al., 2008). Wells that have a static water-level elevation above the Accounting Surface are presumed to yield water that will be replaced by water from precipitation and inflow from tributary valleys. Wells that have static water-levels equal to or below the Accounting Surface are presumed to yield water that will be replaced by water from the Colorado River, and therefore are subject to accounting and require an entitlement to use or divert river water. Project pumping would likely result in water level drawdowns, such that the elevation of the water table could be below the Accounting Surface. Note that the USBR

Accounting Surface rule has not been finalized, and the applicability of the Accounting Surface to the current Project has not been established.

In August of 2011, representatives of BrightSource met with USBR Chief of the Boulder Canyon Operations, Steve Hvindon and his staff in Boulder City, Nevada to discuss water usage of the Project and the water usage provisions contained in the option and lease agreement with MWD (Appendix 5.15B). After reviewing the project, its water usage requirements, and the provisions of the option lease agreement, USBR stated that the proposed water usage of the Project and the associated provisions in the option/lease agreement satisfied their concerns and that the construction and operation of the Project will result in no adverse effects to the lower Colorado River flows. A letter from USBR summarizing this information is currently in progress.

In the mid-1970s, the project site was considered as a possible location for a nuclear power plant (SunDesert Project). Extensive studies were conducted as part of a Final Site Environmental Statement (ES) on behalf of SDG&E (U.S Nuclear Regulatory Commission 1978). As part of this effort, many wells were installed to evaluate the characteristics of the underlying aquifers as a potential source for water supply. A report (Stone and Webster 1976) was prepared that analyzed the groundwater table elevations. A copy of an attachment from that report is provided in Appendix 5.15C. WorleyParsons (WP) also analyzed the groundwater table elevations within the project vicinity in the *Assessment of Groundwater Conditions Report* provided in Appendix 5.15D (WP 2011). As depicted in Figure 5.15-3, the groundwater table elevations decrease in a southeasterly direction to an outfall drain located within the agricultural area east of the project site at a gradient of approximately 2 to 3 feet per mile (0.0004 to 0.0006 foot per foot).

In addition to the wells that appear to be associated with the SunDesert Project, the USGS NWIS database indicates that there are many observation, destroyed, abandoned, and pumping wells in the PVMGB and the adjacent PVVGB. These wells are shown on Figure 5.15-4. A *Report of Groundwater Sampling and Monitoring* at the Rio Mesa SEGF site, prepared by URS, includes the results of water-level monitoring for 19 wells and groundwater quality analyses for two wells sampled in the project area (URS 2011; Appendix 5-15E). The water level monitoring results are shown in Table 5.15-3 below and the well locations are provided on Figure 5.15-5. WP also analyzed several wells within the PVMGB and PVVGB to determine groundwater level trends in the *Assessment of Groundwater Conditions Report* for the Project (WP 2011). The report (Appendix 5.15D) indicated that groundwater levels within the PVMGB have remained relatively stable, with some localized water level declines due to pumping.

Table 5.15-3
Groundwater Well Information and Water-level Measurements

Well ID	Notes	Depth to Groundwater (btoc)	Total Depth (feet btoc)	Riser Height (inches ags)	Easting	Northing	Location ID on Figure 5.15-5
27R001S	1	DRY	36.84	15.6	7009396.19	21103178.85	7
28R001S (B-OB-2) [a]	2	145.10	350.10	--	7009386.21	2110319.95	3
28R002S [a]	2	142.66	339.20	21	7009415.58	2110068.11	4

Table 5.15-3
Groundwater Well Information and Water-level Measurements

Well ID	Notes	Depth to Groundwater (btoc)	Total Depth (feet btoc)	Riser Height (inches ags)	Easting	Northing	Location ID on Figure 5.15-5
28R003S [b]	3	144.66	345.80	--	7009309.57	2110238.30	1
28P001S [a] (Well O/BDH-42)	4	163.10	417.30	16.8	7007638.85	2110073.52	6
28Q001S (B-OB-1)	2	145.68	404.50	21	7009045.85	2110381.36	2
28Q002S (Well D/BHD-39)	4	147.87	506.35	20.25	7008606.64	2110591.79	5
33G001S (B-DH-19)	4	DRY	132.56	8	7008817.77	2107392.13	8
33J001S	5	DRY	18.28	14.25	7010313.56	2106918.94	9
34M001S	5	DRY	15.91	21	7010499.84	2106858.70	10
A	4	DRY	101.52	20.25	7008261.33	2111003.53	11
B	4	32.40	86.76	18.5	7008464.32	2111010.90	12
C (SB6-83)	4	DRY	101.46	15.5	7008668.49	2111003.58	13
E	4,5	16.18	98.30	0	7008852.36	2111005.03	14
F	4	DRY	99.60	9.5	7009098.89	2111004.13	15
G	4	DRY	100.55	22	7009300.39	2111003.81	16
H	4	145.43	490.00	23	7009183.60	2111138.48	17
I	4	DRY	100.99	28	7009097.75	2111155.33	18
J	4	100.70	100.80	15.5	7009097.91	2111618.16	19

Notes:
[a] Observation well
[b] Pumping well
1 - 8" Galvanized Steel
2 - 4" polyvinyl chloride (PVC) with Drum Cap
3 - 12" Steel Casing
4 - 3" PVC
5 - No Cap

btoc - below top of casing
ags - above ground surface

Groundwater Recharge/Inflows

Natural recharge of the PVMGB is chiefly from percolation of precipitation and subsurface inflow from the Chuckwalla Valley Groundwater Basin to the west and the PVVGB to the east (DWR, 2004). Irrigation water percolation contributes approximately 10% of the PVMGB and PVVGB recharge. Recharge to the PVMGB and PVVGB totals approximately 424,600 acre-feet (af) (WP 2011). Groundwater movement is generally in the southeast direction as shown on the groundwater contour map (Figure 5.15-3).

Groundwater Storage Changes

The total storage capacity of the PVMGB is estimated at 6,840,000 af (DWR 1975). The total amount of groundwater in storage is unknown. Despite drier than normal conditions in the past 10 years, consumption of surface water from the Colorado River and groundwater has remained constant through the period.

Groundwater Well Yields

DWR indicates that well yields are reported to be as high as 2,750 gallons per minute (gpm) (approximately 4,438 afy) in wells located in the PVMGB (DWR 2004). The 1978 ES conducted on behalf of SDG&E indicates that one test well and three observation wells were installed on the project site. A constant-rate aquifer test was conducted for the SunDesert project in April 1976 and documented in the Stone and Webster Engineering Company report of June 1976 (Stone and Webster 1976, Appendix 5.15C). A 12-inch-diameter louvered well screen was installed from 8 to 108 feet amsl, and gravel packed from 2 feet to 258 feet amsl. The well was pumped at 820 gpm for 97 hours during which groundwater levels were measured in the three observation wells (100 to 300 feet from the test well) and four borings (600 to 1,500 feet from the test well). The radius of influence was reported to stabilize at a distance of 500 to 1,200 feet. Approximately 55 feet of drawdown was observed during the test. Preliminary analysis of the data indicated a transmissivity range of 100,000 to 200,000 gallons per day (gpd)/ft and a storage coefficient on the order of $1x10^{-3}$. For the 220-foot saturated thickness of the aquifer, the transmissivity corresponds to a coefficient of hydraulic conductivity (permeability) of 0.042 to 0.088 foot per minute. Although this yield could not support the quantity of water needed for cooling the reactors, the well yield (approximately 1,666 afy assuming 820 gpm) is more than 3 times the volume required for construction and nearly 10 times the volume that would be required for operation of the Rio Mesa SEGF.

Other aquifer tests, related to the Blythe Solar and Genesis projects, have been conducted in the PVMGB. Both projects are approximately 15 miles from the project site. Groundwater wells for both projects range from 70 to 100 feet in depth and appear to produce from a transmissive zone at a depth similar to the test well on the project site (CEC 2009).

Groundwater Quality

No water quality information was noted in the NWIS database for existing on-site wells; however, groundwater quality information was provided in the 1978 ES (U.S. Nuclear Regulatory Commission 1978), DWR Bulletin No. 118 (DWR 2004) and a USGS professional paper for the Palo Verde Valley area (Metzger, et al. 1973). DWR reports that total dissolved solids (TDS) in the surficial groundwater in the PVMGB range from 730 to 3,100 milligrams per liter (mg/L); however, water from one deep well in the southwest portion of the basin had a TDS concentration of 4,500 mg/L (DWR 2004). Analyses of water from 11 public supply wells in the basin indicate TDS concentrations range from 590 to 1,790 mg/L and the average is approximately 1,089 mg/L. Groundwater is calcium-sodium chloride or calcium-sodium sulfate in character. Groundwater quality impairments in the basin consist of arsenic, selenium, fluoride, chloride, boron, sulfate, and TDS concentrations are above their respective maximum contaminant levels (MCLs) for drinking water in California. Because of the higher than recommended

values of TDS, some groundwater in the basin is unsuitable for domestic and irrigation purposes. Fluoride concentrations above the MCL for drinking water has been found in the older geologic units such as the Bouse Formation and Miocene-age fanglomerate (DWR 2004). The water quality in the surficial deposits is generally of slightly better quality than the Bouse Formation (DWR 2004).

The MCL is defined as the highest level of a contaminant that is allowed in water. MCLs are first set by the EPA with the intention of protecting public health. Guidelines for enforcing MCLs are established in CCR Title 22. At least once every five years, the California Department of Public Health (CDPH) is required to assess and, if necessary, amend MCLs established for drinking water. MCLs established by CDPH cannot be less stringent than those established by EPA. MCLs must also be as close to public health goals established by the Office of Environmental Health Hazard Assessment as is technically and economically feasible. Water that has contaminants that exceed the MCL requires further treatment in order to be suitable for potable use (not suitable for drinking)For example groundwater with a concentration of sulfate of 400 mg/L exceeds the MCL of 250 mg/L, and would require treatment to reduce the sulfate level to less than 250 mg/L.

As part of the Report of Groundwater Sampling and Monitoring at the Rio Mesa SEGF site, prepared by URS, sampling and analyses of groundwater from two on site wells (28R003S and 28Q002S) located in Township 8 South, Range 21 East (URS 2011, Appendix 5.15E). Laboratory analytical results for the groundwater samples collected and analyzed are provided in Table 5.15-4. The two well locations are shown as Wells 1 and 5, respectively, on Figure 5.15-5. Analytical data for Well 28R003 from 1976 are included in this table for comparison to the recent data.

Table 5.15-4
Groundwater Analytical Results for Two Test Wells on Project Site

Analyte	Well #28R003S			Well #28Q002S	Primary/ Secondary MCL
Date Sampled	**1976a**	**1/26/11**	**5/11/11**	**1/26/11**	
Title 22 Metals:					
Antimony	NA	<0.000380	<0.000380	<0.000380	0.006
Arsenic	NA	0.00919	**0.0129**	<0.000589	0.01
Barium	NA	0.0184	0.0269	0.0845	1.0
Beryllium	NA	<0.000131	<0.000131	<0.000131	0.004
Cadmium	NA	<0.000266	<0.000266	<0.000266	0.005
Chromium	NA	0.00151	0.00138	0.00351	0.05
Cobalt	NA	<0.000618	<0.000140	0.00027J	NE
Copper	NA	0.00054 J	0.00121	0.0483	1.0*
Lead	NA	<0.000170	<0.000170	0.00033J	0.015
Mercury	NA	<0.0000348	<0.0000348	<0.0000348	0.002
Molybdenum	NA	0.0438	0.0589	0.0249	NE

Table 5.15-4
Groundwater Analytical Results for Two Test Wells on Project Site

Analyte	Well #28R003S			Well #28Q002S	Primary/ Secondary MCL
Date Sampled	**1976a**	**1/26/11**	**5/11/11**	**1/26/11**	
Nickel	NA	0.00067J	0.00164	0.0117	0.1
Selenium	NA	<0.000554	0.00461	0.00173	0.05
Silver	NA	<0.000120	<0.000120	<0.000120	0.1*
Thallium	NA	<0.000498	<0.000498	<0.000498	0.002
Vanadium	NA	<0.000790	<0.000790	<0.000790	NE
Zinc	NA	0.00635	0.0101	0.350	5.0
Base Cations:					
Calcium	56	18.3	36.2	89.8	NE
Magnesium	5	2.27	3.70	19.1	NE
Sodium	580	511	615	363	NE
Potassium	11	5.02	6.81	5.28	NE
Other Metals:					
Aluminum	NA	<0.0105	<0.0105	<0.0105	0.2*
Iron	0.08	**0.321**	0.250	0.0618	0.3*
Manganese	NA	0.00782	0.0188	0.00991	0.05*
Anions:					
Fluoride	**3.8**	**4.2**	**4.2**	0.41	2.0
Chloride	**604**	**740**	**730**	**470**	250*
Nitrate (as N)	2	<0.017	0.0045	0.070J	10
Total Alkalinity (as CaCO3)	160b	74.0	95.0	124	NE
Sulfate	**450**	**390**	**420**	**410**	250*
o-Phosphate (as P)	NA	<0.014	<0.047	<0.014	NE
Bicarbonate (as CaCO3)	140	74.0	95.0	124	NE
Hydroxide (as CaCO3)	NA	<0.85	<0.85	<0.85	NE
Silica:					
Total	32	19.000	36.6	15.000	NE
Dissolved	NA	17.000	34.7	14.000	NE
Colloidal (Reactive)	NA	19	30	15	NE

Table 5.15-4
Groundwater Analytical Results for Two Test Wells on Project Site

Analyte	Well #28R003S			Well #28Q002S	Primary/ Secondary MCL
Date Sampled	**1976a**	**1/26/11**	**5/11/11**	**1/26/11**	
General Water Quality Parameters:					
SC (umhos/cm)	**2900**	**2900**	**2600**	**2300**	900*
TDS	**1815**	**1850**	**1840**	**1570**	500*
pH (unitless)	7.7	8.60	8.12	7.27	NE
Turbidity (NTU)	0	14	4.8	5.6	NE
TSS	5	5.4	5.9	8.9	NE
Phosphorus	NA	0.27	0.12	0.35	NE
Carbon Dioxide	NA	<1.0	1.5	12	NE
Total Organic Carbon (TOC)	NA	NA	0.12	NA	NE
Other Priority Pollutants:					
Cyanide	NA	<0.050	<0.0070	<0.050	NE
SVOCs: Bis (2-Ethylhexyl) Phthalate (ug/l)	NA	<10	ND	2.3J	NE
OCPs	NA	ND	ND	ND	NE
PCBs	NA	ND	ND	ND	NE
VOCs: Toluene (ug/l)	NA	ND	1.4	ND	NE

Notes:
a: From Stone and Webster, 1976. Represents average concentrations for five samples collected during aquifer testing.
b: Reported as total hardness (as $CaCO_3$).
J: Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
NA: Not Analyzed
NE: None Established
ND: None detected; see laboratory report for detection limits for specific compounds.
SVOCs: Semivolatile organic compounds
OCPs: Organochlorine pesticides
PCBs: Polychlorinated biphenyls
VOCs: Volatile organic compounds
MCL: Maximum Containment Level
MCL is primary, unless indicated with an asterisk (*) that indicates secondary
BOLD indicates concentration is above MCL
The symbol "<" (less than) indicates the constituent was not detected above the analytical detection limit specified
Units are given in mg/L, unless otherwise noted.

Based on the analytical results associated with the groundwater sample collected from the two on-site wells, URS concluded the following:

- groundwater that will be used by the Project is not suitable for use as a drinking water source without treatment based on TDS, base cation, and anion concentrations;
- arsenic was present in Well #28R003S at a concentration exceeding the primary MCL for drinking water on the May 11, 2011 test date;
- fluoride is present in the pumping well at a concentration that is above the primary MCL for drinking water;
- iron is present in the pumping well at a concentration that is slightly above the secondary MCL for drinking water;
- sulfate is present in the pumping well at a concentration that is above the secondary MCL for drinking water; and
- chloride, sulfate, SC, and TDS are present in each of the groundwater samples from the wells at levels above their respective MCLs for drinking water.

Flooding Potential

A hydrologic and hydraulic analysis of the existing condition for the project site was performed by VTN Consulting (VTN 2011). The report provides existing condition watershed boundaries, hydrologic analyses to determine a range of expected peak stormwater runoff flow rates, and a hydraulic analysis (Hydrologic Engineering Center River Analysis System [HEC-RAS[1]] and FLO-2D) of the washes to determine approximate flow depths, widths, and velocities. The VTN report is included in Appendix 5.15A.

According to the FEMA FIRM Panel # 06025C0275C (effective date September 26, 2008), the project site is not impacted by a special flood hazard area. Although the FIRM does not depict any special flood hazard areas impacting the project site, research revealed that the DWR recently published a study which delineates the area as an “awareness floodplain” or “100-year floodplain based upon best available data.” The DWR study denotes four separate 100-year floodplains traversing the site. The “awareness floodplains” are treated as 100-year floodplains for the purpose of development. This means that 100-year water surfaces would need to be defined, and structures would need to be raised above the 100-year water surface or the structures would need to be flood proofed to protect against the 100-year water surface. Riverside County Flood Control staff indicated to VTN staff that no FEMA submittal is required for developing within an “awareness floodplain” (RFCD & WCD Manual 1978, and DWR 2009). The 100-year DWR awareness floodplains are depicted on Figure 5.15-6. The 100-year existing condition floodplains per the VTN report are provided on Figure 5.15-7. Additionally, with the exception of local surface drains (Hodges Drain and Palo Verde Drain), there are no known existing or planned large scale flood control facilities within the vicinity of the Project.

[1] HEC-RAS is a computer program developed by the US Army Corps of Engineers that models the hydraulics of water flow through natural rivers and other channels

Based on the USGS topographic maps and aerial images, the Project location is in an alluvial fan area and there are many ephemeral 'blue-line' drainages through the site. Typically, ephemeral drainages located on alluvial fans have a tendency to be highly erosive and can shift laterally during intense flooding events. An evaluation of channel stability is provided in the existing condition hydrologic and hydraulic analysis (VTN 2011). The evaluation indicates that major flow corridors have been relatively stable over the 63-year period that was analyzed. However, the hydrology and hydraulic analysis indicated one breakout channel in the northwest portion of the project site that was formed between 2005 and 2009. Since there is insufficient evidence to suggest the breakout was man-made, it is assumed to be the product of flooding events.

5.15.3.2 Stormwater Runoff and Drainage

The following paragraphs provide information regarding stormwater runoff conditions at the project site.

Stormwater Runoff Prior to Construction

The tributary watershed to the project site consists of approximately 50 square miles (32,000 acres). The majority of the watershed is located west and southwest of the project site and slopes easterly toward the Palo Verde Mesa. A series of mountain ranges are located west, northwest, and southwest of the site and serve as the tributary watershed divides (within Riverside and Imperial Counties). Specifically, the Palo Verde Mountains are located southwest of the site and the Mule Mountains are located to west and northwest (VTN 2011). The on-site wastershed is approximately 15 square miles (9,600 acres).

The vegetation within the tributary watershed areas varies depending on the elevation and terrain. Higher mountain areas within the watershed are barren land with extremely sparse vegetation. The eastern (lower elevation) portion of the watershed contains a greater density of desert shrub, especially in and along the banks of washes. Runoff from the off-site watershed and proposed project site flows through six major washes that discharge to Hodges Drain (VTN 2011).

A summary of the 100-year, 24-hour existing conditions hydraulic analysis results from the VTN study are provided in Table 5.15-5 below. This table provides the maximum depth and velocity within a particular on-site wash. Generally, the discharges range from 64 to 6154 cubic feet per second (cfs), the maximum flow depths range from approximately 1.2 to 4.5 feet, and maximum velocities range from 2.9 to 6.1 feet per second (fps). The flow rates, depths, and velocities associated with the 100-year storm indicate the potential for minor to moderate scour, erosion, and sedimentation within the washes during extreme flood events. Additional return frequency results (2-, 5-, 10-, and 25-year) are provided in the VTN report in Appendix 5.15A. The wash locations are shown on Figure 5.15-7.

Table 5.15-5
HEC-RAS Hydraulic Analysis Maximum Depth and Velocity Results (100-year, 24-hour)

Wash	Discharge (cubic feet per second)	Maximum Depth (feet)	Maximum Velocity (feet per second)
90	491	2.1	4.4
60	64	1.2	3.2

Table 5.15-5
HEC-RAS Hydraulic Analysis Maximum Depth and Velocity Results (100-year, 24-hour)

Wash	Discharge (cubic feet per second)	Maximum Depth (feet)	Maximum Velocity (feet per second)
80	242	2.2	4.3
75	189	1.2	2.9
70	443	1.7	3.8
0	788	2.2	6.1
10A	160	1.7	4.8
4	105	1.7	4.6
10B	280	2.2	4.1
5	445	2.4	5.0
20	726	2.6	4.7
15	676	2.9	4.6
25A	1351	2.4	3.7
23	195	1.7	4.0
25B	1336	3.6	4.8
30	306	1.7	3.6
45	6154	3.9	4.6
35	615	2.4	4.3
40	4641	4.5	4.6

As a comparison to the 100-year, 24-hour hydraulic analysis results, which provide design parameters near the upper end of expected flow rates, depths, and velocities (extreme runoff event), Table 5.15-6 provides the 2-year, 24-hour existing condition hydraulic analysis results, which provide flow rates, depths, and velocities at the lower end of the return frequency analysis (more frequent runoff event).

Table 5.15-6
HEC-RAS Hydraulic Analysis Maximum Depth and Velocity Results (2-year, 24-hour)

Wash	Discharge (cubic feet per second)	Maximum Depth (feet)	Maximum Velocity (feet per second)
90	8	0.7	2.1
60	3	0.4	1.7
80	22	0.9	3.0
75	0.1	0.1	0.8
70	0.1	0.1	1.2
0	67	1.0	3.0
10A	23	0.8	3.1
4	16	1.3	3.0
10B	39	1.0	3.0
5	71	1.3	3.7

Table 5.15-6
HEC-RAS Hydraulic Analysis Maximum Depth and Velocity Results (2-year, 24-hour)

Wash	Discharge (cubic feet per second)	Maximum Depth (feet)	Maximum Velocity (feet per second)
20	86	1.4	2.6
15	205	2.3	3.8
25A	40	1.1	2.6
23	1	0.2	1.4
25B	25	1.8	2.6
30	1	0.2	1.5
45	788	2.4	3.4
35	79	1.1	4.6
40	701	2.8	3.3

Table 5.15-7 provides the estimated total runoff volume for both existing and post-construction conditions that leaves the project site during each storm event classification analyzed in the VTN study (2-, 5-, 10-, 25-, and 100-year). The results indicate that there is a wide range (10 times) of expected runoff volume between the HEC-RAS 2-year, 24-hour event and the 100-year, 24-hour event, largely due to differences in rainfall amount and soil infiltration capacity among the various storm events analyzed.

Stormwater Runoff During and after Construction

The *Final Post Construction Hydrologic & Hydraulic Analysis*, provided in Appendix 5.15F concluded that development of the site should not have a negative impact on any downstream properties (VTN 2011). Table 5.15-7 below shows the increases in runoff volumes due to construction of the Project.

Table 5.15-7
Existing Condition and Post-Construction Runoff Volume Summary

Storm Event	Existing Condition Total Runoff Volume (acre-feet)	Post-Construction Total Runoff Volume (acre-feet)	Runoff Volume Increase (acre-feet)	Runoff Volume Percent Increase
100-year, 24-hour	5269	5367	98	1.86%
25-year, 24-hour	2991	3026	35	1.17%
10-year, 24-hour	1867	1880	13	0.68%
5-year, 24-hour	1148	1153	5	0.50%
2-year, 24-hour	456	457	1	0.20%

The results indicate that there is a slight increase in the volume of runoff leaving the project area. This is expected due to the increased impervious area caused by the Project's development. The flow rates generally experienced slight increases due to the added impervious area and new drainage channels. The

flow results are shown in Table 5.15-8 below. The corresponding cross sections used the FLO-2D analysis are shown on Figure 5.15-8.

Table 5.15-8
Peak Flow Rate Summary: 100-Year, 24-Hour Storm Event

Storm Event	Existing Condition Maximum Discharge (cubic feet per second)	Post-Construction Maximum Discharge (cubic feet per second)	Flow Increase (cubic feet per second)
CS1	672	675	3
CS2	0	11	11
CS3	1336	1369	34
CS4	0	7	7
CS5	299	344	45
CS6	6143	6143	0
CS7	64	63	-1
CS8	788	802	14
CS9	45	68	23
CS10	43	49	6
CS11	443	509	67
CS12	491	521	30
CS13	34	38	4

As a comparison to the 100-year, 24-hour hydraulic analysis results, which provide design parameters near the upper end of expected flow rates, depths, and velocities (extreme runoff event), Table 5.15-9 provides the 2-year, 24-hour existing condition flow rates at the lower end of the return frequency analysis (more frequent runoff event) for post-construction conditions.

Table 5.15-9
Peak Flow Rate Summary: 2-Year, 24-Hour Storm Event

Storm Event	Existing Condition Maximum Discharge (cubic feet per second)	Post-Construction Maximum Discharge (cubic feet per second)	Flow Increase (cubic feet per second)
CS1	257	264	7
CS2	0	0	0
CS3	8	10	2
CS4	0	0	0
CS5	0	0	0
CS6	758	758	0
CS7	3	3	0
CS8	67	68	1

Table 5.15-9
Peak Flow Rate Summary: 2-Year, 24-Hour Storm Event

Storm Event	Existing Condition Maximum Discharge (cubic feet per second)	Post-Construction Maximum Discharge (cubic feet per second)	Flow Increase (cubic feet per second)
CS9	0	0	0
CS10	0	0	0
CS11	0	0	0
CS12	8	8	0
CS13	0	0	0

If the proposed solar field is developed, sheet flow and existing natural contours will be maintained to the extent practicable to maintain existing flow rates. The majority of the original grades and natural drainage features at the project site will be maintained and, therefore, no added storm drainage control will be required. In limited areas, such as the power blocks, substation, heliostat assembly buildings and administrative areas, the stormwater management system will include berms/ditches, bypass channels, or swales to direct run-on flow from upslope areas and run-off flow through and around each facility. To reduce erosion, storm drainage channels may be lined with a non-erodible material, such as compacted rip-rap, Rock Gabions, geo-synthetic matting, or engineered vegetation. Additionally, storm drainage channels will include a downstream flow dispersion features to reduce the depth and velocity of the flows.

Protection of soil resources during construction activities will be an important factor in the design of the erosion and sedimentation controls. To minimize wind and water erosion, open spaces will be preserved and left undisturbed maintaining existing vegetation (to the extent possible with respect to site topography and access requirements).

If needed, stone filters and check dams will be placed throughout the project site to provide areas for sediment deposition and to promote sheet flow. Where available, native materials (rock and gravel) will be used for the construction of the stone filter and check dams. Diversion berms and ditches will be used to direct stormwater around critical facilities, as required. Periodic maintenance will be conducted as required after major storm events. Stone filters and check dams are not intended to alter drainage patterns, but to reduce the potential for soil erosion and promote sheet flow. Additionally, temporarily disturbed areas associated with the Project site and gen-tie-line will be revegetated as appropriate after construction in order to prevent increased soil erosion.

Paved access roads will be protected from floods via ditches, culverts, and local fords with reinforced concrete shoulders. Overall, the project is being designed to maintain, to the extent practicable, the existing sheet flow patterns on the site.

Surface runoff during and after construction will be controlled in accordance with the requirements of the DESCP, construction- and industrial-phase SWPPPs, and all other applicable LORS, as discussed in Section 5.15.2.

Scour and Sediment Transport

The *Erosion, Scour, and Sediment Transport Analysis* was prepared by VTN Consulting (VTN 2011, Appendix 5.11B). As described in the analysis, FLO-2D software was used to compute scour for three different methodologies: for areas described in the analysis as major flow corridor areas, alluvial fan areas, and head cut areas. The analysis was performed based on the 100-year, 24-hour storm event. The results are summarized in Table 5.15-10 below.

Table 5.15-10
Total Scour Depth Summary

Analysis	Predicted General Scour Depth (feet)	Predicted Local Scour Depth (feet)	Predicted Total Scour Depth (feet)
General Scour – FLO-2D	1.46	1.5	2.96
General Scour – Alluvial	1.42	1.5	2.92
General Scour - Head Cut	1.46	1.5	2.93

General scour is caused by the 100-year, 24 hour storm and local scour is localized around the heliostat pylons. Total scour is computed by adding the local scour depth to the general scour depth. The largest of the three values for total scour depth, or 2.96 feet, will be used for design purposes. Recommended scour mitigation includes additional burial depth for pylons, riprap trenches upstream of pylons, and implementation of maintenance program for inspections after storm events that produce noticeable amounts of runoff.

Sediment transport was also computed using FLO-2D. The software utilizes the Zeller-Fullerton equation. The existing and developed condition sediment transport results, for the 100-, 25-, 10-, 5-, and 2-year storm events are summarized in Table 5.15-11 below.

Table 5.15-11
Sediment Load Summary

Storm	Existing Condition			Developed Condition			% Change in Sediment Load
	Sediment Load (acre-feet)	Stormwater Runoff (acre-feet)	Sediment Concentration (%)	Sediment Load (acre-feet)	Stormwater Runoff (acre-feet)	Sediment Concentration (%)	
100-Year	55	1297	4.22	56	1405	3.98	2.14
25-Year	22	693	3.17	22	770	2.90	1.59
10-Year	10	394	2.48	10	449	2.20	1.12
5-Year	4.2	222	1.89	4.2	261	1.61	0.48
2-Year	0.72	70.4	1.02	0.72	88	0.82	0.00

The results show a decrease in sediment concentration from existing to developed conditions due to the increase in impervious area. However, the increase in impervious area causes greater runoff flows, which will result in a higher sediment load. The increase in sediment load is minor, ranging from 0% to 2.14% for the different storm events.

5.15.3.3 Water Supply, Use, and Wastewater Discharges and Disposal

The following sections discuss the sources of water supply for the proposed Project, how the water will be used, and how wastewater will be disposed and discharged.

Water Supply

The Applicant secured through its land lease agreement with MWD (Appendix 5.15B) access to up to 600 afy of water. This is considered a stable supply, and a need for alternate supplies is not currently anticipated. Raw water will be drawn from on-site wells located within the common area. Two of the three wells within the common area will be used as the primary water supply, while the third well will be used as a backup water supply. Treated groundwater will be distributed to/from the common area and the three plants via pipelines. Because the new wells will be drawing from the same aquifer, water quality is expected to be similar to the existing on-site well water quality, provided that there are no geological conditions, such as a fault or different lithology, which could be responsible for variations in water quality. Previous investigations conducted for the proposed SunDesert Project identified no major faults within the site. There are no known wells within 0.5 mile of the project site. The nearest off-site wells are approximately 3,400 feet (0.6 mile) east of the common area.

Water Use

Groundwater will be treated on site in the common area for use as Project potable water, service water, firewater, boiler make-up water, auxiliary cooling water, and to wash the heliostat mirrors. Because the project site is located in a desert environment, to save water, each plant will use an air-cooled condenser for the main steam cycle. Water consumption, therefore, will be minimal. In terms of annual operation usage, it is estimated that 84.5 afy will be required for each of the three plants, with an additional 6.5 afy for the common area, or a total of 260 afy (160 gpm) for the entire 750 MW (nominal) facility mainly to provide water for washing heliostats, dust control, main process system make up water, and auxiliary load cooling required for equipment reliability and protection.. The current estimate for peak construction usage is, approximately 400 afy (250 gpm). The current plan includes a single centralized water treatment plant in the common area with small supplementary treatment systems at each power block to further minimize overall water usage. Water mass balance diagrams of the power block and common area are shown on Figures 5.15-9 and 5.15-10 respectively.

A breakdown of the estimated average daily and annual average quantity of water required for operation of the facility is presented in Table 5.15-12. The water requirements shown are estimated quantities based on the plants operating at full load.

Table 5.15-12
Water Requirements with All Three Plants in Operation

Water Use	Average Use (gallons per minute)	Average Use (gallons per day)	Average Use (acre-feet per year)
Process and heliostat wash water	157.1	226,200	253.5
Potable water	3.9	5,800	6.5
Total	161	232,000	260

Each plant will have a treated water tank sized to accommodate a two-day reserve of process water that includes makeup for demineralizer and a wet-surface air cooler (WSAC). A separate mirror wash tank will be provided in each power block area and the common area. In addition, a combined service water/firewater storage tank will be provided for service water and a dedicated two-hour reserve volume for firewater. A dedicated two-hour firewater storage tank will be provided in the common area to fight a two-hour fire. The facility will operate an average of eight to 16 hours a day, 7 days a week throughout the year, with the exception of a scheduled shutdown in winter for maintenance (at a time to be negotiated with the Transmission System Operator). However, the water treatment plant will operate continuously in order to minimize water treatment system size and capital cost, and to use off-peak energy at night.

The potable water treatment system will consist of re-mineralizing the treated water to include the appropriate chemicals, storage tanks, and supply pumps.

The main raw water treatment systems will be supplied by a water treatment specialty company, and will utilize two mixed-bed demineralizers (cation/anion) within the power block areas. The demineralizers will be supplied to the Project, along with feed pumps, a spent resin storage tank, fresh resin storage tank, and resin sluice pumps. The resin will be regenerated off-site by an outside water treatment supplier. The demineralized water will be stored in the demineralized water storage tank.

Wastewater Discharges and Disposal

The primary wastewater collection system will collect process wastewater from all of the plant equipment, including the boilers and WSAC blowdowns. To the extent practical, process wastewater will be recycled and reused. Each plant and the common area will have an onsite Waste Water Treatment (WWT) system consisting of either thermal distillation with mechanical vapor compression or a reverse osmosis system with ion exchange. Distillate/permeate collected from the WWT System will be recycled to the respective treated water storage tanks for reuse within the project site. Effluent from the WWT systems will be diverted to two evaporation ponds (each two acres in size) located within the common area and allowed to evaporate. Each pond will be lined with a HDPE liner to prevent infiltration of process wastewater into the subsoil below. Provisions to discourage use of ponds by avian species will be determined based on agency requirements. When needed, pond sludge will be removed and properly disposed of at an off-site facility by an outside contractor.

Domestic waste streams for items such as showers and toilets at each plant and the common facilities will be routed through separate on-site septic systems and leach fields. Sewage sludge from the septic tanks will be removed from the project site by a local sanitary service provider.

General plant drains will collect containment area washdown, and wastewater from sample drains and plant equipment drains. Water from these areas will be collected in a system of floor drains, hub drains, sumps, and piping and routed to the wastewater collection system. Wastewater from drains that potentially could contain oil or grease will first be routed through an oil/water separator. Similarly, drains in the common area are only located in the water treatment building. These drains will be collected and routed to a sump and pumped back to the wastewater collection tank for process in the WWTS. Any of these drains that could potentially contain oil or grease will be administratively controlled via operational procedures. Wastewater from the power blocks will be piped to the common area. Reject waste produced from the reverse osmosis process in the raw water treatment in the common area will be captured in the wastewater collection tank and treated in the wastewater treatment system.

Demineralized water from the mixed-bed system in each plant will be used as the feed water for power cycle makeup. The mixed-bed unit will be a self-contained, skid-mounted unit and the resin will be regenerated off site.

Boiler water discharged from each solar receiver steam generator (SRSG), boiler blowdown, will be treated to maintain the water chemistry within acceptable ranges. Boiler blowdown from the SRSG will be routed to the SRSG flash tank. Flash steam from the flash tank will be recovered back into the steam cycle via the deaerator. Condensate from the flash tank will be further flashed to atmosphere then cooled and recovered in the treated water storage tank. As an alternative, blowdown may be discharged to the wastewater collection tank for treatment.

Blowdown from the nighttime preservation, startup and auxiliary boilers will also be collected in blowdown tanks and recovered in the treated water storage tank. As with SRSG boiler blowdown, this water may alternatively be discharged to the wastewater collection tank for treatment.

5.15.4 Environmental Analysis

This section provides a discussion of the construction and operational impacts of the project. The following criteria are adapted from the CEQA Appendix G checklist, which establishes the significant criteria for Project impacts. According to the CEQA checklist, the Project is considered to have a potentially significant effect if it would adversely affect these criteria.

- Violate any water quality standards or waste discharge requirements. Potential impacts are discussed in Sections 5.15.4.1.
- 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). Potential impacts are discussed in Section 5.15.4.2.

- 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 or in flooding on site or off site. Potential impacts are discussed in Sections 5.15.4.1 and 5.15.4.2.
- 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. Potential impacts are discussed in Sections 5.15.4.1 and 5.15.4.2.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Potential impacts are discussed in Sections 5.15.4.1 and 5.15.4.2.
- Substantially degrade water quality. Potential impacts are discussed in Section 5.15.4.
- Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or FIRM, or other flood hazard delineation map. This criterion is not applicable, as no housing is planned as part of the Project.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows. Potential impacts are discussed in Section 5.15.4.2.
- 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. This criterion is not applicable, as there are no dams or levees in the vicinity of the project site.
- Cause inundation by seiche, tsunami, or mudflow. This criterion is not applicable, as the project site is not located near water bodies so there is no possibility of a seiche or tsunami. The project site has a slope of approximately 1 percent, so it is not subject to a mudflow.

5.15.4.1 Construction Impacts

The following sections discuss the potential impacts to the project site, from a water resource standpoint, during construction of the proposed improvements.

Drainage

During construction, portions of the project site, including the power blocks, the common areas, and portions along the ephemeral washes, will be graded. Grading is not intended to level the site, but rather to prepare the site for installation of the heliostats and reduce the number of future maintenance activities that may be required (e.g., washing the heliostats). As such, the existing depressions for the drainages will remain and natural drainage waters are expected to continue to occupy these ephemeral washes. Any grading required will be designed to promote sheet flow to the extent practicable. Areas disturbed by grading and other ground disturbance will be protected from erosion by implementation of appropriate BMPs that will be identified in the Project's DESCP and construction SWPPP. Approximately 6% of the site will be graded (VTN 2011). Site grading and development will maintain the overall drainage patterns on site, and potential impacts to existing drainage patterns during construction will be less than significant.

Water Quality

Water quality impacts are anticipated to be related to short-term construction activities and consist primarily of an increased potential for erosion. Additionally, stormwater runoff during construction activities could result in the transport of construction-related contaminants, such as oils and lubricants from equipment or from the improper storage and use of materials. Following approved grading and drainage plans, adhering to proper material handling procedures, and complying with the construction SWPPP will ensure that construction-related water quality impacts are less than significant. The construction SWPPP will require stormwater BMPs, dewatering runoff controls, and construction equipment decontamination.

Through compliance with the Construction General Permit, potential pollutants generated during construction will be sufficiently mitigated such that the beneficial uses of downstream receiving waters will be protected and water quality standards will not be violated. Furthermore, the downstream waters are not impaired for sediment, which is the priority pollutant associated with construction. Therefore, potential water quality impacts during construction are considered less than significant.

5.15.4.2 Operational Impacts

The following sections discuss the potential impacts to the project site, from a water resource standpoint, during operation of the proposed facility.

Drainage

The project site is currently undeveloped with little to no impervious surfaces. It has been partially disturbed as part of previous activities including military training exercises and off highway vehicle usage. Development of the Project would result in the presence of impervious surfaces at the power blocks and in the common area, including the administration building and related facilities. After construction, approximately 1.5% of the project site will be impervious. For the purposes of hydrologic stormwater runoff calculations, VTN conservatively assumed the mirror area of the heliostats to be impervious and applied an overall impervious factor of 23% of the Project site and adjusted the runoff curve numbers to account for these unconnected impervious areas. Relatively small rock filters and local diversion berms may be installed in the heliostat fields, as required, to discourage water from concentrating and to maintain sheet flow. A berm/ditch drainage system will be used to protect the power blocks from upstream surface water runoff.

Overall, the Project is being designed to maintain, to the extent practicable, the existing drainage and sheet flow patterns on the site. The increase in the amount of impervious surface and the routing of flows around the power blocks will not significantly change the amount or timing of runoff from the project site. Comparisons of existing conditions and post-construction conditions are provided in Tables 5.15-7 through 5.15-9. Project operation will also have no effect on the overall drainage pattern of the site in a manner that would result in substantial erosion, siltation, or flooding on or off site. For these reasons, potential impacts to drainage quantities and patterns will be less than significant.

Water Quality

Adhering to proper material storage and handling procedures and complying with the industrial SWPPP will ensure that operational impacts to water resources are less than significant. The industrial SWPPP will require a suite of maintenance and storage requirements for materials and equipment, including identifying and mitigating pollutants and conditions of concern. BMPs will be selected to address material loading and storage areas, spill and leak prevention, waste handling, and employee training. Inspections, monitoring, and sampling also will be conducted per the permit requirements.

As discussed under the Groundwater Flow and Gradient subsection to Section 5.15.3.1, the Palo Verde Outfall Drain is on the 303(d) list. It is listed for dichlorodiphenyltrichloroethane (DDT) and pathogens. These pollutants are not anticipated to be present on the site. Through compliance with the General Industrial Permit, potential pollutants generated during the industrial phase will be sufficiently mitigated such that the beneficial uses of downstream receiving waters and groundwater will be protected and water quality standards will not be violated. Therefore, potential surface water and groundwater quality impacts during the operations phase are considered less than significant.

Groundwater

The Project requires the installation of three new on-site groundwater production wells for Project water supply within the common area. Total water consumption is estimated at 260 afy for the operating life of the Project, which is 25 years. During the three-year construction period, the water use is estimated to be 400 afy. All pumped water will be consumptively used and no groundwater return flows are expected. For perspective, a new three bedroom single family home in California with four occupants typically uses approximately 0.5 afy (CONSOL 2010).

As described in the *Groundwater Impact Assessment Report* (Appendix 5.15G), a superposition modeling approach was used to determine drawdown (WP 2011). Superposition or impact modeling is a robust numerical modeling approach which focuses on evaluation of drawdown as opposed to actual hydraulic head, and allows the modeler to incorporate boundary conditions, variable aquifer parameters, and diverse geological layer geometry.

The most recent groundwater modeling study completed in the area is a two-dimensional groundwater flow model developed by for the Blythe Solar Energy Project (BSEP). This model has a domain that includes both the PVMGB and PVVGB of the Palo Verde Valley, as well as the Colorado River. It is a single-layer MODFLOW 2000 model that considers only the unconfined alluvial aquifer, including both the Older and Younger Alluvium as one hydrostratigraphic unit based on the BSEP hydraulic connection. Based on the location of the Project in the southern PVMGB and the anticipated magnitude of groundwater withdrawals, it would be expected that potential effects from Project groundwater withdrawals on the groundwater system will be limited to the PVMGB and PVVGB, mainly to the east, north, and south of the project site.

The objectives of the groundwater modeling impact assessment were to evaluate the following specific potential impacts to groundwater resources resulting from the proposed solar power plant:

- Evaluation of potential project and cumulative effects of groundwater levels near the Site, to nearby groundwater users and relative to the proposed Colorado River Accounting Surface;
- Evaluation of the potential Project effects on basin-wide groundwater flow and balances;
- Evaluation of the potential effects of Project pumping on surface water resources; and
- Evaluation of the potential effects of Project pumping on flow paths that could affect water quality.

The BSEP PVMGB/PVVGB Groundwater Model was constructed using the MODFLOW2000 model developed by the USGS, within the BOSS GMS modeling environment. The model files were obtained from CEC and imported into the Groundwater Vistas® (Version 5.0) modeling environment for use in evaluating Project groundwater impacts.

Figure 5.15-11 shows that drawdown from Project pumping will be limited to the PVMGB to areas very close to the project site. Contoured drawdown extends into the PVVGB approximately 0.5 mile; however, drawdown greater than 0.5 feet is limited to the PVMGB. Maximum drawdown near the Project pumping wells is 1.3 feet at the end of pumping. The maximum observed drawdown will occur during construction pumping and is predicted to be approximately 3 feet near the pumping wells.

Drawdown impacts from BSEP pumping are not predicted to extend to the project site. This is because groundwater levels in the area are dominated by recharge from deep percolation of irrigation water. Therefore, cumulative drawdown effects are not anticipated.

Drawdown imposed by a well on another nearby pumping well can have adverse effects on the performance of that well and is referred to as interference drawdown or well interference. These effects can include a well going dry, the need to lower pump intakes, well damage or increased electrical or maintenance costs. Figure 5.15-11 does not indicate the presence of any existing wells within the contoured drawdown cone associated with Project pumping. Drawdown at the closest nearby wells is predicted to be less than 0.2 feet. This is within the range of naturally occurring background fluctuations. Therefore, well interference impacts will be less than significant.

Model mass balance analysis indicates that 109 afy of the pumped groundwater is derived from the area between the Project site and the Mule Mountains and the remaining 151 afy is derived from the relatively small portion of the capture zone to the east and southeast of the pumping wells. Pumping at the Project site will not affect surface water flows in the Colorado River. The modeled steady state flow rate to PVID drains under non-pumping or baseline conditions is predicted to decrease by 0.07 percent after 31 years. A change of this magnitude would not be measureable or observable. Because the groundwater flow system is dominated by deep percolation of irrigation water and discharge of shallow groundwater in the PVID drains, further changes to the basin water budget are not anticipated.

In terms of baseline water level trends, comparison of hydrographs for wells in the basin to precipitation records does not indicate distinct trends indicative of climatic influence during dry or critically dry years (WP 2011). This may be due to the fact that groundwater levels in the PVMGB are strongly influenced by irrigation and surface water and groundwater pumping in the area generally does not increase during dry years. Therefore, groundwater budget deficits are not anticipated during dry and critically dry years.

Therefore the cumulative water level impacts during dry and critically dry years will be less than significant.

In summary, the Project's groundwater use will not cause or contribute to significant groundwater level declines, impacts to basin storage levels, or impacts to neighboring wells based on the WP groundwater impact assessment the factors identified below.

- The anticipated water use from plant operations over 25 years (260 afy) constitutes approximately less than 0.2 percent of the total water estimated in storage within the PVMGB (6.8 million af).
- The groundwater analysis indicates that the drawdown resulting from pumping at the Project wells is not significant and is not likely to affect neighboring pumping wells. The nearest existing offsite well is over one-half mile from the common area boundary where the proposed Project water supply wells will be located.
- Less than half of the available 600 afy allocated by MWD will be used during operations, and up to two-thirds of the allocation will be used during peak construction.

Because the Project will use only a small amount of water and all of it will be used and discharged to a treatment process (i.e., none of it will be returned directly to the groundwater basin), the Project will not affect groundwater quality. Lined evaporation ponds will be utilized for wastewater that can no longer be recycled within the water treatment system. The operation, maintenance, and monitoring of the evaporation ponds will be subject to conditions of certification and/or WDRs to ensure that the ponds are designed and maintained properly to prevent leakage into the underlying soil. No changes in the existing physical or chemical conditions of groundwater resources are expected and no impacts to groundwater quality are expected as a result of the Project.

Flooding Potential

Flooding conditions after Project build-out will be similar to those under existing conditions, because:

- the Project will maintain unobstructed sheet/channel flow, with water exiting the site in existing natural contours and flows;
- minimal grading will occur on site; and
- natural channels/washes will be minimally disturbed and major structures will not be placed in areas identified as within 100-year floodplain.

Generally, there will be slight increases in post-development runoff volumes and peak flow rates as shown in Tables 5.15-7 through 5.15-9. The Project will not expose people or structures to significant risk of loss, injury, or death resulting from a levee or dam failure because there are no levees or dams in the project vicinity. Similarly, the Project is not located near the Pacific Ocean, a large confined water body, or on steep slopes, and, therefore, the possibility of potential inundation from seiche, tsunami, or mudflow is remote.

5.15.4.3 Alternative Water Supplies

The Applicant has considered the use of alternative water supplies to groundwater. Alternative water sources considered include water for agricultural supply or return, water brought in from surrounding areas using trucks, water from a secondary service provider, and reclaimed wastewater from the City of Blythe. These alternatives are also discussed in Section 6.7 of the AFC.

Agricultural supply and return/backwash water was considered a potential supply source due to the agricultural activity in the vicinity of the project site in the PVID. Freshwater agricultural supply for the Project is not typically a favorable option if other sources are available. Agricultural wastewater discharges include stormwater runoff from irrigated lands. Irrigation return water includes surface discharges and subsurface discharges known as "tile water" in tiled areas, and groundwater or "seepage."

Agricultural return water quality is generally slightly less than that of groundwater. Use of agricultural supply or return water would require conveyance to the site from the Palo Verde Valley Groundwater Basin via pipeline. Construction of a pipeline would increase infrastructure costs and environmental impacts compared to use of an on-site water supply. Moreover, use of agricultural supply or return water may require additional treatment before conveyance to the project site, which would increase costs and add time to the Project schedule relative to use of on-site groundwater.

Trucking Water to the Project Site from Surrounding Areas

Trucking water to the project site from the surrounding area is both a short-term water supply alternative and an emergency back-up option for supplying water to the Project. It is not anticipated that this alternative is viable for long-term Project operation. To continuously haul water to the project site during the lifetime of the Project would not only be costly, but would increase the potential for environmental impacts (e.g., increase the volume of traffic and air quality emissions related to the truck trips).

Water from a Secondary Service Provider

Obtaining water from a water service provider in the area other than PVID, such as the City of Blythe domestic water supply, was also considered as a potentially viable alternative. However, this alternative would require the construction of more than 12 miles of pipeline that will cross numerous land parcels with dozens of separate owners. Achieving project objectives to construct a cost effective facility with a commercial on-line date of 2015 would be made difficult by the need to secure the necessary Right Of Way, easements, and financing for this water pipeline.

Reclaimed Water from the City of Blythe

Reclaimed water options were evaluated as part of this analysis. The City of Blythe (City) owns a sewage collection, treatment and disposal system that provides sewage services to the City. The City of Blythe Regional Wastewater Treatment Plant (WWTP) is a Class III Facility and the treatment process is Activated Sludge (secondary level treatment), and currently operates under the California RWQCB, Colorado River Basin Order R7-2005-0103. The WWTP is located approximately 10 miles northeast of the project site. Treated wastewater from Blythe infiltrates into the Colorado River Aquifer and is accounted for as Colorado River Water under allocations to the PVID. Water from the Colorado River is

fully allocated. Under an average, dry-weather flow, the facility treats 1.3 million gallons per day (mgd) (1,460 afy). The facility is permitted to discharge up to 2.4 mgd of treated wastewater from the Blythe Regional Wastewater Reclamation Facilities to percolation evaporated ponds.

The City WWTP operator indicated that the City currently does not have intention to upgrade the facility to a tertiary treatment, which would be required if wastewater were to be used for the Project to comply with CCR Title 22. An upgrade to tertiary treatment will require substantial costs and permitting requirements. In addition, a pipeline of considerable length would be required to transport treated wastewater from Blythe to the Project, resulting in substantial cost to the Project, ground disturbance and associated environmental impacts, and increased utility electrical demand due to pumping electrical loads. Therefore, this possible water source is not considered favorable or feasible without upgrading the facility to tertiary treatment.

5.15.5 Cumulative Effects

Cumulative impacts to water resources could occur as a result of stormwater runoff discharge to surface water resources, the use of groundwater, or impacts to groundwater quality. Operation of the Project has the potential to impact water quality primarily through improper storage and use of materials. Rio Mesa SEGF will adhere to proper material storage and handling as well as any other applicable good housekeeping procedures. Construction and operation of the Rio Mesa SEGF will employ stormwater design BMPs and adhere to a SWPPP, state water quality standards, and other applicable federal, state, and local LORS addressing stormwater runoff and surface water quality. As a result, drainage patterns, drainage volumes and peak flow rates from the site will be similar to existing conditions. Since natural channels/washes will be minimally disturbed and occupied structures will not be placed in areas identified as located within a 100-year floodplain, flooding conditions for the Rio Mesa SEGF will be similar to those under existing conditions. Therefore, construction and operation of the Rio Mesa SEGF will have a less than significant impact to surface water runoff.

None of the solar energy projects that will likely be under construction before or concurrently with the Rio Mesa SEGF, including the Rice Solar Energy Project (RSEP), the BSPP, the Palen Solar Power Project (PSPP), and the Genesis Solar Energy Project (GSEP), are located within the PVMGB. While any other reasonably foreseeable future projects are likely to incrementally increase the potential for stormwater runoff and adverse effects to surface water quality, such projects are also subject to existing LORS that address stormwater runoff management and surface water quality. Therefore, the incremental effects of the Rio Mesa SEGF to surface water runoff, combined with the effects of past, present, and reasonably foreseeable projects, are not cumulatively considerable.

The Rio Mesa SEGF will require use of approximately 400 acre-feet per year (afy) of groundwater for construction and up to 260 afy during operation. Groundwater will be accessed through wells that will be installed on site, and wastewater will be discharged to a treatment process to the extent practicable. Concentrate from the wastewater treatment will be disposed into two evaporation ponds located in the common area. The Rio Mesa SEGF will use less than half of its available annual water allocation from the Metropolitan Water District of Southern California during operations and approximately two-thirds of the allocation during peak construction. Over 25 to 30 years, Project water use would constitute less than

0.2 percent of total water estimated in storage within the PVMGB. At the Project-level, the amount of groundwater use by the Rio Mesa SEGF is considered a less than significant impact.

As stated previously, none of the solar energy projects that will likely be under construction before or concurrently with the Rio Mesa SEGF, including the RSEP, BSPP, PSPP, and GSEP, are located within the PVMGB. While other present and reasonably foreseeable future projects within the PVMGB will incrementally increase the amount of groundwater required for construction and/or operation activities, the cumulative demand for groundwater will not adversely affect the groundwater recharge in the PVMGB. Therefore, the incremental effects of the Rio Mesa SEGF to groundwater use, when combined with the effects of past, present, and reasonably foreseeable future projects, are not cumulatively considerable.

Additionally, the Rio Mesa SEGF will comply with existing LORS addressing groundwater quality and wastewater discharge. As described above, the Rio Mesa SEGF will discharge wastewater to a treatment process. Past, present, and reasonably foreseeable future projects also are subject to applicable LORS addressing groundwater quality and wastewater discharge. Therefore, the Rio Mesa SEGF, when considered together with the effects of past, present, and reasonably foreseeable future projects, will not result in cumulative considerable impacts to groundwater quality.

5.15.6 Mitigation Measures

This section presents mitigation measures proposed to reduce impacts to water resources. The mitigation measures proposed are prescribed by stormwater and erosion control management programs mandated under the NPDES permitting system. These programs have been in place for a number of years and the prescribed measures have proven effective. Under the General NPDES Permits for Construction and Industrial Stormwater, for example, various specific measures are prescribed, and a program of monitoring is required. Compliance with these programs will ensure that all residual impacts associated with the proposed project are mitigated to a less-than-significant level.

- Implement BMPs designed to minimize soil erosion and sediment transport during construction. Implement and maintain appropriate erosion and sediment controls for all areas prone to erosion, waste management BMPs, non-stormwater pollution control BMPs, and other BMPS in accordance with the California Statewide General Construction Permit.
- Conduct operations at the project site in accordance with the California Statewide General Industrial Permit. Implement a suite of good housekeeping requirements including steps to identify and mitigate pollutants and conditions of concern. Select BMPs to address material loading and storage areas, spill and leak prevention, waste handling, and employee training. Conduct inspections, monitoring, and sampling per the permit requirements.

5.15.7 Involved Agencies and Agency Contacts

Agencies and agency contacts for water resources are listed in Table 5.15-13.

Table 5.15-13
Agency Contacts

Issue	Agency	Contact
Pending approval of SF-299 application, regulations pertaining to grading and soil erosion will be developed in the Conditions of Approval	BLM	Cedric Perry Bureau of Land Management 22835 Calle San Juan de Los Lagos Moreno Valley, CA 92553-9046 (951) 697-5200
Application for Certification	CEC	Pierre Martinez California Energy Commission 1516 Ninth Street Sacramento, CA 95814 (916) 651-3765
To comply with NPDES permit requirements, a Notice of Intent must be filed prior to construction activities. A construction SWPPP also must be prepared.	Colorado River Basin RWQCB	John Carmona Colorado River Basin RWQCB (760) 340-4521
To comply with NPDES permit requirements, a Notice of Intent must be filed prior to operational activities. An operational SWPPP also must be prepared.	Colorado River Basin RWQCB	John Carmona Colorado River Basin RWQCB (760) 340-4521
A Report of Waste Discharge is required for discharge of wastewater to the evaporation ponds.	Colorado River Basin RWQCB	Jennie Snyder Colorado River Basin RWQCB (760) 776-8936
Groundwater well permits.	Riverside County Department of Environmental Health	Greg Dellenbach Riverside County Department of Environmental Health, Office of Water Engineering 4080 Lemon Street Riverside, California 92501 (951) 955-8980
Grading permit.	Riverside County Planning Department	Larry Ross Riverside County Planning Department 4080 Lemon Street Riverside, California 92502-1629 951-955-1852
Jurisdiction over Waters of the United States	USACE	James E. Mace (951) 8276-6624 x 263 USACE Riverside Regulatory Field Office 1451 Research Park Drive, Suite 100 Riverside, CA 92507-2154

Table 5.15-13
Agency Contacts

Issue	Agency	Contact
Groundwater usage within the Lower Colorado Region	USBR	Steve Hvinden, Area Manager Boulder Canyon Operations Office PO Box 61470 Boulder City, NV 89006-1470 702-293-8156

BLM = Bureau of Land Management
CEC = California Energy Commission
CWA = Clean Water Act
NPDES = National Pollution Discharge Elimination System
RWQCB = (California) Regional Water Quality Control Board
SWPPP = Stormwater Pollution Prevention Plan
USACE = United States Army Corps of Engineers
USBR = United States Bureau of Reclamation

5.15.8 Permits Required and Permit Schedule

Table 5.15-14 provides a list of the permits required for the Project and the associated schedule for those permits.

Table 5.15-14
Permits and Permit Schedule

Permit	Agency	Schedule
Grading permit – Large scale (non-residential)	Larry Ross Riverside County Planning Department 4080 Lemon Street Riverside, California 92502-1629 951-955-1852	Grading plan and permit applications will be submitted six weeks prior to the start of construction.
Report of Waste Discharge for Evaporation Ponds	Jennie Snyder Colorado River Basin RWQCB (760) 776-8936	WDRs from the RWQCB are required for discharge of wastewater to the evaporation ponds. The WDR process is expected to take 6 to 9 months. WDRs will either be provided directly by the RWQCB or through the CEC Conditions for Certification.
NPDES General Construction Permit (Construction SWPPP) and General Industrial Permit (Industrial SWPPP)	John Carmona Colorado River Basin RWQCB (760) 340-4521	Submit Notice of Intent to use the permit at least 30 days in advance of use, prepare SWPPP for construction and SWPPP for operation.

Table 5.15-14
Permits and Permit Schedule

Permit	Agency	Schedule
Well Installation Permit	Greg Dellenbach Riverside County Department of Environmental Health, Office of Water Engineering 4080 Lemon Street Riverside, California 92501 (951) 955-8980	Submit application 30 days prior to drilling.

CEC = California Energy Commission
CWA = Clean Water Act
NPDES = National Pollution Discharge Elimination System
RWQB = (California) Regional Water Quality Control Board
SWPPP = Stormwater Pollution Prevention Plan
WDR = Waste Discharge Requirements

5.15.9 References

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SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.15.3, page 5.15-10 Section 5.15.5, page 5.15-36 Section 5.15.6, page 5.15-37		
Appendix B (g) (14) (A)	All the information required to apply for the following permits, if applicable, including:	Section 5.15.2, page 5.15-2		
Appendix B (g) (14) (A) (i)	Waste Discharge Requirements; National Pollutant Discharge Elimination System Permit; and/or a Section 401 Certification or Waiver from the appropriate Regional Water Quality Control Board (RWQCB);	Section 5.15.2.1, page 5.15-4		
Appendix B (g) (14) (A) (ii)	Construction and Industrial Waste Discharge and/or Industrial Pretreatment permits from wastewater treatment agencies;	Section 5.15.2.2, page 5.15-5		
Appendix B (g) (14) (A) (iii)	Nationwide Permits and/or Section 404 Permits from the U.S. Army Corps of Engineers; and	Section 5.15.2.1, page 5.15-4		
Appendix B (g) (14) (A) (iv)	Underground Injection Control Permit(s) from the U.S. Environmental Protection Agency, California Division of Oil and Gas, and RWQCB.	N/A		

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Appendix B (g) (14) (B)	A detailed description of the hydrologic setting of the project. The information shall include a narrative discussion and on maps at a scale of 1:24,000 (or appropriate scale approved by staff), describing the chemical and physical characteristics of the following nearby water bodies that may be affected by the proposed project:	Section 5.15.3.1, page 5.15-11 Figure 5.15-1		
Appendix B (g) (14) (B) (i)	Ground water bodies and related geologic structures;	Section 5.15.3.1, page 5.15-11		
Appendix B (g) (14) (B) (ii)	Surface water bodies;	Section 5.15.3.1, page 5.15-11		
Appendix B (g) (14) (B) (iii)	Water inundation zones, such as the 100-year flood plain and tsunami run-up zones;	Section 5.15.3.1, page 5.15-11		
Appendix B (g) (14) (B) (iv)	Flood control facilities (existing and proposed); and	Section 5.15.3.1, page 5.15-11		
Appendix B (g) (14) (B) (v)	Groundwater wells within ½ mile if the project will include pumping.	Section 5.15.3.3, page 5.15-27		
Appendix B (g) (14) (C)	A description of the water to be used and discharged by the project. This information shall include:	Section 5.15.3.3, page 5.15-27		
Appendix B (g) (14) (C) (i)	Source(s) of the primary and back-up water supplies and the rationale for their selection;	Section 5.15.3.3, page 5.15-27		

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Appendix B (g) (14) (C) (ii)	The expected physical and chemical characteristics of the source and discharge water(s) including identification of both organic and inorganic constituents before and after any project-related treatment. For source waters with seasonal variation, provide seasonal ranges of the expected physical and chemical characteristics. Provide copies of background material used to create this description (e.g., laboratory analysis);	Section 5.15.3.1, page 5.15-11		
Appendix B (g) (14) (C) (iii)	Average and maximum daily and annual water demand and waste water discharge for both the construction and operation phases of the project;	Section 5.15.3.3, page 5.15-27		
Appendix B (g) (14) (C) (iv)	A detailed description of all facilities to be used in water conveyance (from primary source to the power plant site), water treatment, and wastewater discharge. Include a water mass balance diagram;	Section 5.15.3.3, page 5.15-27		
Appendix B (g) (14) (C) (v)	For all water supplies intended for industrial uses to be provided from public or private water purveyors, a letter of intent or will-serve letter indicating that the purveyor is willing to serve the project, has adequate supplies available for the life of the project, and any conditions or restrictions under which water will be provided. In the event that a will-serve letter or letter of intent can not be provided, identify the most likely water purveyor and discuss the necessary assurances from the water purveyor to serve the project;	Appendix 5.15B		

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Appendix B (g) (14) (C) (vi)	For all water supplied which necessitates transfers and/or exchanges at any point, identify all parties and contracts/agreements involved, the primary source for the transfer and/or exchange water (e.g., surface water, groundwater), and provide the status of all appropriate agencies' approvals for the proposed use, environmental impact analysis on the specific transfers and/or exchanges required to obtain the proposed supplies, a copy of any agency regulations that govern the use of the water, and an explanation of how the project complies with the agency regulation(s);	N/A		
Appendix B (g) (14) (C) (vii)	Provide water mass balance and heat balance diagrams for both average and maximum flows that include all process and/or ancillary water supplies and wastewater streams. Highlight any water conservation measures on the diagram and the amount that they reduce water demand; and	Figures 5.15-9 and -10		

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SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (14) (C) (viii)	For all projects which have a discharge, provide a copy of the will-serve letter, permit or contract with the public or private entity that will be accepting the wastewater and contact storm water from the project. The letter, permit or contract, if possible, shall identify the discharge volumes and the chemical or physical characteristics under which the wastewater and contact storm water will be accepted. In the event that a will-serve letter, permit, or contract cannot be provided, identify the most likely wastewater/storm water entity and discuss why the applicant was unable to secure the necessary assurances to serve the project's wastewater/storm water needs. Also, discuss the term of the wastewater service to the project, whether the wastewater entity has adequate permit capacity for the volume of wastewater from the project and has adequate permit levels for the chemical/physical characteristics of the project's wastewater and storm water for the life of the project, and any issues or conditions/restrictions the wastewater entity may impose on the project.	Appendix 5.15B		
Appendix B (g) (14) (D)	Identify all project elements associated with stormwater drainage, including a description of the following:	Section 5.15.3.1, page 5.15-11 Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (D) (i)	Monthly and/or seasonal precipitation and stormwater runoff and drainage patterns for the proposed site and surrounding area that may be affected by the project's construction and operation;	Section 5.15.3.1, page 5.15-11 Section 5.15.3.2, page 5.15-21		

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SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (14) (D) (ii)	Drainage facilities and the design criteria used for the plant site and ancillary facilities, including but not limited to capacity of designed system, design storm, and estimated runoff;	Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (D) (iii)	All assumptions and calculations used to calculate runoff and to estimate changes in flow rates between pre- and post-construction; and	Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (D) (iv)	A copy of applicable regional and local requirements regulating the drainage systems, and a discussion of how the project's drainage design complies with these requirements.	Section 5.15.2, page 5.15-2		
Appendix B (g) (14) (E)	An impacts analysis of the proposed project on water resources and a discussion of conformance with water-related LORS and policy. This discussion shall include:			
Appendix B (g) (14) (E) (i)	The effects of project demand on the water supply and other users of this source, including, but not limited to, water availability for other uses during construction or after the power plant begins operation, consistency of the water use with applicable RWQCB basin plans or other applicable resource management plans, and any changes in the physical or chemical conditions of existing water supplies as a result of water use by the power plant;	Section 5.15.3.3, page 5.15-27 Section 5.15.5, page 5.15-36		
Appendix B (g) (14) (E) (ii)	If the project will pump groundwater, an estimation of aquifer drawdown based on a computer modeling study shall be conducted by a professional geologist and include the estimated drawdown on neighboring wells within 0.5 mile of the proposed well(s), any effects on the migration of groundwater contaminants, and the likelihood of any changes in existing physical or chemical conditions of groundwater resources shall be provided;	Section 5.15.4.2, page 5.15-31		

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SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (14) (iii)	The effects of construction activities and plant operation on water quality and to what extent these effects could be mitigated by best management practices;	Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (iv)	If not using a zero liquid discharge project design for cooling and process waters, include the effects of the proposed wastewater disposal method on receiving waters, the feasibility of using pre-treatment techniques to reduce impacts, and beneficial uses of the receiving waters. Include an explanation why the zero liquid discharge process is “environmentally undesirable,” or “economically unsound;”	Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (v)	If using fresh water, include a discussion of the cumulative impacts, alternative water supply sources and alternative cooling technologies considered as part of the project design. Include an explanation of why alternative water supplies and alternative cooling are “environmentally undesirable,” or “economically unsound;	Section 5.15.4.3, page 5.15-35 Section 5.15.5, page 5.15-36		
Appendix B (g) (14) (vi)	The effects of the project on the 100-year flood plain, flooding potential of adjacent lands or water bodies, or other water inundation zones; and	Section 5.15.3.2, page 5.15-21		
Appendix B (g) (14) (vii)	All assumptions, evidence, references, and calculations used in the analysis to assess these effects.	Section 5.15.3.2, page 5.15-21		

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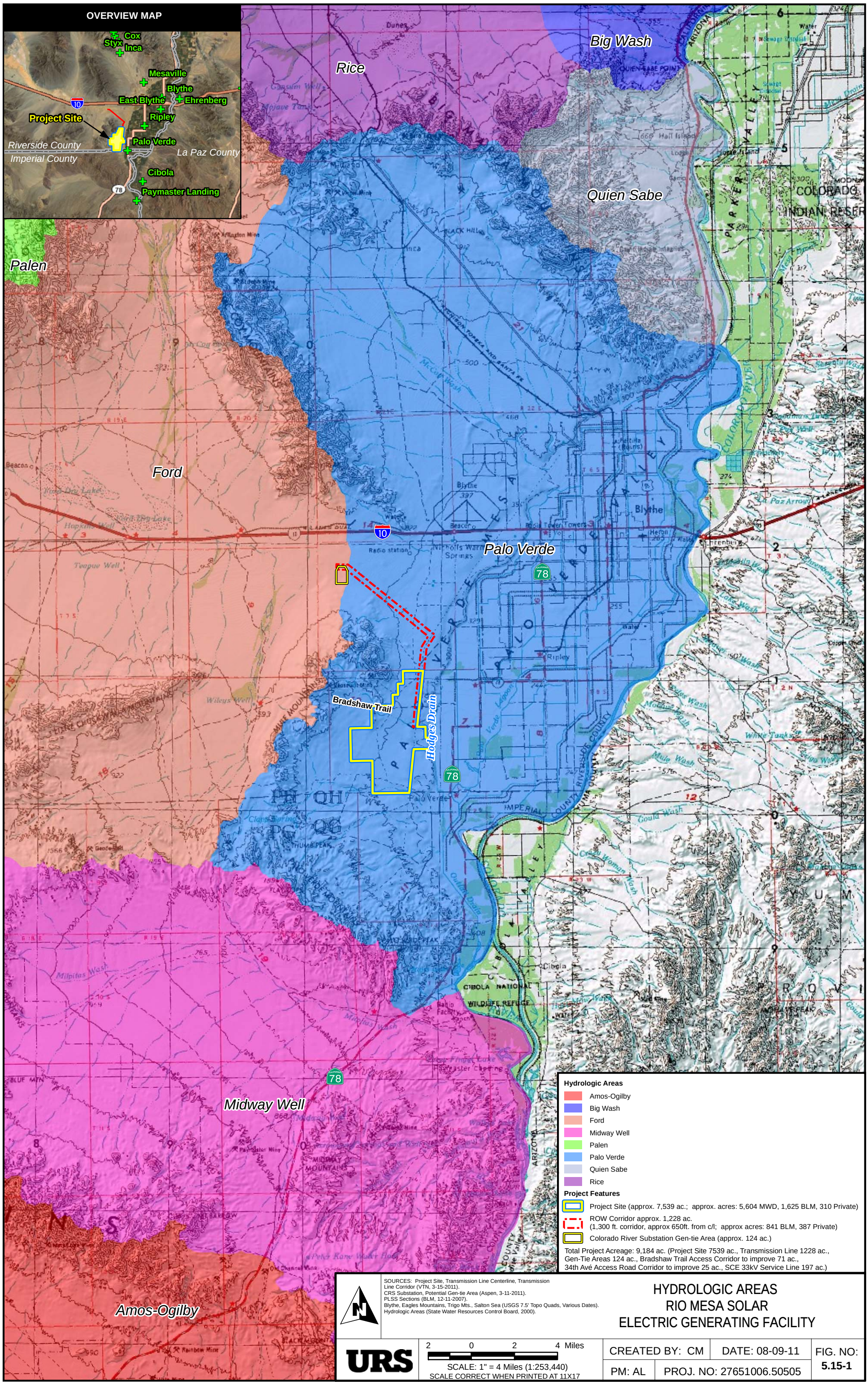
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.15.2, page 5.15-2		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.15.7, page 5.15-38 Section 5.15.8, page 5.15-39		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.15.7, page 5.15-38		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.15.7, page 5.15-38 Section 5.15.8, page 5.15-39		



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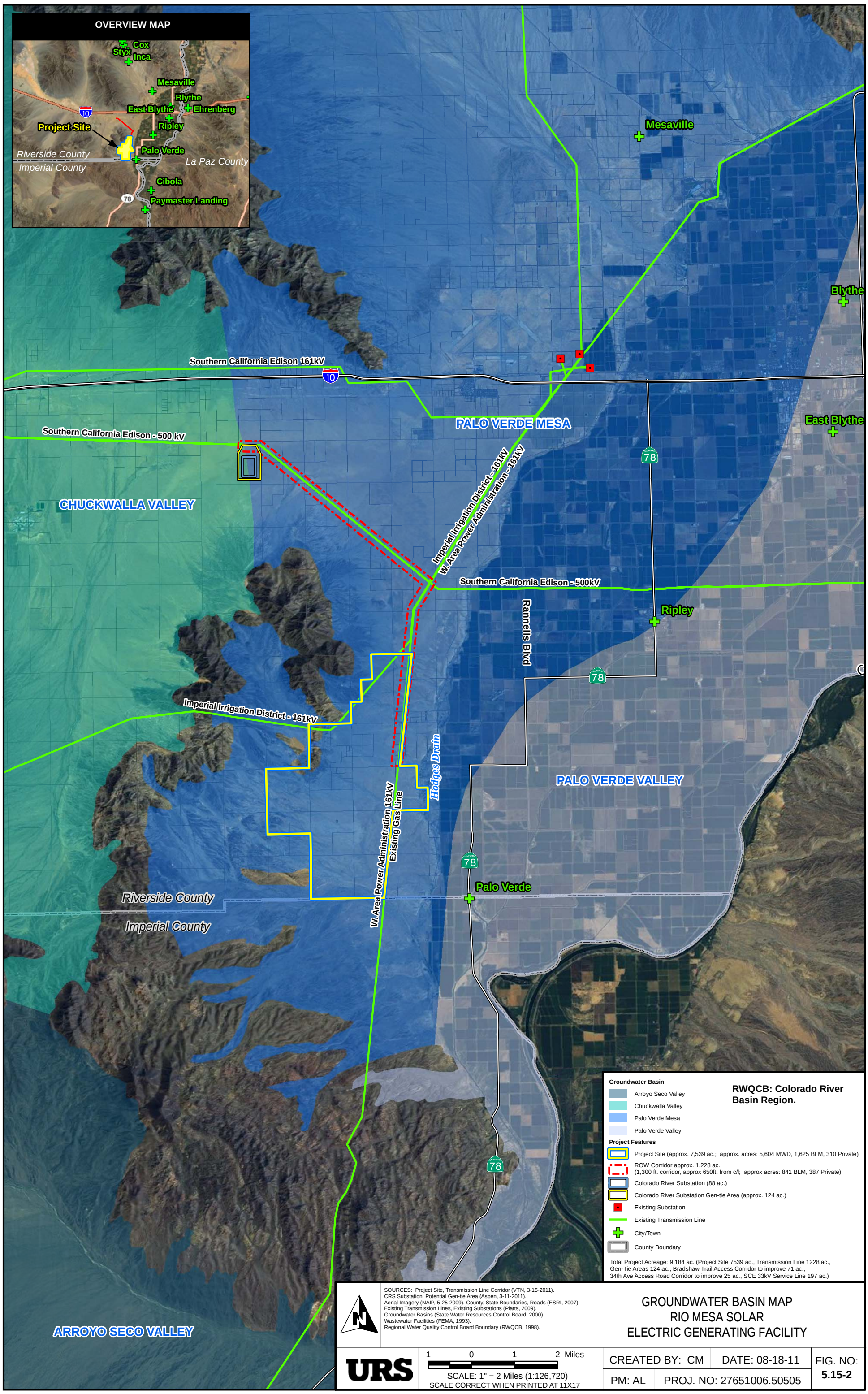

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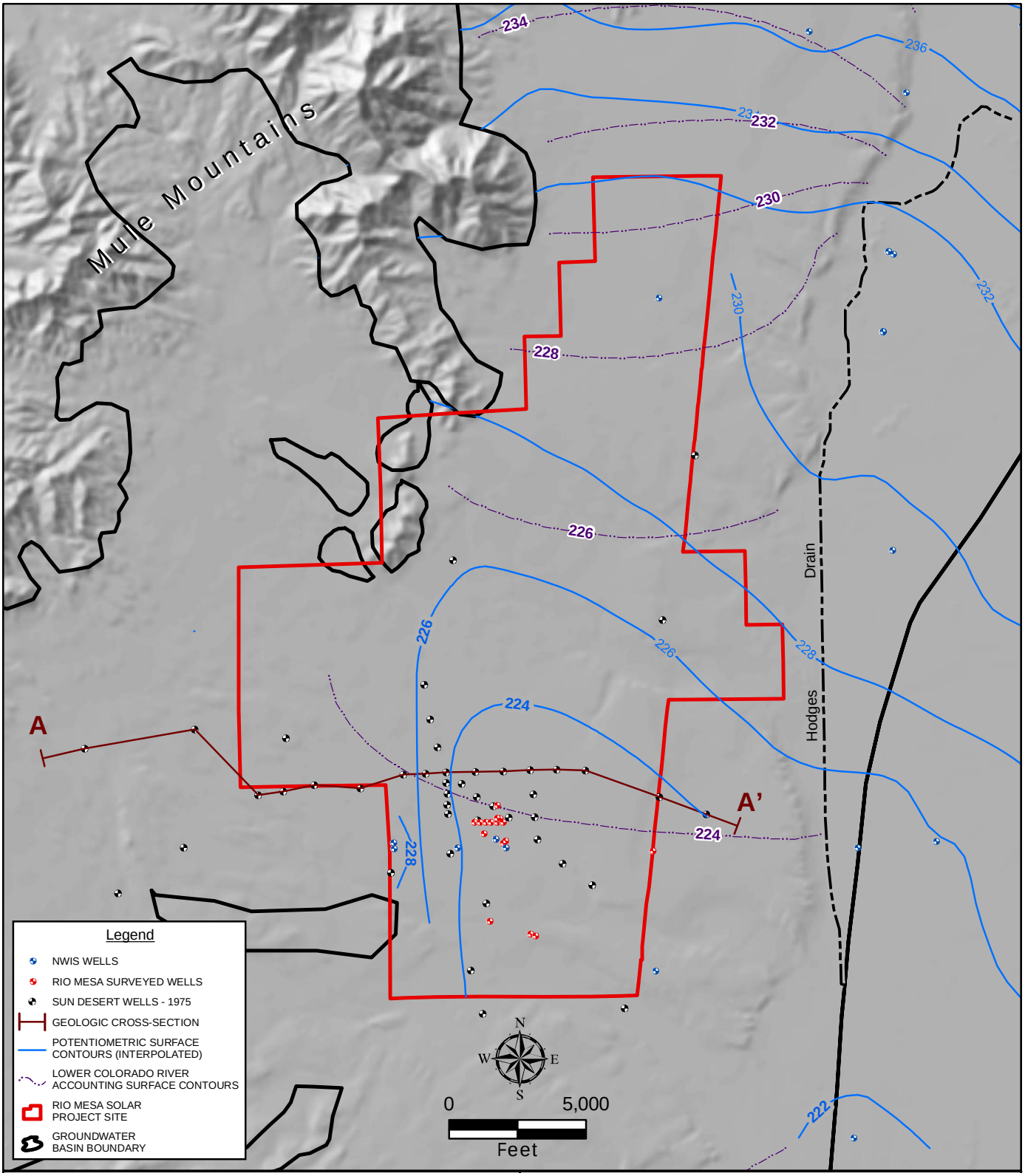


SOURCES: WORLEY PARSONS

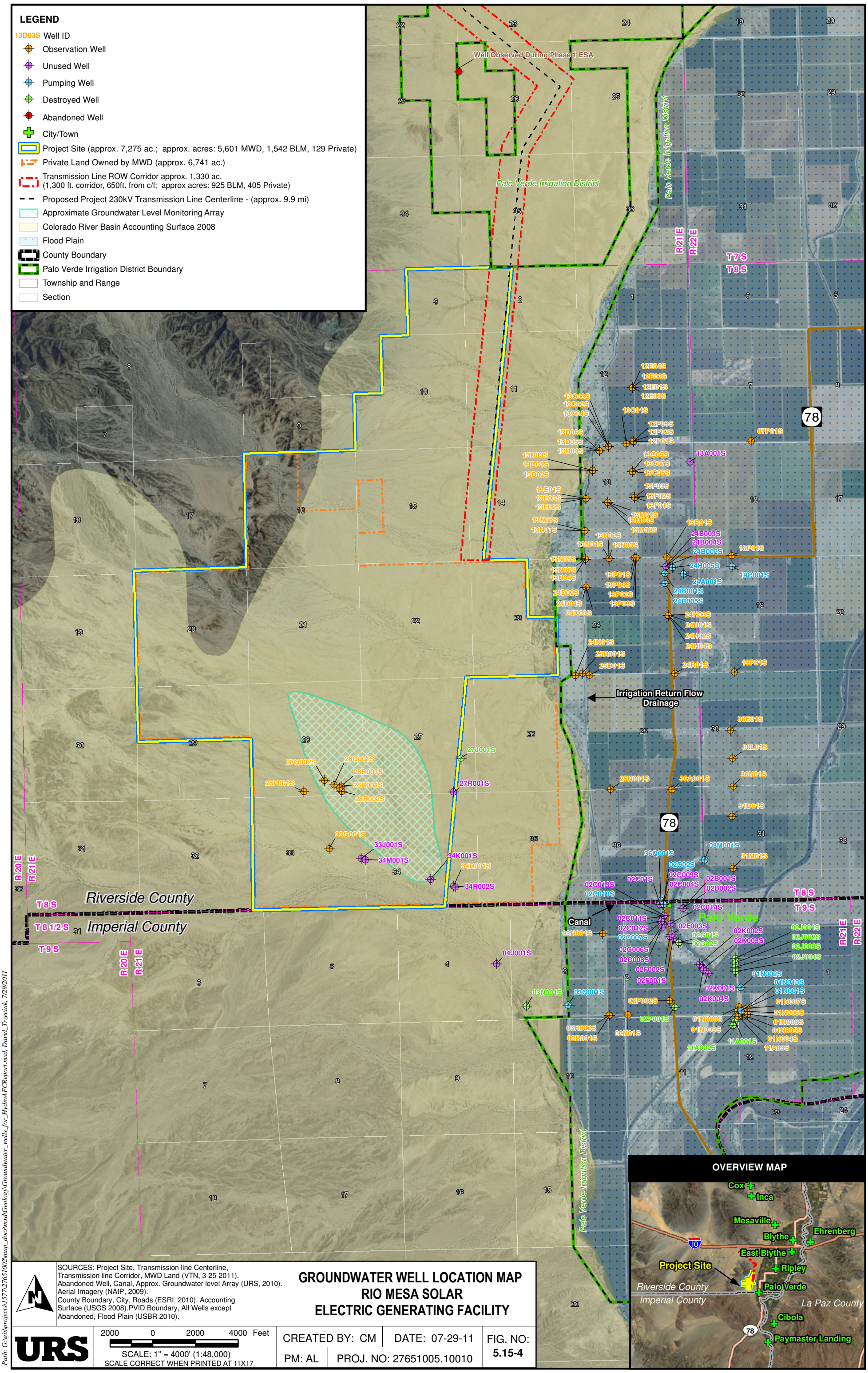
GROUNDWATER TABLE CONTOUR MAP
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

NOT TO SCALE

CREATED BY: PM	DATE: 09-15-11	FIG. NO:
PM: AL	PROJ. NO: 27651006.50505	5.13-3

G:\gis\projects\1577\27651002\graphics\ai\groundwater contours.ai, 09/15/11, paul_moreno



SOURCES: Project Site, Transmission line Centerline, Transmission line Corridor, MWD Land (VTN, 3-25-2011). Abandoned Well, Canal, Approx. Groundwater level Array (URS, 2010). Aerial Imagery (NAIP, 2009). County Boundary, City, Roads (ESRI, 2010). Accounting Surface (USGS 2008).PVID Boundary, All Wells except Abandoned, Flood Plain (USBR 2010).

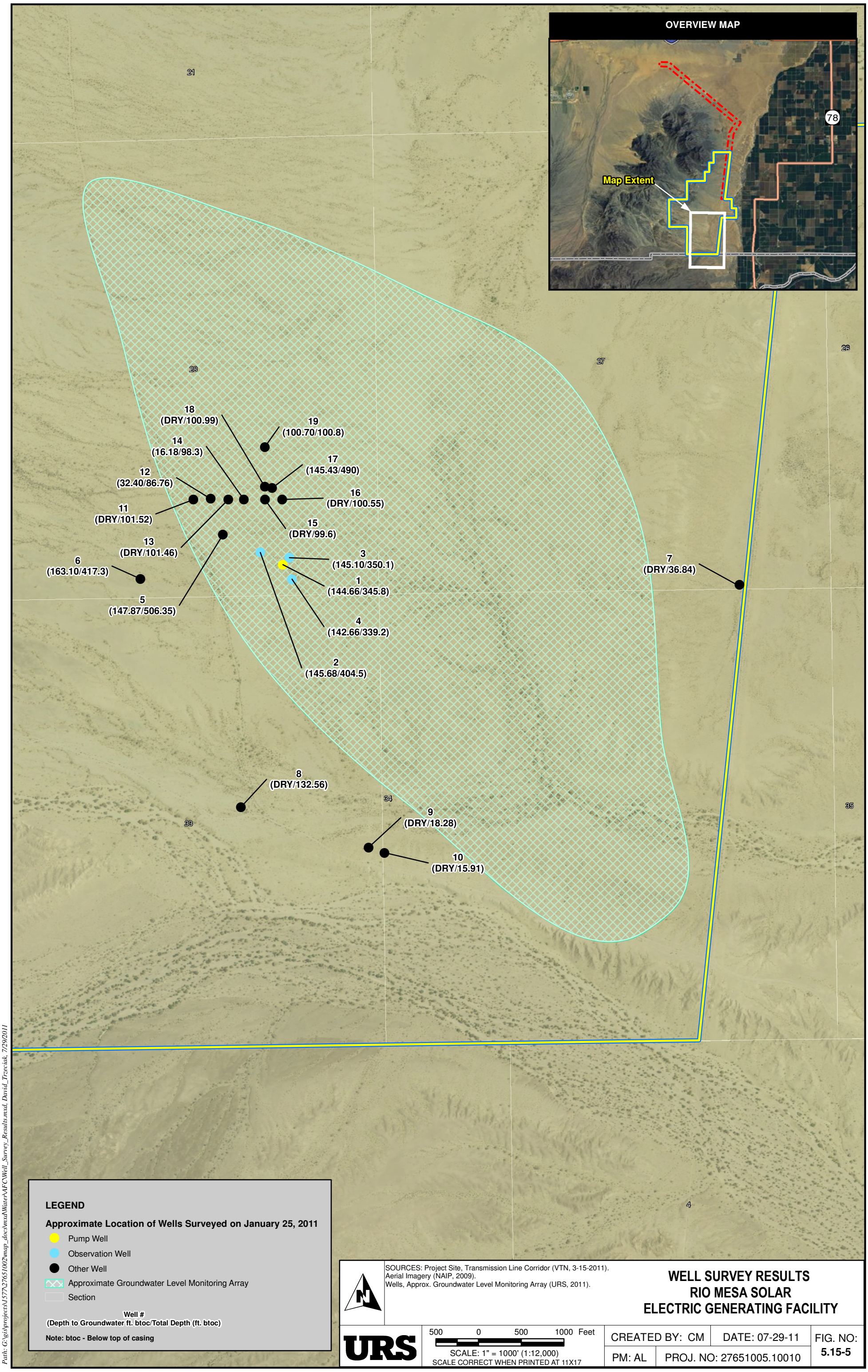
GROUNDWATER WELL LOCATION MAP
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 07-29-11	FIG. NO:
PM: AL	PROJ. NO: 27651005.10010	5.15-4

Path: G:\gis\projects\157\27651002\map_docs\mxd\Geology\Groundwater_wells_for_HydroAFCReport.mxd, David_Trzeciak, 7/29/2011



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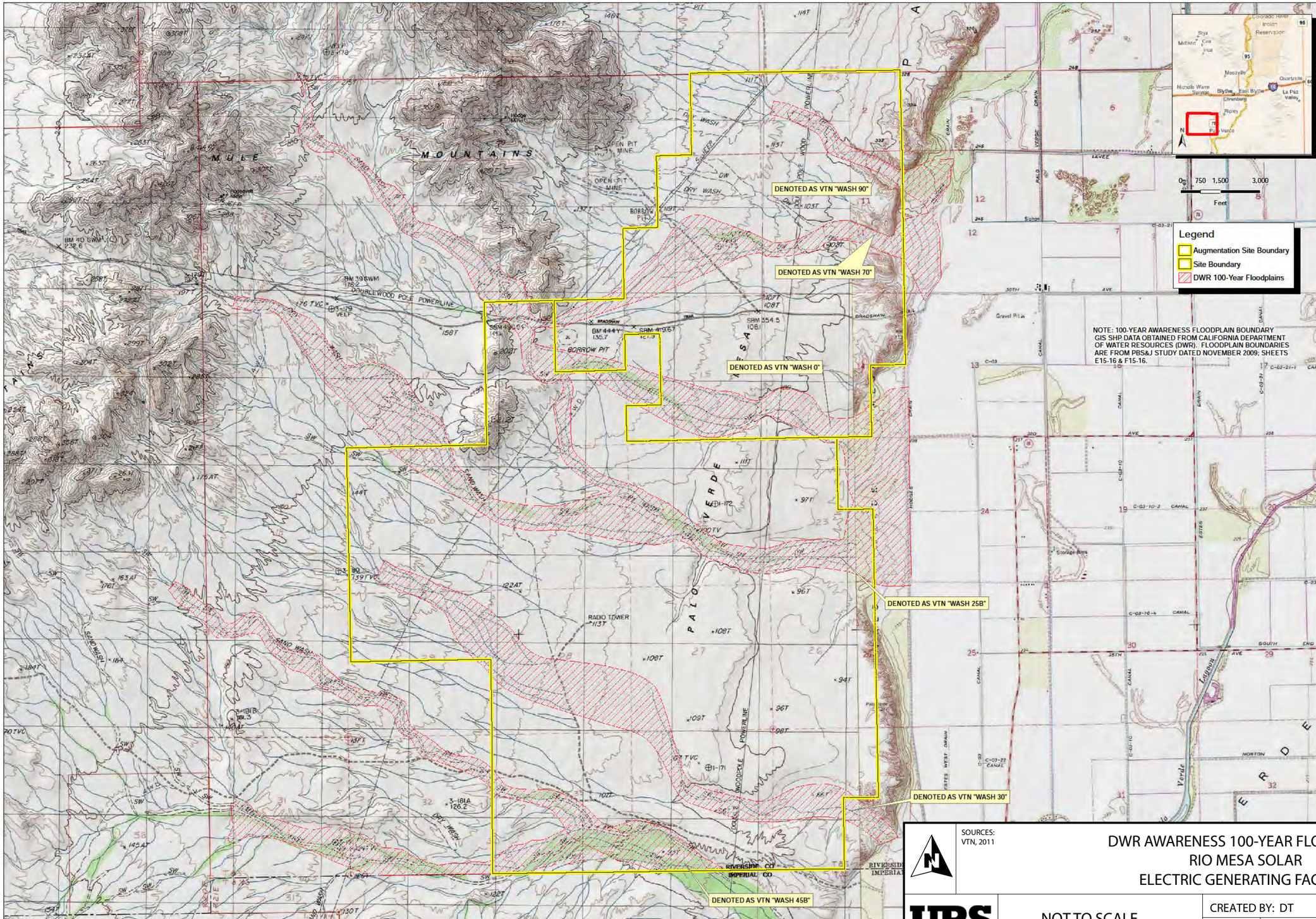


REV	DATE	BY	REVISION
1	6/13/11	RV	Fig. rev. to depict new augmentation area parcel.

RIVERSIDE COUNTY, CA

BrightSource

vtn

DWR 100-YEAR AWARENESS FLOODPLAIN MAP

RIO MESA SOLAR

SOURCES:
VTN, 2011

DWR AWARENESS 100-YEAR FLOODPLAIN
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

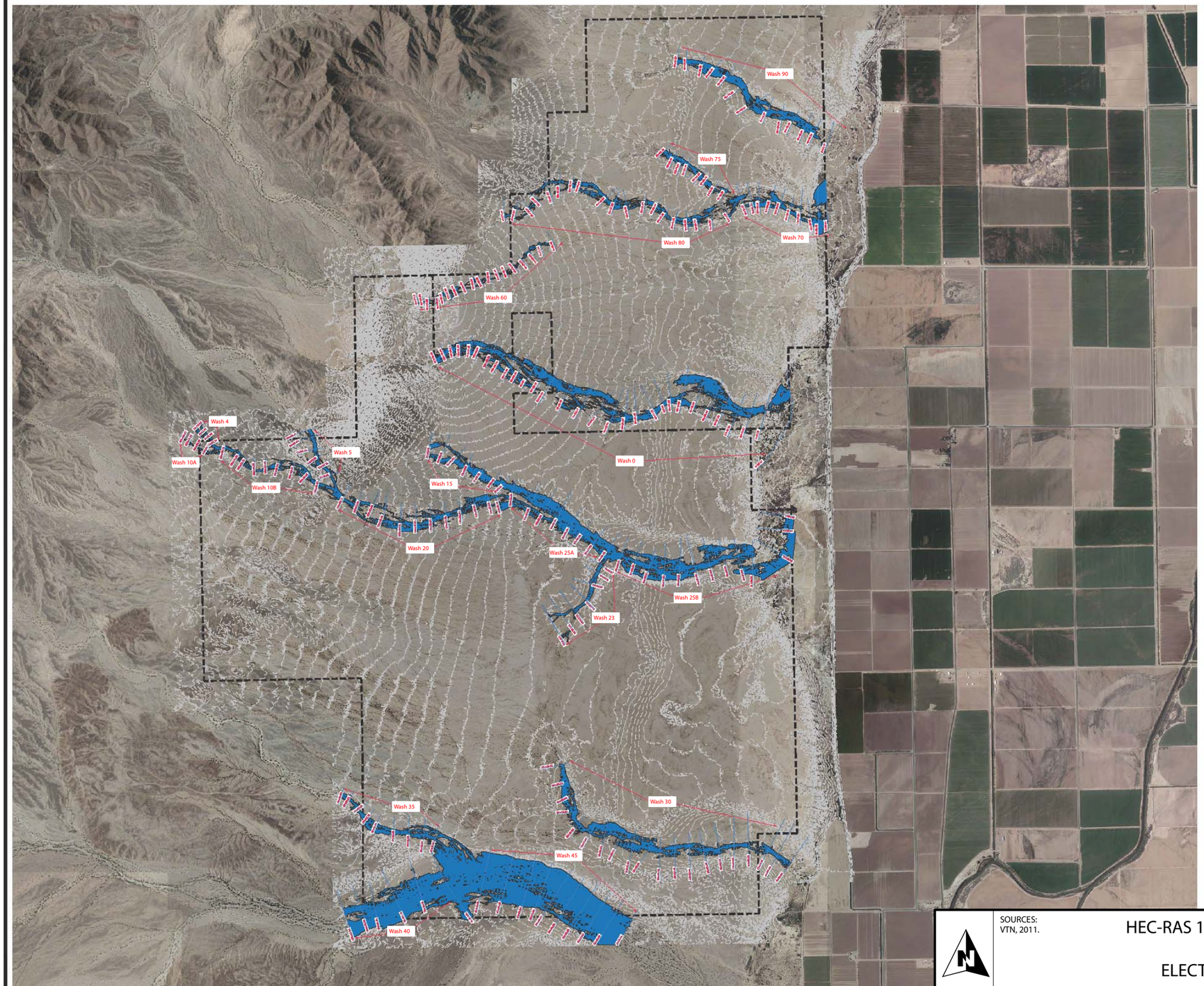
NOT TO SCALE

CREATED BY: DT | DATE: 09-15-11

PM: AL | PROJ. NO: 27651006.50505

FIG. NO: 5.15-6

Path: C:\Users\david_trzeciak\Desktop\Illustrator\DWR100year.mxd, David Trzeciak, 7/29/2011, 4:08:18 PM



GRAPHIC SCALE

1500 0 750 1500 3000

1" = 1500'

MAGNETIC

LEGENDS

- SITE BOUNDARY
- 1+00.00 HEC-RAS RIVER CROSS SECTIONS
- WATER SURFACE EXTEND
- 5' CONTOUR

REV.	DATE	BY	REVISION

BRIGHTSOURCE ENERGY

RIO MESA SOLAR
HEC-RAS EXHIBIT (100 YR)

VTN
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2827 WEB WWW.VTNFN.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

DRAWN BY: WT
DESIGNED BY:
CHECKED BY:
PROJECT NO: 7303
SCALE: HORIZ. VERT.

SOURCES:
VTN, 2011.

HEC-RAS 100-YEAR EXHIBIT (EXISTING CONDITIONS)
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

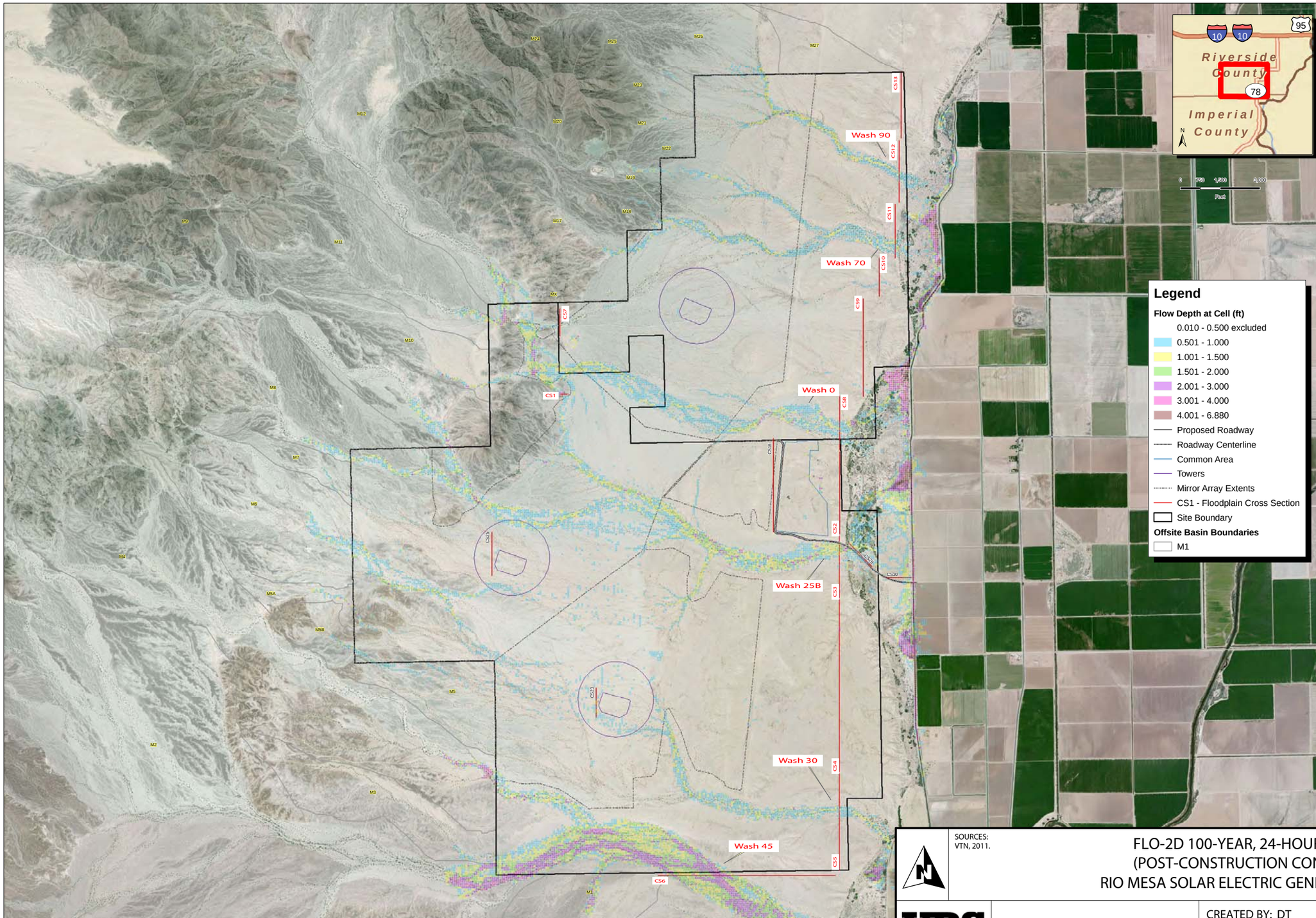
URS

NOT TO SCALE

CREATED BY: DT | DDATE: 09-15-11
PM: AL | PROJ. NO: 27651006.50505

FIG. NO: 5.15-7

Path: C:\Users\david.trzeciak\Desktop\Illustrator\100year.mxd, David Trzeciak, 7/29/2011, 4:26:36 PM



REVISION | BY | DATE | REV.

RIVERSIDE COUNTY, CA

BrightSource

vtn

2377 S. Rainbow Boulevard
Las Vegas, NV 89146
Tel (702) 362-2000
Fax (702) 362-2007
www.vtnnv.com

FLO-2D DEPTH MAP
24HR-100YR
DEVELOPED CONDITION

RIO MESA SOLAR

SOURCES:
VTN, 2011.

FLO-2D 100-YEAR, 24-HOUR EXHIBIT
(POST-CONSTRUCTION CONDITIONS)
RIO MESA SOLAR ELECTRIC GENERATING FACILITY

URS

NOT TO SCALE

CREATED BY: DT | DDATE: 09-15-11

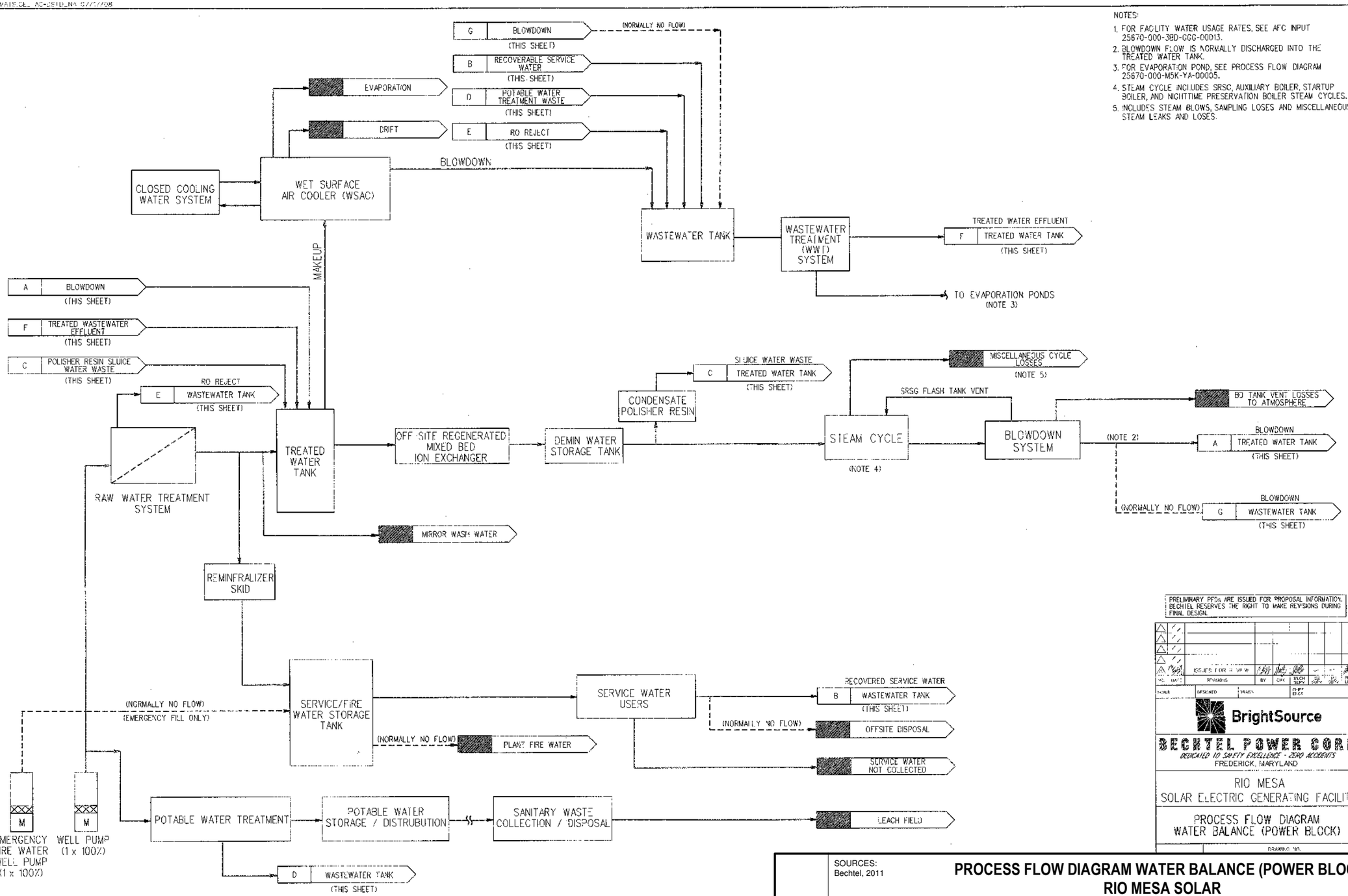
PM: AL | PROJ. NO: 27651006.50505

FIG. NO: 5.15-8

G:\gis\projects\1577\27651002\graphics\ai\5.15-8 FLO 2D.ai, 09/15/11, paul_moreno

NOTES:

1. FOR FACILITY WATER USAGE RATES, SEE AFC INPUT 25670-000-38D-GGG-00013.
2. BLOWDOWN FLOW IS NORMALLY DISCHARGED INTO THE TREATED WATER TANK.
3. FOR EVAPORATION POND, SEE PROCESS FLOW DIAGRAM 25670-000-M5K-YA-00005.
4. STEAM CYCLE INCLUDES SRSG, AUXILIARY BOILER, STARTUP BOILER, AND NIGHTTIME PRESERVATION BOILER STEAM CYCLES.
5. INCLUDES STEAM BLOWS, SAMPLING LOSES AND MISCELLANEOUS STEAM LEAKS AND LOSES.



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NO.	DATE	REMARKS	BY	CHK	ENGR SUPV	CHIEF ENGR	PROJ ENGR
1		ISSUED FOR REVIEW					

DESIGNED DRAWN CHIEF ENGR

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FREDERICK, MARYLAND

RIO MESA
SOLAR ELECTRIC GENERATING FACILITY

PROCESS FLOW DIAGRAM
WATER BALANCE (POWER BLOCK)

DRAWING NO.

SOURCES:
Bechtel, 2011

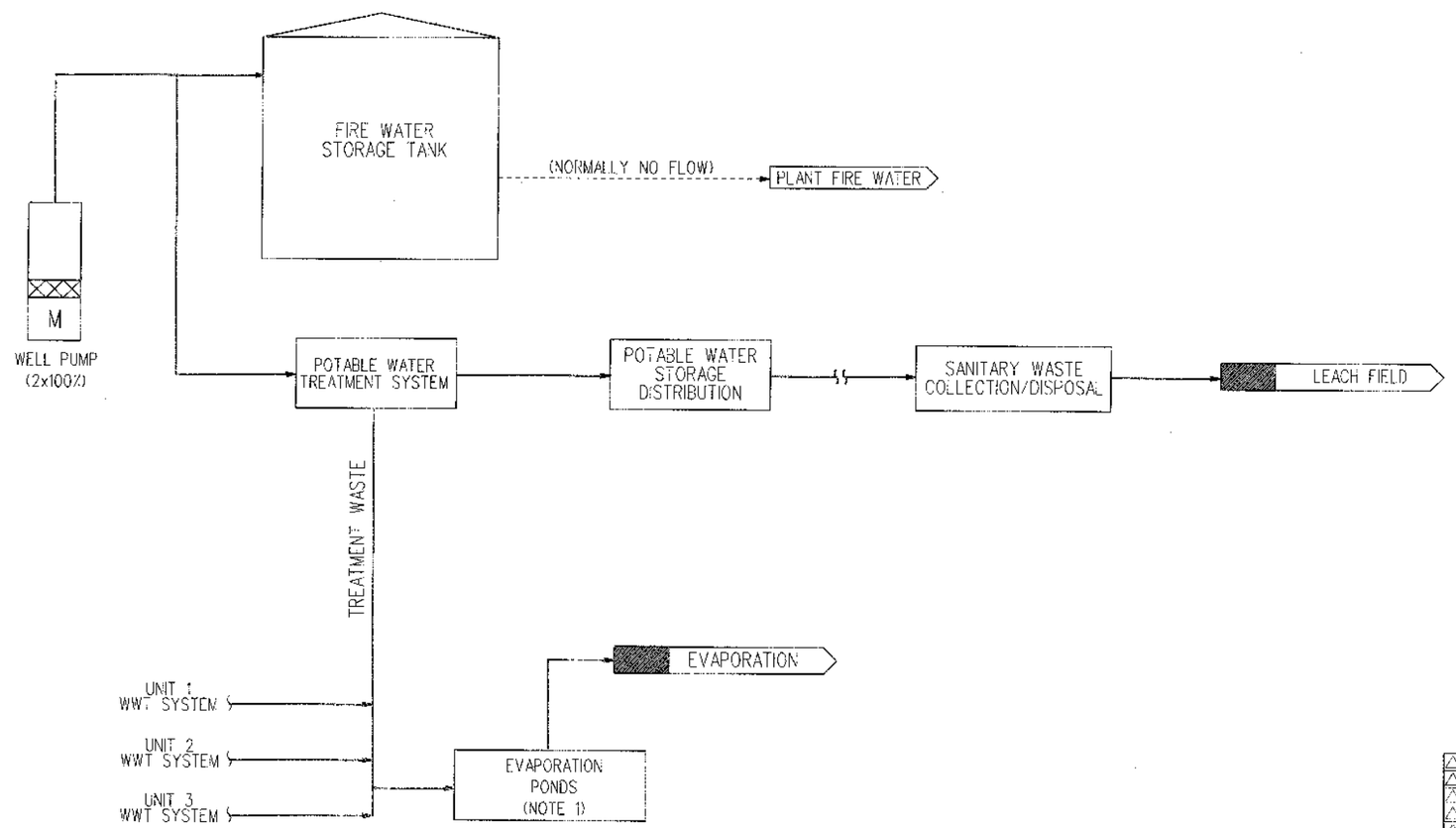
PROCESS FLOW DIAGRAM WATER BALANCE (POWER BLOCK)
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

CREATED BY: DT	DATE: 07-29-11	FIG. NO:
PM: AL	PROJ. NO: 27651006.50505	5.15-9

Path: C:\Users\david.traczia\Desktop\Illustrator\PowerBlockFlowDiagram.mxd, David Traczia, 8/3/2011, 11:34:02 AM

NOTES:
1. FOR WASTEWATER CONCENTRATE FROM EACH UNIT, SEE PROCESS FLOW DIAGRAM 25670-000-M5K-YA-00004.
2. FOR FACILITY WATER USAGE RATES, SEE AFC INPUT 25670-000-3BD-GGG-00013.



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NO.	DATE	REVISIONS	BY	CHK	PROJ SUPV	CS SUPV	TM MGR	PROJ ENGR
		ISSUED FOR REVIEW						

SCALE | DESIGNED | DRAWN | CHIEF ENGR

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RIO MESA
SOLAR ELECTRIC GENERATING FACILITY

SOURCES:
Bechtel, 2011

PROCESS FLOW DIAGRAM WATER BALANCE (COMMON AREA)
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

CREATED BY: DT	DATE: 07-29-11	FIG. NO:
PM: AL	PROJ. NO: 27651006.50505	5.15-10

Path: C:\Users\david.trzeciak\Desktop\Illustrator\CommonAreaFlowDiagram.mxd, David_Trzeciak, 8/8/2011, 11:38:38 AM
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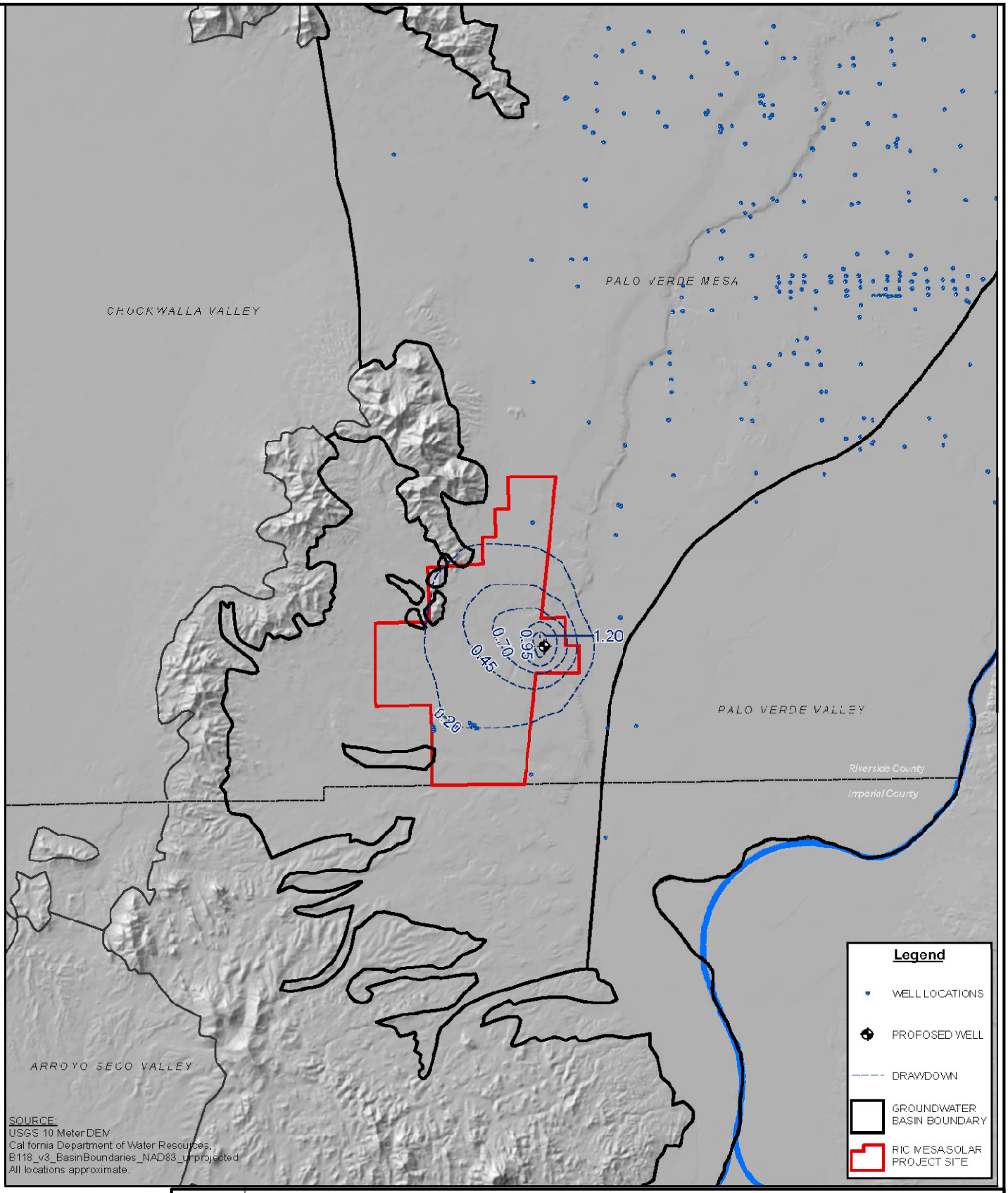

SOURCES:
Worley Parsons, 2011

DRAWDOWN CONTOUR MAP
YEAR 31 AT END OF RMS PUMPING

URS	NOT TO SCALE	CREATED BY: PM	DATE: 10/3/2011	FIG. NO: 5.15-11
		PM: XX	PROJ. NO: 27651006.50505	

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