

Appendix J

Hydrology and Water Quality

Appendix J1, Hydrology and Water Quality
Technical Report for the Little Bear Solar Project

Appendix J2, Water Supply Assessment for Little
Bear Solar Project

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the Little Bear Solar Project Pursuant to
Requirements of Fresno County Solar Facility
Guidelines

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Appendix J1

Hydrology and Water Quality Technical Report for the Little Bear Solar Project

**HYDROLOGY AND WATER QUALITY
TECHNICAL REPORT
for the
Little Bear Solar Project
Mendota, California**

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A Fresno County Basin Design Standards

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1 INTRODUCTION

1.1 Scope and Purpose

This preliminary Hydrology and Water Quality Technical Report (Study) was prepared for the Little Bear Solar Project (Project) in support of the Environmental Impact Report (EIR) and in accordance with the 1966 Fresno County Improvement Standards (FCIS; County of Fresno 1966). The purpose of this Study is to identify hydrology and water quality impacts of the Project and to describe best management practices (BMPs) required for mitigating potential short and long term hydrology and water quality impacts. This Study uses the Rational Method, as defined by the FCIS, to quantify the peak-discharge for pre- and post-development conditions for the 5-year, 10-year and 100-year storm events. In addition, the Project is evaluated in the context of water quality standards contained in the Tulare Lake Water Pollution Control Plans (Basin Plan) (Central Valley RWQCB 2016).

This Study is based on Project plans and specifications that are preliminary in nature and not approved for construction purposes. As such, contractors shall refer to the final approved construction documents, which will be developed as the Project plans are finalized. Because preliminary construction plans were used for the hydrological calculations, this Study provides a general estimate of the hydrological conditions which are likely to exist at the Project location following construction completion. The results of hydrologic modeling herein are based on 8.46 acres of impervious surfaces proposed on site (or a change in site imperviousness from 0.01% to 0.94%).

1.2 Project Location

The Project site is located in the San Joaquin Valley, approximately 2.5 miles southwest of the City of Mendota. From Interstate 5 (I-5), the Project is approximately 13 miles east, and is situated immediately west of State Route 33 (SR-33). This area is in the western portion of the San Joaquin Valley, in unincorporated Fresno County, Sections 13 and 14, Township 14 South, Range 14 East, Mount Diablo Base and Meridian (MDBM). Specifically, the Project site is bounded by West California Avenue to the north, West Jensen Avenue to the south, San Bernardino Avenue to the west, and SR-33 to the east.

The Project area currently consists of eight cultivated fields (agricultural units) which are separated by unpaved access roads. Figure 1-1 presents the location of the proposed Project from a regional perspective.

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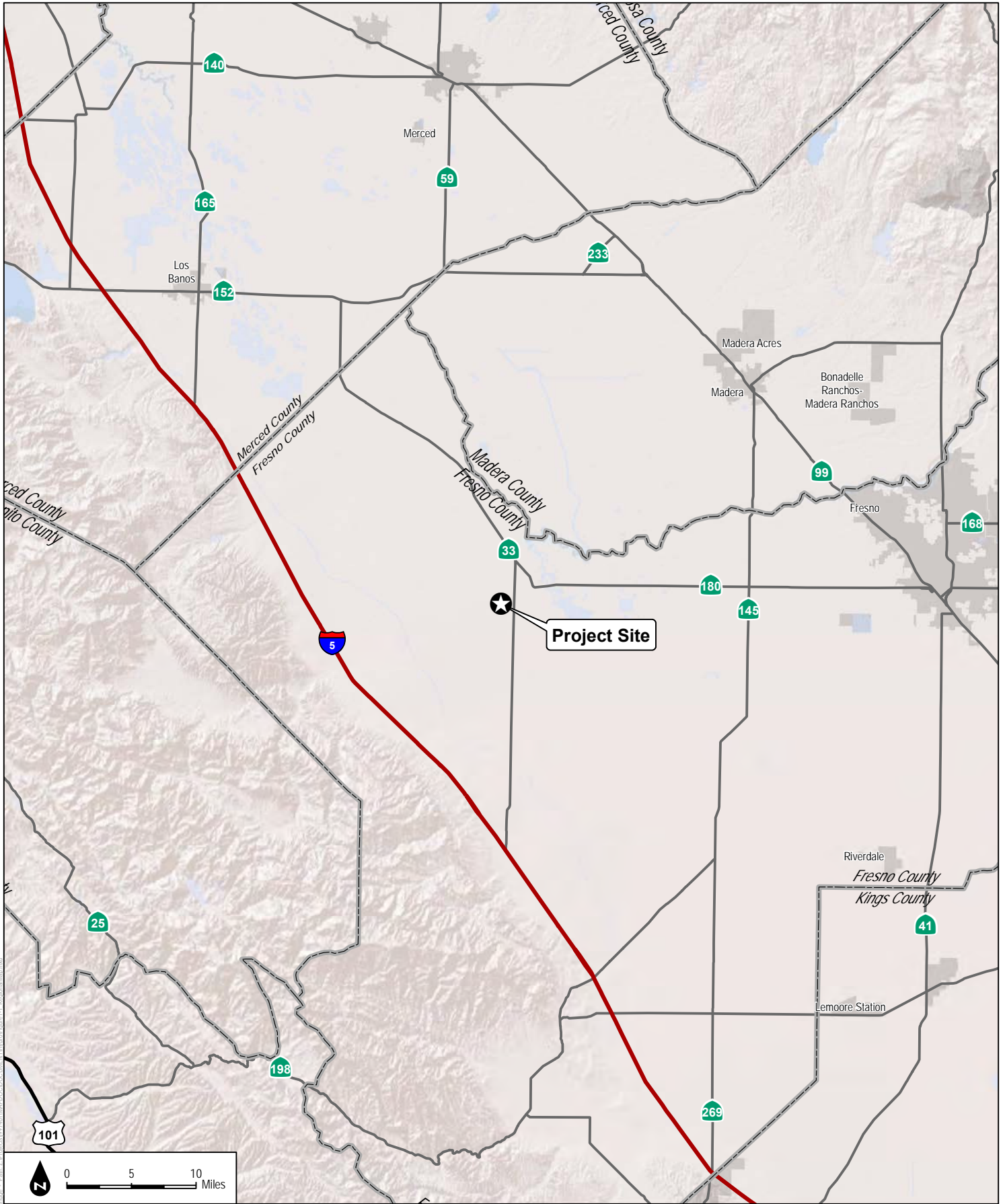
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1.3 Project Description and Activity

The Project will develop a solar photovoltaic (PV) power generating farm (solar PV farm) on approximately 1,288 acres of private agricultural lands in western Fresno County. The solar PV farm will consist of five individually operating facilities, which will range in size, from approximately 161 to 322 acres. These five facilities comprise the Project site and are referred to by their individual Facility names (Figure 1-2). The individual facilities include Little Bear 1 (322-acres), Little Bear 3 (161-acres), Little Bear 4 (322-acres), Little Bear 5 (322-acres), and Little Bear 6 (161-acres) (there is no Little Bear 2).

Each facility will consist of modular photovoltaic solar panels on single-axis or fixed-tilt trackers, direct current to alternating current power inverters mounted on concrete pads, three-phase transformers mounted on concrete pads, and detention basins designed for capturing stormwater generated within the Project site. The location and sizing of proposed detention basins are addressed in Section 6.2. A substation and control/administration building with parking lot are proposed in the Little Bear 1 facility. The Project may also include as many as 5 Energy Storage Systems (ESS). Each ESS would require 1 acre for self-contained battery storage modules placed in racks, converters, switchboards, integrated heating, ventilation and air conditioning (HVAC) units, inverters, transformers, and controls in prefabricated metal containers or buildings.

Upon completion (as presently designed) the Project's solar PV facilities will produce approximately 180 megawatts AC (MWac) of electricity during daylight hours when electricity demand is highest. The power generated from the Project will be connected to PG&E's Mendota Substation approximately 1.8 miles west of the Project's northwest corner. The existing generation tie-line between the North Star Solar Project Substation and the PG&E's Mendota Substation will be shared, where possible, with the expectation that some additional transmission poles will be required in this corridor.



SOURCE: ESRI Basemaps

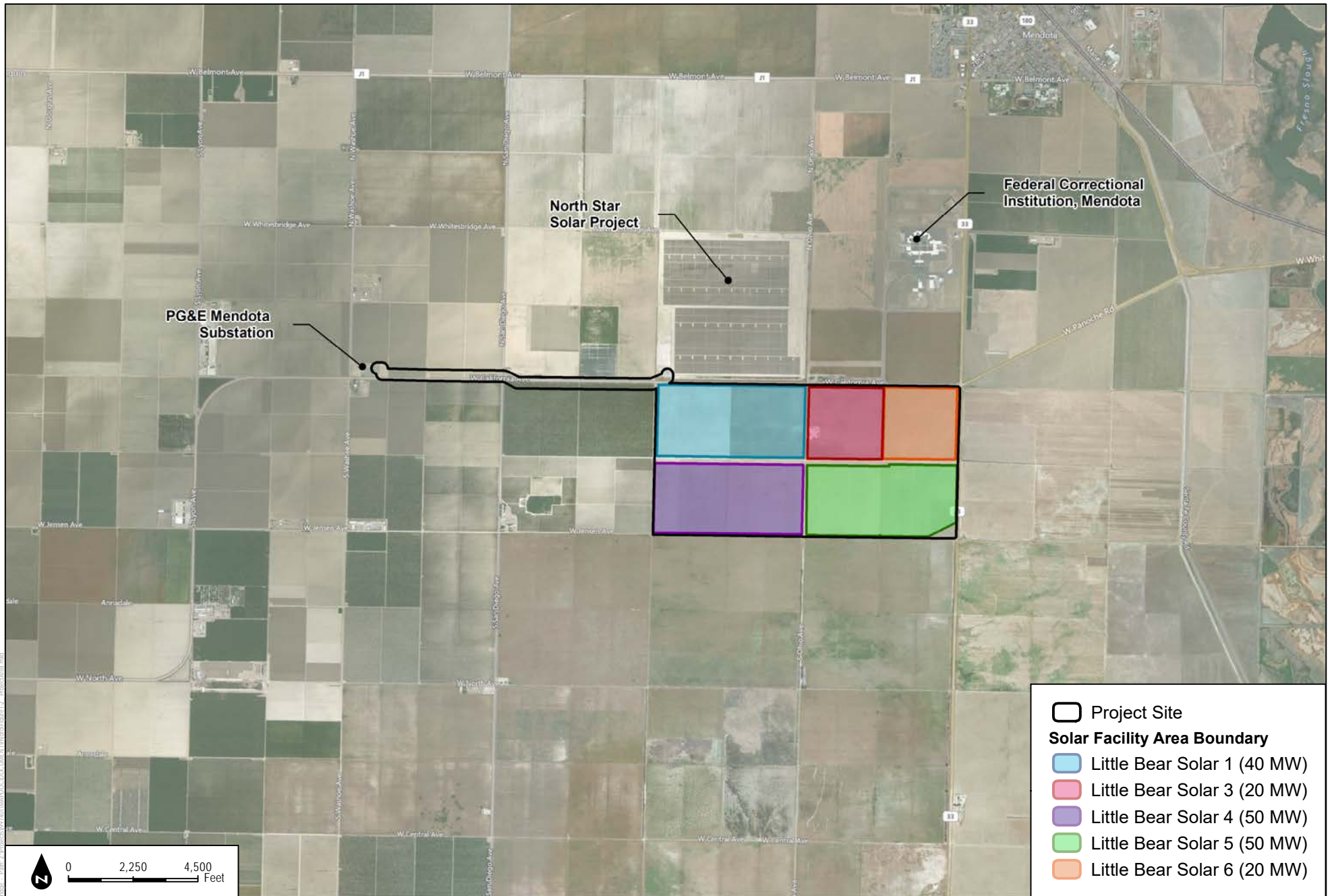


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FIGURE 1-1
Regional Location

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-  Project Site
- Solar Facility Area Boundary**
-  Little Bear Solar 1 (40 MW)
-  Little Bear Solar 3 (20 MW)
-  Little Bear Solar 4 (50 MW)
-  Little Bear Solar 5 (50 MW)
-  Little Bear Solar 6 (20 MW)

FIGURE 1-2
Project Vicinity

0 2,250 4,500 Feet

SOURCE: Bing Maps (Accessed 2017)



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Hydrology and Water Quality Technical Report Little Bear Solar Project

2 HYDROLOGIC SETTING

This section describes the Project’s local and regional hydrologic characteristics, as well as receiving waterbody beneficial uses and general water quality conditions.

2.1 Project Hydrologic Characteristics

The Project site falls within the Huron hydrologic subarea (HAS) of the Westlands hydrologic area (HA) located within the South Valley Floor hydrologic unit (HU) in the Tulare Lake Basin (Table 2-1). The HU, HA and HSA information presented in Table 2-1 was obtained from the California Interagency Watershed Map (Calwater 2.2.1, 2004).

**Table 2-1
Project Hydrologic Characteristics**

Hydrologic Unit (HU)	Hydrologic Area (HA)	Hydrologic Subarea (HSA)
South Valley Floor (551.00)	Westlands (551.10)	Huron (551.11)

Source: California Interagency Watershed Map (Calwater 2.2.1, 2004)

Figure 2-1 shows the location of the proposed project with reference to the Huron HSA. A comparison of the proposed project area with respect to the acreage of the Huron HSA is presented in Table 2-2. The proposed project area is approximately 0.22 percent of the area encompassed by the affected hydrologic subarea.

**Table 2-2
Project Contribution to Hydrologic Subarea**

Watershed	Area (Acres)	Approximate Proposed Project Area (Acres)	Estimated Project Contribution (Percent)
Huron (551.11)	589,961	1288	0.22%

Source: California Interagency Watershed Map (Calwater 2.2.1, 2004)

The region is characterized by low average annual rainfall (~12 inches), high rates evapotranspiration, and nearly flat land. During rainfall events with sufficient intensity and/or duration to produce overland flow, runoff pools in low-lying areas or is collected and conveyed along shallow roadside depressions to the nearest ditch or drain. Stormwater drainage infrastructure in the Project area is limited to pipe culverts that cross main roads. Surface flow generated from the Project area flows east-northeast through roadside swales which receive runoff from adjacent agricultural plots, and ultimately discharges into the Fresno Slough located approximately 3 miles east of the Project’s eastern boundary. The Fresno Slough functions as both a distributary of the Kings River, which is located over 30 miles to the southeast, as well as

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a southerly conveyance of irrigation water from the Mendota Pool (located about 4.5 miles to the north-northeast). During the irrigation season, water is directed south from the San Joaquin River at the Mendota Pools towards the Kings River through a series of irrigation control structures (pumps, canals). Only under exceptional circumstances (i.e., when the Kings River is at flood stage) does water flow north through the Fresno Slough to the San Joaquin River. Because of the Fresno Slough's flat topography and topographic position between two major river systems (i.e., the Kings River and San Joaquin River), water can flow in both directions but rarely flows north.

Prior to discharging to the Fresno Slough, surface flow passes over the San Luis Drain through a culvert along West Panoche Road approximately 1.5 miles east of the Project. This drainage feature was engineered to receive subsurface flows from the surrounding agricultural fields while precluding the discharge of surface flows into it, and conveying them to the Sacramento-San Joaquin Bay Delta. Due to high concentrations of selenium in the agricultural discharge, this use of this drainage feature was discontinued in 1985 and the system was closed to the Delta (U.S. Bureau of Reclamation 2012).

2.2 Floodplain

Federal Emergency Management Agency (FEMA) Fire Insurance Rate Maps (FIRMs) identify flood zones and areas that are susceptible to 100-year and 500-year floods. As shown on FEMA FIRM panel 06019C1985H, the proposed Project is not located within a FEMA Special Flood Hazard Area, which includes all types of 100-year flood zones such as floodways and shallow flooding (i.e., Zone A, AE, AH, AO, AR, A99, V or VE). Furthermore, the Project is specifically identified as being outside a 500-year flood zone (i.e., unshaded Zone X). The 100-year flood zone is depicted in Figure 2-1.

2.3 Groundwater

A groundwater basin is defined by the California Department of Water Resources (DWR) as a hydrogeologic unit containing one large aquifer, or a series of stacked aquifers, with definitive lateral and horizontal boundaries (California DWR 2003). California's Central Valley is characterized by one large aquifer composed of numerous smaller interconnected groundwater basins and subbasins. The proposed project is located within the approximately 640,500 acre Westside Subbasin (5-22.09), within the larger San Joaquin Valley Groundwater Basin (5-22) (approximately 8,871,000 acres) as defined by the DWR Bulletin 118 (California DWR 2006). A summary of the upper and lower Westside Subbasin Aquifers is provided in Table 2-3.

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Table 2-3
Westside Subbasin Summary

Aquifer	Description	Thickness
Upper Aquifer	Unconfined to Semi-Confined zone consisting of mixed-age alluvium and some Tulare Formation above Corcoran Clay layer.	Between 500 and 850 feet
Lower Aquifer	Confined zone with some Tulare Formation and potentially part of the San Joaquin Formation. Freshwater present in uppermost sections of this aquifer, underlain by brackish/saline water.	Not Defined

Seven groundwater wells were identified on the Project site using the State Water Resources Control Board Geotracker GAMA groundwater information online database. Records for 6 of the 7 wells only contained water quality data for the years between 1943 and 1966. One well located at the southwest corner of the Project site provides current groundwater depth data for the past ten years. The 10-year historical groundwater elevation data at this site shows that water levels have generally declined since 2006. While groundwater elevation fluctuates based on annual hydrologic conditions and groundwater pumping, the depth to groundwater has increased by approximately 149 ft. below ground surface (BGS) since 2006. While modest elevation gains were recorded between 2009 and 2011 (63 ft.), and again between 2015 and 2016 (7 ft.), the depth to groundwater has remained at approximately 300 ft. BGS between 2014 and 2016.

Based on a comprehensive soil suitability analysis conducted by the University of California, Davis (UC Davis 2015), the majority of the site is considered to have ‘very poor’ suitability for groundwater recharge. Sections of the Little Bear 1 facility are shown to have ‘moderately poor’ to ‘moderately good’ suitability for groundwater recharge. Due to the small average annual precipitation (12 in.), the depth to water (300 ft.), and a high average annual evapotranspiration demand (58 in; CIMIS 1999), groundwater recharge through infiltration at this Project site is unlikely, and would only occur during abnormally wet seasons.

2.4 Beneficial Uses for Surface Water and Groundwater

The Central Valley RWQCB implements the *Water Quality Control Plan for the Tulare Lake Basin* (Central Valley RWQCB 2016), which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan (California Water Code Sections 13240–13247). The Basin Plan provides quantitative and narrative criteria for a range of water quality constituents applicable to certain receiving water bodies and groundwater basins within the Tulare Lake Basin. Specific criteria are provided for the larger, designated water bodies within the region, as well as general

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criteria or guidelines for surface and groundwater. In general, the narrative criteria require that degradation of water quality does not occur due to increases in pollutant loads that will adversely affect the designated beneficial uses of a water body. Surface waters and groundwaters within the Huron Subarea (551.11) and Westside Subbasin (5-22.09) have been assigned the following beneficial uses in the Tulare Lake Basin Plan as show in Table 2-4.

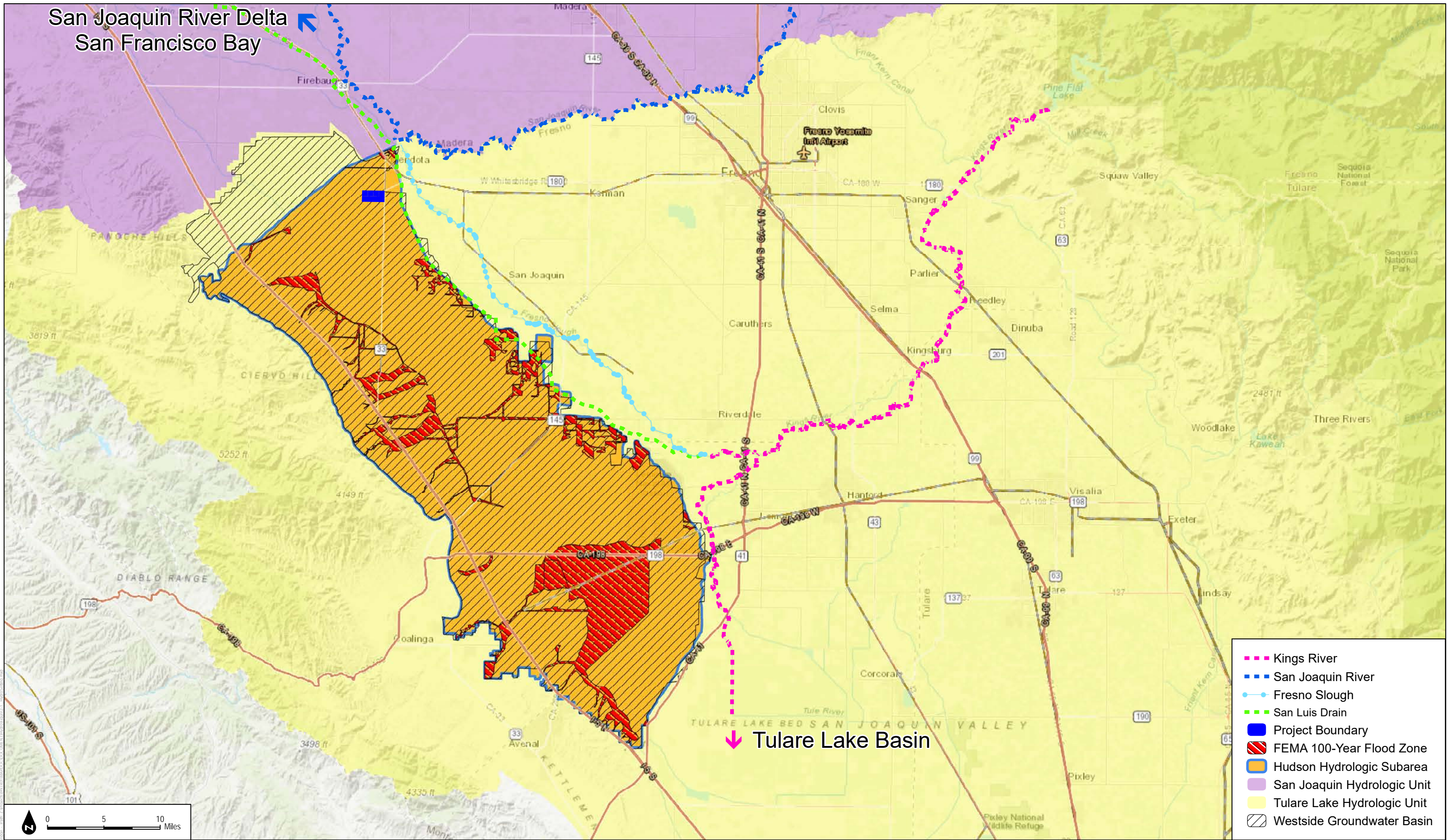
**Table 2-4
Beneficial Uses for Surface Waters and Groundwaters**

Surface Water and Groundwater Body	Hydrologic Unit Basin Number	Beneficial Use								
		<i>MUN</i>	<i>AGR</i>	<i>IND</i>	<i>PRO</i>	<i>REC1</i>	<i>REC2</i>	<i>WARM</i>	<i>WILD</i>	<i>RARE</i>
Westlands (Surface Water)	551.1		●	●	●	●	●		●	●
Westside (Groundwater)	5-22.09	●	●	●						

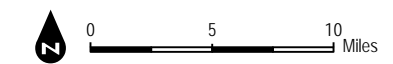
Source: Tulare Lake Basin Plan (Central Valley RWQCB 2016)

Notes:

- = Existing Beneficial Uses



- ◆◆◆ Kings River
- ◆◆◆ San Joaquin River
- ◆◆◆ Fresno Slough
- ◆◆◆ San Luis Drain
- Project Boundary
- ▨ FEMA 100-Year Flood Zone
- ▨ Hudson Hydrologic Subarea
- San Joaquin Hydrologic Unit
- Tulare Lake Hydrologic Unit
- ▨ Westside Groundwater Basin



SOURCE: ESRI World Imagery (2016); CalWater 2.2.1 (2004); FEMA (2016); USGS NHD (2016)

FIGURE 2-1

Little Bear Hydrologic Setting



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The beneficial uses identified in Table 2-4 for the Westlands surface water bodies and the Westside groundwater body are defined below:

- **Municipal and Domestic Supply (MUN)** – Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- **Agricultural Supply (AGR)** – Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- **Industrial Service Supply (IND)** – Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
- **Industrial Process Supply (PRO)** – Includes uses of water for industrial activities that depend primarily on water quality.
- **Contact Water Recreation (REC-1)** – Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.
- **Non-contact Water Recreation (REC-2)** – Includes the uses of water for recreational activities involving proximity to water, but not where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
- **Warm Freshwater Habitat (WARM)** – Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates. Includes support for reproduction and early development of warm water fish.
- **Wildlife Habitat (WILD)** – Includes uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- **Rare, Threatened, or Endangered Species (RARE)** – Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

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3 EXISTING DRAINAGE (PRE-DEVELOPMENT CONDITION)

This section provides the pre-development drainage conditions at the Project site. A hydrologic assessment using topography, hydrologic soil groups, and existing land uses evaluated the existing run-on and run-off conditions.

3.1 Existing Topography

Topographic data were derived from a U.S. Geological Survey (USGS) 1/3 arc-second (10 meter) Digital Elevation Model (DEM) (USGS 2013). The Project site has historically been used for agricultural production and ranges in elevation from 180 to 214 feet above mean seal level (MSL). The proposed project primarily slopes towards the east-northeast at an approximate average grade of 0.28 percent. The existing topography of the proximate area of the Project site is presented in Figure 3-1 and includes the topography of the Project area and its contributing watershed.

3.2 Existing Hydrologic Soil Group

Soils are classified by the Natural Resources Conservation Service (NRCS, 2016) into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soil Groups are A, B, C and D. The Hydrologic Soil Groups are defined as follows:

- **Group A.** Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- **Group B.** Soils having a moderate infiltration rate when thoroughly wet. These consist primarily of moderately deep or deep, moderately well-drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- **Group C.** Soils having a slow infiltration rate when thoroughly wet. These consist mostly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- **Group D.** Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist largely of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Group A generally has the smallest runoff potential and group D the greatest.

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The soil at the proposed project site is classified as 76.6 percent group D (clays) and 23.4 percent group C (clay loams) by the NRCS as shown in Figure 3-1.

3.3 Existing Land Use

Though historically irrigated, the Project site no longer has access to irrigation water and now lays fallow in most years. It is occasionally dry-farmed, typically for grain crops such as winter wheat or barley. The Project site is bordered on the north by the North Star Solar Project and the Federal Correctional Institution, Mendota, as well as agricultural uses to the east, west, and south. SR-33 borders the Project site to the east.

3.4 Existing Run-on and Runoff

For the existing conditions, the peak discharge in cubic feet per second (cfs) from the Project's Concentration Point¹ was calculated using the Rational Method (RM) as defined in the 1966 FCIS (County of Fresno 1966). This analysis required the delineation of the entire watershed contributing runoff to the Project's Concentration Point to calculate area (A), and the development of the watershed's rainfall intensity (I) and land cover runoff coefficients (C) values. The development of the RM components, and its results, are provided below.

3.4.1 Project Watershed Delineation

The existing Project watershed was delineated using ArcHydro GIS analyses on the 1/3 arc-second USGS DEM (USGS 2013). This watershed boundary includes the Project area as well as the additional areas identified as contributing run-on to the Project area. The model output of estimated watershed delineation was verified against a site-survey Dudek conducted on 12/9/2016 and was adjusted accordingly.

The majority of stormwater runoff generated at the Project site is contained and/or directed onto adjacent cultivated fields, as the site features slopes less than 0.3 percent. The excess flow which does discharge from the fields travels east/northeast towards the Fresno Slough through a series of shallow drainage ditches. The drainage ditches parallel the larger roads (e.g., California Avenue and State Road 33) which are slightly elevated above the adjacent fields. The Project's Concentration Point is a culvert just south of the northeast corner of the Project which passes underneath State Road 33 and discharges onto the cultivated fields east of the Project. The existing surface hydrology for the Project site and its contributing area are shown in Figure 3-1.

¹ The concentration point is the point at which all flow from the Project area discharges downstream. This point also includes upland flow from areas outside of the Project boundary.

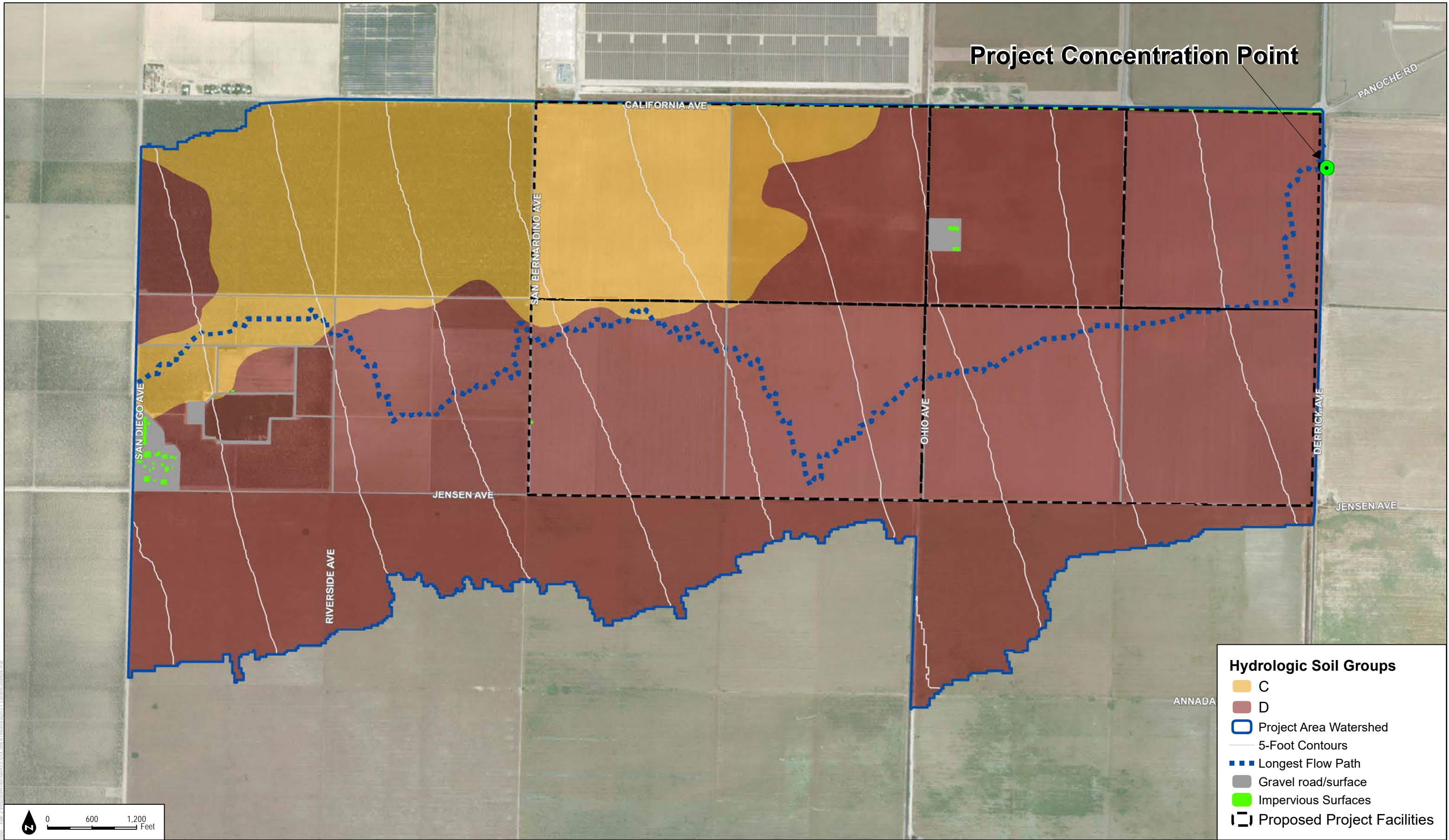


FIGURE 3-1

Little Bear Solar - Existing Conditions

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A brief description of the existing surface drainage provided below:

1. **No distinct discharge points of run-on.** Channels/flow-paths where concentrated flows enter the Project area (run-on) were not identified during the 12/9/2016 site visit. Run-on generated up-gradient from the Project appears to enter the site as sheet flow from adjacent fields. The area contributing run-on to the Project area is defined as follows:
 - a. San Bernardino Avenue (west of Project) and West Jensen Avenue (south of Project) do not have drainage features that would re-route flow from entering the site. Flows generated from the orchard west of the Project or the cultivated fields south of the Project would drain onto the Project area.
 - b. San Diego Avenue is identified as the western limit of the contributing watershed due to its elevation above the surrounding fields. Excess rainfall west of this boundary will be contained within the existing orchards.
 - c. A large detention basin along Ohio Avenue, south of West Jensen Avenue, intercepts flow traveling east/northeast towards Site.
2. **No distinct flow paths through the site.** Runoff generated from the Project area is defined as follows:
 - a. Drainage channels parallel California Avenue and State Road 33 along the northern and eastern perimeter of the Project, but there are no distinct flow paths within the site. The flow path generated using the GIS ArcHydro software meanders across the Project watershed, and is used in the existing conditions hydrology model to replicate flow across the nearly level terrain.

The entire Project watershed comprises 2,403 acres, with 1,115 acres comprising cultivated fields and dirt roads that drain onto the 1,288-acre Project area.

3.4.2 FCIS Rational Method Components

Drainage design specifications established in Section II B of the FCIS (County of Fresno 1966) require that a project's impact to the peak flow at a project's downstream concentration point be determined using the Rational Method. As defined in the FCIS, the Rational Method consists of:

$$Q = CiA$$

Where:

Q is the design discharge in cubic feet per second;

C is the dimensionless runoff coefficient;

i is the design rainfall intensity in inches per hour (in/hr); and

A is the watershed drainage area in acres.

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Area (A)

As identified in Section 3.4.1, the entire watershed area is 2,403 acres. 1,115 acres contribute run-on to the Project area, while the remaining 1,288 acres comprise the Project area.

Rainfall Intensity (*i*)

In order to determine rainfall intensity, the time of concentration (t_c), or the amount of time required for all portions of the watershed to be contributing discharge to the Project's Concentration Point, must be determined. According to the Rational Method, this is the time required to reach peak discharge. The 1966 FCIS protocol require that t_c be determined from Chart H-2 of the FCIS, which utilizes the slope of the watershed and the length of the longest flow path (County of Fresno 1966).

Since the publication of the 1966 FCIS, however, advances in rainfall measurement have allowed for more accurate data. The National Oceanic and Atmospheric Administration (NOAA) maintains an online database for their Atlas 14 precipitation frequency estimates (NOAA Atlas 14; NOAA 2016). This database provides Intensity-Duration-Frequency curves based on latitude and longitude for the entire United States. As rainfall values are reported for discrete hourly time periods, the rainfall intensity for $t_c = 162$ minutes was calculated as a linear interpolation between the values for 120 minutes and 180 minutes. Rainfall Intensities for the Project site, using the more accurate NOAA data, are provided in Table 3-1.

Table 3-1
Rainfall Intensities (in/hr) per NOAA Atlas 14

Rainfall Duration	Rainfall Return Period		
	5-year	10-year	100-year
	Rainfall Intensity (in/hr)		
120 min	0.230	0.273	0.443
180 min	0.188	0.222	0.360
162 min	0.201	0.237	0.385

The rainfall intensities produced by the NOAA Atlas 14 are lower than those produced following the charts in the 1966 FCIS, and are considered more appropriate for a region where surface flows are frequently interrupted in the cultivated fields. Furthermore, an updated set of development standards are currently being reviewed for Fresno County (2016 Public Improvement Standards), and they recommend the use of NOAA Atlas 14 (County of Fresno 2016). For the purpose of this analysis, Rainfall Intensity (I), as determined by NOAA Atlas 14, was used for this Study.

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Runoff Coefficient (C)

FCIS require that the runoff coefficient be determined from Chart H-1 for all undeveloped land, which combines the watershed characteristics of relief, soil, vegetation cover, and surface storage to calculate a total runoff coefficient as the sum of partial factors. As the entire Project watershed consists of low-gradient agricultural operations, only two surface runoff coefficients were developed for the two soils groups that exist on the site: clays (C soils) and clay loams (D soils). Coefficient values assigned to the two soil covers are provided in Table 3-2 below. Vegetative cover was estimated from review of aerial photographs.

Table 3-2
Designation of Runoff Coefficients

Development of Runoff Coefficient from Chart H-1 of the 1966 FCIS					C	D
Relief	.30-.38	.22-.30	.12-.22	.08-.12	0.08	0.08
	Steep 40+% slopes	Hilly 15%-40% slopes	Rolling 6%-15% slopes	Flat < 6% slopes		
Soil	.15-.19	.11-.15	.06-.11	.01-.06	0.13	0.15
	Rock or thin soil with poor infiltration	Soils with fair to poor infiltration	Soils with normal drainage	Well drained soils		
Veg Cover	.15-.19	.11-.15	.06-.11	.04-.06	0.13	0.14
	No effective plant cover	Fair to sparse cover	Good to fair cover	Good to excellent cover		
Surface Storage	.15-.19	.11-.15	.06-.11	.04-.06	0.04	0.04
	No surface storage	Some surface storage	Normal surface storage	Excessive surface storage		
Runoff Coefficients for Areas Covered by C and D Soil (USDA Hydro Soil Class)					0.38	0.41

Chart H-1, however, does not provide runoff coefficients for developed surface coverage (i.e., paved or gravel roads, concrete pads, rooftops). For these values, numbers were provided by the “Basin Capacity Criteria and Design Standards” document provided by County officials (Attachment A). This document provides a range of runoff coefficients for the different surfaces; for this Study the highest coefficients for each surface type were selected. The runoff coefficient for all impervious surfaces is 0.95 (e.g., asphalt, concrete, and roofs), and 0.7 for all gravel roads.

Utilizing these runoff coefficients and the proportional surface areas of pre-development conditions acquired through GIS analysis, the weighted average runoff coefficient for the entire watershed was estimated as 0.410, as shown in Table 3-3.

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**Table 3-3
Project Watershed – Existing Conditions – Weighted Runoff Coefficient**

Surface Coverage	Area (acres)	Runoff Coefficient	% of Total Area	Weighted Runoff
Gravel	41.0	0.7	1.7%	0.012
Impervious	7.3	0.95	0.3%	0.003
C Soils	563.4	0.38	23.4%	0.089
D Soils	1,791.6	0.41	74.5%	0.306
Total	2,403.2			0.410

3.4.3 FCIS Rational Method Hydrology Analysis – Existing Conditions

As directed by the Section II.B.2.b. of the 1966 FCIS, peak discharge at the Project Concentration Point (Figure 3-1) in cfs is calculated using the Rational Method (see Section 3.4.2.) (County of Fresno 1966). For this Study, peak discharge was determined for the 5-, 10-, and 100-year storm events.

**Table 3-4
Peak Discharge – Existing Conditions**

Rational Method Component	Rainfall Return Period		
	5-year	10-year	100-year
Runoff Coefficient	0.41	0.41	0.41
Rainfall Intensity (in/hr)	0.201	0.237	0.385
Watershed Area (acres)	2,403	2,403	2,403
Peak Discharge (cfs)	197.7	233.8	379.2

Per the FCIS Rational Method, peak discharge from the 2,403-acre watershed, including the Project area, for the 5-, 10-, and 100-year rainfall events is 197.7 cfs, 233.8 cfs, and 379.2 cfs, respectively.

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4 PROPOSED DRAINAGE (POST-DEVELOPMENT CONDITION)

4.1 Proposed Topography

The grading necessary to create the proposed civil improvement (e.g., access roads, detention basins, and building pads for the substation and control/administration building) will not modify the natural topography of the site. Topography within the Project area will remain similar between existing and proposed conditions, since cuts and fills will be balanced on site. The main differences between pre- and post-development conditions will be the inclusion of access roads (which may be slightly elevated) and the five proposed detention basins designed for capturing runoff generated within the Project area. Because there would be no appreciable changes in topography, the overall pattern and direction of runoff will remain the same as pre-Project conditions.

However, by increasing the compaction of on-site soils and introducing structures (including impervious surfaces), the Project could increase the amount of rainfall that is ultimately translated to runoff (rather than infiltrating or evaporating on site).

4.2 Proposed Hydrologic Soil Group

The post-development on-site hydrologic soil group was assumed to be compacted, thus reducing the permeability of the existing areas with C soils to the permeability of the areas with D soils.

4.3 Proposed Land Use

The proposed project site is occasionally dry-farmed, typically for grain crops such as winter wheat or barley. However, the post-development condition would change the existing land use from agricultural to a solar power generating operation. The proposed project is approximately 1,288 acres, of which approximately 8.46 acres will consist of impervious surfaces (i.e., paved entrances, concrete slabs, and assuming 5 acres of impervious Energy Storage Systems as a conservative estimate). The increase in impervious surfaces due to the development of the Project will result in a change in imperviousness from approximately 0.01% to 0.94%. The proposed land use for the post-development condition is shown on Figure 4-1.

4.4 Proposed Run-on and Runoff

As conducted in Section 3.4, the peak discharge (cfs) at the Project's Concentration Point was calculated for the 5-, 10-, and 100-year rainfall events (FCIS Rational Method). With no proposed drainage paths in/around the Project site, and in order to provide a direct comparison between existing and proposed conditions, the flow path used in the existing conditions analysis is utilized in this proposed conditions hydrology analysis. Table 4-1 provides the runoff

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coefficients for the Project watershed under the proposed conditions. The runoff coefficient for the exposed D soils on the site remains the same as during existing conditions (0.41) in order to reflect fallow cultivated fields.

**Table 4-1
Project Watershed – Proposed Conditions – Weighted Runoff Coefficient**

Surface Coverage	Area (acres)	Runoff Coefficient	% of Total Area	Weighted Runoff
Gravel	63.1	0.7	2.63%	0.018
Impervious	15.6	0.95	0.65%	0.006
C Soils	323.9	0.38	13.48%	0.051
D Soils	2000.6	0.41	83.25%	0.341
Total	2,403.2			0.417

The increase in the Project watershed’s runoff coefficient by 0.007 as a result of the proposed infrastructure results in small increases in modeled peak discharges from at the Project’s Concentration Point. The peak discharge for the 5-, 10-, and 100-year rainfall events are provided in Table 4-2 below. A comparison of the pre- versus post-development conditions are provided in Section 7.

**Table 4-2
Peak Discharge – Proposed Conditions**

Rational Method Component	Rainfall Return Period		
	5-year	10-year	100-year
Runoff Coefficient	0.417	0.417	0.417
Rainfall Intensity (in/hr)	0.201	0.237	0.385
Watershed Area (acres)	2,403	2,403	2,403
Peak Discharge (cfs)	201.0	237.8	385.7

The FCIS Rational Method does not produce a total storm volume, so the storage of the proposed detention basins were not included in the Project impacts hydrologic model. While the post-development hydrologic modelling does not include the proposed detention basins, the model results provide conservative values for expected runoff. An estimate of the impact the detention basins will have on surface flows is provided in Section 6.2, where total storage for the detention basins is calculated following the County’s Basin Capacity Criteria and Design Standards (Appendix A). Per the County methodology, the detention basins must be sized to hold the volume of a 100-year 48-hour storm. Following the sizing calculations provided in Section 6.2, there would be no storm water discharge from the Project area up to a 100-year 48-hour rainfall event (~3.2 inches per NOAA Atlas 14).

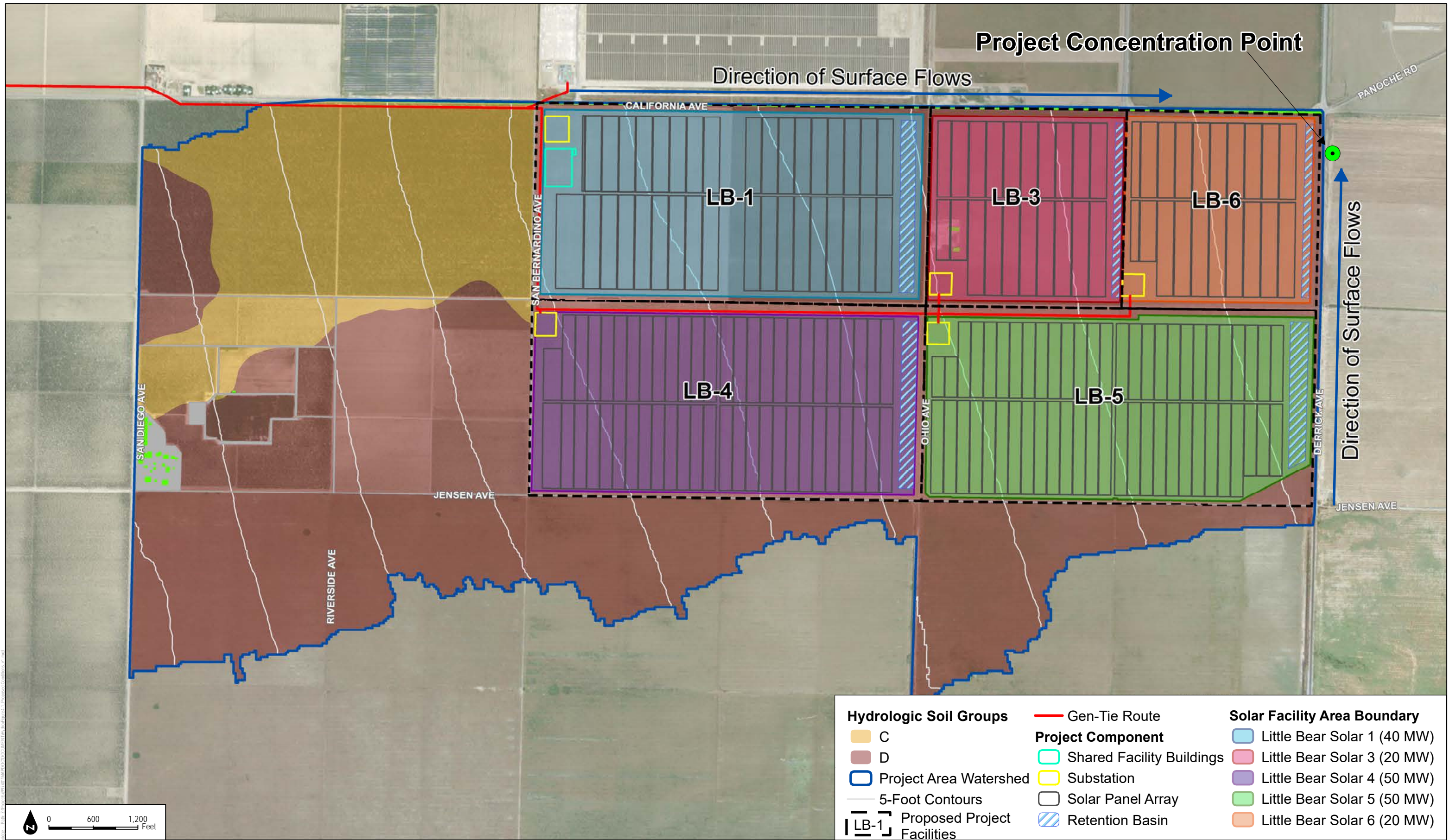


FIGURE 4-1

Little Bear Solar - Proposed Conditions

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5 CHARACTERIZATION OF PROJECT RUNOFF

This section provides a characterization of the Project runoff as it relates to water quality. Potential pollutants associated with the operation of the Project facilities are summarized, as well as the applicable receiving water body beneficial uses, water quality impairments, and TMDLs.

5.1 Potential Pollutants

During operations and maintenance of the Project facilities, small quantities of hazardous materials may be periodically and routinely transported, used, and disposed. These materials would consist primarily of minor amounts of petroleum products (fuels and lubricating oils) and a small to moderate amounts of motor vehicle fuel. Small quantities of additional common hazardous materials may also be used on site, including antifreeze and coolants, latex and oil-based paint, paint thinners and other solvents, cleaning products, and herbicides.

5.2 Receiving Waters Impairments, TMDLs, and Beneficial Uses

Run-on and runoff from the proposed project may discharge to the Fresno Slough, as described in Section 2.3. The Fresno Slough is listed as the impaired water body according to the 2012 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) published by the California Environmental Protection Agency, State Water Resources Control Board.

To comply with the Clean Water Act, water quality objectives must be met to maintain listed 303(d) primary pollutants at target levels. Table 5-1 presents the listed 303(d) pollutants for the Fresno Slough and downstream receiving waters. Downstream receiving waters include waterbodies in both the Tulare Lake Basin and the San Joaquin and Sacramento Basin. While excess flows from the Project location typically drains to the Tulare Lake Basin, flows may reach the San Joaquin River through the Mendota Pool when the Kings River is at flood stage. The receiving water body beneficial uses, water quality impairments, and TMDLs were identified by using the Tulare Lake and San Joaquin and Sacramento Basin Plans, and the USEPA Water Quality Assessment and TMDL Reports (Central Valley RWQCB 2016; USEPA 2016).

While the Project operations are not expected to generate pollutants of concern, historical agriculture practices within the Project site could have applied fertilizers and/or pesticides/herbicides/insecticides which are identified as pollutants in a number of the downstream 303(d) listed water bodies. Runoff generated from the site currently has the potential to contribute unknown pollutants to downstream water bodies. While this is the case under both the pre- and post-development conditions, the Project should result in reduced runoff volumes to downstream water bodies (see Section 4.4 and 6.2), providing an overall benefit to downstream water quality conditions.

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Table 5-1
CWA Section 303(d) Water Bodies – 2010 303(d) List of Water Quality Segments

Receiving Water Bodies	Beneficial Uses	Listed 303(d) Pollutants	TMDL(s)
<i>Tulare Lake Basin</i>			
1. Mendota Pool 2. Fresno Slough (Graham Road to James Bypass) 3. Kings River (Island Weir to Stinson and Empire Weirs)	Not Specified by Basin Plan	Mercury ^a Selenium ^b Chlorpyrifos ^a Unknown Toxicity Electrical Conductivity ^c Molybdenum ^b Toxaphene ^a	No TMDLs listed
<i>San Joaquin and Sacramento Basin</i>			
1. San Joaquin River (Mendota Pools to Bear Creek) 2. San Joaquin River (Bear Creek to Mud Slough) 3. San Joaquin River (Mud Slough to Merced River) 4. San Joaquin River (Merced River to Tuolumne River) 5. San Joaquin River (Tuolumne River to Stanislaus River) 6. San Joaquin River (Stanislaus River to Delta Boundary) 7. Delta Waterways (Southern Portion) 8. Delta Waterways (Central Portion) 9. Delta Waterways (Western Portion) 10. Delta Waterways (Export Area) 11. Sacramento San Joaquin Delta 12. San Francisco Bay (Suisun Bay) 13. San Francisco Bay (Carquinez Strait) 14. San Francisco Bay (San Pablo Bay) 15. San Francisco Bay (Central)	AGR COLD COMM MUN WARM REC-1 MIGR PROC IND REC-2 SPWN WILD NAV EST	Boron ^b Chlorpyrifos ^a DDT ^a Diazinon ^a Exotic Species Group A Pesticides ^a Mercury ^a Pesticides ^a Sedimentation/Siltation ^c Selenium ^b Specific Conductivity ^c Unknown Toxicity Arsenic ^b Electrical Conductivity ^c Escherichia coli (E Coli) Temperature, water ^c DDE ^a Diuron ^a Toxaphene ^a Invasive and Invasive/Exotic Species Chlordane ^a Dieldrin ^a Dioxin Compounds ^a Furan Compounds ^a PCBs – Dioxin-like ^a PCBs ^a Nickel ^b Trash	San Joaquin River Diazinon ^a and Chlorpyrifos ^a (December 20, 2006) Lower San Joaquin River Salt and Boron ^b (February 8, 2007) Sacramento – San Joaquin Delta Estuary TMDL for Methylmercury ^a (October 20, 2011) Sacramento-San Joaquin Delta Waterways And Tributaries Diazinon ^a And Chlorpyrifos ^a TMDL (October 10, 2007) San Francisco Bay Mercury ^a TMDL (February 12, 2008) San Francisco Bay PCBs ^a TMDL (March 29, 2010) Selenium ^b in North San Francisco Bay TMDL (August 23, 2016)

a. Pollutants associated with pesticides, insecticides, herbicides

b. Pollutants associated with fertilizers

c. Basic water quality impairments associated with higher concentrations of salts and suspended solids

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6 STORMWATER MANAGEMENT MEASURES

Section 17.64 of the Fresno County Code of Ordinances (Drainage of Land) provides the Fresno County public works and development services department the authority to impose conditions on development related to drainage. Agricultural uses are subject to certain exemptions, but developers not within an area subject to a local drainage fee (including the Project) must provide for drainage facilities and improvements on site as necessary to ensure the safe disposal of surface and storm waters. Per Section 17.64.025, this also includes measures necessary to comply with the stormwater quality provisions of the Federal Water Pollution Control Act (Clean Water Act), the California Porter-Cologne Act, and other stormwater quality statutes and regulations. The stormwater quality standards applicable to this project and location include the narrative and numeric water quality objectives of the Basin Plan, which seek to avoid degradation of receiving water quality and maintenance of beneficial uses. In addition to County drainage standards, the project is subject to the statewide Construction General Permit (SWRCB Order No. 2009-0009-DWQ, as amended), which is administered by the State Water Resources Control Board and requires the development of a Stormwater Pollution Prevention Plan (SWPPP) by qualified individuals. The SWPPP will be developed separately and submitted with grading permit documents. Therefore, this document is not intended to address construction-related impacts on water quality.

This section provides applicable stormwater management measures for the post-development conditions for the Project as a means of demonstrating that the Project will adequately handle on-site drainage and ensure that appropriate measures are implemented to reduce post-construction impacts on water quality. Stormwater management measures include structural and non-structural best management practices (BMPs). In addition, detention basins are recommended for the Project to detain and treat stormwater runoff.

6.1 Best Management Practices

To address potential water quality issues to downstream water bodies (Section 5), storm water BMPs will be implemented during construction and post-development phase of the Project. Runoff and erosion control BMPs shall be appropriately implemented for the Project in accordance with the FCIS. The nearly updated/approved FCIS currently requests the use of the State's Department of Transportation's (Caltrans) Highway Design Manual be included in drainage designs. Accordingly, the BMPs are referenced from the Caltrans BMP Manual, and are recommended based off of the preliminary Project plans (Table 6-1).

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Table 6-1
Recommended Best Management Practices

Type of BMP	Design Concept	Description Applicable to the Proposed Project
Source Control BMPs	Non-Stormwater Discharge Controls	<ul style="list-style-type: none"> Solar Panel and Equipment Washing: When possible, dry methods of solar panel and equipment washing shall be applied. When the use of wet methods, or acid-based solvents are required for equipment cleaning, direct application techniques will be used to limit non-stormwater discharges and other potential impacts to the drainage area. Efficient Irrigation Systems and Landscape Design: If perimeter landscaping is proposed, drought tolerant plants requiring minimal irrigation, fertilizers and pesticides are suggested. Landscaping that captures/retains all irrigation will be required to preclude non-stormwater runoff from the site.
	Good Housekeeping	<ul style="list-style-type: none"> Site Maintenance: Establish reoccurring site inspections of all BMPs (e.g., detention basins) to identify potential maintenance needs. Material Storage: The collection or stockpiling of Project materials/debris will need to take place within a secure facility that eliminates the exposure and transport of potential pollutants. If hazardous materials are involved, this will require the implementation of secondary containment system.
	Non-Toxic Roofing Materials	Building materials that do not require toxic materials for weather proofing (e.g., tar) shall be utilized where possible.
Low Impact Development	Retention and Detention Systems	It is anticipated that preliminary detention basins designed for the Project will collect and treat runoff generated within the Project boundary. County requirements for detention basins require a specific design volume based on contributing area and associated land covers. Design volumes for each basin are provided in Section 6.2 of this report.
	Native Trees/Shrubs	Native vegetation can be incorporated across the proposed project site to reduce the hydrograph volume by increasing local evapotranspiration and can also reduce the peak hydrograph through rainfall interception. This can consist of low-lying groundcover that would not interfere with solar panel operations.
	Minimize Impervious Footprint	Reduce impermeable surfaces through efficient site design. Permeable pavers should be considered as an option for construction of the Little Bear 1 facility parking area if that feature is pursued.
	Construction Considerations	Minimize soil compaction and implement soil amendments.

6.2 Proposed Detention Basins – Preliminary Sizing Calculations

The 1966 FCIS require that projects outside of the Fresno Metropolitan Flood Control District manage hydrologic impacts either through the retention of the 100-year 48-hour duration storm, or by discharging to existing drainage facilities. While the Project’s preliminary design includes detention basins, discharge to the downstream conveyance system may be a possibility if the downstream receiving features meet County criteria for existing drainage facilities. In the event

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that permanent storage is required on site, the five basins included in the draft design were sized per County standards.

Detention basin storage capacity was calculated for each of the proposed five (5) detention basins planned for the Project. These calculations followed the detention basin storage capacity calculation methodology in the Basin Capacity Criteria and Design Standards provided by the Fresno County Department of Public Works and Planning (Attachment A). Assuming the intention of these basins is for permanent stormwater detention, part (a.) of Basin Capacity Criteria and Design Standards suggests that volume capacity be calculated as,

$$V_S = 0.28CA$$

V_S: Required basin storage capacity in cubic feet

0.5 = Depth of rainfall event in feet

C: Composite runoff coefficient (dimensionless)

A: Drainage area in square feet

For this preliminary calculation of required basin storage volumes, the areas contributing runoff to each basin were identified as the Project components due west from each basin (basin and associated Unit names are identified on Figure 4-1). Any run-on onto the Project area was not included in this analysis. Attributes for the five units draining to the five detention basins are defined in Table 6-2 below. Units were converted to acres and acre-feet for presentation.

**Table 6-2
Detention Basin Sizing Calculations**

Project Unit	Drainage Area (acres)	Weighted Runoff Coefficient	Required Basin Storage (ac-ft)
LB-1	322	0.434	69.8
LB-3	161	0.432	34.7
LB-4	322	0.428	68.9
LB-5	322	0.428	68.9
LB-6	161	0.431	34.7

Final Site grading plans will need to: 1) verify that all run-on is precluded from entering the Project area by routing run-on through or around the periphery of the Project site (and if not, resize the basins to include drainage from the additional contributing areas), and 2) provide basin dimensions that will hold the required volume with at least 1-foot of freeboard. Using the preliminary site plan dimensions for the proposed detention basins, constructing basins 7 feet deep with 3:1 slopes would capture the required volume from their respective units while maintaining a freeboard of at least 1 foot. If the detention basins are within 10 feet of a County-

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maintained road, then the required freeboard will be 1.5 feet. The location and extent of basins shown in Figure 4-1 are preliminary and may be adjusted by the Project applicant given they meet the total volume criteria in Table 6-2, or in accordance with future consultation with County, per conditional use permit approvals and/or grading/building permits.

6.3 BMP Maintenance

Structural and non-structural BMPs (which include detention basins) should be regularly monitored following installation. If any singular BMP is determined to be under performing, an assessment will be made for correcting performance deficiencies. The property owner or the responsible party is responsible for scheduling and conducting maintenance of BMPs.

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7 PROJECT IMPACTS

This section presents the potential impacts associated with the Project, as referenced by the California Environmental Quality Act Guidelines (CEQA) guidelines (California Natural Resources Agency, 2007). Where feasible, these impacts will be mitigated through application of various construction and post-development techniques, BMPs, and other operational practices.

7.1 CEQA Significance Criteria

Based on California Code of Regulations (CCR) 15382, a “significant effect on the environment” includes any substantial, or potentially substantial, impact on all environmental resources by a project. The following lists significance criteria related to hydrology and water quality impact analysis from the CEQA Guidelines, Appendix G, along with a reference to the section that addresses the impact or an explanation of why the impact is less than significant or out of the scope of this report:

1. *Violate any water quality standards or waste discharge requirements.*

Based on the characterization of water quality impairments, potential Project-related pollutant sources, comparison of pre- versus post-Project runoff rates, and the implementation of stormwater best management measures identified in Section 6, the Project’s impact on water quality standards and waste discharge requirements would be less than significant. Potential construction-related water quality impacts of the Project would be eliminated or substantially reduced by the requirements of the statewide Construction General Permit (SWRCB Order No. 2009-0009-DWQ, as amended), which is outside the scope of this report but will be developed separately and submitted with grading permit documents as a condition of approval.

2. *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).*

This impact criterion is outside the scope of this report.

3. *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.*

The Project will have less than significant impacts on the existing drainage patterns within and downstream the site. The issue of erosion and siltation impacts is addressed in Section 7.2.2.

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4. ***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.***

The Project would not significantly alter downstream drainage patterns nor result in increased flooding on-site or downstream from the site.

5. ***Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.***

The Project is not located in an area that has an existing or planned stormwater drainage system. Therefore, this issue is not applicable to the Project. However, proposed features necessary to capture on-site drainage are discussed in Section 6.2 and Section 7.2.1.

6. ***Otherwise substantially degrade water quality.***

The Project would not result in degraded water quality within or downstream from the site.

7. ***Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.***

The project does not involve housing and is not located in a 100-year flood hazard zone. There is no impact with regard to this issue.

8. ***Place within a 100-year flood hazard area structures which would impede or redirect flood flows.***

The project is not located in a 100-year flood hazard zone. On-site basins as described in Section 6.2 would be designed to retain the 100-year flow. There is no impact with regard to this issue.

9. ***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.***

The Project is not located in a flood hazard zone, including from dam or levee failure. There is no impact with regard to this issue.

10. ***Inundation by seiche, tsunami, or mudflow.***

The Project is not located in a flood hazard zone, including from dam or levee failure. There is no impact with regard to this issue.

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7.2 Identified Impacts

7.2.1 Hydrology Impacts

Without including the proposed on-site detention, the Project would increase peak-discharge from the 5-, 10- and 100-year rainfall events by 1.7% for each event (Table 7-1).

Table 7-1
Comparison of Existing and Proposed Conditions – Runoff

	Rainfall Return Period		
	5-Year	10-Year	100-Year
Existing Conditions	197.7	233.8	379.2
Proposed Conditions	201.0	237.8	385.7
Difference (cfs)	3.4	4.0	6.5
Difference (%)	1.7%	1.7%	1.7%

An overall increase in peak-discharge less than 2% is not considered a substantial impact. Furthermore, the potential inclusion of additional on-site stormwater storage provided by the detention basins will fully detain the 100-year 48-hour rainfall volume, ultimately reducing the overall discharge from the site.

There are no natural drainage features around/within the Project area that would be impacted due to the construction of the Project nor the potential modifications to the existing flow regime. The two earthen ditches paralleling the northern and eastern ends of the Project will receive less runoff from the Project site due to the proposed detention basins. Overland flows that potentially drain onto the site from the west and south should either be routed towards these earthen ditches around the Project site (e.g., additional drainage ditches and/or slightly elevated access roads), or included in a final design analysis for sizing detention basins.

Groundwater recharge within the site may be reduced in the Little Bear 1 facility if the soils in the Hydrologic Soil Group C are compacted, reducing infiltration rates from ‘slow’ to ‘very slow’. While existing benefits for groundwater recharge at the site are likely non-existent during normal years, and minimal during above average rainy seasons, care should be taken to minimize soil compaction during the installation of the Little Bear 1 facility.

7.2.2 Water Quality Impacts

The proposed Project infrastructure and activities are not expected generate pollutants detrimental to the water bodies identified in Section 5. While past agricultural practices on the

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site may have introduced fertilizers and/or pesticides that may be listed on a number of downstream 303(d) lists (which serves as an existing water quality concern for the site), the transport of such pollutants should terminate (through settling) in the low-gradient fields and/or proposed detention basins. The potential for reduced stormwater discharge from the site during proposed conditions should ultimately serve to improve the overall water quality of stormwater discharge from the site.

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8 CONCLUSIONS

Based on this Study, the proposed Project would have minimal impacts on hydrology and water quality within, and downstream, from the Project site. The primary findings of this Study are:

1. Without hydrologic control structures (i.e., the proposed detention basins), the proposed Project would increase stormwater generated for the 5-, 10- and 100-year rainfall events by 1.7% (for each event). This increase in volume is not substantial. If hydrologic control structures are required by the County for the Project, discharge from the Project site would be reduced.
2. The entire Project is located outside of a 100-year floodplain, does not substantially alter topography, and does not involve housing. Therefore, the Project would have no impact with regard to flooding (including tsunami, dam inundation and seiche), obstruction flood flows, or exposure of people or structure to flood hazards.
3. The suitability of the site for groundwater recharge is characterized as moderately poor to moderately good in the northwest corner, to primarily very poor throughout the majority of the site. Based on the low average annual rainfall and high annual evapotranspiration demand for this region, recharge at the site is considered negligible except during years with above average rainfall. With the use of low-impact construction technique to minimize soil compaction (large treads), and the introduction of 5 large detention basins, the existing groundwater recharge potential for the site should remain comparable between pre- and post-development conditions.
4. The proposed Project would not have substantial impact with regard to water quality. While the potential for existing pollutants from prior agricultural practices being mobilized by stormwater discharge exists, these pollutants would settle out within the proposed detention basins. Implementation of BMPs in Section 6 would substantially reduce potential project-related impacts on water quality.

With the application of appropriate Source Control and Low-Impact Development BMPs, the proposed Project will not have substantial impacts on the hydrology and water quality resources within, or downstream, the Project site.

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ATTACHMENT A
Fresno County Basin Design Standards

Basin Capacity Criteria and Design Standards

a. Basin storage capacity

If runoff is to be temporarily retained on site, the storage basin shall be sized using the formula $V_S = 0.28CA$. If permanent facilities are required, the storage basin shall be sized using the formula $V_S = 0.5CA$. The units of 0.28 and 0.5 are in foot.

where

V_S = Required basin storage capacity in acre-feet or cubic feet

C = Composite runoff coefficient (dimensionless)

A = Drainage area in acres or square feet

b. Basin design capacity

The basin design capacity shall be calculated using the pyramidal frustum volume equation below.

$$V = \frac{[A_B + A_{ws} + (A_B \times A_{ws})^{1/2}]}{3} \times D_w$$

where

V = Basin design capacity in cubic feet

A_{ws} = Area of water surface in square feet

A_B = Area of bottom in square feet

D_w = Average depth of water in feet not including the freeboard depth

Surface Conditions (Values of Runoff Coefficient, C)

Pavement:

Asphalt 0.70 to 0.95

Concrete 0.80 to 0.95

Brick 0.70 to 0.85

Gravel* 0.35 to 0.70

Drives and walks 0.75 to 0.85

Roofs 0.75 to 0.95

Lawns; Sandy Soil:

Flat, 2% slope 0.05 to 0.10

Average, 2 to 7% slope 0.10 to 0.15

Steep, >7% slope 0.15 to 0.20

Lawns; Heavy Soil:

Flat, 2% slope 0.13 to 0.17

Average, 2 to 7% slope 0.18 to 0.22

Steep, >7% slope 0.25 to 0.35

* For gravel landscaping, $C_{min} = 0.35$ and gravel roadway or shoulder, $C_{min} = 0.50$

Appendix J2

Water Supply Assessment for Little Bear Solar Project

Water Supply Assessment for Little Bear Solar Project



Prepared for

**Little Bear Solar 1, LLC
Little Bear Solar 3, LLC
Little Bear Solar 4, LLC
Little Bear Solar 5, LLC
Little Bear Solar 6, LLC**

January 2018

WEST YOST



ASSOCIATES

Consulting Engineers

367-16-17-23



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WEST YOST ASSOCIATES

consulting engineers

Water Supply Assessment for Little Bear Solar Project

Project No. 367-16-17-23



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1/18/18

Date



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List of Acronyms and Abbreviations

AB	Assembly Bill
AE-20	Exclusive Agricultural District, 20-acre minimum parcel size
AF	Acre-Feet
AFY	Acre-Feet per Year
APN	Assessor Parcel Number
CEQA	California Environmental Quality Act
County	County of Fresno
CVP	Central Valley Project
DWR	Department of Water Resources
EIR	Environmental Impact Report
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
M&I	Municipal and Industrial
North Star	North Star Solar Project
O&M	Operation and Maintenance
P&SA	Purchase and Sale Agreement
Project	Little Bear Solar Project
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
Water Code	California Water Code
Westside Subbasin	Westside Subbasin of the San Joaquin Valley Groundwater Basin
WSA	Water Supply Assessment
WWD	Westlands Water District

Water Supply Assessment for Little Bear Solar Project

1.0 INTRODUCTION

The proposed Little Bear Solar Project¹ (Project), if approved, will be a solar photovoltaic power generating project that would be constructed in the northwest portion of Fresno County, California. The purpose of this Water Supply Assessment (WSA) is to support the Environmental Impact Report (EIR) for the proposed Project. Key topics covered in this introduction include:

- Legal Requirements for the WSA;
- Need for and Purpose of WSA; and
- WSA Preparation, Format and Organization.

1.1 Legal Requirements for the Water Supply Assessment

California Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures that sought to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require that detailed information regarding water availability be provided to city and county decision-makers prior to approval of specified large development projects. The purpose of providing such information is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands from approved projects, and the demands of proposed projects.

SB 610 amended California Water Code (Water Code) sections 10910 through 10915 to require agencies responsible for land use decisions to:

1. Identify if there is a public water system that may supply water for a proposed development project; and
2. Request a WSA from the identified public water system or, by the lead agency (city or county), if no public water system exists.

The Project site falls within the service area of Westlands Water District (WWD) in Fresno County. WWD provides water for agricultural, agricultural-related, and some non-agricultural uses through a piped water system to a service area that includes the Project site, but this water, as delivered, is not potable. Based on this, and as discussed in Section 3.3, WWD is not a public water system, and there are no other public water systems near the Project site. Based on this information, the County of Fresno (County) is the lead agency for the proposed Project, and is responsible for preparing the WSA. The purpose of the WSA is to demonstrate the sufficiency of the available water supplies to satisfy the water demands of the Project, while still meeting other existing and planned future uses, including agricultural and manufacturing uses. Water Code sections 10910 through 10915 delineate the specific information that must be included in the WSA.

¹ Little Bear Solar 1, LLC, Little Bear Solar 3, LLC, Little Bear Solar 4, LLC, Little Bear Solar 5, LLC and Little Bear Solar 6, LLC, collectively, have proposed the Little Bear Solar Project. There is no Little Bear Solar 2.

Water Supply Assessment for Little Bear Solar Project

SB 221 amended State law (California Government Code section 66473.7) to require that approval by a city or county of certain residential subdivisions² requires an affirmative written verification of sufficient water supply. SB 221 was intended as a fail-safe mechanism to ensure that collaboration on finding the needed water supplies to serve a new large residential subdivision occurs before construction begins. The proposed Project does not include a residential subdivision and, as such, SB 221 does not apply to the Project.

1.2 Need and Purpose of Water Supply Assessment

The purpose of this WSA is to perform the evaluation described in Water Code sections 10910 through 10915 (SB 610) in connection with the proposed Project. This WSA is not intended to reserve water, or to function as a “will serve” letter or any other form of commitment to supply water (see Water Code section 10914). The provision of water service will continue to be undertaken in a manner consistent with applicable County policies and procedures and consistent with existing law.

1.3 Water Supply Assessment Preparation, Format and Organization

The format of this WSA is intended to clearly delineate compliance with the specific requirements for a WSA, per Water Code sections 10910 through 10915. This WSA includes the following sections:

- Section 1: Introduction
- Section 2: Description of Proposed Project
- Section 3: Required SB 610 Determinations
- Section 4: Documentation of Water Supply
- Section 5: Determination of Water Supply Sufficiency Based on the Requirements of SB 610
- Section 6: Water Supply Assessment Approval Process
- Section 7: References

Relevant citations of Water Code sections 10910 through 10915 are included throughout this WSA to demonstrate compliance with the specific requirements of SB 610.

² Per Government Code Section 66473.7(a)(1) subdivision means a proposed residential development of more than 500 dwelling units.

Water Supply Assessment for Little Bear Solar Project

2.0 DESCRIPTION OF PROPOSED PROJECT

A general description of the Project location, proposed land uses, projected water demand, and proposed water supply is provided below.

2.1 Project Location

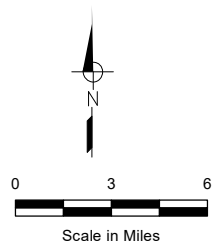
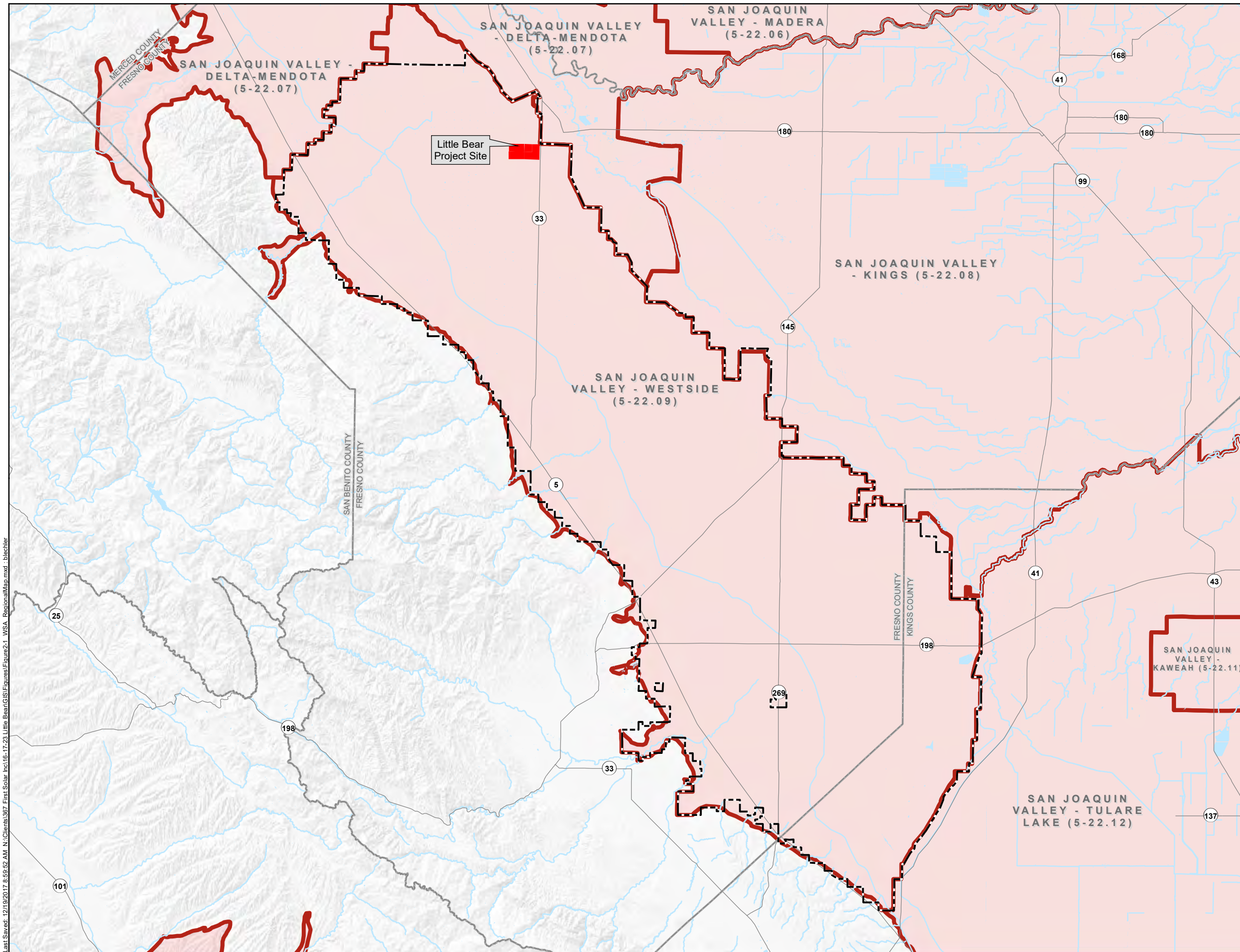
The proposed Project is located approximately 2.5 miles southwest of Mendota, California, in the northwest portion of Fresno County (see Figure 2-1). The Project area is bounded on the north by West California Avenue, on the east by State Route 33 (South Derrick Avenue), on the south by West Jensen Avenue, and on the west by San Bernardino Avenue (see Figure 2-2).

The proposed Project includes five solar photovoltaic power generating facilities (Little Bear 1, 3, 4, 5, and 6) and is comprised of two sections of land (Township 14S, Range 14E, Sections 13 and 14) divided into five parcels totaling approximately 1,288 acres. Table 2-1 summarizes the Project facilities and includes the County's Assessor Parcel Numbers (APN) and the associated acreage. The project facilities and parcel boundaries are shown on Figure 2-2.

Facility	Assessor Parcel Number (APN)	Approximate Size (acres)
Little Bear 1	019-110-04ST	161
	019-110-05ST	161
Little Bear 3	019-110-06ST	161
Little Bear 4	019-110-03ST	322
Little Bear 5	019-110-13ST	322
Little Bear 6	019-110-13ST	161
Total		1,288

The Project site is relatively flat with natural gentle slope from west to east, with topography ranging in elevation from approximately 175 to 200 feet above sea level. The Project site is periodically farmed, typically for grain or forage crops and has some existing improvements, including an approximately 5,000 square-foot metal storage shed with neighboring metal storage silos (approximately 2,500 square-foot), which will be removed as part of the Project.

The land use near the Project site is generally agricultural production, with a few scattered residences. The closest residence is approximately three quarters of a mile from the Project site. Other existing uses north of the Project site include the North Star Solar Project (North Star), immediately adjacent to the north, and the Federal Correctional Institution, Mendota, approximately half a mile to the north.



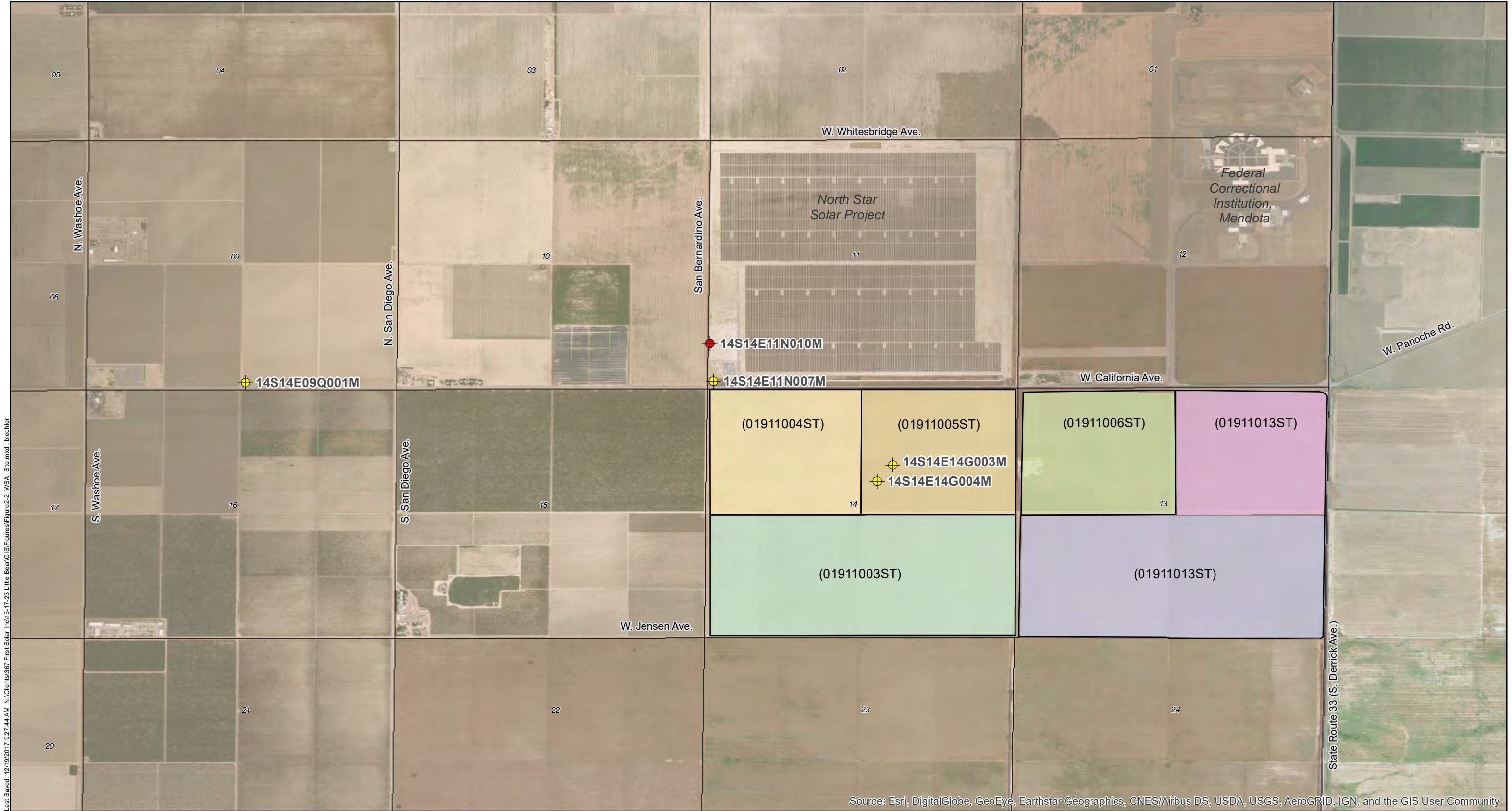
Symbology
 [Dashed line] Westlands Water District
 [Red outline] High Priority and Critically Overdrafted Basins

- Notes:**
1. Critically overdrafted groundwater basins are identified as part of the California SGMA effort. The final list of critically overdrafted basins was released January 2016.
 2. California DWR groundwater basin prioritization results were finalized in June 2014.
 3. The groundwater basins shown on this map are the final modified Bulletin 118 groundwater basin boundaries posted in December 2016. Since the modified draft basin boundaries were released after the initial prioritization and overdraft list, new basins may not yet be prioritized or identified to be in critical overdraft.

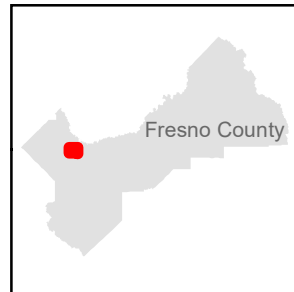
Last Saved: 12/19/2017 8:59:52 AM N:\Clients\367 First Solar Inc\16-17-23 Little Bear\GIS\Figures\Figure2-1 WSA_RegionalMap.mxd : blechler



Figure 2-1
Project Location and Regional Map
 Little Bear Solar Project



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Symbology

- ◆ Proposed Supply Well
- ◆ Other Lower Aquifer Well
- Township 14S, Range 14E with Section Numbers

Project Facilities (APN)

- Little Bear 1
- Little Bear 3
- Little Bear 4
- Little Bear 5
- Little Bear 6

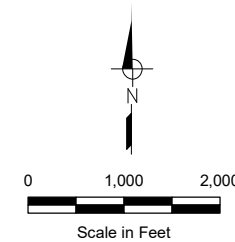


Figure 2-2
Little Bear Facilities and Well Locations
 Little Bear Solar Project

Water Supply Assessment for Little Bear Solar Project

2.2 Proposed Land Uses

According to the Fresno County 2000 General Plan, the land use designation for the Project site is Agriculture. The Agriculture land use designation provides for the production of crops and livestock, and for locating necessary agriculture commercial centers, agricultural processing facilities, and for certain nonagricultural activities (County of Fresno, 2000).

The County Zoning Ordinance establishes the basic regulations that guide land development, including allowable uses, building setback requirements, and development standards. The County Zoning Ordinance applies to all property in unincorporated portions of the County, except federally-owned land or land owned by any federal agencies.

The Project parcels are currently zoned Exclusive Agricultural District, 20-acre minimum parcel size (AE-20). The AE-20 zone designation is intended to be an exclusive district for agricultural and other uses, which are necessary and an integral part of agricultural operations. The designation is also intended to protect the agricultural community from encroachment of non-related agricultural uses, which could be detrimental to the physical and economic well-being of the agricultural district. Uses under zone designation AE-20 are limited primarily to agricultural and agricultural-related uses (County of Fresno, 2004).

The Project site is not subject to any Williamson Act contracts, and the Williamson Act does not apply to the Project site as WWD, the current property owner, acquired the Project parcels in lieu of eminent domain proceedings for the public purpose of improving drainage as part of the Peck Settlement in 2002. The Williamson Act and the standard restrictions of the Williamson Act and conditions adopted by the County expressly provide that Williamson Act contracts are null and void upon acquisition of such property by a public agency (in this case WWD) in lieu of eminent domain proceedings for a public purpose.

2.3 Project Water Demands

The water demands for the proposed Project consist of one-time construction water requirements and the annual operational water requirements following Project construction. Construction and operational water demands for the proposed Project are summarized below.

2.3.1 Construction Water Requirements

During construction, water will be used for soil compaction and dust control, and will not be used for human consumption (i.e., water supply will not be required to be potable). Construction is scheduled to take place generally during daylight hours on a Monday through Friday schedule and is estimated to be completed in 12 to 14 months. The proposed Project is anticipated to require up to approximately 200 acre-feet (AF) of water during the construction period. Based on the estimated construction duration of 12 to 14 months, an estimate of the average flow rate required to supply water during construction is 110 to 130 gpm³.

³ Assumes a constant pumping rate 24 hours per day, 7 days per week for 12 to 14 months

Water Supply Assessment for Little Bear Solar Project

2.3.2 Operational Water Requirements

Once the Project facilities have been constructed, the annual operational water consumption is expected to be approximately 5 acre-feet per year (AFY) (approximately 1 AFY is needed for each facility), which is equivalent to approximately 9 gpm, on average⁴. Operational water will be used for operation and maintenance (O&M) buildings and potentially used for photovoltaic solar panel washing.

2.4 Projected Water Supply for Proposed Project

Construction water demands for the proposed Project will be satisfied using water from an existing well on the neighboring North Star Solar Project (see Figure 2-2). The North Star well has demonstrated the production capacity to satisfy the proposed Project's water supply demand. The Project has rights to water from the North Star Solar Project per the Water Wells Access and Easement Agreement provided in Appendix A. Aboveground or underground water line(s) may be installed from North Star to the Project site to transmit water or, alternatively, water may be trucked from the well location to the Project site. Aboveground, portable storage tanks will be used to store water at the Project site during construction. Although the North Star well is expected to meet the proposed Project construction supply needs, contingent water sources for construction of the Project include delivery from WWD or trucking water to the Project site from an offsite source.

Operational water demands for the proposed Project will be satisfied using water delivered by WWD under a Municipal and Industrial (M&I) water supply contract. Per the comments provided to the County by WWD on the Notice of Preparation for the proposed Project's Draft EIR (Appendix B), WWD will make available up to 5 AFY per 160 acres annually for solar development operations. Article 19 of WWD's Regulations Regarding the Application for and Use of M&I Water within WWD indicates that utility scale solar projects are eligible for M&I water (WWD, 2018b).

Water delivered from WWD will require treatment to potable standards for use within the O&M buildings. An alternative to WWD delivery for operational water demands would require installation of a permanent pipeline from the North Star well to the Project site.

⁴ Assumes a constant pumping rate 12 hours per day, 5 days per week, 4.3 weeks per month.

Water Supply Assessment for Little Bear Solar Project

3.0 REQUIRED SB 610 DETERMINATIONS

The following determinations must be made, pursuant to SB 610.

3.1 Does SB 610 Apply to the Proposed Project?

Water Code sections 10910 and 10912 state:

10910 (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

10912 (a) "Project" means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.*
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- (4) A proposed hotel or motel, or both, having more than 500 rooms.*
- (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.*

Based on the following assumptions, SB 610 is conservatively assumed to apply to the Project.

1. The proposed Project is subject to California Environmental Quality Act (CEQA) and an EIR is required.
2. The proposed Project has a one-time projected water supply demand of 200 AF during construction, which is tentatively scheduled to be completed in 12 to 14 months. The long-term annual demand following project construction is estimated to be 5 AFY. For the purpose of this WSA, the one-time demand of 200 AF is conservatively interpreted to meet the definition of a "Project" as specified in Water Code section 10912(a)(5)(B).

The Project has not been the subject of a previously adopted WSA and has not been included in an adopted WSA for a larger project. Therefore, according to Water Code section 10910(a), a WSA is required for the proposed Project.

3.2 Does SB 221 Apply to the Proposed Project?

In 2001, SB 221 amended State law to require that approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply.

Water Supply Assessment for Little Bear Solar Project

Per California Government Code section 66473.7(a)(1), a “subdivision” means a proposed residential development of more than 500 dwelling units, except for a public water system that has fewer than 5,000 service connections, “subdivision” means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.

The Project, which includes no residential dwelling units, is therefore not subject to the requirements of SB 221.

3.3 Is There a Public Water System (“Water Supplier”)?

Water Code sections 10910 and 10912 state:

10910 (b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined by Section 10912, that may supply water for the project.

10912 (c) “Public water system” means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections...

The proposed Project is within the service area of WWD, which is a provider of agricultural water to users within its service area. WWD does not provide water for human consumption, and therefore is not a public water system as defined above. In instances when there is no public water system, the lead agency is responsible for preparing the WSA. Since the Project site is in an unincorporated area of Fresno County, the County is the lead agency.

Even though WWD is not a “public water system”, they may serve the Project and will be involved, in a consultation role, in determining the water supply for the proposed Project.

3.4 Is There an Urban Water Management Plan that Accounts for the Demand Associated with the Proposed Project?

An Urban Water Management Plan (UWMP) has not been prepared by the County (lead agency), or any other entity, that accounts for the projected water demand associated with the proposed Project.

Water Code section 10910 states:

10910 (c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system’s total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system’s existing and planned future uses, including agricultural and manufacturing uses.

Water Supply Assessment for Little Bear Solar Project

There is no public water system or UWMP with applicability to the Project. Therefore, based on the California Department of Water Resources (DWR) WSA Guidance (DWR, 2003), this WSA was prepared based on the available evidentiary record.

3.5 What Information Should be Included in the Assessment?

Since there is no UWMP that accounts for the demand associated with the Project and no public water system to supply water for the Project, the County (as the lead agency), is responsible for the assessment.

Water Code section 10910 states:

10910 (c) (4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

In addition to the above requirements, if the proposed Project's water supplies include groundwater, additional requirements apply to the WSA (as discussed in Section 4).

Water Supply Assessment for Little Bear Solar Project

4.0 DOCUMENTATION OF WATER SUPPLY

Key topics addressed in this section include:

- Regulatory Background;
- Proposed Project Water Supply;
- Alternate Water Supply; and
- Proposed Water Supply Availability and Reliability.

4.1 Regulatory Background

Water Code section 10910 states:

10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

- (A) Written contracts or other proof of entitlement to an identified water supply.*
- (B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.*
- (C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.*
- (D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.*

10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or

Water Supply Assessment for Little Bear Solar Project

county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

It is anticipated that water supply for construction of the proposed Project would be groundwater from a well located on the North Star Solar Project located north of the Project site (Figure 2-2). Operational water demands for the proposed Project will be satisfied using water delivered by WWD under a M&I water supply contract. Although the North Star well and WWD M&I water deliveries are considered adequate to meet the proposed Project construction supply and long-term annual supply needs, respectively, contingent water sources for the Project have been identified.

Proponents of the proposed Project will provide the required funding for the acquisition and delivery of water supply to the proposed Project site, which may require constructing pipelines from the North Star Solar Project through connection fees with WWD or trucking water from offsite sources. As part of the County's formal land use actions, the County may impose permitting requirements or other conditions of approval to ensure the supply of water to the Project.

The following sections summarize the proposed Project water supply, alternate supply options, and the availability and reliability of the proposed water supply.

4.2 Proposed Project Water Supply

Water Code section 10910 states:

10910(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment.

10910(f)(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

10910(f)(2) (A) A description of any groundwater basin or basins from which the proposed project will be supplied. (B) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. (C) For a basin that has not been adjudicated that is a basin designated as high- or medium-priority pursuant to Section 10722.4, information regarding the following: (i) Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924. (ii) If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan. (D) For a basin that has not been adjudicated that is a basin designated as low- or very low priority pursuant to Section 10722.4, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

Water Supply Assessment for Little Bear Solar Project

10910(f)(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

10910(f)(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

10910(f)(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

There is no UWMP relevant to the water supply for the proposed Project, and records of the historical agricultural water use at the Project site are not available based on discussions with the current landowner. The water supply for construction and operation of the Project will be satisfied using the North Star groundwater supply well and an M&I water supply contract with WWD, respectively. Alternate water sources may be used on an as-needed basis, as described below. The Project site is located in the Westside Subbasin of the San Joaquin Valley Groundwater Basin (Westside Subbasin). The Westside Subbasin boundary generally overlaps the WWD service area boundary and falls under the jurisdiction of WWD. A summary of the Westside Subbasin, WWD and regional groundwater, and the proposed construction and operational water supplies are provided below.

4.2.1 Westside Subbasin

The Project is located in the Westside Subbasin of the San Joaquin Valley Groundwater Basin (DWR subbasin number 5-22.09). The Westside Subbasin consists mainly of the WWD and is located in the west-central portion of the San Joaquin Valley Groundwater Basin, in Fresno and Kings Counties, east of the Coast Range foothills and west of the San Joaquin River drainage and the Fresno Slough (DWR, 2006). The Westside Subbasin is underlain by unconsolidated deposits of interbedded sands, silts, and clays of Tertiary and Quaternary Age (DWR, 2006). The freshwater aquifer system is composed of a shallow unconfined to semi-confined aquifer (upper aquifer system) in younger alluvium, older alluvium, and part of the Tulare Formation and a deeper confined aquifer (lower aquifer system), consisting of the lower part of the Tulare Formation. The upper and lower aquifer systems are separated by the 20- to 120-foot thick Corcoran Clay.

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Thirteen of the sixteen subbasins of the San Joaquin Valley Groundwater Basin, including the Westside Subbasin, have been designated by DWR as high priority basins pursuant to Water Code section 10722.4 (DWR, 2014). Eleven of the sixteen subbasins, including the Westside Subbasin, were identified by DWR as being subject to critical conditions of overdraft pursuant to Water Code section 12924 (DWR, 2016).

The Westside Subbasin consists mainly of lands within WWD (see Figure 2-1). The Westside Subbasin is not adjudicated; however, WWD prepared a groundwater management plan pursuant to Assembly Bill (AB) 3030 (WWD, 1996) and implements a number of groundwater management initiatives in the Westside Subbasin, as described below. WWD formed an exclusive (non-overlapping) Groundwater Sustainability Agency (GSA) that covers a majority of the Westside Subbasin for implementation of California's Sustainable Groundwater Management Act (SGMA). A Groundwater Sustainability Plan (GSP) has not yet been prepared for the Westside Subbasin; however, WWD is currently developing a GSP and anticipates adoption of the GSP by WWD board members sometime in 2018 (WWD, 2016a).

4.2.2 Westlands Water District

WWD is composed of over 1,000 square miles of farmland in western portions of Fresno and Kings Counties, and is the largest agricultural water district in the United States. WWD was initially formed in 1952 upon petition of the landowners within the proposed district boundaries. Negotiations between WWD and the U.S. Bureau of Reclamation (USBR) on a contract to provide supplemental surface water supply lead to the State of California and the federal government signing a joint-venture agreement in 1961 for construction of the San Luis Unit of the Central Valley Project (CVP). The San Luis Canal was completed in 1968 and water deliveries from the CVP water to WWD began thereafter (WWD, 1996). Prior to water deliveries from the CVP, farmers in the WWD area relied on groundwater for irrigation (WWD, 2012).

WWD has an annual contract entitlement of 1,150,000 AF from the CVP, but the amount of water delivered is contingent on several factors, with the amount of precipitation in northern California over the previous year being a key component. CVP contractors South-of-Delta, including WWD, received 100 percent of their CVP allocation in 2017, which is the first time this has occurred since 2006 (USBR, 2017). Appendix C includes the Water Supply Charts for WWD from 1988 to 2017 (WWD, 2017) and Figure C-1 compares the annual Net CVP allocation with annual groundwater pumping and average groundwater elevations in WWD. As shown, in years when CVP allocations are significantly reduced, water demands are met by increased groundwater pumping. Figure B-1 shows a strong correlation between average regional groundwater elevations and the distribution of water supply between CVP allocations and groundwater pumping.

WWD does not supply groundwater to customers within WWD and currently does not regulate or control groundwater pumping (WWD, 2012). Individual landowners install their own wells and maintain facilities to pump their own groundwater. However, in 1996, WWD adopted a Groundwater Management Plan for its service area with the primary goals of preserving and enhancing reliability of groundwater resources, ensuring long-term availability of high-quality groundwater, maintaining local control of groundwater resources, and minimizing the cost and impacts of groundwater use (WWD, 1996). The Groundwater Management Plan and the more comprehensive Water Management Plan (WWD, 2012), which addresses CVP allocations and other supplies, outline a number of programs to assist with responsible management of

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groundwater resources within WWD. These programs include: surveying and evaluating water levels and water quality in wells; installing, upgrading, and maintaining water meters on private wells; and assisting farmers to increase irrigation efficiency.

4.2.3 Construction Water Supply - North Star Solar Project Groundwater Supply Well

Water demands for construction of the proposed Project will be satisfied using water from an existing supply well: North Star Well 14S14E11N010M. The North Star well is located northeast of the intersection of West California Avenue and San Bernardino Avenue (see Figure 2-2). Well construction details for the North Star supply well are summarized in Table 4-1.

State Well No.	Date Drilled	Well Diameter (inch)	Well Depth (feet)	Perforated Interval Depth (feet)
14S14E11N010M ^(c)	2000	16	900	NA

^(a) Source: URS Corporation, 2015
^(b) DWR Water Data Library (DWR, 2017) reports well and perforated interval depths of 900 feet and 560-880 feet, respectively.

The North Star well was used for water supply during construction of the North Star Solar Project. Observations collected when pumping the North Star well during construction of that project are summarized as follows (URS Corporation, 2015):

- The supply well was pumped at rates of up to 125 gpm during construction;
- When pumping the supply well, the observed drawdown was consistent with the predicted drawdown based on aquifer properties estimated from pumping tests conducted prior to construction; and
- When pumping of the well stopped, groundwater levels recovered to static levels in the aquifer prior to pumping.

The Project has rights to water from the North Star well per the Water Wells Access and Easement Agreement provided in Appendix A. Aboveground or belowground water line(s) may be installed from North Star to the Project site to convey water, water may be trucked from North Star to the Project site, and aboveground storage tanks may be used to store water at the Project site during construction.

4.2.4 Operation Water Supply - WWD M&I Water Supply Contract

The annual operational water demand for the proposed Project will be satisfied using deliveries from WWD under an M&I water supply contract. Appendix B, which includes WWD's comments provided to the County on the Notice of Preparation for the proposed Project's Draft EIR, WWD's Terms and Conditions for M&I Water Service, and Regulations Regarding the Application for and Use of M&I Water within WWD, provides documentation of the proposed operational water supply as follows:

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- WWD will make available up to 5 AFY per 160 acres annually for solar development operations; and
- The Project location is served by a water delivery system maintained by WWD.

The proposed Project is comprised of two sections of land divided into five parcels totaling approximately 1,288 acres. Based on the size of the proposed Project, WWD could make up to approximately 40 AFY of water available to the Project under M&I water service. Water delivered from WWD will require treatment for potable use within the O&M buildings.

4.3 Alternate Water Supply

Although the North Star well and WWD M&I water deliveries are anticipated to meet the proposed Project construction and operational water supply needs, respectively, alternate water supplies have been identified. Contingent water sources for construction of the Project include delivery from WWD or trucking water to the Project site from an offsite source. An alternative to WWD M&I delivery to meet annual operation water requirements is installation of a permanent pipeline from the North Star well to the Project site. These alternate water supplies—which would be used in the event the North Star well fails to provide adequate supply—are described below.

4.3.1 Alternate Construction Water Supply – Westlands Water District

WWD exercises provisions of its Agricultural Water Service Contract to supply M&I water incidental to agricultural purposes to commercial and industrial operations (WWD, 2018a). Article 19 of WWD’s Regulations Regarding the Application for and Use of M&I Water within WWD indicates that utility scale solar projects are eligible for M&I water (WWD, 2018b). Based on this, WWD could deliver M&I water to supplement the Project’s construction water demands.

Other WWD water supplies potentially available to the Project include flood flows from the San Joaquin and Kings Rivers. These water supplies are available on a year-by-year and seasonal basis, dependent on precipitation, and flow into the Mendota Pool, which is approximately 5 miles northeast of the Project site. Water from the Mendota Pool is delivered to WWD through the 7-1 Pumping Plant. The maximum water delivered from this source would be approximately 20,000 AF due to pumping plant limitations (WWD, 2012).

4.3.2 Alternate Construction Water Supply - Offsite Sources

In addition to WWD deliveries to supplement construction water supply, water could also be trucked in during construction of the proposed Project from an offsite source. The Project has identified an agricultural well approximately 1.5 miles west of the Project site, on W. California Avenue. The Project proponent had an agreement with the well owner to purchase water that was used during construction of a different solar project in 2015. Subject to a new agreement with the well owner, this well could be used to provide water, which would be trucked to the Project site.

4.3.3 Alternate Operational Water Supply - North Star Well

An alternative to WWD delivery for operational water demands would be water from the North Star well. The Project has rights to water from the North Star well per the Water Wells Access and Easement Agreement provided in Appendix A. Use of the North Star well to meet

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operational water demands would require installation of a permanent pipeline from the North Star well to the Project site.

4.4 Proposed Water Supply Availability and Reliability

The proposed Project will be supplied by the North Star groundwater well. There are many factors that can affect groundwater supply reliability, including current storage conditions, water quality, seasonal groundwater level variations, annual precipitation, and climate change.

The availability and reliability of water supply from the North Star well and WWD is summarized below based on published reports and available historical information.

4.4.1 Reliability of Groundwater from North Star Solar Project

Groundwater beneath the Project and North Star sites occurs under unconfined to semiconfined conditions in an upper aquifer system and under confined conditions in a lower aquifer system. The aquifers are separated by the 20-foot to 120-foot thick Corcoran Clay member of the Tulare Formation (DWR, 2006). The top of the Corcoran Clay is reported to occur at depths ranging from 450 to 500 feet below land surface near the Project site (Page, 1986). Numerous wells are reported to penetrate the Corcoran Clay, resulting in hydraulic interactions between the upper and lower aquifer systems. Based on their reported depths, the North Star Solar Project supply wells likely penetrate the Corcoran Clay.

Figure 4-1 provides hydrographs for the proposed North Star supply well, other wells completed in the lower aquifer, and long-term and annual average groundwater elevations in WWD for the lower aquifer from 1965 to 2017. Groundwater level data for the proposed North Star supply well and the other lower aquifer wells, which are located on the Project Site (North Star) and at the offsite location identified as a potential alternate source, were obtained from the DWR Water Data Library (DWR, 2017). Average groundwater elevations for WWD are based on information presented in the December 2015 Deep Groundwater Conditions Report (WWD, 2016b). Observations based on review of the groundwater elevation trends shown on Figure 4-1 are provided below.

- Water level records for the proposed North Star supply well and other lower aquifer wells are discontinuous for this period. When considered collectively, hydrographs for these wells generally mirror regional groundwater trends for the lower aquifer, as represented by the annual average groundwater elevations in WWD.
- The similarity between the proposed North Star supply well, other lower aquifer wells, and regional trends for the lower aquifer indicate the perforated section of these wells are either partially or completely beneath the Corcoran Clay.
- Average groundwater elevations for WWD are only available through 2015, but based on the trend observed in North Star Well 14S14E11N007M, regional groundwater levels have likely recovered relative to 2015 levels.
- Water levels are approaching the long-term average groundwater elevation from 1956 to 2015, suggesting the aquifer has recovered from significant groundwater pumping between 2013 and 2016 due to reductions in CVP allocations during the drought.

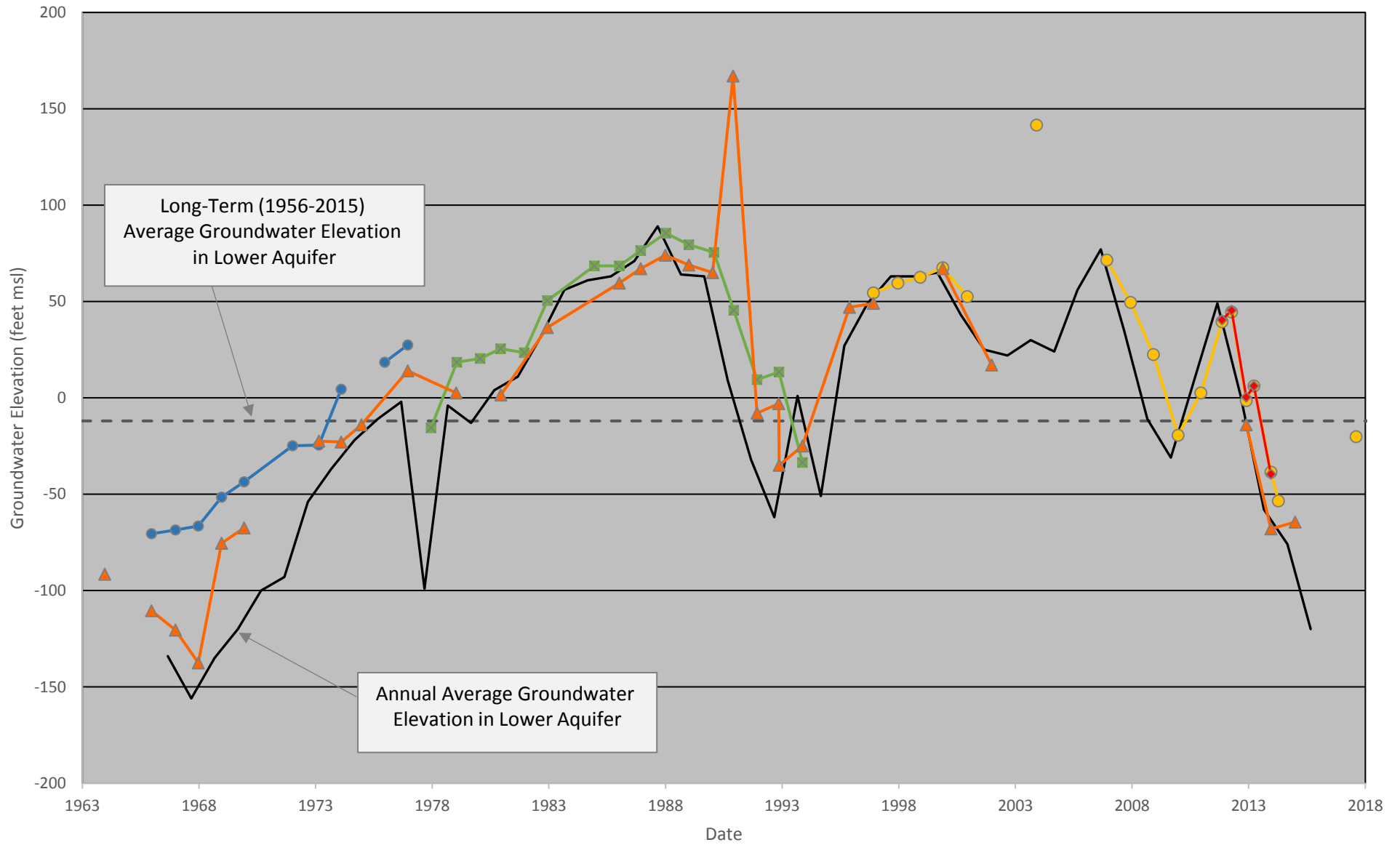
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Construction of the North Star Solar Project began in July 2014, which was a period following multiple dry years and above average groundwater pumping in WWD. During construction of the North Star project, the North Star supply well was used to meet construction water demands and pumped at rates capable of meeting the construction water supply demand for the proposed Project (URS, 2015). The historical data, aquifer testing results and prior use of the well during construction of the North Star project all support a conclusion that the North Star well will reliably supply the Project's expected construction water requirements of 200 AF over 12 to 14 months. For these same reasons, the North Star well would be a reliable source of water for the operational phase of the Project, if needed as an alternative to water from WWD.

4.4.2 Reliability of M&I Water from Westlands Water District

WWD will make available up to 5 AFY per 160 acres annually for solar development operations which, based on the size of the Project, equates to up to approximately 40 AFY of water potentially available to the Project (Appendix B). Based on review of the Regulations Regarding Application for and Use of M&I Water within WWD (WWD, 2018b), the quantity of water for M&I use may be reduced or temporary conservation measures may be imposed if WWD's water supply is insufficient to meet all water demands.

WWD delivers M&I water to government facilities, area businesses, and family homes. M&I water use within the WWD accounts for less than 6,500 AF, or less than 1 percent of annual water sales (WWD, 2012). It would require a reduction of greater than 87 percent of the 40 AFY potentially available to the Project for WWD M&I water supplies to fall short of the anticipated annual water demand of 5 AFY. Since the operational water demand is a small fraction of the M&I water potentially available to the Project, reductions below the operational demand of 5 AFY are not likely. Therefore, WWD M&I water deliveries are an available and reliable source to meet the operational water supply of 5 AFY for the Project.



- 14S14E11N007M (North Star)
- ◆ 14S14E11N010M (North Star - Proposed Supply Well)
- 14S14E14G003M (Little Bear)
- 14S14E14G004M (Little Bear)
- ▲ 14S14E09Q001M (Offsite Well)



Figure 4-1
Hydrographs for Proposed Supply Well and other Lower Aquifer Wells

Water Supply Assessment for Little Bear Solar Project

5.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON THE REQUIREMENTS OF SB 610

Water Code section 10910 states:

10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

Pursuant to Water Code section 10910(c)(4), and based on the evidentiary record and technical analyses described in this WSA, the water supplies determined to be available for the proposed Project will meet the projected water demand associated with the proposed Project, in addition to existing and planned future uses.

Following the one-time construction water requirement (200 AF over a 12 to 14-month construction period), the annual water demand is assumed to be 5 AFY for the anticipated 30-year life of the Project. For purposes of this WSA, no demand reductions are assumed during dry years. The estimated safe yield of the Westside Subbasin is approximately 200,000 AFY (WWD, 1996). The one-time construction demand for the proposed project is a small fraction of the estimated safe yield, amounting to 0.1 percent of the estimated safe yield. WWD M&I water use accounts for less than 6,500 AF, or less than 1 percent of annual water sales in WWD (WWD, 2012). The annual operational water demand for the Project is less than 0.1 percent of the M&I water use.

The evidentiary record and technical analyses described in this WSA indicate that groundwater supply from the North Star well and WWD M&I water delivery are sufficient to meet the construction and annual operational demand, respectively, for the proposed Project.

To ensure adequate supply to accommodate the projected water demand for the proposed Project, additional water supply sources were identified in this WSA. Alternate construction and operational water supplies include the following:

- **Alternate Construction Supply:** Based on the size of the Project site, WWD could make available up to 40 AFY of M&I water to the Project. This water could be used as an additional source to meet construction water supply demands. Water deliveries from offsite sources, such as the agricultural well 1.5 miles west of the Project site, could also be used as an additional source to meet construction water supply demands.
- **Alternate Operational Supply:** Water from the North Star well could be used as an alternative to WWD delivery for operational water demands. The well is an available source to the Project, per the agreement in Appendix A, and is sufficient to meet the annual operational water demand. Use of the North Star well to meet long-term operational water demands would require installation of a permanent pipeline from the North Star well to the Project site.

Water Supply Assessment for Little Bear Solar Project

6.0 WATER SUPPLY ASSESSMENT APPROVAL PROCESS

Water Code sections 10910 and 10911 state:

10910 (g)(1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

10911 (b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

As indicated above, this WSA must be included in the Draft EIR being prepared for the Project. The County, as the lead agency, is responsible for the review and approval process for the EIR and the proposed Project.

Water Supply Assessment for Little Bear Solar Project

7.0 REFERENCES

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APPENDIX A

Water Wells Access and Easement Agreement

FSFM-2021500296

FRESNO County Recorder
Paul Dictos, C.P.A.
DOC-
2015-0041039-00
Acct 3059-Fidelity National Title - Fresno
Tuesday, APR 07, 2015 15:25:41
Ttl Pd \$88.00 Rcpt # 0004288720
JFH/E1/1-24

RECORDING REQUESTED BY
AND WHEN RECORDED RETURN TO:

Farella Braun + Martel, LLP
235 Montgomery Street
San Francisco, CA 94104
Attn: Richard J. Rabbitt, Esq.

WATER WELLS ACCESS AND EASEMENT AGREEMENT

This **WATER WELLS ACCESS AND EASEMENT AGREEMENT** (this "**Agreement**") is dated as of ~~March~~ 4/7, 2015 by and between the following: (i) North Star Solar, LLC, a Delaware limited liability company ("**Grantor**" or "**Ground Lease Tenant**") and the following grantees: (ii) Little Bear Solar 1, LLC, a Delaware limited liability company ("**LB1**"), Little Bear Solar 2, LLC, a Delaware limited liability company ("**LB2**"), and First Solar Development, LLC, a Delaware limited liability company ("**FSD**") (each individually a "**Grantee**" and collectively as the "**Grantees**"). HA Northstar LLC, a Delaware limited liability company ("**Fee Owner**") is joining into this Agreement solely for the purpose of agreeing to the matters set forth on the joinder signature page below.

RECITALS

A. Fee Owner is the owner of that certain real property located within the unincorporated area of Fresno County, California and more particularly described in Exhibit A attached hereto and incorporated herein by this reference (the "**Property**"). Fee Owner has previously entered into that certain Solar Facility Ground Lease, dated July 17, 2014 ("**Ground Lease**"), with Ground Lease Tenant, which encumbers all of the Property, as evidenced by that certain Short Form of Solar Facility Ground Lease, dated and recorded July 17, 2014 as Document No. 2014-0078840-00 with the Fresno County Recorder.

B. As provided in the Ground Lease, the property that Fee Owner leased to Ground Lease Tenant as part of the Property included, without limitation, any and all water rights owned by Fee Owner and associated with the Property. Pursuant to the Ground Lease, Ground Lease Tenant has certain rights to assign its interest in the water rights, in whole or in part, as provided in the Ground Lease. Pursuant to such rights, Ground Lease Tenant is entering into this Agreement to partially assign to Grantees certain groundwater well rights, and to provide Grantees with certain associated access rights, all with respect to two (2) wells on the Property and in order to permit Grantees to use certain groundwater from the Property, all as more fully as set forth below in, and subject to all of the terms and conditions of, this Agreement.

AGREEMENT

NOW THEREFORE, incorporating the foregoing and in consideration of the recitals and of the mutual covenants set forth below, the parties agree as follows:

1. Grant of Easement. Grantor hereby grants to each Grantee a separate non-exclusive easement (each, an “**Easement**” and collectively the “**Easements**”) over those portions of the Property described on Exhibits B-1 and B-2 attached hereto for the purpose of taking and using water from the two (2) wells identified and shown on Exhibits B-1 and B-2 (the “**Wells**”), together with associated rights to access the Wells by means of the access routes shown on Exhibit C attached hereto. The Easements include rights to maintain, and repair the Wells. The purpose and intent of such Easements is to grant to each Grantee the right to obtain water from the Wells and transport it to any of those specific properties identified on Exhibit D and to any other property within three (3) miles of the boundary line of the Property that each Grantee or its affiliates may develop, construct, own, lease, use, operate, or manage for a solar energy project and associated uses. Pursuant to the preceding sentence, the water may be used by each Grantee in connection with the development, construction, operation, use, and management of a solar project on each such property but may not be used by any Grantee for other purposes or sold to third parties. Without limitation of the foregoing, Exhibit D-1 identifies a specific property that LB1 intends to develop and for which it may use the water, Exhibit D-2 identifies a specific property that LB2 intends to develop and for which it may use the water, and Exhibit D-3 identifies a specific property that FSD may intend to develop and for which it may use the water. Each Easement will have a term expiring on the earlier of the date of the expiration or termination of the Ground Lease or July 17, 2054, being the date that is forty (40) years from and after July 17, 2014. The Easements being granted are easements in gross, subject to the provisions of Section 12(1) below with respect to each Easement becoming appurtenant to adjacent or nearby land that may be subsequently acquired (in fee or through a leasehold interest) by a Grantee. Grantor will not be entitled to any payment from any Grantee with respect to each Grantee’s use of the water, provided, however, that, to the extent that Grantee’s use of the Wells requires further construction, replacement, repair and maintenance of the Wells or any improvements associated with same, each Grantee shall pay its respective share of any and all such costs and Grantor will have no liability for same. Each Grantee agrees that its use and enjoyment of its Easement shall be undertaken in a manner that does not interfere with Grantor’s use and enjoyment of its Property for the construction, development, operation, use, and management of its solar energy project and associated uses.

2. Allocation of Water from Wells. The water from the Wells is intended to be used by both Grantor and the Grantees for their respective solar energy projects and the parties agree to reasonably cooperate consistent with that agreed purpose and intent. In the event that there is insufficient water from the Wells to satisfy the project needs of each party, the water from the Wells shall be allocated in the following order of priority as follows: (i) first, to Grantor, whatever water is necessary for Grantor’s construction, development, operation, use, and management of its solar energy project and associated uses on the Property, but not otherwise; and (ii) second, the remaining water to each Grantee on a pari-passu basis for each such Grantee’s construction, development, operation, use, and management of its respective solar energy project and associated uses on its respective property or properties.

3. Water Access and Use Plan. In order to facilitate each party’s use of water from the Wells consistent with the rights and obligations under this Agreement, Grantor will have the right to require, and to reasonably approve, a specific plan from each Grantee that covers the manner and means by which each Grantee proposes to access the Wells, remove water, and transport it to each Grantee’s respective property, including an estimate as to the approximate

amount of water that such Grantee intends to use for a given period of time, which estimate may be revised from time to time. Upon request of Grantor, each Grantee shall prepare a plan and deliver it to Grantor within sixty (60) days of the request. Within thirty (30) days of its receipt, Grantor shall provide any comments to such Grantee and shall not unreasonably withhold its approval of such plan. Grantor's review and approval will be limited to identifying whether the proposed plan would interfere with Grantor's solar energy project or otherwise be inconsistent with the rights and responsibilities of the parties under this Agreement. Without limitation of the right of a Grantee to use vehicles to extract and transport water as necessary and consistent with the foregoing requirements, it is acknowledged and agreed that any such plan may include a request by a Grantee for the installation and use of a temporary water pipeline for the transport of water from one or both Wells to one or more properties of such Grantee, to be located along a route mutually acceptable to both Grantor and the requesting Grantee, and Grantor will not unreasonably withhold its consent to use of such a pipeline subject to the other requirements and limitations set forth in this Agreement.

4. Reduction or Elimination of Water from Wells. If at any time Grantor determines, in its reasonable discretion based on a written explanation of Grantor's determination and the reasons for same, that the priority of water allocation set forth in Section 2 above requires that water use by any Grantee must be reduced or eliminated for a given period of time, then Grantor shall be entitled to reduce or eliminate the water otherwise allocable to such Grantee for a given period of time on the following terms and conditions:

a) Except in an emergency, Grantor shall give each Grantee at least five (5) business days written notice prior to reducing or eliminating any water use by Grantees.

b) If Grantor has previously approved a specific water use plan by a Grantee pursuant to Section 3 above, Grantor may not reduce or eliminate water use by such Grantee during the period of time covered by the approved water plan and with respect to the amount of water described in the approved water plan, unless there is a material change in facts or circumstances indicating that sufficient water will not be available from the Wells to provide the priority allocation to Grantor set forth in Section 2 above.

5. New Wells. The Easements granted herein will also govern any replacement wells drilled by Grantor on the Property, subject to the following terms and conditions. If the Wells run dry, and if Grantor, in its sole discretion, elects to drill a replacement well (a "**Replacement Well**"), each Grantee will have the same rights with respect to water use for such Replacement Well as are set forth in this Agreement with respect to the Wells, provided, however, that each Grantee shall be required, as a condition to its exercise of any such rights, to reimburse Grantor for its then applicable percentage share (such applicable percentage share being equivalent to a fraction where the numerator is 1 and the denominator is a number equal to one plus the number of Grantees having exercised their rights under this Agreement) of the costs of drilling such Replacement Well and the costs of any associated new equipment or improvements such that, collectively, Grantor will be responsible for its percentage share of the replacement well costs and the Grantees will collectively be responsible for their applicable aggregate percentage share of such replacement well costs. For the avoidance of doubt, the parties agree that a Grantee will not be subject to cost sharing unless and until it has given notice to Grantor that it is electing to exercise its rights under this Agreement to access and extract

water; in addition, the respective percentage shares of the parties are subject to further adjustment (in accordance with the formula set forth above) if a Grantee's interest is terminated or quitclaimed. If a Replacement Well is drilled, within thirty (30) days after (i) completion of the drilling and any associated improvements and installation of equipment for same on the Property, (ii) payment by each Grantee of its respective share of the costs for same, and (iii) a request by a Grantee, Grantor shall have a legal description prepared by a licensed surveyor showing the location of the Replacement Well on the Property. Each Grantee may elect, by prior written notice to Grantor, to record the exact location of its Easement with respect to such Replacement Well, and Grantor shall cooperate with the requesting party in executing documents necessary to so fix and record the location of the Replacement Well governed by such Grantee Easement.

6. Maintenance Cost Obligations. Grantor shall use commercially reasonable efforts to maintain the Wells and the improvements and equipment associated with same in good repair and sound condition and free of hazards. Each Grantee shall be responsible for its percentage share (subject to the limitations set forth above, including the requirement that a Grantee provide notice that it is electing to exercise its rights under this Agreement) of all costs for maintaining, repairing, replacing, and operating the Wells (and associated improvements and equipment). In addition, each Grantee's Easement rights include the right, at each Grantee's sole cost and expense, to maintain and repair the Wells if Grantor fails to do so.

7. Indemnification. Each of the Grantees hereby agree to indemnify, defend, protect and hold harmless Grantor and the other Grantees, and their officers, directors, employees, agents, contractors and visitors ("**Indemnified Parties**") from and against any and all claims, demands, liabilities, losses, costs, damages, liens, suits, judgments, taxes and penalties, including without limitation, reasonable attorneys' fees and costs, expert witness fees and costs and court costs (collectively, "**Claims**"), arising out of (i) the entry onto the Property by such indemnifying Grantee and its consultants and contractors, or anyone acting on behalf of such Grantee or such consultants and contractors, (ii) the installing, constructing, using, operating, maintaining, repairing and replacing of any improvements by such indemnifying Grantee to the extent permitted by this Agreement, and (iii) such indemnifying Grantee's failure to comply with any obligation imposed upon it or to cause such Grantee's consultants or contractors to comply with any obligation imposed upon them, under this Agreement, including, without limitation, injury or death to third parties and damage to or loss of personal property, any damage to or interference with the improvements, facilities, or operations of Grantor, and any contamination of the Wells, water and property with hazardous materials or substances, except for any claims that are the result of the gross negligence or willful misconduct of the Indemnified Parties. Grantor hereby agrees to indemnify, defend, protect and hold harmless each of the Grantees, and their officers, directors, employees, agents, contractors and visitors from and against any and all Claims arising out of Grantor's failure to comply with any obligation imposed upon it under this Agreement. The indemnification provisions in this Section 7 shall be enforceable to the fullest extent permitted by law and shall survive termination of this Agreement for any reason.

8. Subject to Laws. This Agreement shall at all times be subject to any and all laws, ordinances, and governmental regulations and orders, whether federal, state, county or city, and any modifications made to this Agreement or to the conduct of the parties under this Agreement

caused by any such laws, ordinances, regulations or orders shall not impose liability on any party hereto for breach of its duties under this Agreement.

9. Insurance. Each Grantee shall maintain that insurance required under that separate Grant of Easements Agreement (Little Bear Easements on North Star Project Site), of substantially even date herewith.

10. No Liens. Each Grantee shall keep the Property free of liens of any kind, and shall cause any claim of lien arising from such Grantee's or its contractors' acts or omissions to be removed within ten (10) days.

11. No Warranties. The grants of the Easements are subject to all matters of record as of the date hereof, and all rights and conditions which would be disclosed by inspection of the Property or due inquiry. Grantor makes no representation or warranty regarding any of the following: (a) the condition of title and each Grantee shall obtain title insurance if it desires title assurances of any kind; (b) the condition of the Property or the suitability of the Wells for Grantee's intended use; and (c) the quality or quantity of water available from the Wells.

12. Miscellaneous.

a) Successors and Assigns. The terms and conditions of this Agreement shall be binding upon and inure to the benefit or burden of the parties hereto and their heirs, legal representatives, successors, and assigns.

b) Notices. Any notice permitted or required herein may be delivered either personally or by U.S. mail, certified or registered, return receipt requested, with all postage prepaid or by messenger or courier service which provides one day delivery service with written confirmation of delivery. If delivery is by mail, it shall be deemed effective on the date of receipt or refusal by the addressee, as evidenced by the date on the return receipt, or, if no such date is specified on the return receipt, seventy-two (72) hours after a copy of the same has been deposited in the United States mail, postage prepaid, addressed to each person at the address set forth below or to such other address or addresses as either party may from time to time designate in writing to the other.

c) Time. Time is of the essence for the payment and performance of all obligations under this Agreement.

d) Covenant of Further Assurances; Cooperation. The parties hereby agree to execute such other documents and perform such other acts as may be necessary or desirable to carry out the purposes of this Agreement. The parties hereto shall reasonably cooperate to effectuate the intent and purposes of this Agreement, including, without limitation, cooperating with respect to obtaining any approvals, permits, or other consents related to the use and operation of the Wells or any Replacement Well.

e) Attorneys' Fees. In the event of any controversy, claim or action, whether based on contract, tort or other cause of action, being filed between the parties respecting or in any way relating to this Agreement, the prevailing party shall be entitled, in addition to all expenses, fees, consultant and expert witness fees, costs or damages, to reasonable attorneys'

fees, whether or not such controversy was litigated or prosecuted to judgment, including without limitation, all fees, costs and expenses incurred in connection with any proceedings under the United States Bankruptcy Code involving any party to this Agreement. Any attorneys' fees and other costs and expenses incurred by either party in enforcing a judgment in its favor under this Agreement shall be recoverable separately from and in addition to any other amount included in such judgment, and such attorneys' fees obligation is intended to be severable from the other provisions of this Agreement and to survive and not be merged in any such judgment.

f) Partial Invalidity. If any term, covenant or condition of this Agreement or its application to any persons or circumstances shall be held to be invalid or unenforceable, the remainder of this Agreement and the application of such term or provision to other persons or circumstances shall not be effected, and each term hereof shall be valid and enforceable to the fullest extent permitted by law.

g) Not a Public Dedication. Nothing contained in this Agreement shall be deemed to be a gift or dedication of any portion of the Property to or for the general public or for any public purpose.

h) Governing Law and Venue. This Agreement is entered into and shall be governed by and construed in accordance with the laws of the State of California. If any legal or equitable action is necessary to enforce the terms of this Agreement, such action shall be brought in San Francisco County, State of California.

i) Entire Agreement. This document represents the entire and only agreement between the parties respecting the grant of the Easements and supersedes all other prior and contemporaneous agreements, whether oral or written, express or implied. This Agreement may not be amended or modified except by a writing signed by the party against whom enforcement is sought.

j) Compliance with Laws. Each party shall comply with all applicable laws, ordinances, codes, rules, regulations, orders, consents and permits in the performance of all their obligations under this Agreement.

k) No Waiver. No consent or waiver by any party to or of any breach or non-performance of any representation, condition, covenant or warranty shall be enforceable unless in a writing signed by the party entitled to enforce performance, and such signed consent or waiver shall not be construed as a consent to or waiver of any other breach or non-performance of the same or any other representation, condition, covenant, or warranty.

l) Easements to Run With Land. The parties agree that all of the covenants and easements created and/or described in this Agreement shall run with the land and shall burden the Property and benefit the Grantee properties. Each Grantee's rights hereunder shall be in gross (without any limitation on transferability) until such time as each Grantee or its successor or assign acquires a fee or leasehold interest in any property referenced in Section 1 above or falling within the parameters set forth in Section 1 above; at, and from and after such time, the rights hereunder for such Grantee shall attach and be appurtenant to, and run with, such

acquired fee or leasehold property, automatically and without the need for any further action by Grantor or such Grantee.

m) Right of a Grantee to Quitclaim Its Easement Interests. Upon written notice from a Grantee to all other parties hereto that it has elected to terminate, relinquish, and quitclaim its rights hereunder and upon delivery and recordation of a quitclaim from such Grantee to Grantor, such Grantee will be released from any further liability hereunder, except for liabilities accruing prior to such quitclaim and except for any obligations hereunder that expressly survive such a termination. Upon any such quitclaim, the percentage shares of the Grantor and the remaining Grantees with respect to cost sharing for the Wells (as set forth in Sections 5 and 6) shall be adjusted accordingly.

n) Exhibits. All recitals and exhibits referred to in this Agreement are incorporated herein by reference and shall be deemed part of this Agreement.

o) Authority. Each of the individuals executing this Agreement on behalf of a party individually represents and warrants that he or she has been authorized to do so and has the power to bind the party for whom they are signing.

p) Counterparts. This Agreement may be executed in any number of original counterparts, all of which evidence only one agreement, binding on all parties, even though all parties are not signatories to the same counterpart.

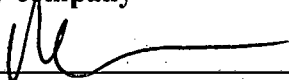
[Signature pages follow.]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date and year first above written.

Grantor:

North Star Solar, LLC, a Delaware limited liability company

TAB

By: 

Name: Richard A. Lammers

Its: VP-Asset Management

Grantees:

Little Bear Solar 1, LLC, a Delaware limited liability company

By: 



Name: Richard A. Lammers

Its: VP-Asset Management

Little Bear Solar 2, LLC, a Delaware limited liability company


By: 



Name: Richard A. Lammers

Its: VP-Asset Management

First Solar Development, LLC, a Delaware limited liability company

By: 



Name: Richard A. Lammers

Its: VP-Asset Management

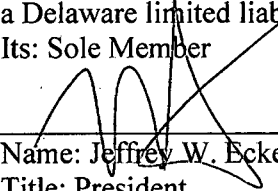
Limited Joinder by Fee Owner:

Fee Owner is joining into this Agreement solely for purposes of confirming that the Ground Lease provides for the assignment and grant of rights by Grantor hereunder and to confirm that no consent or approval from Fee Owner is required for the grant of the Easements hereunder to be fully effective and enforceable pursuant to the terms of this Agreement.

Fee Owner:

HA Northstar LLC
a Delaware limited liability company

By: HA LAND LEASE HOLDINGS LLC,
a Delaware limited liability company,
Its: Sole Member

By: 
Name: Jeffrey W. Eckel
Title: President

ALL-PURPOSE CERTIFICATE OF
ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of Texas
County of Harris

On March 26, 2015 before me, Michelle Hendrickson
Notary Public, personally appeared Richard A. Lammers,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are
subscribed to the within instrument and acknowledged to me that he/she/they executed the same
in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument
the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Texas that the
foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Michelle Hendrickson
Signature of Notary Public

(Notary Seal)



CALIFORNIA ALL-PURPOSE
CERTIFICATE OF ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of Maryland

County of Anne Arundel

On March 26, 2015 before me, Polly Ortlieb,
Notary Public, personally appeared Jeffrey W. Feibel,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are
subscribed to the within instrument and acknowledged to me that he/she/they executed the same
in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument
the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Maryland that the
foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Polly Ortlieb

Signature of Notary Public

(Notary Seal)

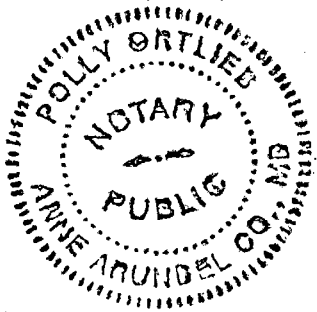


EXHIBIT A

Description of Grantor Property

The land referred to herein below is situated in the unincorporated area, County of Fresno, State of California and is described as follows:

Lots 49 to 52, inclusive, Lots 61 to 64, inclusive, Lots 67 and 68, Lots 77 and 78, and Lot E of Valley Verde Colony, according to the map thereof recorded in Book 3 Page 59 of Record of Surveys, Fresno County Records. Together with that portion of Kearney Avenue (formerly Sultana Avenue) (abandoned), which would pass by a conveyance of said land under Sections 1112 and 831 of the Civil Code.

EXCEPTING THEREFROM an undivided one-half interest in all oil, gas and minerals on, in and under said real estate, with the right at all times to explore, drill for, mine and remove the same, together with all other rights and privileges incident thereto, as reserved in the deed from General American Life Insurance Company, a corporation, to Russell Giffen, dated March 14, 1941, recorded March 25, 1941, in Book 1904 Page 497 of Official Records, Document No. 11004.

ALSO EXCEPTING THEREFROM an undivided 25% of 100% of all oil, gas and other hydrocarbons and minerals on, in or under said real property, as reserved in the deed from Anderson, Clayton & Co., a Delaware Corporation, to Dudley J. Silveira, et al, recorded December 31, 1974, as Document No. 96737.

APN 019-050-56ST

Lots 65, 66, 79 and 80 of Valley Verde Colony, according to the map thereof recorded in Book 3 Page 59 of Record of Surveys, Fresno County Records. Together with that portion of Kearney Avenue (formerly Sultana Avenue) (abandoned), which would pass by a conveyance of said land under Sections 1112 and 831 of the Civil Code.

EXCEPTING THEREFROM an undivided one-half interest in all oil, gas and minerals on, in or under said real estate, with the right at all times to explore, drill for, mine and remove the same, together with all other rights and privileges incident thereto, as reserved in the deed from Great American Life Insurance Company, a corporation, to Russell Giffen, dated March 14, 1941, recorded March 25, 1941, in Book 1904 Page 497 of Official Records, Document No. 11004.

ALSO EXCEPTING THEREFROM an undivided 25% of 100% of all oil, gas and other hydrocarbons and minerals on, in or under said real property, as reserved in the deed from Anderson, Clayton & Co., a Delaware Corporation, to Dudley J. Silveira, et al, recorded December 31, 1974, as Document No. 96737.

APN: 019-050-55ST

With the foregoing as modified by that certain Notice of Merger by Fresno County, dated July 18, 2014, and recorded July 23, 2014, as Document No. 2014-0081211.

EXHIBIT B-1

Description of Well Site 14S/14E-11N10 Easement Area

**LEGAL DESCRIPTION
OF THE WELL SITE 14S/14E-11N10 EASEMENT
APN: 019-050-56ST**

That certain parcel of land situated in the unincorporated territory of the County of Fresno, State of California, being that portion of Lot E of Valle Verde Colony, filed in Book 3, Page 59 of Record of Surveys in the office of the County Recorder of said County, included within a strip of land 25.00 feet wide, the centerline of which is described as follows:

COMMENCING at the southwesterly corner of Section 11, Township 14 South, Range 14 East, Mount Diablo Meridian according to the official plat thereof being marked by a County of Fresno brass cap in a monument well, the southeasterly corner of said Section 11 bearing South 89°19'41" East and being marked by a County of Fresno brass cap in a monument well as shown on Record of Survey filed in Book 23, Page 24 of Records of Survey in the Office of the County Recorder of Fresno County, thence along the westerly line of said Section 11, North 01°18'12" East 905.02 feet; thence leaving said westerly line, South 88°41'48" East 33.39 feet to the **TRUE POINT OF BEGINNING**; thence continuing South 88°41'48" East 25.00 feet.

Unless otherwise described, all bearings and distances shown hereon are in grid based on the California Coordinate System of 1983, CCS Zone IV (Epoch 2007.00), based locally upon the CGPS Stations "ALEX 5 (DH6668)" and "GIGI 2003 (DH6678)" as published by the National Geodetic Survey (NGS) and shown on a map filed in Book 56, Pages 44 through 67 of Record of Surveys in the Office of the County Recorder of said Fresno County. To obtain ground distances, divide the distances herein by 0.99993740.

CONTAINING: 625 Square Feet, more or less

ATTACHMENT "A" attached and by this reference made a part hereof.

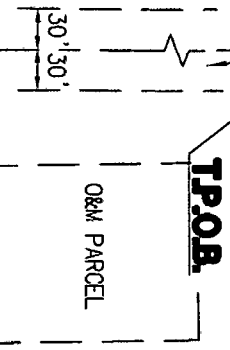
Kurt R. Troxell

Kurt R. Troxell, L.S. 7854

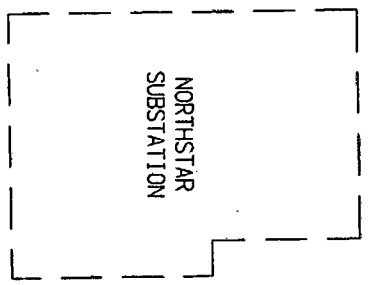
3/23/15



SEE DETAIL 'A' MIDDLE RIGHT



R.S.B.
3 / 59
LOT 77



SEC. 11
T.14 S., R.14 E., M.D.M.

WELL SITE
14S/14E-11N07

SAN BERNARDINO AVENUE
N01° 18' 12" E 905.02'

SW COR
SEC 11

P.O.C.

SOUTHERLY LINE OF SECTION 11

T.14 S., R.14 E., M.D.M.

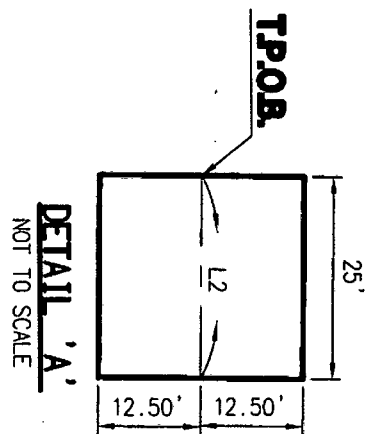
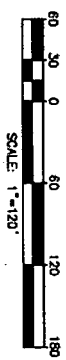
SEC. 14

W. CALIFORNIA AVENUE
S89° 19' 41" E (BASIS OF BEARINGS)

SE COR
SEC 11

OHIO AVENUE

LINE DATA TABLE			
NO.	BEARING	LENGTH	
L1	N88° 41' 48" E	33.39'	
L2	N88° 41' 48" E	25.00'	



DETAIL 'A'
NOT TO SCALE

ATTACHMENT 'A'

SKETCH TO ACCOMPANY A
LEGAL DESCRIPTION OF
WELL SITE 14S/14E-11N10
EASEMENT
APN: 019-050-56ST

CONTAINING: 625 SQ. FT.

BASIS OF BEARINGS

UNLESS OTHERWISE DESCRIBED, ALL BEARINGS AND DISTANCES SHOWN HEREON ARE IN GRID BASED ON THE CALIFORNIA COORDINATE SYSTEM OF 1983, OCS ZONE 1V (EPOCH 2007.00), BASED LOCALLY UPON THE CORS STATIONS "ALEX 5 (046668)" AND "GIGI 2003 (046678)" AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY (NGS) AND SHOWN ON A MAP FILED IN BOOK 56, PAGES 44 THROUGH 67 OF RECORD OF SURVEYS IN THE OFFICE OF THE COUNTY RECORDER OF SAID FRESNO COUNTY.

TO OBTAIN GROUND DISTANCES, DIVIDE THE DISTANCES HEREIN BY 0.99993740.



MARCH 11, 2015

PLANNING ■ DESIGN ■ CONSTRUCTION
SHEET 1 OF 1 SHEET
1025 ALTON PARKWAY
FRESNO, CALIFORNIA 93720-0022
949.272.8005 • FAX 949.272.8079 • WWW.RBF.COM
R# 145329

H:\DATA\145329\CAD\MAPPING\EXHIBITS\LEGAL DESCRIPTIONS\145329-LG-WELL-SITE-14S-14E-11N10-ESKETCH.DWG CRIBBLE 3/23/15 10:48 am

EXHIBIT B-2

Description of Well Site 14S/14E-11N07 Easement Area

**LEGAL DESCRIPTION
OF THE WELL SITE 14S/14E-11N07 EASEMENT
APN: 019-050-56ST**

That certain parcel of land situated in the unincorporated territory of the County of Fresno, State of California, being that portion of Lot E of Valle Verde Colony, filed in Book 3, Page 59 of Record of Surveys in the office of the County Recorder of said County, included within a strip of land 25.00 feet wide, the centerline of which is described as follows:

COMMENCING at the southwesterly corner of Section 11, Township 14 South, Range 14 East, Mount Diablo Meridian according to the official plat thereof being marked by a County of Fresno brass cap in a monument well, the southeasterly corner of said Section 11 bearing South 89°19'41" East and being marked by a County of Fresno brass cap in a monument well as shown on Record of Survey filed in Book 23, Page 24 of Records of Survey in the Office of the County Recorder of Fresno County, thence along the westerly line of said Section 11, North 01°18'12" East 101.88 feet; thence leaving said westerly line South 88°41'48" East 78.73 feet to the **TRUE POINT OF BEGINNING**; thence continuing South 88°41'48" East 25.00 feet.

Unless otherwise described, all bearings and distances shown hereon are in grid based on the California Coordinate System of 1983, CCS Zone IV (Epoch 2007.00), based locally upon the CGPS Stations "ALEX 5 (DH6668)" and "GIGI 2003 (DH6678)" as published by the National Geodetic Survey (NGS) and shown on a map filed in Book 56, Pages 44 through 67 of Record of Surveys in the Office of the County Recorder of said Fresno County. To obtain ground distances, divide the distances herein by 0.99993740.

CONTAINING: 625 Square Feet, more or less

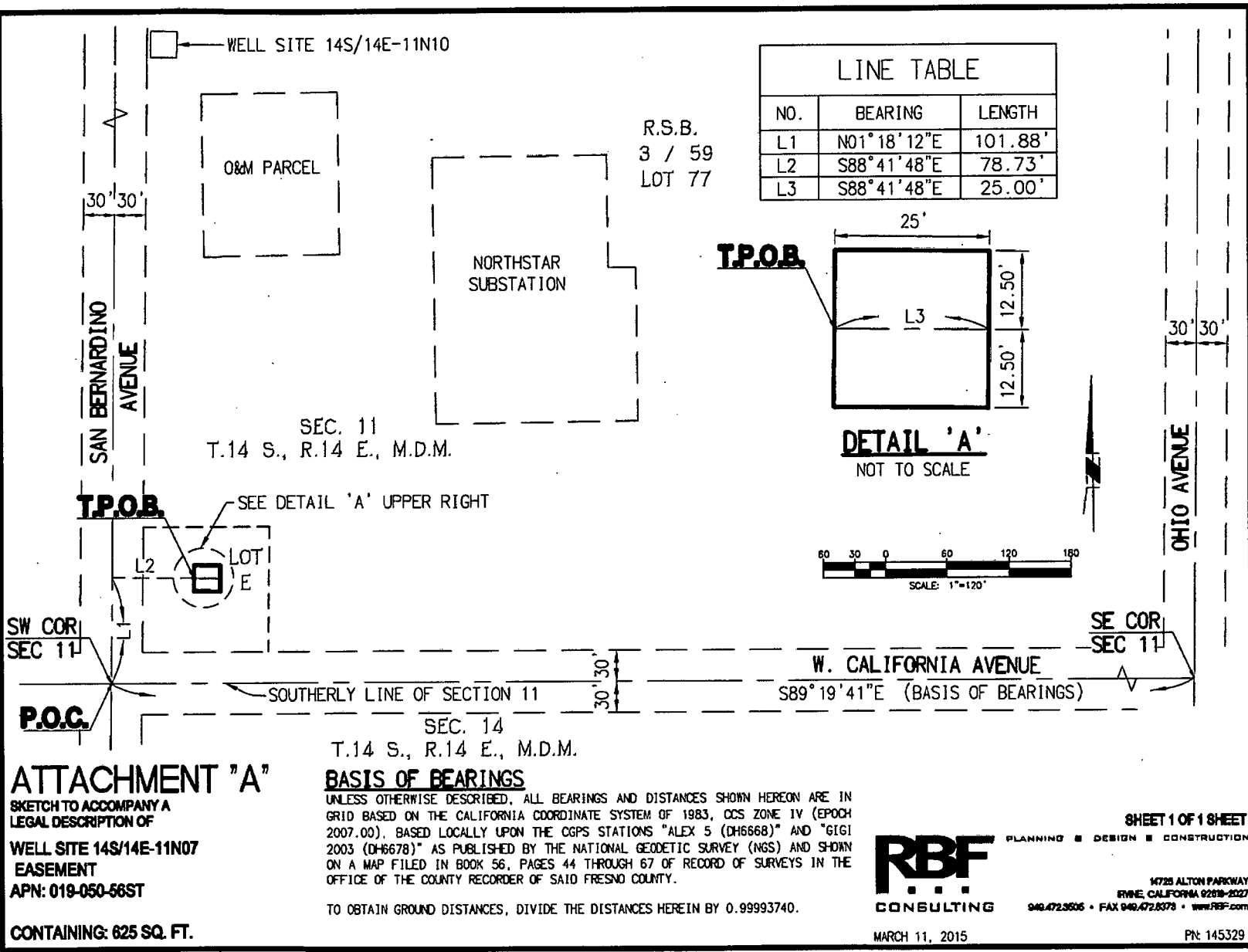
ATTACHMENT "A" attached and by this reference made a part hereof.

Kurt R. Troxell

Kurt R. Troxell, L.S. 7854

3/23/15





ATTACHMENT "A"
 SKETCH TO ACCOMPANY A
 LEGAL DESCRIPTION OF
 WELL SITE 14S/14E-11N07
 EASEMENT
 APN: 019-050-56ST
 CONTAINING: 625 SQ. FT.

BASIS OF BEARINGS
 UNLESS OTHERWISE DESCRIBED, ALL BEARINGS AND DISTANCES SHOWN HEREON ARE IN GRID BASED ON THE CALIFORNIA COORDINATE SYSTEM OF 1983, CCS ZONE IV (EPOCH 2007.00). BASED LOCALLY UPON THE CGPS STATIONS "ALEX 5 (DH6668)" AND "GIGI 2003 (DH6678)" AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY (NGS) AND SHOWN ON A MAP FILED IN BOOK 56, PAGES 44 THROUGH 67 OF RECORD OF SURVEYS IN THE OFFICE OF THE COUNTY RECORDER OF SAID FRESNO COUNTY.
 TO OBTAIN GROUND DISTANCES, DIVIDE THE DISTANCES HEREIN BY 0.99993740.

RBF CONSULTING PLANNING ■ DESIGN ■ CONSTRUCTION
 SHEET 1 OF 18 SHEET
 14725 ALTON PARKWAY
 IRVINE, CALIFORNIA 92618-2027
 949.472.3506 • FAX 949.472.8378 • www.RBF.com
 MARCH 11, 2015
 PN: 145329

H:\PDATA\145329\CADD\MAPPING\EXHIBITS\LEGAL DESCRIPTIONS\145328-LQL-WELL-SITE-14S-14E-11N07-ESMT.DWG CRIEHL 3/23/15 10:46 am

EXHIBIT C

Access Road Easements for Wells Sites over Grantor's Property

LEGAL DESCRIPTION OF THE WATER WELL ACCESS EASEMENT

APN: 019-050-56ST

Those certain parcels of land situated in the unincorporated territory of the County of Fresno, State of California, being those portions of Lot 77 and Lot "E" of Valle Verde Colony, filed in Book 3, Page 59 of Record of Surveys in the office of the County Recorder of said County, more particularly described as follows:

PARCEL #1

A strip of land of variable width, the reference line of which is described as follows:

COMMENCING at the southwesterly corner of Section 11, Township 14 South, Range 14 East, Mount Diablo Meridian according to the official plat thereof being marked by a County of Fresno brass cap in a monument well, the southeasterly corner of said Section 11 bearing South 89°19'41" East and being marked by a County of Fresno brass cap in a monument well as shown on Record of Survey filed in Book 23, Page 24 of Records of Survey in the Office of the County Recorder of Fresno County, thence along the southerly line of said Section 11, South 89°19'41" East 565.50 feet to the **TRUE POINT OF BEGINNING**; thence North 00°42'27" East 57.42 feet to a point hereinafter referred to as Point "A"; thence continuing North 00°42'27" East 172.56 feet to a point hereinafter referred to as Point "B"; thence continuing North 00°42'27" East 623.19 feet to a point hereinafter referred to as Point "C"; thence continuing North 00°42'27" East 66.00 feet.

Said Strip shall be 50.00 feet wide, lying 25.00 feet westerly and 25.00 feet easterly of said reference line between the **TRUE POINT OF BEGINNING** and said Point "B", and 65.00 feet wide, lying 40.00 feet westerly and 25.00 feet easterly of said reference line between Point "B" and terminus of said parcel.

EXCEPTING THEREFROM the southerly 30.00 feet of said Section 11, more particularly being the County Road commonly known as W. California Avenue.

PARCEL #2

COMMENCING at the previously aforementioned Point "A" in Parcel #1; thence North 89°17'33" West 25.00 feet to a point on the westerly line of previously described said Parcel #1, said point also being the **TRUE POINT OF BEGINNING**; thence leaving said westerly line, North 54°05'05" West 48.96 feet; thence North 89°17'33" West 325.78 feet to the beginning of a tangent curve, concave southeasterly and having a radius of 50.00 feet; thence southwesterly along said curve 45.16 feet through a central angle of 51°45'12" to a point of reverse curve, concave easterly and having a radius of 55.00 feet; thence southwesterly, southerly, northwesterly, northerly, northeasterly, easterly and southeasterly along said curve 272.15 feet through a central angle of 283°30'24" to a point of reverse curvature, concave northwesterly and

having a radius of 50.00 feet; thence southeasterly along said curve 45.16 feet through a central angle of 51°45'12" to a line parallel with and 30.00 feet northerly of that certain course described hereinbefore as having a bearing and distance of "North 87°17'33" West 325.78 feet"; thence along said parallel line South 89°17'33" East 325.78 feet; thence North 48°43'13" East 53.81 feet to the westerly line of said Parcel #1; thence along said westerly line South 00°42'27" West 94.23 feet to the **TRUE POINT OF BEGINNING**.

PARCEL #3

COMMENCING at the previously described Point "C"; thence North 89°17'33" West 40.00 feet to a point on the westerly line of previously described said Strip #1, said point also being the **TRUE POINT OF BEGINNING**; thence North 47°18'19" West 53.81 feet; thence North 89°17'33" West 347.87 feet to the beginning of a tangent curve, concave southeasterly and having a radius of 50.00 feet; thence southwesterly along said curve 45.16 feet and through a central angle of 51°45'12" to a point of reverse curve, concave northwesterly and having a radius of 55.00 feet; thence southwesterly along said curve 66.23 feet and through a central angle of 68°59'50" to the easterly Right-of-way line of San Bernardino Avenue; thence northerly along said easterly Right-of-way line, North 01°18'12" East 105.39 feet to a point of a non-tangent curve, concave southwesterly and having a radius of 55.00 feet, a radial line from said point bears South 15°20'41" East; thence leaving said easterly Right-of-way line, easterly and southeasterly along said curve 65.09 feet and through a central angle of 67°48'20" to a point of a reverse curve, concave northeasterly and having a radius of 50.00 feet; thence southeasterly along 45.16 feet and through a central angle of 51°45'12" to a line parallel with and 30.00 feet northerly of that certain course described hereinbefore as having a bearing and distance of "North 87°17'33" West 347.87 feet"; thence along said parallel line, South 89°17'33" East 387.87 feet to the westerly line of said Parcel#1; thence along said westerly line, South 00°42'27" West 66.00 feet to the **TRUE POINT OF BEGINNING**.

CONTAINING (Total): 97,542 Square Feet, more or less

Unless otherwise described, all bearings and distances shown hereon are in grid based on the California Coordinate System of 1983, CCS Zone IV (Epoch 2007.00), based locally upon the CGPS Stations "ALEX 5 (DH6668)" and "GIGI 2003 (DH6678)" as published by the National Geodetic Survey (NGS) and shown on a map filed in Book 56, Pages 44 through 67 of Record of Surveys in the Office of the County Recorder of said Fresno County. To obtain ground distances, divide the distances herein by 0.99993740.

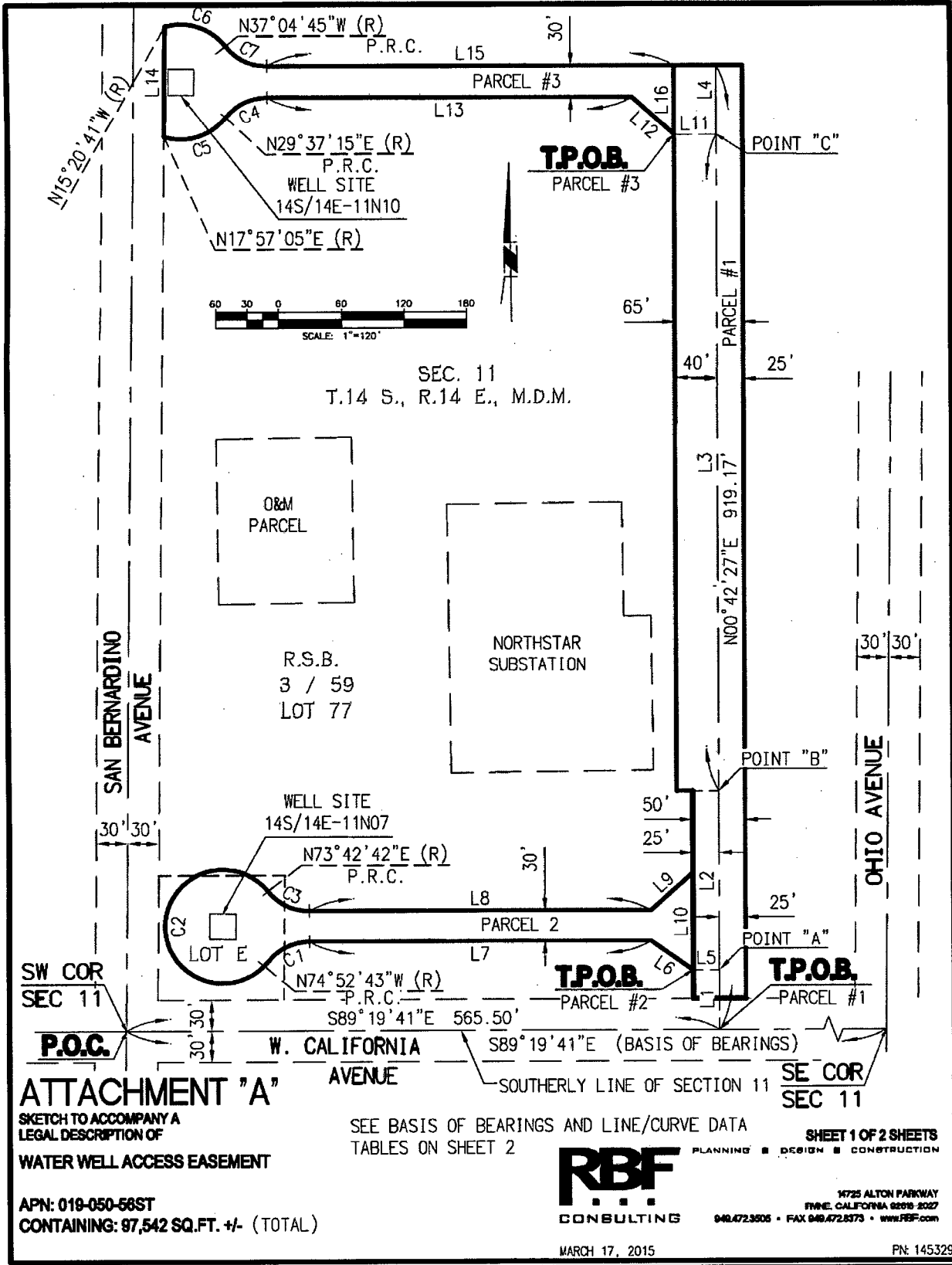
ATTACHMENT "A" attached and by this reference made a part hereof.

Kurt R. Troxell

Kurt R. Troxell, L.S. 7854

3/17/15





LINE DATA TABLE		
NO.	BEARING	LENGTH
L1	N00°42'27"E	57.42'
L2	N00°42'27"E	172.56'
L3	N00°42'27"E	623.19'
L4	N00°42'27"E	66.00'
L5	N89°17'33"W	25.00'
L6	N54°05'05"W	48.96'
L7	N89°17'33"W	325.78'
L8	S89°17'33"E	325.78'
L9	N48°43'13"E	53.81'
L10	S00°42'27"W	94.23'
L11	N89°17'33"W	40.00'
L12	N47°18'19"W	53.81'
L13	N89°17'33"W	347.87'
L14	N01°18'12"E	105.39'
L15	S89°17'33"E	387.87'
L16	S00°42'27"W	66.00'

CURVE DATA TABLE			
NO.	DELTA	RADIUS	LENGTH
C1	51°45'12"	50.00'	45.16'
C2	283°30'24"	55.00'	272.15'
C3	51°45'12"	50.00'	45.16'
C4	51°45'12"	50.00'	45.16'
C5	68°59'50"	55.00'	66.23'
C6	67°48'20"	55.00'	65.09'
C7	51°45'12"	50.00'	45.16'

BASIS OF BEARINGS

UNLESS OTHERWISE DESCRIBED, ALL BEARINGS AND DISTANCES SHOWN HEREON ARE IN GRID BASED ON THE CALIFORNIA COORDINATE SYSTEM OF 1983, CCS ZONE IV (EPOCH 2007.00), BASED LOCALLY UPON THE CGPS STATIONS "ALEX 5 (DH6668)" AND "GIGI 2003 (DH6678)" AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY (NGS) AND SHOWN ON A MAP FILED IN BOOK 56, PAGES 44 THROUGH 67 OF RECORD OF SURVEYS IN THE OFFICE OF THE COUNTY RECORDER OF SAID FRESNO COUNTY.

TO OBTAIN GROUND DISTANCES, DIVIDE THE DISTANCES HEREIN BY 0.99993740.

ATTACHMENT "A"

SKETCH TO ACCOMPANY A
LEGAL DESCRIPTION OF

WATER WELL ACCESS EASEMENT

APN: 019-050-56ST
CONTAINING: 97,542 SQ.FT. +/- (TOTAL)

SHEET 2 OF 2 SHEETS



PLANNING ■ DESIGN ■ CONSTRUCTION

14725 ALTON PARKWAY
RYNE, CALIFORNIA 92308-2027
949.472.9506 • FAX 949.472.6373 • www.RBF.com

MARCH 17, 2015

PN: 145329

EXHIBIT D-1

Potential Property for LB1 Grantee

A parcel of approximately 156.38 acres, located in County of Fresno, assessor parcel number 019-016-04ST and legally described as:

THE WEST HALF OF THE NORTH HALF OF SECTION 14, TOWNSHIP 14 SOUTH,
RANGE 14 EAST, COUNTY OF FRESNO, STATE OF CALIFORNIA, MOUNT DIABLO
BASE AND MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXHIBIT D-2

Potential Property for LB2 Grantee

A parcel of approximately 156.38 acres, located in County of Fresno, assessor parcel number 019-016-05ST and legally described as:

THE EAST HALF OF THE NORTH HALF OF SECTION 14, TOWNSHIP 14 SOUTH,
RANGE 14 EAST, COUNTY OF FRESNO, STATE OF CALIFORNIA, MOUNT DIABLO
BASE AND MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXHIBIT D-3

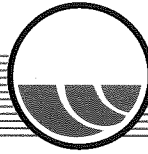
Potential Property for FSD Grantee

A parcel of approximately 314.60 acres, located in County of Fresno, assessor parcel number 019-016-03ST and legally described as:

THE SOUTH HALF OF SECTION 14, TOWNSHIP 14 SOUTH, RANGE 14 EAST, COUNTY OF FRESNO, STATE OF CALIFORNIA, MOUNT DIABLO BASE AND MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

APPENDIX B

Westlands Water District Comments on Notice of Preparation of Draft EIR



Westlands Water District

3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 224-1523, FAX (559) 241-6277

October 12, 2017

Ms. Christina Monfette
Fresno County Department of Public Works and Planning
Development Services Division
County of Fresno
2220 Tulare Street, Sixth Floor
Fresno, California 93721

Subject: COMMENTS REGARDING NOTICE OF PREPARATION OF A DRAFT
ENVIRONMENTAL IMPACT REPORT FOR THE LITTLE BEAR SOLAR
PROJECT

Dear Ms. Monfette,

Westlands Water District (District) has reviewed the notice of preparation for the proposed solar panel project proposed by Little Bear Solar 1 LLC, Little Bear Solar 3 LLC, Little Bear Solar 4 LLC, Little Bear Solar 5 LLC, & Little Bear Solar 6 LLC (Little Bear Solar Project). After reviewing the Little Bear Solar Project application, we have the following comments about the project site.

1. The Little Bear Solar Project lies within the District boundary. This land consists of dry farming and does not receive an allocation of water from the District's agricultural water service contract. Since the Applicant is proposing a solar development, the Applicant is eligible to receive water through the District's Municipal and Industrial (M&I) supply and the land will continue to have access to the District's distribution system.
2. The District has adopted regulations governing the application for and use of M&I water (Regulations). The Regulations stipulate the quantity of water that will be made available to a water user from the District's Central Valley Project (CVP) contract supply. The District will make available up to five (5) acre-feet per 160 acres annually for solar development operations. The Applicant is responsible for acquiring more water if needed. A copy of the Regulations is also provided for your information.
3. The project location is served by a water delivery system operated and maintained by the District. During the construction and operation of this facility, please do not disturb District property. Prior to any excavation the applicant should contact Underground Service Alert.
4. The Applicant must comply with the District's Backflow Prevention guidelines for this connection to the water system.

Thank you for the opportunity to assist the County of Fresno in this matter, if you have any additional questions please feel free to contact Jose Rangel at 559-241-6220.

Sincerely,

A handwritten signature in cursive script that reads "Russ Freeman". The signature is written in black ink and has a long, sweeping horizontal line extending to the right.

Russ Freeman
Deputy General Manager of Resources

Enclosures (2)

1. *Terms and Conditions for Municipal and Industrial Water Service*
2. *Article __. Regulations Regarding the Application for and Use of Municipal and Industrial Water Within Westlands Water District*

WESTLANDS WATER DISTRICT

OFFICE--3130 N. FRESNO STREET/MAILING--P. O. BOX 6056, FRESNO, CA 93703
TELEPHONE: WATER DEPT. (559) 241-6250/OTHER (559) 224-1523/FAX (559) 241-6276

TERMS AND CONDITIONS FOR MUNICIPAL AND INDUSTRIAL WATER SERVICE

1. The furnishing of water to and its use by the water user shall be subject to all regulations of the Board of Directors of the District as the same may exist now or hereafter be amended or adopted. In the event of a conflict between the terms and conditions set forth herein and the regulations, the latter shall be controlling.

2. All water delivered shall be pursuant to a request by the water user for the delivery of a stated amount to a specific location. The request shall be made within the time and in the manner prescribed by the General Manager.

3. Water will be furnished by the District subject to the terms and conditions under which the water is made available to the District and if, in the exclusive judgment of the District, the water and facilities for its delivery are available; provided, that the District will use its best efforts, to the extent that it has water and capacity available and taking into account the requirements of other water users to receive water from its facilities, to provide such water in the manner and at the times requested. The District may temporarily discontinue water service or reduce the amount of water to be furnished for the purpose of such investigation, inspection, maintenance, repair, or replacement as may be reasonably necessary of any of the District's facilities. Insofar as feasible, the District will give the water user notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which event no notice need be given. No liability shall accrue against the District or any of its officers, directors, or employees for damage, direct or indirect, because of the failure to provide water as a result of system malfunctions, interruptions in service necessary to properly operate and maintain the water distribution system, or other causes which are beyond the District's reasonable control.

4. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, all damage or claims for damage, which may arise from his furnishing or use of the water after it leaves the District facilities.

5. The water furnished by the District is not potable (suitable for drinking, cooking, bathing, or other domestic use) and the District does not warrant the quality or potability of water so furnished. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, damage or claims for damage arising out the non-potability of water furnished by the District. Untreated water must never be used for any type of human consumptive needs. A water user defined and operating as a Public Water Supply (PWS) shall be responsible for any water treatment, including but not limited to filtration and chlorination achieved through central treatment or point-of-entry (POE) treatment devices approved by the California Department of Health Services (DHS), in order to provide water safe for human consumption as required by Federal, State or local law or regulation.

According to DHS, the use of POE treatment systems by individual customers of a constructed conveyance system may not provide a continuous safe, potable supply of water due to inadequate operation and maintenance of these systems by the owners, unless they are a regulated PWS. Individual use of POE devices ("Water Treatment Exclusion") may only be used if they are approved by DHS and are regularly maintained by a State-licensed operator or service provider.

Facilities in place prior to July 2001, may continue to use bottled water for drinking and cooking ("Alternative Water Exclusion"). After July 2001, the District cannot furnish new municipal and industrial water service if bottled water use is the basis for the potable water supply unless approved by DHS. Bottled water may only be obtained from a State-licensed provider.

DHS mandates the District conduct periodic surveys of water use as required by the Safe Drinking Water Act and to collect records for Alternative Water and Treatment Exclusions. Records for exclusions include invoices or statements of bottled water delivery from a licensed provider or maintenance and service records for a POE system from a licensed operator. Water users who fail to complete a survey or provide records showing an approved exclusion requested by the District shall have water service discontinued if no response is received after a reasonable attempt has been made to obtain the information.

6. All water will be measured by the District with meters installed by it and such measurements shall be final and conclusive.

7. Charges for water, hereinafter referred to as "water charges", shall be established by the Board of Directors. The water charges shall include District operation and maintenance costs and any other costs determined by the Board to be payable as part of the water charges. Water charges shall be adjusted retroactively to the extent required and authorized by federal or state law or regulations or District regulations. The General Manager may adjust the water charges as necessary and legally authorized to account for increases or decreases in the estimates used to establish the water charges.

8. As a condition of the District continuing to furnish water, the water user shall make payment for the amount billed after the District's billing and by the 25th of the month in which the bill is mailed; provided, that the due date will be not less than 15 calendar days after the billing date. Charges not paid by the due date shall be delinquent; provided, that payments postmarked on or before the due date shall be deemed to have been received by that date. The payment of water charges or related penalties or interest shall be made at the District's Fresno office. When any deadline established herein falls on a Saturday, Sunday, or holiday, it shall be extended to the next working day.

9. All claims for overcharges or errors must be made in writing and filed with the District at its Fresno Office within 10 working days after the date the bill is received by the water user. In the event the water user files a timely written protest, the District's Finance & Administration Committee shall consider the protest at its next regular meeting and notify the water user in writing of its decision. The Committee's decision shall be final, unless a written appeal to the Board of Directors is filed with the Secretary of the District within 15 working days after notice of the decision. In the event of an appeal, the decision of the Board shall be final. The filing of a protest or an appeal does not nullify the payment requirement or the District's right to discontinue water service as provided in these terms and conditions. However, in the event the protest or appeal is sustained, the District will refund the amount of the overcharge and penalty, if any.

10. On the first day following the due date, a penalty of 10 percent of the water charges which became delinquent on the preceding day shall be added to the water charges and penalties and interest, if any, due and owing to the District, the total of which are hereinafter referred to as "unpaid charges." Prior unpaid charges shall accrue interest at a monthly rate of 1½ percent. The interest shall not, however, accrue after the unpaid charges have been added to, and become a part of, the annual assessment levied on the land by the District. All payments and credits shall be applied to the earliest unpaid charges.

11. At the time of filing the District's assessment book with the District Tax Collector, unpaid charges may be added to and become a part of the assessment levied by the District on the land which received the water or for which other water charges were incurred. The District shall notify the landowner of the expected amount prior to its addition to the annual assessment. The amount so added shall be a lien on the land and impart notice thereof to all persons. If the assessment becomes delinquent, penalties and interest will be added as provided by law.

12. To supplement the procedure described in paragraph 11, the District may elect to file and record a Certificate of Unpaid Water Charges as provided in California Water Code Section 36729. This

Certificate creates a lien in the amount of unpaid charges on any land owned by the delinquent water user, or acquired by the water user before the lien's expiration, within the recording County.

13. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any parcel of land for which the unpaid charges for such service are a lien on the land or for which the assessment is delinquent.

14. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any person who owes the District unpaid charges notwithstanding the fact that the unpaid charges have been added to the assessment(s) on the parcel(s) for which they were incurred.

15. Where the District furnishes residential water service to persons other than the water user to whom the service is billed, the District shall make a reasonable, good faith effort to inform the actual users of the services when the account is delinquent. This shall be done by a notice that service will be terminated in 10 days. The notice shall inform the actual users that they have the right to become customers of the District without being required to pay the amount due on the delinquent account.

The District is not required to make service available to the actual users unless each actual user agrees to the terms and conditions of service. However, if one or more actual users are willing and able to assume responsibility for the entire account to the satisfaction of the District, or if there is a physical means legally available to the District of selectively terminating service to those actual users who have not met the requirements of the District's terms and conditions, the District shall make service available to the actual users who have met those requirements. In making service available to an actual user, the District may require that a deposit be paid to the District prior to establishing an account and furnishing service. If a deposit is required, it shall be based solely upon the creditworthiness of the actual user as determined by the District.

The District will give notice of the delinquency and impending termination of residential water service, at least 10 days prior to the proposed termination, by means of a notice mailed postage prepaid or by personal delivery to the water user to whom the service is billed not earlier than 19 days from the date of mailing the District's bill for services, and the 10-day period shall not commence until 5 days after the mailing of the notice. When the day established for the discontinuance of water service falls on a Saturday, Sunday, or District holiday, such water service shall be discontinued on the next working day.

The District will make a reasonable, good faith effort to contact an adult person residing at the premises of the water user by telephone or in person at least 48 hours prior to any termination of residential water service.

The District will comply with all other applicable provisions of California Government Code Sections 60370-60375.5 regarding termination of residential water service.

16. Except as provided in paragraph 15, in the event water service hereunder is discontinued as a result of nonpayment of water charges, all unpaid charges for such service which are due the District from the person in default must be paid before water service can be restored.

17. If a water user's delinquent charges are unpaid for 30 days or more, or if a water user's delinquent charges are added to the annual assessments on any lands within the District, or the procedure in paragraph 12 is implemented, the General Manager shall require, as a condition of resumption of water service, that advance payment of all water charges be made for the 12-month period immediately following resumption of service, according to a schedule to be determined by the General Manager. A written guarantee in a form satisfactory to the General Manager from a recognized financial lending institution may be substituted in lieu of advance payment.

18. The General Manager, after consultation with and approval by the Finance & Administration Committee, may also require advance payment and/or payment by cashier's check or such other actions as he may deem necessary when a water user's account is determined, based on the payment history or other actions of the water user, to create a financial risk or hardship for the District or its landowners. Circumstances which constitute the basis for such a determination include but are not limited to the following: (1) instances of a water user's checks being returned unpaid or (2) instances where a water user whose account is delinquent has, in violation of District regulations, taken water from a District delivery.

19. By applying for or taking delivery of municipal and industrial water from the District, the water user agrees to these terms and conditions of service.

20. The District may modify or terminate these terms and conditions; provided, that such modifications or terminations are prospective only and notice thereof is given prior to the effective date by mail to the water user.

**ARTICLE 2. REGULATIONS REGARDING THE APPLICATION FOR
AND USE OF MUNICIPAL AND INDUSTRIAL WATER WITHIN
WESTLANDS WATER DISTRICT**

2.1 PURPOSE

Westlands Water District has a long-term contractual entitlement to receive from the United States an annual supply of 1,150,000 acre-feet (AF) of Central Valley Project (CVP) water. The contracts between Westlands Water District and the United States allow the District to make CVP water available for municipal, industrial and domestic uses. The District may also acquire additional water supplies for these purposes. This Article establishes the rules and procedures for making application for and the use of municipal and industrial (M&I) water.

2.2 GLOSSARY OF TERMS AND DEFINITIONS

Unless specified below, the terms and definitions contained in Article 2 of these Regulations shall apply.

- A. "Ag Related M&I Use" – the use of water exclusively for purposes of commerce, trade or industry associated with the production of agricultural crops or livestock, or their related by-products, including human uses, other than housing, that are incidental to the Ag Related M&I Use.
- B. "Historic Use" – the greatest annual quantity of CVP water delivered for M&I Use to an M&I Water User at a point of delivery during the five-year period immediately preceding June 30, 2001.
- C. "M&I Use" – the use of water for drinking, cooking, bathing, showering, dish washing, and maintaining oral hygiene or purposes of commerce, trade or industry.
- D. "M&I Water Application" - an agreement in a form approved by the General Manager or his designee between the District and an M&I Water User, which describes the point of delivery for such water and the estimated quantity of water that will be made available by the District for M&I Use.

- E. "M&I Water User" - individual or entity who has executed and submitted to the District an M&I Water Application or to whom the District makes water available for M&I Use.

_.3 M&I WATER AVAILABILITY

- A. The General Manager shall set aside from the District's CVP water supply or other sources he deems appropriate water for M&I Use.
- B. The General Manager or his designee shall assist any M&I Water User in identifying a source of water that can be made available to the District for M&I Use; provided, that this provision shall not impose on the District or its employees an obligation to incur any expense or other obligation on behalf of such M&I Water User.

_.4 APPLICATION FOR WATER

- A. Except for M&I Use initiated before July 1, 2001, to receive water for M&I Use, a proposed M&I Water User must file at the District's Fresno office an M&I Water Application. Upon approval by the District, the M&I Water Application shall constitute a valid agreement for M&I Use until the M&I Water User notifies the District in writing that such M&I Use will be terminated. Every M&I Water Application shall identify the point of delivery and the intended use of the M&I Water.
- B. An M&I Water Application for use in excess of 5 acre-feet per year shall identify a source of water that will, at the applicant's expense, be made available to the District for the proposed M&I Use.
- C. Notwithstanding Section _.4 B. of this Article, a M&I Water User may annually transfer into the M&I Water User's account a quantity of water, from any source available to the M&I Water User, sufficient to satisfy any Ag Related M&I Use for the water year; provided, the M&I Water User shall acknowledge in writing that the District has no obligation to make available to the M&I Water User, in any year, a quantity of water in excess of the quantity transferred into the M&I Water User's account.

- D. A supplemental M&I Water Application shall be filed by any M&I Water User before the quantity of water for M&I Use made available to such M&I Water User is increased (i) above Historic Use, for M&I Water Users receiving M&I water before July 1, 2001, or (ii) above the quantity stated in the initial M&I Water Application, for M&I Use initiated after June 30, 2001.

_.5 USE OF WATER

- A. The unauthorized use or taking of water for M&I Use, or the waste or unreasonable use of water, are prohibited. Water made available for M&I Use may only be used at the point of delivery and for the purpose(s) identified in the M&I Water Application. Except as provided in Section _.5 B. of this Article, the transfer of M&I water is prohibited.
- B. M&I water identified pursuant to Section _.4 B. of this Article or water transferred by the M&I Water User pursuant to Section _.4 C. of this Article may be transferred within the District's boundaries. Nothing contained in this Article shall prevent an M&I Water User from changing the place of use of its M&I water within the District's boundaries.
- C. All M&I Water Users shall implement conservation measures adopted by the Water Policy Committee of the Board of Directors or its successor.
- D. All M&I Water Users shall cooperate in the District's efforts to comply with the terms of the Compliance Agreement between the California Department of Health Services and Westlands Water District, dated June 1, 2001.
- E. Every point of delivery for M&I Water shall be equipped with a backflow prevention device of a design approved by the General Manager.
- F. The General Manager is authorized, after written notice to the M&I Water User, to discontinue water service to any M&I Water User who violates this Article or the Terms and Conditions for Municipal and Industrial Water Service.
- G. In the event the District's water supply is insufficient to meet all demands for water, including demands for irrigation, the General Manager is authorized to reduce the quantity of water made available for M&I Use or to impose such

temporary conservation actions or other measures, as he deems necessary to protect the public health and safety.

_.6 COMPLIANCE WITH TERMS AND CONDITIONS

Each M&I Water User shall comply with the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board from time to time. Failure to comply with the Terms and Conditions for Municipal and Industrial Water Service may be grounds for termination of M&I Water Use service, and no water shall be furnished to an M&I Water User who fails to make required payments pursuant to the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board, from time to time.

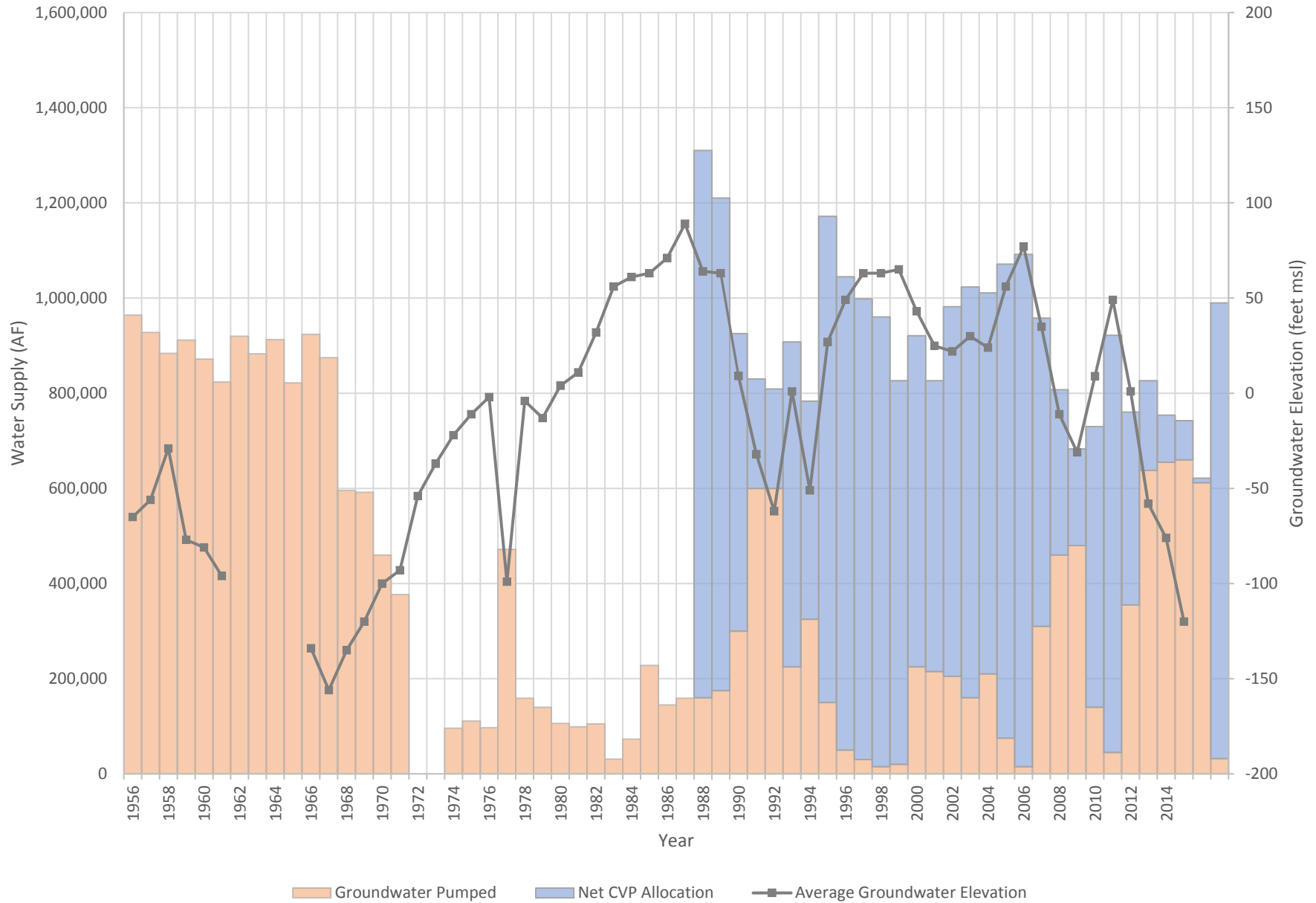
_.7 MISCELLANEOUS

- A. The General Manager may do all things necessary to implement and effectuate these Regulations.
- B. An appeal from any decision made pursuant to these Regulations shall be made to the Finance and Administration Committee of the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Finance and Administration Committee may be appealed to the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Board shall be final.
- C. The General Manager shall provide notice of any changes or revision to these Regulations to all District landowners and M&I Water Users.

APPENDIX C

Water Supply Charts 1988-2017

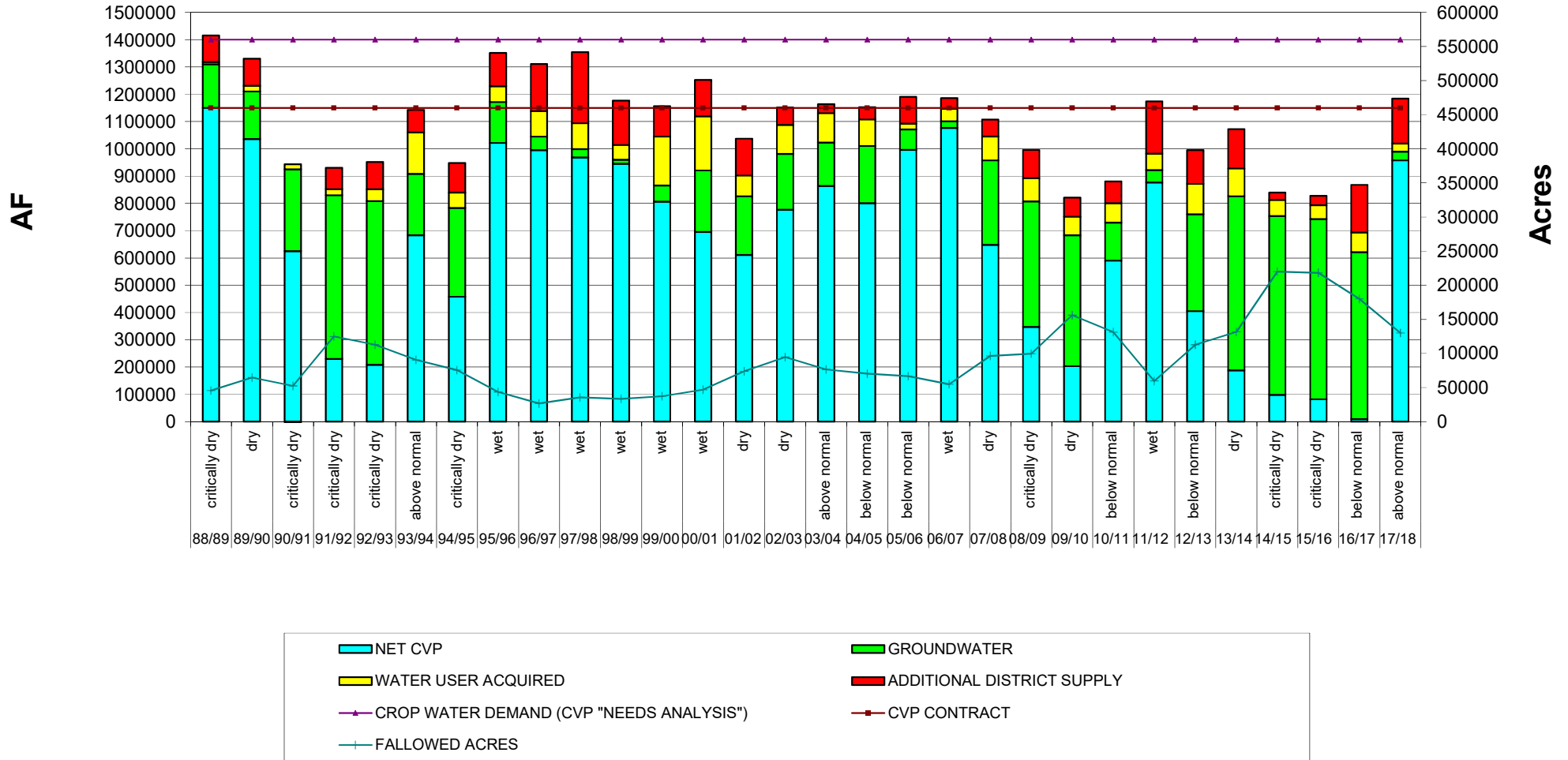
Figure C-1. Westlands Water District Groundwater Pumping and Net CVP Allocation



District Water Supply							
Water Year	CVP Allocation %	Net CVP (AF)	Groundwater (AF)	Water User Acquired (AF)	Additional District Supply (AF)	Total Supply (AF)	Fallowed Acres
1988	100%	1,150,000	160,000	7,657	97,712	1,415,369	45,632
1989	100%	1,035,369	175,000	20,530	99,549	1,330,448	64,579
1990	50%	625,196	300,000	18,502	(2,223)	941,475	52,544
1991	27%	229,666	600,000	22,943	77,399	930,008	125,082
1992	27%	208,668	600,000	42,623	100,861	952,152	112,718
1993	54%	682,833	225,000	152,520	82,511	1,142,864	90,413
1994	43%	458,281	325,000	56,541	108,083	947,905	75,732
1995	100%	1,021,719	150,000	57,840	121,747	1,351,306	43,528
1996	95%	994,935	50,000	92,953	172,609	1,310,497	26,754
1997	90%	968,408	30,000	94,908	261,085	1,354,401	35,554
1998	100%	945,115	15,000	54,205	162,684	1,177,004	33,481
1999	70%	806,040	60,000	178,632	111,144	1,155,816	37,206
2000	65%	695,693	225,000	198,294	133,314	1,252,301	46,748
2001	49%	611,267	215,000	75,592	135,039	1,036,898	73,802
2002	70%	776,526	205,000	106,043	64,040	1,151,609	94,557
2003	75%	863,150	160,000	107,958	32,518	1,163,626	76,654
2004	70%	800,704	210,000	96,872	44,407	1,151,983	70,367
2005	85%	996,147	75,000	20,776	98,347	1,190,270	66,804
2006	100%	1,076,461	25,000	45,936	38,079	1,185,476	54,944
2007	50%	647,864	310,000	87,554	61,466	1,106,884	96,409
2008	40%	347,222	460,000	85,421	102,862	995,505	99,663
2009	10%	202,991	480,000	68,070	70,149	821,210	156,239
2010	45%	590,059	140,000	71,296	79,242	880,597	131,339
2011	80%	876,910	45,000	60,380	191,686	1,173,976	59,514
2012	40%	405,451	355,000	111,154	123,636	995,241	112,755
2013	20%	188,448	638,000	101,413	143,962	1,071,823	131,848
2014	0%	98,573	655,000	59,714	26,382	839,669	220,053
2015	0%	82,429	660,000	51,134	34,600	828,163	218,112
2016	5%	9,204	612,000	72,154	174,374	867,732	179,784
2017*	100%	957,763	32,000	30,000	164,220	1,183,983	130,000

Definitions: *Estimated
Water Year - March 1 to February 28
CVP Allocation - Final CVP water supply allocation for the year (100% = 1,150,000 AF)+(Reassignment = 46,948 AF)
Net CVP - CVP Allocation adjusted for carry over and rescheduled losses
Groundwater - Total groundwater pumped (see District's Deep Groundwater Report)
Water User Aquired - Private Landowner water transfers
Additional District Supply - Surplus water, supplemental supplies, and other adjustments.
Fallowed Acres - Agricultural land out of production

WESTLANDS WATER DISTRICT WATER SUPPLY 1988 THROUGH 2017



Appendix J3

Identification of Sources of Water for the Little Bear Solar Project Pursuant to Requirements of Fresno County Solar Facility Guidelines



January 18, 2018

Project No.: 367-16-17-23
SENT VIA: EMAIL

Mr. Dave Sterner
Manager of Siting
First Solar, Inc.
135 Main Street, 6th Floor
San Francisco, CA 94105

SUBJECT: Identification of Sources of Water for the Little Bear Solar Project Pursuant to Requirements of Fresno County Solar Facility Guidelines

Dear Mr. Sterner:

This letter provides documentation of the available municipal and industrial (M&I) water supply and historical groundwater level and quality documentation in support of the anticipated use of groundwater and M&I water supplies for construction and operation, respectively, of the proposed Little Bear Solar Project in Fresno County, California (Project). This information is being provided in response to the County of Fresno's (County) Solar Facility Guidelines¹ (Guidelines).

The County's Guidelines state:

Information shall be submitted that identifies the source of water for the subject parcel (surface water from irrigation district, individual well(s), conjunctive system). If the source of water is via district delivery, the applicant shall submit information documenting the allocations received from the irrigation district and the actual disposition of the water (i.e., utilized on-site or moved to other locations) for the last ten years. If an individual well system is used, provide production capacity of each well, water quality data and data regarding the existing water table depth.

The water demands for the proposed Project consist of one-time construction water requirements and the annual operational water requirements following Project construction.

PROJECT WATER DEMANDS

As described in the February 2017 project description², the Little Bear Solar Project is a solar photovoltaic power generating project consisting of up to five individual facilities (Little Bear 1, 3, 4, 5, and 6) ranging in size from 161 to 322 acres and totaling approximately 1,288 acres (see Figure 1). The current design capacity of the project is approximately 180 megawatts AC. Per the

¹ County of Fresno Solar Facility Guidelines revised by the Board of Supervisors on May 21, 2013.

² Little Bear Solar Project, Little Bear 1, 3, 4, 5 and 6 and Related Facilities, prepared for Fresno County Public Works and Planning Development Services Section, February 2017.

project description, up to approximately 200 acre-feet (AF) of water will be needed during construction and approximately 5 acre-feet per year (AFY) of water will be needed during project operations. Construction is scheduled to begin in late 2019 and to be completed in 12 to 14 months.

Construction Water Requirements

During construction, water will be used for soil compaction and dust control. Construction is scheduled to take place generally during daylight hours on a Monday through Friday schedule. The estimated groundwater pumping rates required to supply water during construction range from approximately 110 to 130 gallons per minute (gpm)³.

Operational Water Requirements

The planned 5 AFY water use during operations is equivalent to an average flowrate rate of approximately 9 gpm.⁴

PROJECTED WATER SUPPLY FOR THE PROPOSED PROJECT

Construction water demands for the proposed Project will be satisfied using water from an existing well on the neighboring North Star Solar Project (North Star) (see Figure 1). The North Star well has demonstrated the production capacity to satisfy the proposed Project's water supply demand. Aboveground or underground water line(s) may be installed from North Star to the Project site to transmit water or, alternatively, water may be trucked from the well location to the Project site. Aboveground, portable storage tanks will be used to store water at the Project site during construction. Although the North Star well is assumed to meet the proposed Project construction supply needs, contingent water sources for construction of the Project include delivery from Westlands Water District (WWD), or trucking water to the Project site from an offsite source.

Operational water demands for the proposed Project will be satisfied using water delivered by WWD under an M&I water supply contract. Per WWD's comments provided to the County on the Notice of Preparation for the proposed Project's Draft Environmental Impact Report (EIR) (Attachment A), WWD will make available up to 5 AFY per 160 acres annually for solar development operations. Water delivered from WWD will require treatment for potable use within the operation and maintenance (O&M) buildings. An alternative to WWD delivery for operational water demands would require installation of a permanent pipeline from the North Star well to the Project site.

The following sections provide information regarding the North Star well and groundwater conditions near the Project, documentation of M&I water supplies from WWD, and other alternate water supplies for the proposed Project.

³ Assumes a constant pumping rate 24 hours per day, 7 days per week for 12 to 14 months.

⁴ Assumes a constant pumping rate 12 hours per day, 5 days per week, 4.3 weeks per month.

Water Supply from North Star Well and Groundwater Conditions

Consistent with the County Guidelines, the following sections provide information regarding the production capacity of the North Star well and data regarding the existing water table depth and groundwater quality in the vicinity of the proposed Project.

Production Capacity of North Star Well

Little Bear Solar plans to obtain the groundwater for construction of the Project from an existing well at the nearby North Star Solar Project.

The North Star supply well, 14S14E110N10M (N10), is located north of the intersection of West California Avenue and San Bernardino Avenue (see Figure 1). Per the available records, Well N10 was drilled in 2000 and is constructed of 16-inch diameter steel casing. The well is reported to have a total depth of 900 feet⁵. Specific capacity ranged from 1.07 to 1.56 gpm per foot of drawdown within a discharge range of 10 to 32 gpm⁶. Complete well construction details were not available for Well N10, but the well was pumped at a rate up to 125 gpm during construction of the North Star Solar Project. Based on the reported yield of the North Star well⁷ and general information on well yields in the groundwater basin⁸, it appears that the North Star well could supply the projected 110 to 130 gpm water required during construction of the Project.

Groundwater Levels

Groundwater beneath the Project and North Star sites occurs under unconfined to semiconfined conditions in an upper aquifer system and under confined conditions in a lower aquifer system. The aquifers are separated by the 20-foot to 120-foot thick Corcoran Clay member of the Tulare Formation⁹. The top of the Corcoran Clay is reported to occur at depths ranging from 450 to 500 feet below land surface near the Project site¹⁰. Numerous wells are reported to penetrate the Corcoran Clay, resulting in hydraulic interactions between the upper and lower aquifer systems. Based on their reported depths, the North Star supply well may penetrate the Corcoran Clay.

Groundwater level data for the Project area were obtained from the California Department of Water Resources (DWR) Water Data Library¹¹. Figure 2 shows the locations of the proposed North Star supply well, other lower aquifer wells, and observation wells in the Project vicinity for which groundwater level hydrographs were prepared using data from the DWR Water Data Library. Figure 3 provides hydrographs for the proposed North Star supply well, other wells completed in the lower aquifer, and long-term and annual average groundwater elevations in

⁵ URS, 2015, Water Supply, First Solar – Little Bear Solar Project, Fresno County, California.

⁶ Ibid.

⁷ Ibid.

⁸ Municipal/ irrigation wells yield 600 to 1,800 gpm on average, per DWR, 2006, San Joaquin Valley Groundwater Basin, Westside Subbasin, Individual Subbasin Description, California's Groundwater Bulletin 118.

⁹ DWR, 2006, San Joaquin Valley Groundwater Basin, Westside Subbasin, Individual Subbasin Description, California's Groundwater Bulletin 118.

¹⁰ Page, R.W., 1986, U.S. Geological Survey Professional Paper 1401-C, Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections,

¹¹ DWR Water Data Library, <http://www.water.ca.gov/waterdatalibrary/>, accessed May 5, 2017.

WWD for the lower aquifer from 1965 to 2017. Average groundwater elevations for WWD are based on information presented in the December 2015 Deep Groundwater Conditions Report¹². Attachment B provides hydrographs of the groundwater levels in observation wells.

Observations based on review of the groundwater elevation trends shown on Figure 3 are provided below.

- Water level records for the proposed North Star supply well and other wells completed in the lower aquifer are discontinuous for this period. When considered collectively, hydrographs for these wells generally mirror regional groundwater trends for the lower aquifer system, as represented by the annual average groundwater elevations in WWD.
- The similarity between the proposed North Star supply well, other lower aquifer wells, and regional trends for the lower aquifer system indicate the perforated section of these wells are either partially or completely beneath the Corcoran Clay.
- Average groundwater elevations for WWD are only available through 2015, but based on the trend observed in North Star Well 14S14E11N007M, regional groundwater levels have likely recovered relative to 2015 levels. Water levels are approaching the long-term average groundwater elevation from 1956 to 2015, suggesting the aquifer has recovered from significant groundwater pumping between 2013 and 2016 during the drought.

The other wells selected from the DWR Water Data Library and displayed on Figure 2 are identified as observation wells by DWR. Although detailed construction records are generally not available for the observation wells on the DWR Water Data Library website, the wells appear to be constructed in clusters or collocated. Clustered or collocated wells provide monitoring capability at discrete depths within the aquifer system. For example, Figure B-1 (Attachment B) shows the groundwater level hydrographs for wells 14S14E01N002, 14S14E01N003, and 14S14E01N004. Each of the wells is listed at the identical horizontal coordinates, but the depths of the screened intervals are not specified. Based on the differences in water levels observed in these wells, it is probable that these collocated wells monitor different depths within the aquifer system.

Figure B-2 (Attachment B) shows the groundwater level hydrographs for active observation wells 14S14E10A001M, 14S14E10A002M, 14S14E10A003M, and 14S14E10A004M located near the northwest corner of the North Star Solar Project. The DWR Water Data Library contains information on the depths of the screened intervals in these wells, which are as follows:

- 14S14E10A001M – 11 to 18 feet
- 14S14E10A002M – 81 to 86 feet
- 14S14E10A003M – 332 to 342 feet
- 14S14E10A004M – 178 to 188 feet

¹² Westlands Water District. 2016. Deep Groundwater Conditions Report. December 2015.

These screened intervals are shallower than the reported depth to the top of the Corcoran Clay and, therefore, appear to be in the upper aquifer system. Furthermore, the groundwater elevations for these observation wells are significantly higher (greater than 100 feet) than for the North Star supply well which is likely completed partially or completely beneath the Corcoran Clay (see Figure 3).

Several trends in the hydrographs in Figure B-2 (Attachment B) are apparent.

- Groundwater elevations observed in the observation wells screened in the upper aquifer system decrease with depth. This indicates a downward flow gradient, which is to be expected based on the depths of typical irrigation wells in the area, as represented by the North Star supply well and lower aquifer well hydrographs in Figure 3.
- The wells fall into two groups based on temporal trends in the groundwater levels. Except for two outlying measurements, the two shallowest wells show no seasonal patterns and minimal year-to-year fluctuations in groundwater level. Groundwater levels in the two shallow wells were stable over the entire period of record. The trends in these two shallow wells are probably indicative of water table or weakly confined conditions with relatively high storage parameters and minimal pumping stress.
- Groundwater levels in the two deeper wells show no seasonal patterns but exhibit year-to-year fluctuations that correlate with the general pattern of wet versus dry hydrologic conditions in the San Joaquin Valley¹³. Groundwater levels in the two deep wells declined in an overall sense over the entire period of record. The trends in these two deeper wells are probably indicative of more strongly confined conditions with relatively low storage parameters and pumping stress. The long-term declines through 2015 are indicative of overdraft.

The groundwater levels in the other wells shown on Figure 2 and documented in the hydrographs in Attachment B are consistent with the trends described above.

Groundwater Quality

Groundwater quality data for the Project area were obtained from the DWR Water Data Library and the State Water Resources Control Board GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) website¹⁴. Figure 4 shows the locations of wells in the Project vicinity for which groundwater quality results were downloaded. Attachment C provides the groundwater quality results for the wells shown on Figure 4.

¹³ For example, per the San Joaquin Valley Water Year Type Index at <http://cdec.water.ca.gov/>, wet conditions in 2005 and 2006 were followed by dry conditions in 2007 through 2009. Conditions were again wet in 2010 and 2011 prior to the 2012 through 2016 drought. As shown on the hydrographs, groundwater elevations were low during the dry years and high during the wet years.

¹⁴ GeoTracker GAMA website at <http://geotracker.waterboards.ca.gov/gama/>, accessed May 5, 2017.

Groundwater quality data were not available for the North Star supply well or other lower aquifer wells. Based on the available observation well data, groundwater near the Project site is brackish, and moderately to very hard, as demonstrated by the typical ranges of results listed in Table 1.

Table 1. Range and Median of Selected Groundwater Quality Constituents				
Parameter	Units	Minimum Concentration	Maximum Concentration	Median Concentration
Electrical Conductance (EC)	µS/cm	1,360	18,600	2,560
Total Dissolved Solids ^(a) (TDS)	mg/L	872	11,923	1,641
Total Hardness	mg/L as CaCO ₃	77	2,650	217

^(a) Calculated from EC. 1 mg/L TDS is approximately equal to 1.56 µS/cm EC.

Although the sampling depths are not recorded with most of the available groundwater quality results obtained from the DWR Water Data Library and the GeoTracker GAMA websites, it is likely that the results with the highest salinity and hardness are from the shallowest parts of the upper aquifer¹⁵. For this reason, the median concentrations listed in Table 1 may be most representative of groundwater quality that would be pumped from the North Star well proposed to supply the Project.

Based on the available data, the groundwater quality is suitable for use during Project construction.

WWD M&I Water Supply

The annual operational water demand for the proposed Project will be satisfied using deliveries from WWD under an M&I water supply contract. Attachment A, which includes WWD's comments provided to the County on the Notice of Preparation for the proposed Project's Draft EIR, WWD's Terms and Conditions for M&I Water Service, and Regulations Regarding the Application for and Use of M&I Water within WWD, provides documentation of the proposed operational water supply as follows:

- WWD will make available up to 5 AFY per 160 acres annually for solar development operations; and
- The Project location is served by a water delivery system maintained by WWD.

The proposed Project is comprised of two sections of land divided into five parcels, totaling approximately 1,288 acres. Based on the size of the proposed Project, WWD could make up to approximately 40 AFY of water available to the Project under M&I water service. Water delivered from WWD will require treatment for potable use within the O&M buildings.

¹⁵ Davis, G.H. and J. F. Poland. 1957, Ground-Water Conditions in the Mendota-Huron Area, Fresno and Kings Counties, California. USGS. Water Supply Paper No. 1360-G.

Documentation of the allocations received from WWD to the Project site for the past 10 years are not available; however, based on the available information, the Project parcels have been dry farmed for the last 10 years. Information provided in Attachment A provides documentation consistent with the requirements of the County Guidelines regarding the availability of WWD M&I water to meet the annual operational water requirements of the project.

Alternate Water Supply

Additional alternate water supply sources identified for the Project include delivery from WWD or trucking water to the Project site from an offsite source for construction water supply and use of the North Star well to meet operational water supply needs. These alternate water supplies are described below.

Alternate Construction Water Supply - Westlands Water District

WWD exercises provisions of its Agricultural Water Service Contract to supply M&I water incidental to agricultural purposes to commercial and industrial operations¹⁶. Article 19 of WWD's Regulations Regarding the Application for and Use of M&I Water within WWD indicates that utility scale solar projects are eligible for M&I water¹⁷. Based on this, WWD could deliver M&I water to supplement the Project's construction water demands.

Other WWD water supplies potentially available to the Project include flood flows from the San Joaquin and Kings Rivers. These water supplies are available on a year-by-year and seasonal basis, dependent on precipitation, and flow into the Mendota Pool, which is approximately 5 miles northeast of the Project site. Water from the Mendota Pool is delivered to WWD through the 7-1 Pumping Plant. The maximum water delivered from this source would be approximately 20,000 AF due to pumping plant limitations¹⁸.

Alternate Construction Water Supply - Offsite Sources

In addition to WWD deliveries to supplement construction water supply, water could also be trucked in during construction of the proposed Project from an offsite source. The Project has identified an agricultural well approximately 1.5 miles west of the Project site, on W. California Avenue. The Project proponent had an agreement with the well owner to purchase water that was used during construction of a different solar project in 2015. Subject to a new agreement with the well owner, this well could be used to provide water, which would be trucked to the Project site.

Alternate Operational Water Supply – North Star Well

An alternative to WWD delivery for operational water demands would be water from the North Star well. The Project has rights to water from the North Star well per an existing easement agreement. Use of the North Star well to meet operational water demands would require installation of a permanent pipeline from the North Star well to the Project site.

¹⁶ Municipal & Industrial summary on WWD website. <http://wwd.ca.gov/sustainability/municipal-industrial-sustainability/>. Accessed January 9, 2018.

¹⁷ Article 19. Regulations Regarding the Application for and Use of Municipal and Industrial Water within Westlands Water District. <http://wwd.ca.gov/wp-content/uploads/2014/12/rules19.pdf>. Accessed January 9, 2018.

¹⁸ Westlands Water District, 2012. Water Management Plan. April 19.

Mr. Dave Sterner
January 18, 2018
Page 8

West Yost appreciates the opportunity to provide this information. Please contact me if you have any questions or need additional information.

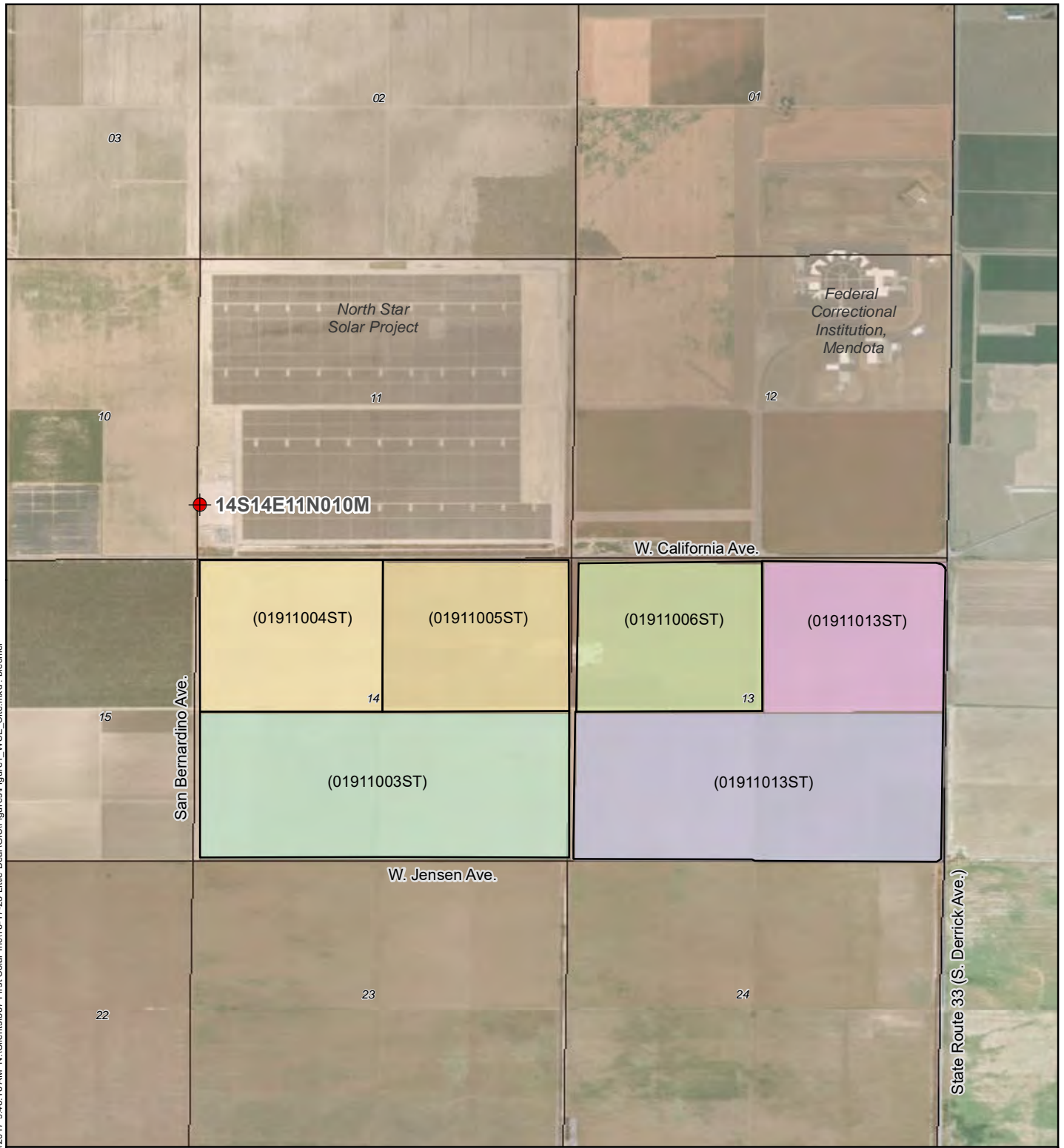
Sincerely,

WEST YOST ASSOCIATES

Kenneth L. Loy
Principal Hydrogeologist
PG #7008

KLL:ac

Attachments





NOTE: The locations of potential supply wells for Little Bear project construction are based on available records and have not been field verified.

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Symbology

-  Proposed Supply Well
-  Township 14S, Range 14E with Section Numbers

Project Facilities (APN)

-  Little Bear 1
-  Little Bear 3
-  Little Bear 4
-  Little Bear 5
-  Little Bear 6

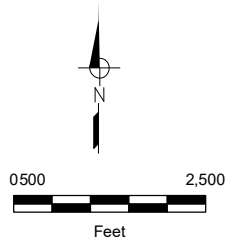
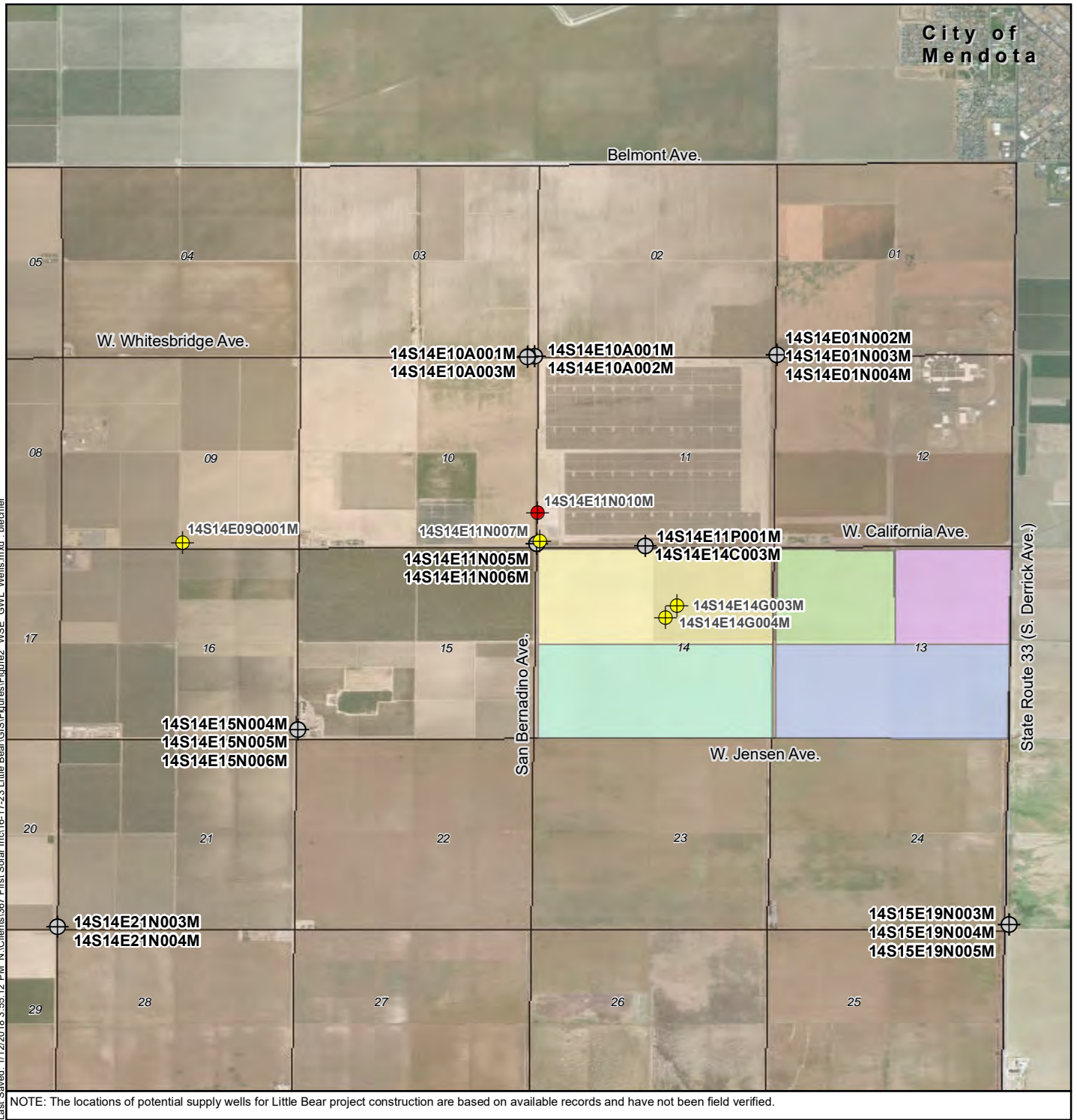


Figure 1
Little Bear Facilities and Proposed Supply Well Location
 Little Bear Solar Project



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NOTE: The locations of potential supply wells for Little Bear project construction are based on available records and have not been field verified.



Symbology

- Proposed Supply Well
- Other Lower Aquifer Well
- Demonstrating Trends near Proposed Supply Well
- Other Well with Water Level Data
- Township 14S, Range 14E with Section Numbers

Project Facilities (APN)

- Little Bear 1
- Little Bear 3
- Little Bear 4
- Little Bear 5
- Little Bear 6

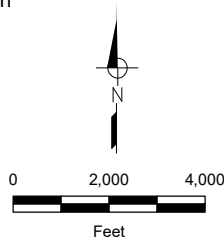
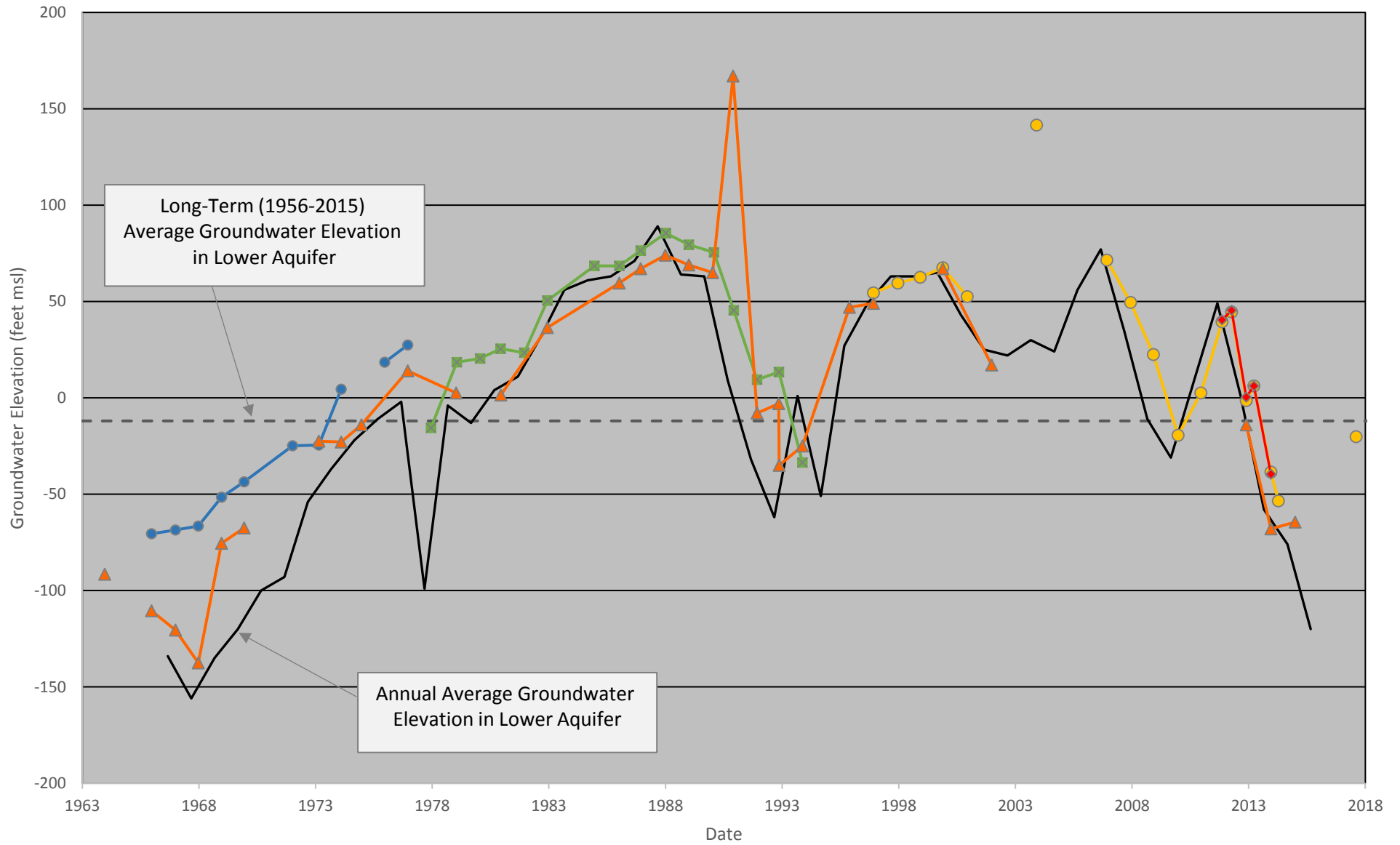


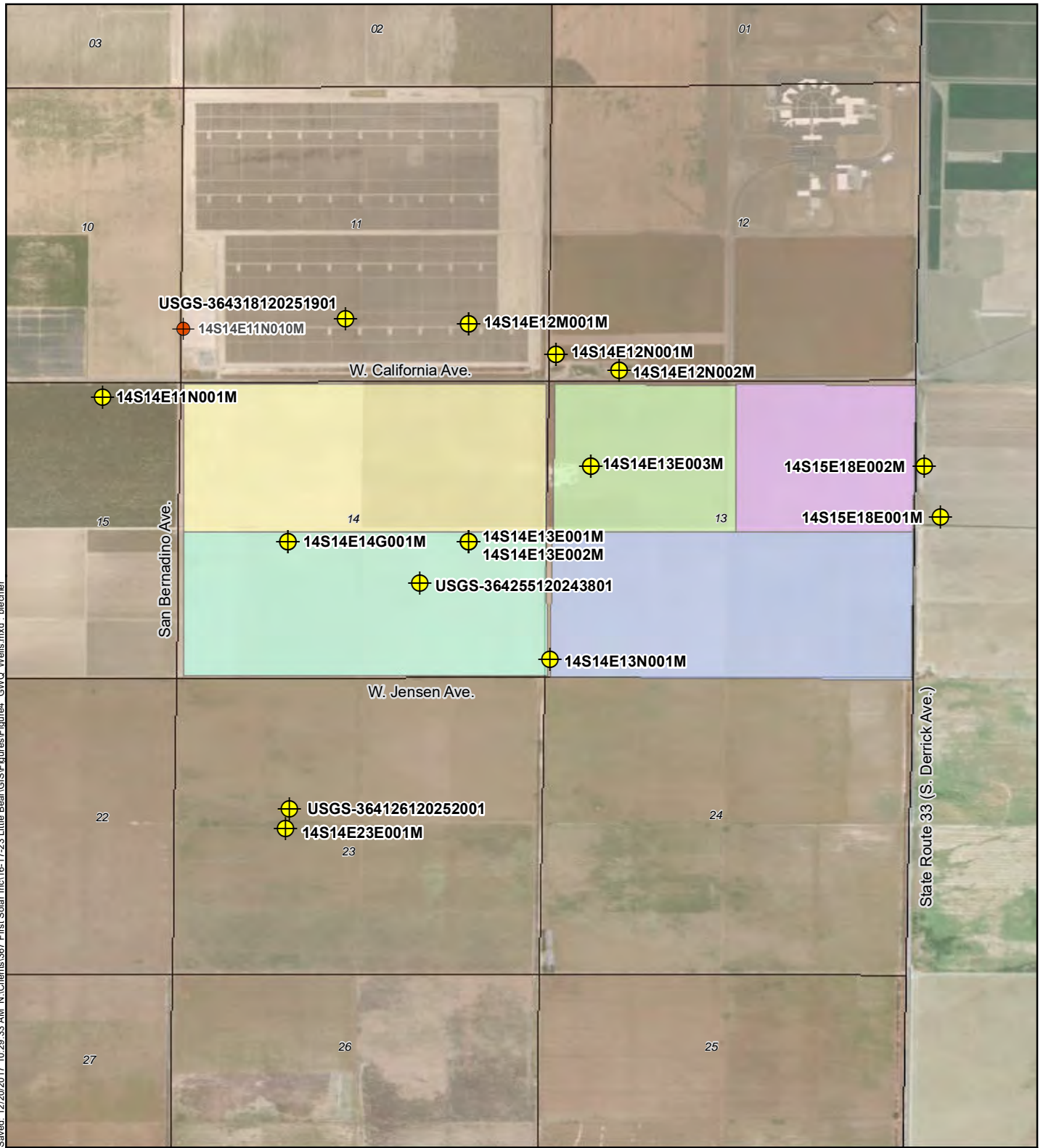
Figure 2
Groundwater Level Monitoring Wells
 Little Bear Solar Project



- 14S14E11N007M (North Star)
- ◆ 14S14E11N010M (North Star - Proposed Supply Well)
- 14S14E14G003M (Little Bear)
- 14S14E14G004M (Little Bear)
- ▲ 14S14E09Q001M (Offsite Well)



Figure 3
**Hydrographs for Proposed Supply Well
and other Lower Aquifer Wells**



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NOTE: The locations of potential supply wells for Little Bear project construction are based on available records and have not been field verified.



Symbology

- Proposed Supply Well
- Wells with Water Quality Data
- Township 14S, Range 14E with Section Numbers

Project Facilities (APN)

- Little Bear 1
- Little Bear 3
- Little Bear 4
- Little Bear 5
- Little Bear 6

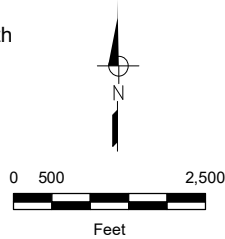
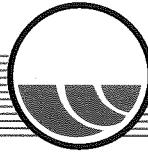


Figure 4
Groundwater Quality Monitoring Wells
 Little Bear Solar Project

ATTACHMENT A

Westlands Water District Comments on Notice of Preparation of Draft EIR



Westlands Water District

3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 224-1523, FAX (559) 241-6277

October 12, 2017

Ms. Christina Monfette
Fresno County Department of Public Works and Planning
Development Services Division
County of Fresno
2220 Tulare Street, Sixth Floor
Fresno, California 93721

Subject: COMMENTS REGARDING NOTICE OF PREPARATION OF A DRAFT
ENVIRONMENTAL IMPACT REPORT FOR THE LITTLE BEAR SOLAR
PROJECT

Dear Ms. Monfette,

Westlands Water District (District) has reviewed the notice of preparation for the proposed solar panel project proposed by Little Bear Solar 1 LLC, Little Bear Solar 3 LLC, Little Bear Solar 4 LLC, Little Bear Solar 5 LLC, & Little Bear Solar 6 LLC (Little Bear Solar Project). After reviewing the Little Bear Solar Project application, we have the following comments about the project site.

1. The Little Bear Solar Project lies within the District boundary. This land consists of dry farming and does not receive an allocation of water from the District's agricultural water service contract. Since the Applicant is proposing a solar development, the Applicant is eligible to receive water through the District's Municipal and Industrial (M&I) supply and the land will continue to have access to the District's distribution system.
2. The District has adopted regulations governing the application for and use of M&I water (Regulations). The Regulations stipulate the quantity of water that will be made available to a water user from the District's Central Valley Project (CVP) contract supply. The District will make available up to five (5) acre-feet per 160 acres annually for solar development operations. The Applicant is responsible for acquiring more water if needed. A copy of the Regulations is also provided for your information.
3. The project location is served by a water delivery system operated and maintained by the District. During the construction and operation of this facility, please do not disturb District property. Prior to any excavation the applicant should contact Underground Service Alert.
4. The Applicant must comply with the District's Backflow Prevention guidelines for this connection to the water system.

Thank you for the opportunity to assist the County of Fresno in this matter, if you have any additional questions please feel free to contact Jose Rangel at 559-241-6220.

Sincerely,

A handwritten signature in cursive script that reads "Russ Freeman". The signature is written in black ink and has a long, sweeping horizontal line at the end.

Russ Freeman
Deputy General Manager of Resources

Enclosures (2)

1. *Terms and Conditions for Municipal and Industrial Water Service*
2. *Article __. Regulations Regarding the Application for and Use of Municipal and Industrial Water Within Westlands Water District*

WESTLANDS WATER DISTRICT

OFFICE--3130 N. FRESNO STREET/MAILING--P. O. BOX 6056, FRESNO, CA 93703
TELEPHONE: WATER DEPT. (559) 241-6250/OTHER (559) 224-1523/FAX (559) 241-6276

TERMS AND CONDITIONS FOR MUNICIPAL AND INDUSTRIAL WATER SERVICE

1. The furnishing of water to and its use by the water user shall be subject to all regulations of the Board of Directors of the District as the same may exist now or hereafter be amended or adopted. In the event of a conflict between the terms and conditions set forth herein and the regulations, the latter shall be controlling.

2. All water delivered shall be pursuant to a request by the water user for the delivery of a stated amount to a specific location. The request shall be made within the time and in the manner prescribed by the General Manager.

3. Water will be furnished by the District subject to the terms and conditions under which the water is made available to the District and if, in the exclusive judgment of the District, the water and facilities for its delivery are available; provided, that the District will use its best efforts, to the extent that it has water and capacity available and taking into account the requirements of other water users to receive water from its facilities, to provide such water in the manner and at the times requested. The District may temporarily discontinue water service or reduce the amount of water to be furnished for the purpose of such investigation, inspection, maintenance, repair, or replacement as may be reasonably necessary of any of the District's facilities. Insofar as feasible, the District will give the water user notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which event no notice need be given. No liability shall accrue against the District or any of its officers, directors, or employees for damage, direct or indirect, because of the failure to provide water as a result of system malfunctions, interruptions in service necessary to properly operate and maintain the water distribution system, or other causes which are beyond the District's reasonable control.

4. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, all damage or claims for damage, which may arise from his furnishing or use of the water after it leaves the District facilities.

5. The water furnished by the District is not potable (suitable for drinking, cooking, bathing, or other domestic use) and the District does not warrant the quality or potability of water so furnished. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, damage or claims for damage arising out the non-potability of water furnished by the District. Untreated water must never be used for any type of human consumptive needs. A water user defined and operating as a Public Water Supply (PWS) shall be responsible for any water treatment, including but not limited to filtration and chlorination achieved through central treatment or point-of-entry (POE) treatment devices approved by the California Department of Health Services (DHS), in order to provide water safe for human consumption as required by Federal, State or local law or regulation.

According to DHS, the use of POE treatment systems by individual customers of a constructed conveyance system may not provide a continuous safe, potable supply of water due to inadequate operation and maintenance of these systems by the owners, unless they are a regulated PWS. Individual use of POE devices ("Water Treatment Exclusion") may only be used if they are approved by DHS and are regularly maintained by a State-licensed operator or service provider.

Facilities in place prior to July 2001, may continue to use bottled water for drinking and cooking ("Alternative Water Exclusion"). After July 2001, the District cannot furnish new municipal and industrial water service if bottled water use is the basis for the potable water supply unless approved by DHS. Bottled water may only be obtained from a State-licensed provider.

DHS mandates the District conduct periodic surveys of water use as required by the Safe Drinking Water Act and to collect records for Alternative Water and Treatment Exclusions. Records for exclusions include invoices or statements of bottled water delivery from a licensed provider or maintenance and service records for a POE system from a licensed operator. Water users who fail to complete a survey or provide records showing an approved exclusion requested by the District shall have water service discontinued if no response is received after a reasonable attempt has been made to obtain the information.

6. All water will be measured by the District with meters installed by it and such measurements shall be final and conclusive.

7. Charges for water, hereinafter referred to as "water charges", shall be established by the Board of Directors. The water charges shall include District operation and maintenance costs and any other costs determined by the Board to be payable as part of the water charges. Water charges shall be adjusted retroactively to the extent required and authorized by federal or state law or regulations or District regulations. The General Manager may adjust the water charges as necessary and legally authorized to account for increases or decreases in the estimates used to establish the water charges.

8. As a condition of the District continuing to furnish water, the water user shall make payment for the amount billed after the District's billing and by the 25th of the month in which the bill is mailed; provided, that the due date will be not less than 15 calendar days after the billing date. Charges not paid by the due date shall be delinquent; provided, that payments postmarked on or before the due date shall be deemed to have been received by that date. The payment of water charges or related penalties or interest shall be made at the District's Fresno office. When any deadline established herein falls on a Saturday, Sunday, or holiday, it shall be extended to the next working day.

9. All claims for overcharges or errors must be made in writing and filed with the District at its Fresno Office within 10 working days after the date the bill is received by the water user. In the event the water user files a timely written protest, the District's Finance & Administration Committee shall consider the protest at its next regular meeting and notify the water user in writing of its decision. The Committee's decision shall be final, unless a written appeal to the Board of Directors is filed with the Secretary of the District within 15 working days after notice of the decision. In the event of an appeal, the decision of the Board shall be final. The filing of a protest or an appeal does not nullify the payment requirement or the District's right to discontinue water service as provided in these terms and conditions. However, in the event the protest or appeal is sustained, the District will refund the amount of the overcharge and penalty, if any.

10. On the first day following the due date, a penalty of 10 percent of the water charges which became delinquent on the preceding day shall be added to the water charges and penalties and interest, if any, due and owing to the District, the total of which are hereinafter referred to as "unpaid charges." Prior unpaid charges shall accrue interest at a monthly rate of 1½ percent. The interest shall not, however, accrue after the unpaid charges have been added to, and become a part of, the annual assessment levied on the land by the District. All payments and credits shall be applied to the earliest unpaid charges.

11. At the time of filing the District's assessment book with the District Tax Collector, unpaid charges may be added to and become a part of the assessment levied by the District on the land which received the water or for which other water charges were incurred. The District shall notify the landowner of the expected amount prior to its addition to the annual assessment. The amount so added shall be a lien on the land and impart notice thereof to all persons. If the assessment becomes delinquent, penalties and interest will be added as provided by law.

12. To supplement the procedure described in paragraph 11, the District may elect to file and record a Certificate of Unpaid Water Charges as provided in California Water Code Section 36729. This

Certificate creates a lien in the amount of unpaid charges on any land owned by the delinquent water user, or acquired by the water user before the lien's expiration, within the recording County.

13. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any parcel of land for which the unpaid charges for such service are a lien on the land or for which the assessment is delinquent.

14. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any person who owes the District unpaid charges notwithstanding the fact that the unpaid charges have been added to the assessment(s) on the parcel(s) for which they were incurred.

15. Where the District furnishes residential water service to persons other than the water user to whom the service is billed, the District shall make a reasonable, good faith effort to inform the actual users of the services when the account is delinquent. This shall be done by a notice that service will be terminated in 10 days. The notice shall inform the actual users that they have the right to become customers of the District without being required to pay the amount due on the delinquent account.

The District is not required to make service available to the actual users unless each actual user agrees to the terms and conditions of service. However, if one or more actual users are willing and able to assume responsibility for the entire account to the satisfaction of the District, or if there is a physical means legally available to the District of selectively terminating service to those actual users who have not met the requirements of the District's terms and conditions, the District shall make service available to the actual users who have met those requirements. In making service available to an actual user, the District may require that a deposit be paid to the District prior to establishing an account and furnishing service. If a deposit is required, it shall be based solely upon the creditworthiness of the actual user as determined by the District.

The District will give notice of the delinquency and impending termination of residential water service, at least 10 days prior to the proposed termination, by means of a notice mailed postage prepaid or by personal delivery to the water user to whom the service is billed not earlier than 19 days from the date of mailing the District's bill for services, and the 10-day period shall not commence until 5 days after the mailing of the notice. When the day established for the discontinuance of water service falls on a Saturday, Sunday, or District holiday, such water service shall be discontinued on the next working day.

The District will make a reasonable, good faith effort to contact an adult person residing at the premises of the water user by telephone or in person at least 48 hours prior to any termination of residential water service.

The District will comply with all other applicable provisions of California Government Code Sections 60370-60375.5 regarding termination of residential water service.

16. Except as provided in paragraph 15, in the event water service hereunder is discontinued as a result of nonpayment of water charges, all unpaid charges for such service which are due the District from the person in default must be paid before water service can be restored.

17. If a water user's delinquent charges are unpaid for 30 days or more, or if a water user's delinquent charges are added to the annual assessments on any lands within the District, or the procedure in paragraph 12 is implemented, the General Manager shall require, as a condition of resumption of water service, that advance payment of all water charges be made for the 12-month period immediately following resumption of service, according to a schedule to be determined by the General Manager. A written guarantee in a form satisfactory to the General Manager from a recognized financial lending institution may be substituted in lieu of advance payment.

18. The General Manager, after consultation with and approval by the Finance & Administration Committee, may also require advance payment and/or payment by cashier's check or such other actions as he may deem necessary when a water user's account is determined, based on the payment history or other actions of the water user, to create a financial risk or hardship for the District or its landowners. Circumstances which constitute the basis for such a determination include but are not limited to the following: (1) instances of a water user's checks being returned unpaid or (2) instances where a water user whose account is delinquent has, in violation of District regulations, taken water from a District delivery.

19. By applying for or taking delivery of municipal and industrial water from the District, the water user agrees to these terms and conditions of service.

20. The District may modify or terminate these terms and conditions; provided, that such modifications or terminations are prospective only and notice thereof is given prior to the effective date by mail to the water user.

**ARTICLE 2. REGULATIONS REGARDING THE APPLICATION FOR
AND USE OF MUNICIPAL AND INDUSTRIAL WATER WITHIN
WESTLANDS WATER DISTRICT**

2.1 PURPOSE

Westlands Water District has a long-term contractual entitlement to receive from the United States an annual supply of 1,150,000 acre-feet (AF) of Central Valley Project (CVP) water. The contracts between Westlands Water District and the United States allow the District to make CVP water available for municipal, industrial and domestic uses. The District may also acquire additional water supplies for these purposes. This Article establishes the rules and procedures for making application for and the use of municipal and industrial (M&I) water.

2.2 GLOSSARY OF TERMS AND DEFINITIONS

Unless specified below, the terms and definitions contained in Article 2 of these Regulations shall apply.

- A. "Ag Related M&I Use" – the use of water exclusively for purposes of commerce, trade or industry associated with the production of agricultural crops or livestock, or their related by-products, including human uses, other than housing, that are incidental to the Ag Related M&I Use.
- B. "Historic Use" – the greatest annual quantity of CVP water delivered for M&I Use to an M&I Water User at a point of delivery during the five-year period immediately preceding June 30, 2001.
- C. "M&I Use" – the use of water for drinking, cooking, bathing, showering, dish washing, and maintaining oral hygiene or purposes of commerce, trade or industry.
- D. "M&I Water Application" - an agreement in a form approved by the General Manager or his designee between the District and an M&I Water User, which describes the point of delivery for such water and the estimated quantity of water that will be made available by the District for M&I Use.

- E. "M&I Water User" - individual or entity who has executed and submitted to the District an M&I Water Application or to whom the District makes water available for M&I Use.

_.3 M&I WATER AVAILABILITY

- A. The General Manager shall set aside from the District's CVP water supply or other sources he deems appropriate water for M&I Use.
- B. The General Manager or his designee shall assist any M&I Water User in identifying a source of water that can be made available to the District for M&I Use; provided, that this provision shall not impose on the District or its employees an obligation to incur any expense or other obligation on behalf of such M&I Water User.

_.4 APPLICATION FOR WATER

- A. Except for M&I Use initiated before July 1, 2001, to receive water for M&I Use, a proposed M&I Water User must file at the District's Fresno office an M&I Water Application. Upon approval by the District, the M&I Water Application shall constitute a valid agreement for M&I Use until the M&I Water User notifies the District in writing that such M&I Use will be terminated. Every M&I Water Application shall identify the point of delivery and the intended use of the M&I Water.
- B. An M&I Water Application for use in excess of 5 acre-feet per year shall identify a source of water that will, at the applicant's expense, be made available to the District for the proposed M&I Use.
- C. Notwithstanding Section _.4 B. of this Article, a M&I Water User may annually transfer into the M&I Water User's account a quantity of water, from any source available to the M&I Water User, sufficient to satisfy any Ag Related M&I Use for the water year; provided, the M&I Water User shall acknowledge in writing that the District has no obligation to make available to the M&I Water User, in any year, a quantity of water in excess of the quantity transferred into the M&I Water User's account.

- D. A supplemental M&I Water Application shall be filed by any M&I Water User before the quantity of water for M&I Use made available to such M&I Water User is increased (i) above Historic Use, for M&I Water Users receiving M&I water before July 1, 2001, or (ii) above the quantity stated in the initial M&I Water Application, for M&I Use initiated after June 30, 2001.

_.5 USE OF WATER

- A. The unauthorized use or taking of water for M&I Use, or the waste or unreasonable use of water, are prohibited. Water made available for M&I Use may only be used at the point of delivery and for the purpose(s) identified in the M&I Water Application. Except as provided in Section _.5 B. of this Article, the transfer of M&I water is prohibited.
- B. M&I water identified pursuant to Section _.4 B. of this Article or water transferred by the M&I Water User pursuant to Section _.4 C. of this Article may be transferred within the District's boundaries. Nothing contained in this Article shall prevent an M&I Water User from changing the place of use of its M&I water within the District's boundaries.
- C. All M&I Water Users shall implement conservation measures adopted by the Water Policy Committee of the Board of Directors or its successor.
- D. All M&I Water Users shall cooperate in the District's efforts to comply with the terms of the Compliance Agreement between the California Department of Health Services and Westlands Water District, dated June 1, 2001.
- E. Every point of delivery for M&I Water shall be equipped with a backflow prevention device of a design approved by the General Manager.
- F. The General Manager is authorized, after written notice to the M&I Water User, to discontinue water service to any M&I Water User who violates this Article or the Terms and Conditions for Municipal and Industrial Water Service.
- G. In the event the District's water supply is insufficient to meet all demands for water, including demands for irrigation, the General Manager is authorized to reduce the quantity of water made available for M&I Use or to impose such

temporary conservation actions or other measures, as he deems necessary to protect the public health and safety.

_.6 COMPLIANCE WITH TERMS AND CONDITIONS

Each M&I Water User shall comply with the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board from time to time. Failure to comply with the Terms and Conditions for Municipal and Industrial Water Service may be grounds for termination of M&I Water Use service, and no water shall be furnished to an M&I Water User who fails to make required payments pursuant to the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board, from time to time.

_.7 MISCELLANEOUS

- A. The General Manager may do all things necessary to implement and effectuate these Regulations.
- B. An appeal from any decision made pursuant to these Regulations shall be made to the Finance and Administration Committee of the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Finance and Administration Committee may be appealed to the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Board shall be final.
- C. The General Manager shall provide notice of any changes or revision to these Regulations to all District landowners and M&I Water Users.

ATTACHMENT B

Hydrographs of Groundwater Levels

Figure B-1. 14S14E01N002-4M Inactive Observation Well Cluster

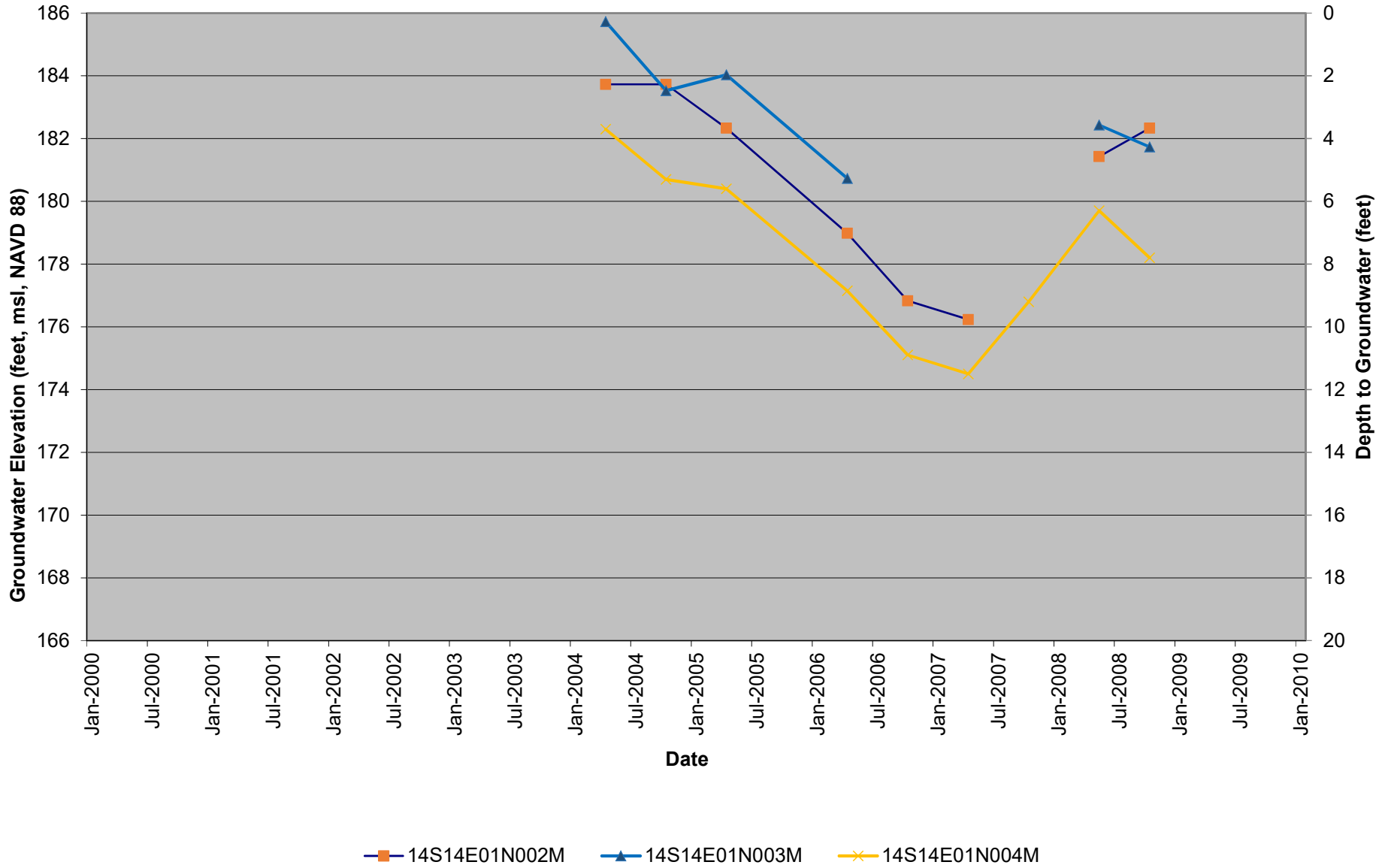


Figure B-2. 14S14E10A001-4M Active Observation Well Cluster

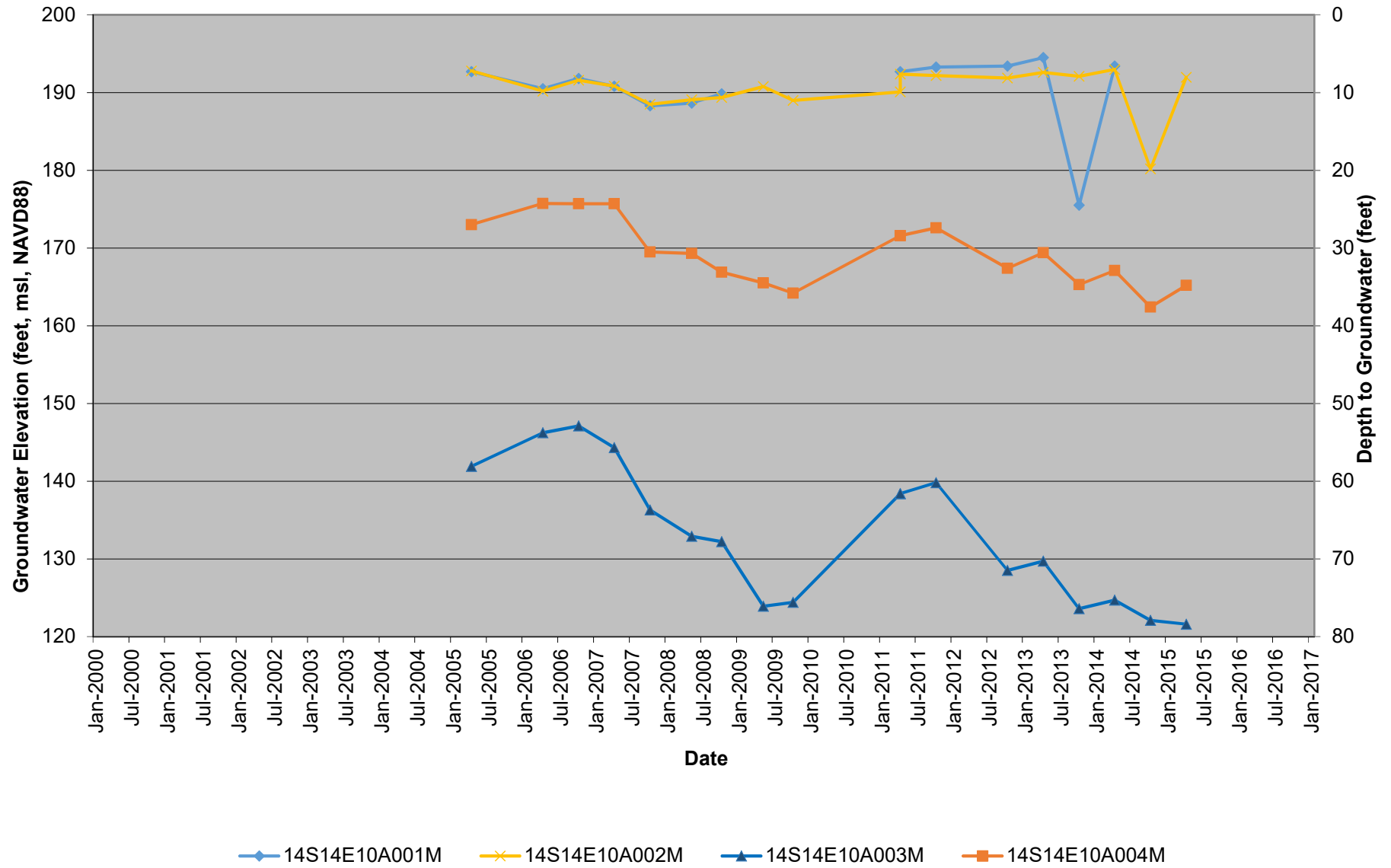


Figure B-3. 14S14E11N005-6M Inactive Observation Well Cluster

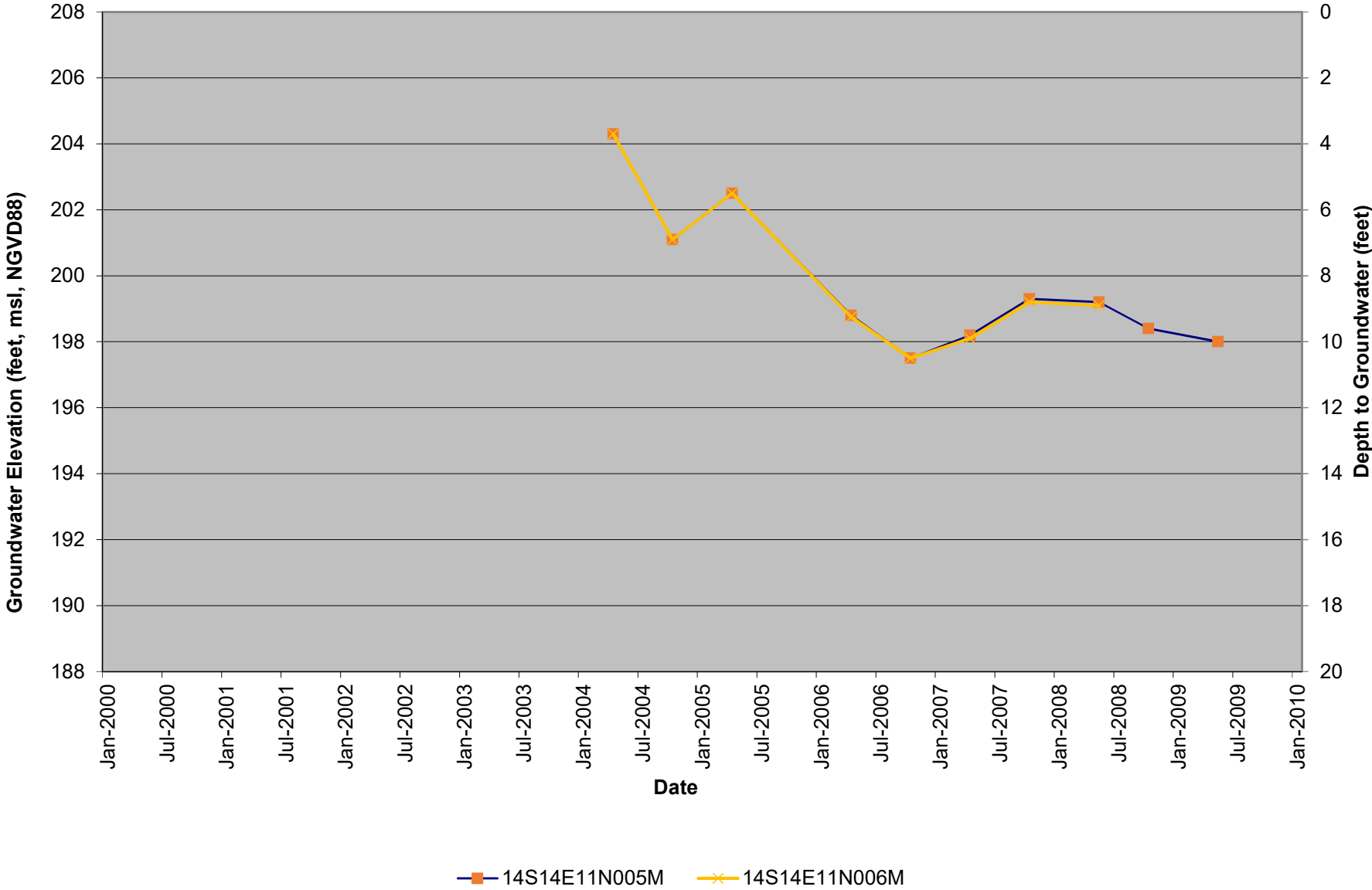
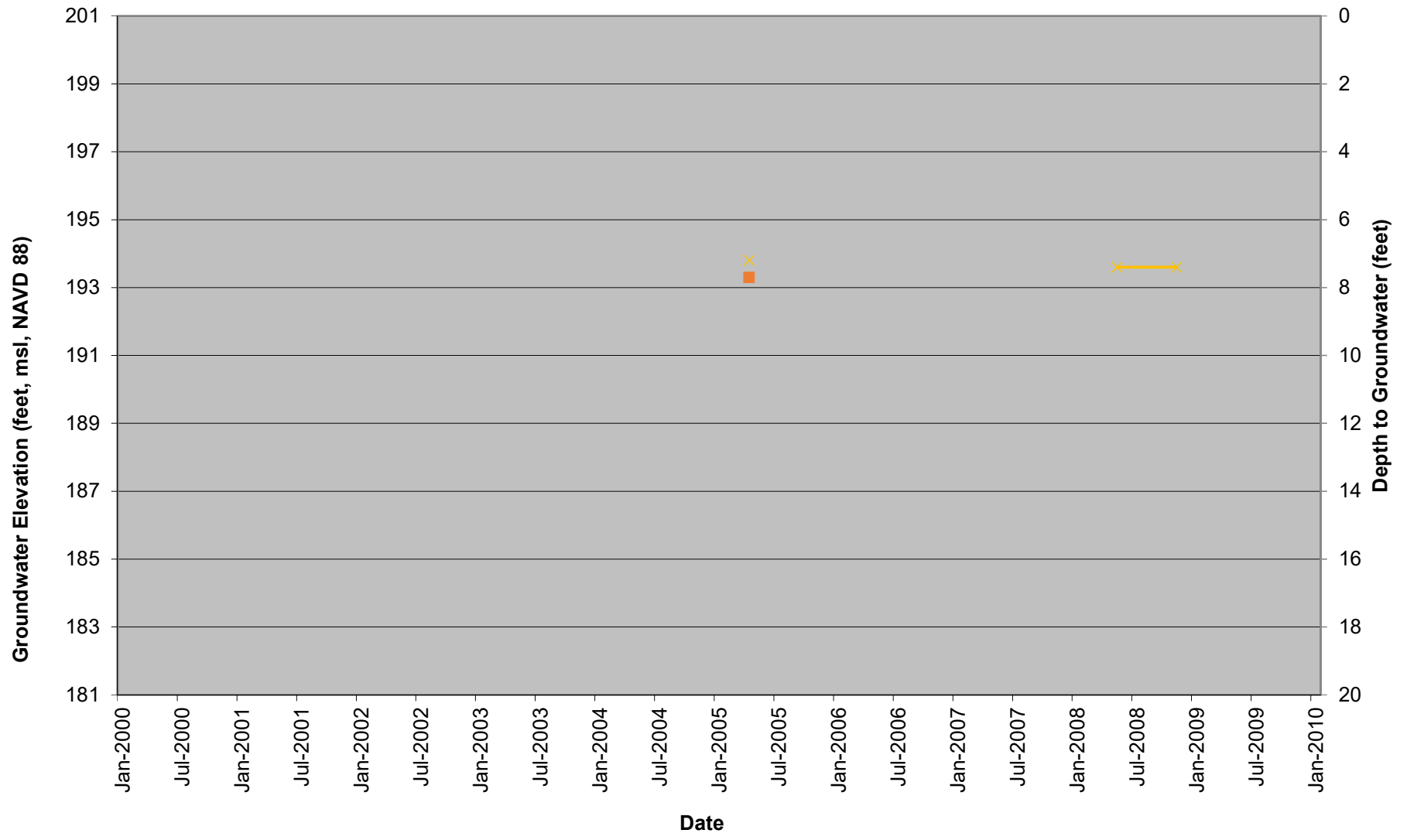


Figure B-4. 14S14E11P001-14S14E14C003 Inactive Observation Well Cluster



■ 14S14E11P001M
 ✕ 14S14E14C003M

Figure B-5. 14S14E15N004-6M Inactive Observation Well Cluster

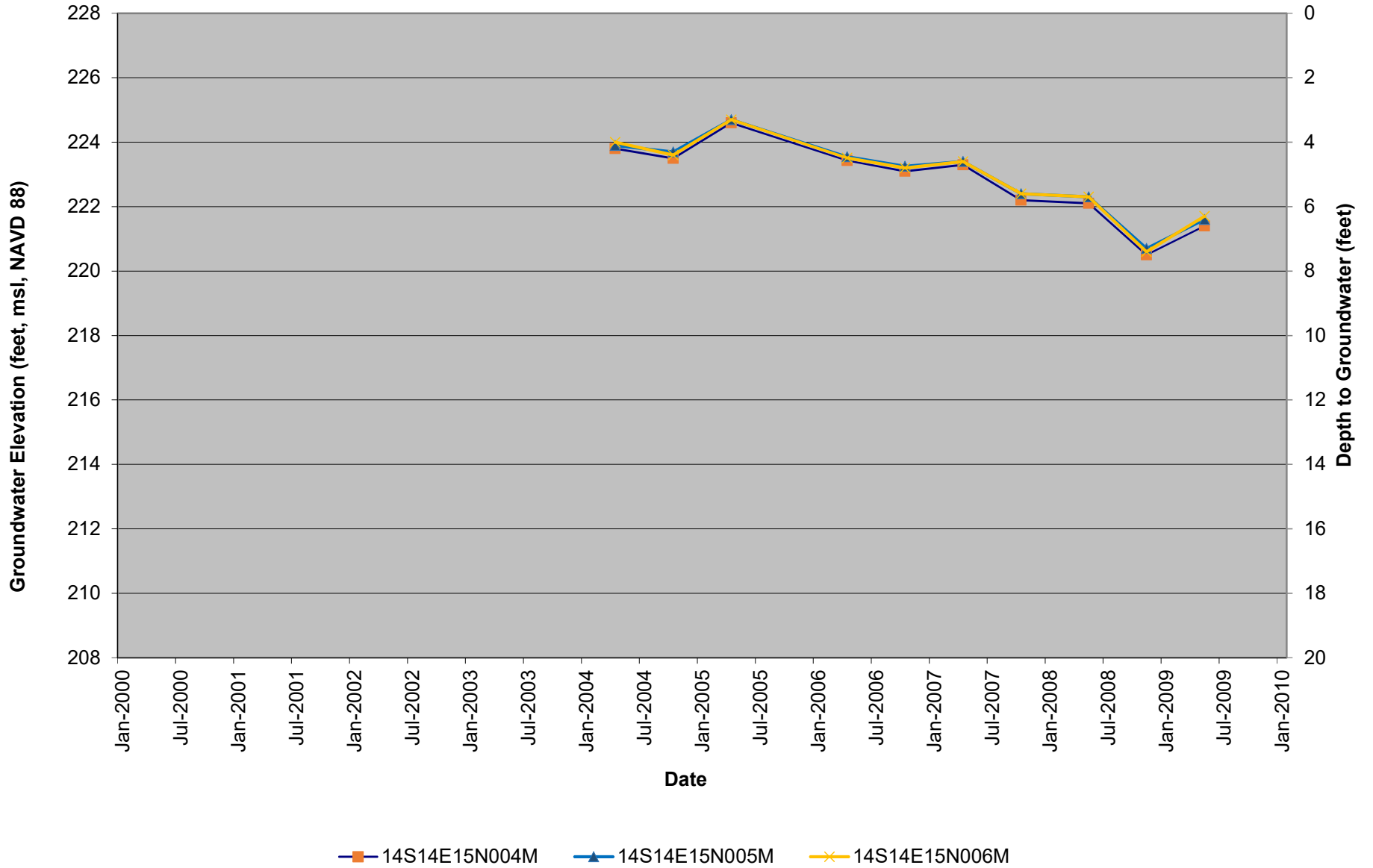


Figure B-6. 14S14E21N003-4M Inactive Observation Well Cluster

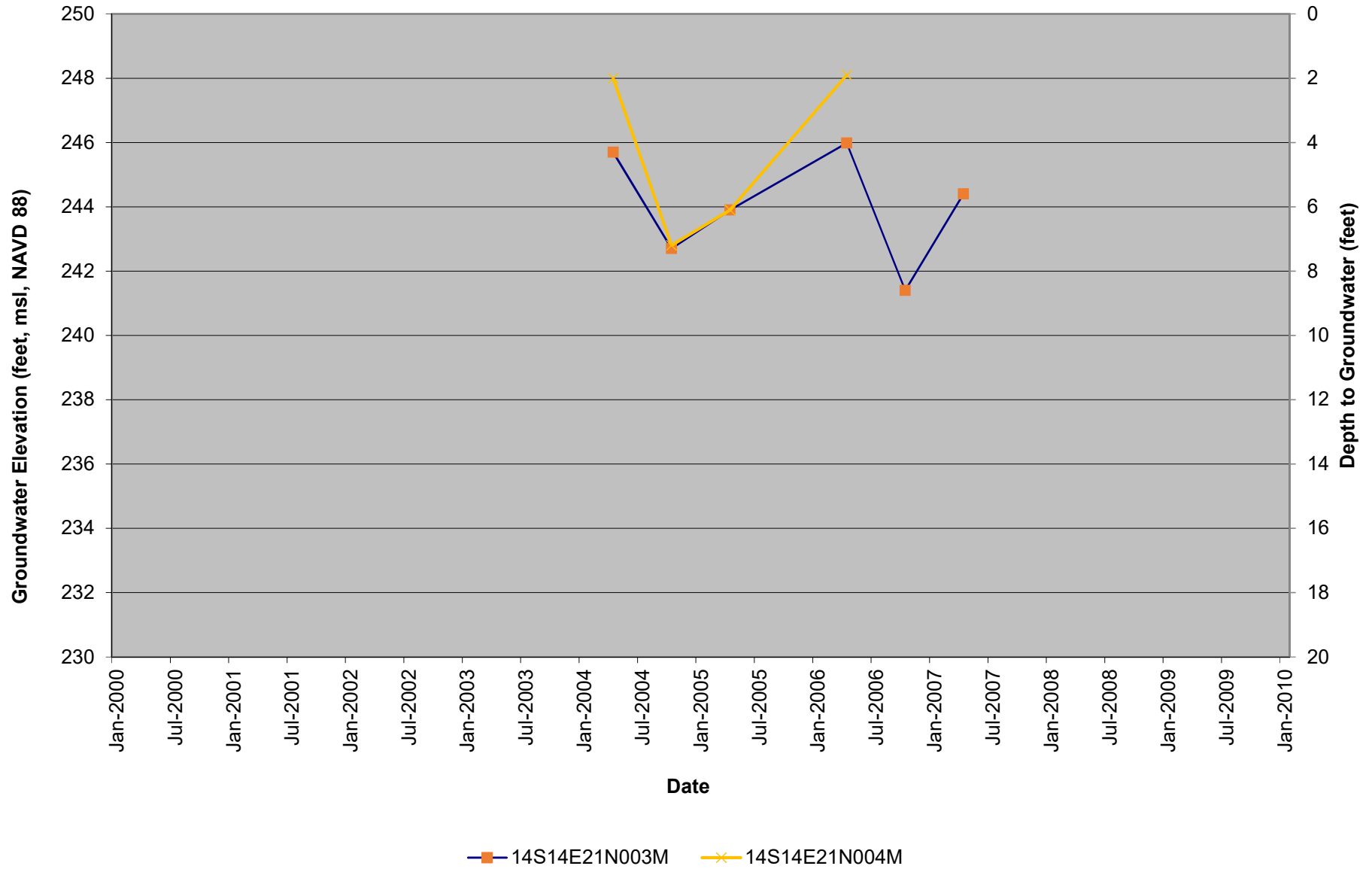
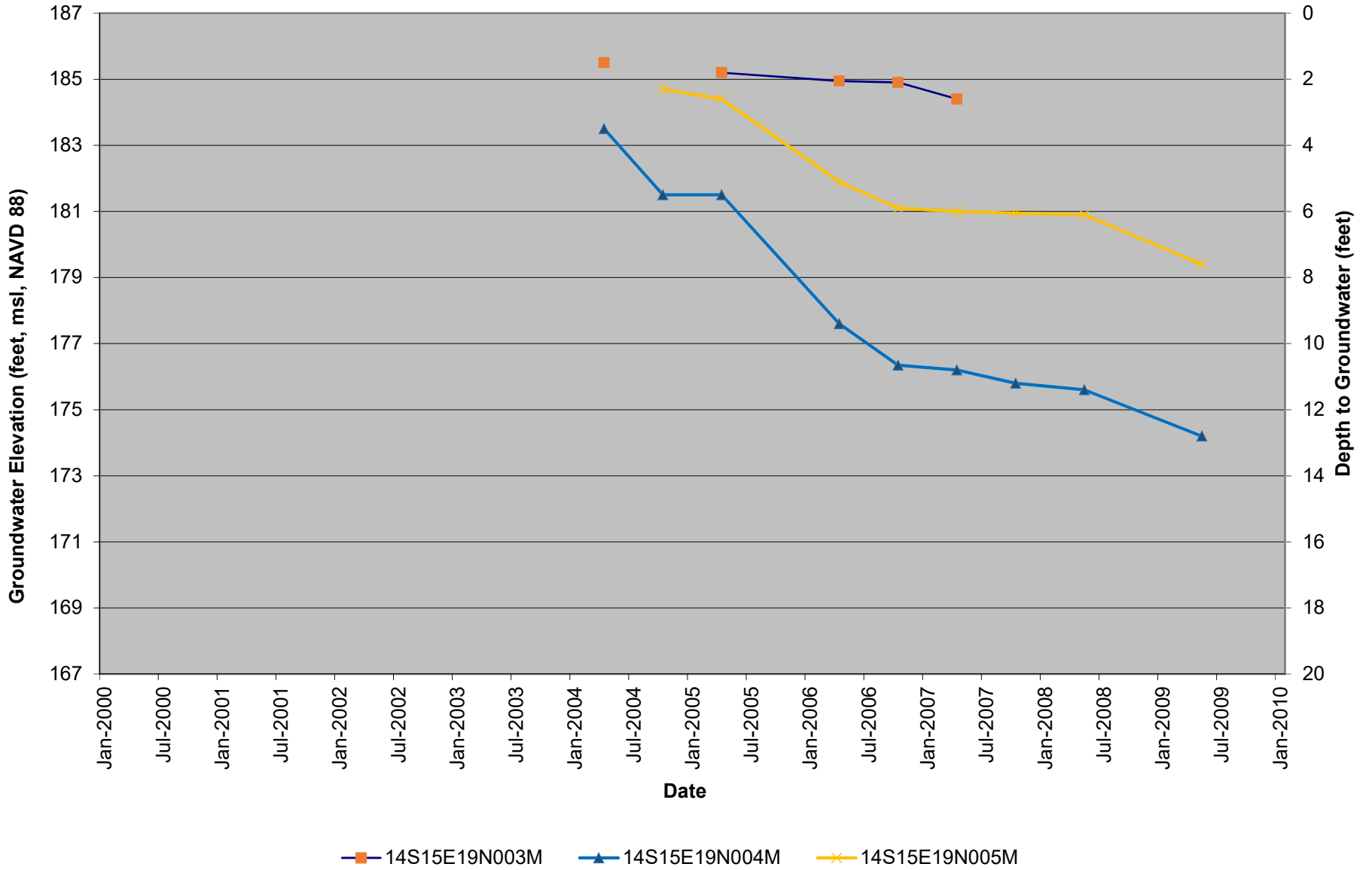


Figure B-7. 14S15E19N003-5M Inactive Observation Well Cluster



ATTACHMENT C

Groundwater Quality Results

Table C1-1. 14S14E12M001M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit/Units	Result Units	Analytical Method
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Conductance (EC)	2545	1	µS/cm	UnkH Conductance
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Dissolved Boron	2.6	0.1	mg/L	UnkH Boron
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Dissolved Chloride	436	0.1	mg/L	UnkH Chloride
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Dissolved Sodium	530	1	mg/L	UnkH Sodium
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Dissolved Sulfate	570	1	mg/L	UnkH Sulfate
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Total Alkalinity	138	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12M001M	WDIS_0728050	8/13/1951 0:00		Feet	Total Hardness	190	1	mg/L as CaCO3	UnkH Hardness

Table C1-2. 14S14E12N001M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Conductance (EC)	2520	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Conductance (EC)	2560	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Conductance (EC)	1790	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Conductance (EC)	1860	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Conductance (EC)	1960	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Conductance (EC)	1850	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Conductance (EC)	1980	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728058	7/28/1955 11:10		Feet	Conductance (EC)	2050	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728059	10/11/1955 15:05		Feet	Conductance (EC)	2040	1	µS/cm	UnkH Conductance
14S14E12N001M	WDIS_0728060	7/31/1957 14:05		Feet	Conductance (EC)	2110	1	µS/cm	EPA 120.1
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Conductance (EC)	2320	1	µS/cm	EPA 120.1
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Boron	1.81	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Boron	1.82	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Dissolved Boron	1.6	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Boron	0.53	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Boron	1.4	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Boron	0.66	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Boron	1.2	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728058	7/28/1955 11:10		Feet	Dissolved Boron	1.6	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728060	7/31/1957 14:05		Feet	Dissolved Boron	1.5	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Boron	1.5	0.1	mg/L	UnkH Boron
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Calcium	31	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Calcium	20	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Calcium	26	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Calcium	25	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Calcium	26	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Calcium	29	1	mg/L	UnkH Calcium
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Calcium	52	1	mg/L	UnkMod Calcium
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Chloride	375	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Chloride	382	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Dissolved Chloride	178	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Chloride	165	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Chloride	156	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Chloride	157	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Chloride	181	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728058	7/28/1955 11:10		Feet	Dissolved Chloride	200	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728059	10/11/1955 15:05		Feet	Dissolved Chloride	211	0.1	mg/L	UnkH Chloride
14S14E12N001M	WDIS_0728060	7/31/1957 14:05		Feet	Dissolved Chloride	228	1	mg/L	UnkMod Chloride
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Chloride	280	1	mg/L	UnkMod Chloride
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Fluoride	0.3	0.1	mg/L	UnkH Fluoride
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Fluoride	0.5	0.1	mg/L	UnkH Fluoride
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Fluoride	0.7	0.1	mg/L	UnkH Fluoride
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Fluoride	0.4	0.1	mg/L	UnkH Fluoride
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Fluoride	0.5	0.1	mg/L	UnkMod Fluoride
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Iron	0	0.001	mg/L	UnkMod Iron
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Magnesium	6.3	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Magnesium	6.6	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Magnesium	3.6	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Magnesium	3.6	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Magnesium	4.4	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Magnesium	3.5	0.1	mg/L	UnkH Magnesium
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Magnesium	6.7	0.1	mg/L	UnkMod Magnesium
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Nitrate	1	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Nitrate	0.3	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Nitrate	3	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Nitrate	0	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Nitrate	0	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Nitrate	1.5	0.1	mg/L	UnkH Nitrate
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Nitrate	4.5	0.1	mg/L	UnkMod Nitrate
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Potassium	2.7	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Potassium	2.9	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Potassium	5.2	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Potassium	3.7	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Potassium	4.1	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Potassium	3.5	0.1	mg/L	UnkH Potassium
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Potassium	8	0.1	mg/L	UnkMod Potassium
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Silica (SiO2)	59	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Silica (SiO2)	45	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Silica (SiO2)	69	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Silica (SiO2)	68	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Silica (SiO2)	68	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Silica (SiO2)	67	0.5	mg/L	UnkH Silica
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Silica (SiO2)	68	0.5	mg/L	UnkMod Silica
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Sodium	506	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Sodium	588	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Dissolved Sodium	385	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Sodium	385	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Sodium	377	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Sodium	385	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Sodium	409	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728058	7/28/1955 11:10		Feet	Dissolved Sodium	420	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728059	10/11/1955 15:05		Feet	Dissolved Sodium	414	1	mg/L	UnkH Sodium
14S14E12N001M	WDIS_0728060	7/31/1957 14:05		Feet	Dissolved Sodium	413	1	mg/L	UnkMod Sodium
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Sodium	445	1	mg/L	UnkMod Sodium
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Dissolved Sulfate	544	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Dissolved Sulfate	540	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Dissolved Sulfate	590	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Dissolved Sulfate	514	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Dissolved Sulfate	525	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Dissolved Sulfate	507	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Dissolved Sulfate	526	1	mg/L	UnkH Sulfate
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Dissolved Sulfate	576	1	mg/L	UnkMod Sulfate
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Total Alkalinity	142	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Total Alkalinity	157	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Total Alkalinity	143	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Total Alkalinity	143	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Total Alkalinity	144	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Total Alkalinity	144	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Total Alkalinity	150	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Total Alkalinity	146	1	mg/L as CaCO3	UnkMod Alkalinity
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	Total Hardness	104	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	Total Hardness	77	1	mg/L as CaCO3	UnkH Hardness

Table C1-2. 14S14E12N001M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	Total Hardness	78	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	Total Hardness	80	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	Total Hardness	78	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	Total Hardness	83	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	Total Hardness	87	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728058	7/28/1955 11:10		Feet	Total Hardness	91	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728059	10/11/1955 15:05		Feet	Total Hardness	92	1	mg/L as CaCO3	UnkH Hardness
14S14E12N001M	WDIS_0728060	7/31/1957 14:05		Feet	Total Hardness	146	1	mg/L as CaCO3	UnkMod Hardness
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	Total Hardness	157	1	mg/L as CaCO3	UnkMod Hardness
14S14E12N001M	WDIS_0728051	5/18/1951 0:00		Feet	pH	7.7	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728052	5/19/1951 0:00		Feet	pH	8.9	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728053	8/13/1951 0:00		Feet	pH	7.5	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728054	11/13/1951 0:00		Feet	pH	8	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728055	8/12/1952 0:00		Feet	pH	8.3	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728056	7/7/1953 11:35		Feet	pH	7.8	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0728057	7/20/1954 9:50		Feet	pH	8.4	0.1	pH Units	UnkH pH
14S14E12N001M	WDIS_0305195	6/24/1958 14:10		Feet	pH	7.6	0.1	pH Units	EPA 150.1

Table C1-3. 14S14E12N002M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Conductance (EC)	4810	1	µS/cm	UnkH Conductance
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Conductance (EC)	4480	1	µS/cm	UnkH Conductance
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Conductance (EC)	4550	1	µS/cm	UnkH Conductance
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Boron	1.33	0.1	mg/L	UnkH Boron
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Boron	1.64	0.1	mg/L	UnkH Boron
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Boron	1.69	0.1	mg/L	UnkH Boron
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Calcium	185	1	mg/L	UnkH Calcium
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Calcium	152	1	mg/L	UnkH Calcium
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Calcium	165	1	mg/L	UnkH Calcium
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Chloride	1080	0.1	mg/L	UnkH Chloride
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Chloride	1040	0.1	mg/L	UnkH Chloride
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Chloride	1070	0.1	mg/L	UnkH Chloride
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Magnesium	117	0.1	mg/L	UnkH Magnesium
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Magnesium	108	0.1	mg/L	UnkH Magnesium
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Magnesium	104	0.1	mg/L	UnkH Magnesium
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Nitrate	110	0.1	mg/L	UnkH Nitrate
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Nitrate	4.8	0.1	mg/L	UnkH Nitrate
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Nitrate	9.6	0.1	mg/L	UnkH Nitrate
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Potassium	12	0.1	mg/L	UnkH Potassium
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Potassium	11	0.1	mg/L	UnkH Potassium
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Potassium	14	0.1	mg/L	UnkH Potassium
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Silica (SiO2)	72	0.5	mg/L	UnkH Silica
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Silica (SiO2)	49	0.5	mg/L	UnkH Silica
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Silica (SiO2)	75	0.5	mg/L	UnkH Silica
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Sodium	737	1	mg/L	UnkH Sodium
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Sodium	673	1	mg/L	UnkH Sodium
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Sodium	640	1	mg/L	UnkH Sodium
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Dissolved Sulfate	742	1	mg/L	UnkH Sulfate
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Dissolved Sulfate	614	1	mg/L	UnkH Sulfate
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Dissolved Sulfate	571	1	mg/L	UnkH Sulfate
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Total Alkalinity	181	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Total Alkalinity	174	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Total Alkalinity	181	1	mg/L as CaCO3	UnkH Alkalinity
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	Total Hardness	942	1	mg/L as CaCO3	UnkH Hardness
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	Total Hardness	823	1	mg/L as CaCO3	UnkH Hardness
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	Total Hardness	835	1	mg/L as CaCO3	UnkH Hardness
14S14E12N002M	WDIS_0728062	5/18/1951 0:00		Feet	pH	7.3	0.1	pH Units	UnkH pH
14S14E12N002M	WDIS_0728065	5/19/1951 0:00		Feet	pH	7.2	0.1	pH Units	UnkH pH
14S14E12N002M	WDIS_0728066	5/20/1951 0:00		Feet	pH	7.8	0.1	pH Units	UnkH pH

Table C1-4. 14S14E13E001M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Conductance (EC)	10100	1	µS/cm	UnkH Conductance
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Conductance (EC)	18600	1	µS/cm	EPA 120.1
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Boron	1.9	0.1	mg/L	UnkH Boron
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Calcium	347	1	mg/L	UnkH Calcium
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Dissolved Calcium	53	1	mg/L	EPA 215.2
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Chloride	1920	0.1	mg/L	UnkH Chloride
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Dissolved Chloride	3740	0.1	mg/L	Std Method 4500-Cl, B
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Fluoride	0.5	0.1	mg/L	UnkH Fluoride
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Magnesium	279	0.1	mg/L	UnkH Magnesium
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Nitrate	1.4	0.1	mg/L	UnkH Nitrate
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Potassium	17	0.1	mg/L	UnkH Potassium
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Silica (SiO2)	39	0.5	mg/L	UnkH Silica
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Sodium	1800	1	mg/L	UnkH Sodium
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Dissolved Sodium	3850	1	mg/L	Std Method 3500-Na, D
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Dissolved Sulfate	2940	1	mg/L	UnkH Sulfate
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Total Alkalinity	251	1	mg/L as CaCO3	UnkH Alkalinity
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Total Alkalinity	1403	1	mg/L as CaCO3	EPA 310.1
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	Total Hardness	2010	1	mg/L as CaCO3	UnkH Hardness
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	Total Hardness	2650	1	mg/L as CaCO3	EPA 130.2
14S14E13E001M	WDIS_0728068	8/12/1952 0:00		Feet	pH	7.4	0.1	pH Units	UnkH pH
14S14E13E001M	WDIS_0728069	8/9/1966 0:00		Feet	pH	8.1	0.1	pH Units	EPA 150.1

Table C1-5. 14S14E13E002M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Conductance (EC)	9780	1	µS/cm	EPA 120.1
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Dissolved Calcium	509	1	mg/L	EPA 215.2
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Dissolved Chloride	1280	0.1	mg/L	Std Method 4500-Cl, B
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Dissolved Magnesium	228.2	0.1	mg/L	Std Method 3500-Mg, E
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Dissolved Sodium	1500	1	mg/L	Std Method 3500-Na, D
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Total Alkalinity	372	1	mg/L as CaCO3	EPA 310.1
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	Total Hardness	2210	1	mg/L as CaCO3	EPA 130.2
14S14E13E002M	WDIS_0728070	8/9/1966 0:00		Feet	pH	7.9	0.1	pH Units	EPA 150.1

Table C1-6. 14S14E13E003M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Conductance (EC)	2600	1	µS/cm	EPA 120.1
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Conductance (EC)	2330	1	µS/cm	EPA 120.1
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Boron	3	0.1	mg/L	UnkMod Boron
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Boron	2.7	0.1	mg/L	UnkMod Boron
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Calcium	40	1	mg/L	UnkMod Calcium
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Calcium	78	1	mg/L	UnkMod Calcium
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Chloride	216	1	mg/L	UnkMod Chloride
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Chloride	234	1	mg/L	UnkMod Chloride
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Magnesium	35	0.1	mg/L	UnkMod Magnesium
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Magnesium	100	0.1	mg/L	UnkMod Magnesium
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Nitrate	0	0.1	mg/L	UnkMod Nitrate
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Sodium	485	1	mg/L	UnkMod Sodium
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Sodium	322	1	mg/L	UnkMod Sodium
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Dissolved Sulfate	826	1	mg/L	UnkMod Sulfate
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Dissolved Sulfate	869	1	mg/L	UnkMod Sulfate
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Total Alkalinity	71	1	mg/L as CaCO3	UnkMod Alkalinity
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Total Alkalinity	25	1	mg/L as CaCO3	UnkMod Alkalinity
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Total Dissolved Solids	1722	1	mg/L at 180°C	UnkMod TDS
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Total Dissolved Solids	1834	1	mg/L at 180°C	UnkMod TDS
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	Total Hardness	244	1	mg/L as CaCO3	UnkMod Hardness
14S14E13E003M	WDIS_0728072	7/16/1963 11:50		Feet	Total Hardness	606	1	mg/L as CaCO3	UnkMod Hardness
14S14E13E003M	WDIS_0728071	6/20/1963 0:00		Feet	pH	7.8	0.1	pH Units	EPA 150.1

Table C1-7. 14S14E14G001M

Station Name	Sample Code	Sample date	Sample Depth	Depth Units	Analyte Name	Analytical Result	Result Reporting Limit	Result Units	Analytical Method
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Conductance (EC)	6230	1	µS/cm	UnkH Conductance
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Conductance (EC)	7740	1	µS/cm	UnkH Conductance
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Conductance (EC)	1360	1	µS/cm	EPA 120.1
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Dissolved Boron	3.8	0.1	mg/L	UnkH Boron
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Boron	2.4	0.1	mg/L	UnkH Boron
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Calcium	352	1	mg/L	UnkH Calcium
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Dissolved Calcium	29	1	mg/L	EPA 215.2
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Dissolved Chloride	1090	0.1	mg/L	UnkH Chloride
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Chloride	1140	0.1	mg/L	UnkH Chloride
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Dissolved Chloride	100	0.1	mg/L	Std Method 4500-Cl, B
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Fluoride	0.7	0.1	mg/L	UnkH Fluoride
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Magnesium	277	0.1	mg/L	UnkH Magnesium
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Dissolved Magnesium	14.2	0.1	mg/L	Std Method 3500-Mg, E
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Nitrate	5.3	0.1	mg/L	UnkH Nitrate
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Potassium	14	0.1	mg/L	UnkH Potassium
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Silica (SiO2)	39	0.5	mg/L	UnkH Silica
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Dissolved Sodium	1090	1	mg/L	UnkH Sodium
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Sodium	1220	1	mg/L	UnkH Sodium
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Dissolved Sodium	238	1	mg/L	Std Method 3500-Na, D
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Dissolved Sulfate	2800	1	mg/L	UnkH Sulfate
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Dissolved Sulfate	2750	1	mg/L	UnkH Sulfate
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Total Alkalinity	210	1	mg/L as CaCO3	UnkH Alkalinity
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Total Alkalinity	216	1	mg/L as CaCO3	UnkH Alkalinity
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Total Alkalinity	189	1	mg/L as CaCO3	EPA 310.1
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	Total Hardness	1750	1	mg/L as CaCO3	UnkH Hardness
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	Total Hardness	2020	1	mg/L as CaCO3	UnkH Hardness
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	Total Hardness	131	1	mg/L as CaCO3	EPA 130.2
14S14E14G001M	WDIS_0728074	8/13/1951 0:00		Feet	pH	7.5	0.1	pH Units	UnkH pH
14S14E14G001M	WDIS_0728075	8/12/1952 0:00		Feet	pH	7.4	0.1	pH Units	UnkH pH
14S14E14G001M	WDIS_0728076	10/28/1965 14:00		Feet	pH	8.4	0.1	pH Units	EPA 150.1

Table C1-8. USGS-364126120252001

ORGANIZATIONFORMALNAME	ACTIDENTIFIER	ACTSTARTDATE	CHARACTERISTICNAME	RESULT SAMPLEFRACTIONTEXT	RESULT MEASVALUE	RESULTMEAS_MEASUNITCODE
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Alkalinity	Total	148	mg/l CaCO3
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Bicarbonate	Total	180	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Boron	Dissolved	1300	ug/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Calcium	Dissolved	28	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Carbon dioxide	Total	4.6	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Carbonate (CO3)	Total	0	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Chloride	Dissolved	130	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Depth		1108	ft
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Hardness, non-carbonate	Total	0	mg/l CaCO3
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Hydrogen ion	Total	0.00002	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Magnesium	Dissolved	4.1	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Nitrate	Total	0.181	mg/l as N
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Nitrate	Total	0.8	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Sodium	Dissolved	330	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Sodium adsorption ratio		15	None
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Specific conductance	Total	1630	uS/cm @25C
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Sulfate	Dissolved	440	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Temperature, water		28	deg C
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Total dissolved solids	Dissolved	1.51	tons/ac ft
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Total dissolved solids	Dissolved	1110	mg/l
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	Total hardness -- SDWA NPDWR		87	mg/l CaCO3
USGS California Water Science Center	nwisca.01.96802421	9/11/1968	pH	Total	7.8	std units

Table C1-9. USGS-364255120243801

ORGANIZATIONFORMALNAME	ACTIDENTIFIER	ACTSTARTDATE	CHARACTERISTICNAME	RESULT SAMPLEFRACTIONTEXT	RESULT MEASVALUE	RESULTMEAS_MEASUNITCODE
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Alkalinity	Total	213	mg/l CaCO3
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Bicarbonate	Total	260	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Boron	Dissolved	3800	ug/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Carbon dioxide	Total	13	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Chloride	Dissolved	1100	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Hardness, non-carbonate	Total	1600	mg/l CaCO3
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Hydrogen ion	Total	0.00003	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Sodium	Dissolved	1100	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Sodium adsorption ratio		11	None
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Sodium, percent total cations		58	%
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Specific conductance	Total	6230	uS/cm @25C
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Sulfate	Dissolved	2800	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Temperature, water		22.8	deg C
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Total dissolved solids	Dissolved	8.47	tons/ac ft
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Total dissolved solids	Dissolved	6230	mg/l
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	Total hardness -- SDWA NPDWR		1800	mg/l CaCO3
USGS California Water Science Center	nwisca.01.95101001	8/13/1951	pH	Total	7.5	std units

Table C1-10. USGS-364318120251901

ORGANIZATIONFORMALNAME	ACTIDENTIFIER	ACTSTARTDATE	CHARACTERISTICNAME	RESULT SAMPLEFRACTIONTEXT	RESULT MEASVALUE	RESULTMEAS_ MEASUNITCODE
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Boron	Dissolved	2500	ug/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Calcium	Dissolved	300	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Chloride	Dissolved	1000	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Magnesium	Dissolved	260	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Potassium	Dissolved	10	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Specific conductance	Total	6400	uS/cm @25C
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Sulfate	Dissolved	2200	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Temperature, water		22.8	deg C
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	Total dissolved solids	Dissolved	5000	mg/l
USGS California Water Science Center	nwisca.01.95101011	8/23/1951	pH	Total	8	std units

Table C2-1. 14S14E11N001M

Station Number	Collection Date	Analyte Name	Analytical Result	Report Limit	Report Units
14S14E11N001M	5/12/1951 0:00	Total Alkalinity	210	1	mg/L as CaCO3
14S14E11N001M	5/12/1951 0:00	Dissolved Boron	2.03	0.1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Calcium	305	1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Chloride	1040	0.1	mg/L
14S14E11N001M	5/12/1951 0:00	Conductance (EC)	6470	1	µS/cm
14S14E11N001M	5/12/1951 0:00	Total Hardness	1770	1	mg/L as CaCO3
14S14E11N001M	5/12/1951 0:00	Dissolved Magnesium	246	0.1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Nitrate	2	0.1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Potassium	8.9	0.1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Silica (SiO2)	50	0.5	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Sodium	974	1	mg/L
14S14E11N001M	5/12/1951 0:00	Dissolved Sulfate	2110	1	mg/L
14S14E11N001M	5/12/1951 0:00	pH	7.7	0.1	pH Units
14S14E11N001M	5/19/1951 0:00	Total Alkalinity	213	1	mg/L as CaCO3
14S14E11N001M	5/19/1951 0:00	Dissolved Boron	2.31	0.1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Calcium	301	1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Chloride	1060	0.1	mg/L
14S14E11N001M	5/19/1951 0:00	Conductance (EC)	6500	1	µS/cm
14S14E11N001M	5/19/1951 0:00	Total Hardness	1780	1	mg/L as CaCO3
14S14E11N001M	5/19/1951 0:00	Dissolved Magnesium	251	0.1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Nitrate	2.4	0.1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Potassium	8.9	0.1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Silica (SiO2)	51	0.5	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Sodium	981	1	mg/L
14S14E11N001M	5/19/1951 0:00	Dissolved Sulfate	2120	1	mg/L
14S14E11N001M	5/19/1951 0:00	pH	7.5	0.1	pH Units
14S14E11N001M	8/23/1951 0:00	Total Alkalinity	215	1	mg/L as CaCO3
14S14E11N001M	8/23/1951 0:00	Dissolved Boron	2.5	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Calcium	297	1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Chloride	1045	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Conductance (EC)	6400	1	µS/cm
14S14E11N001M	8/23/1951 0:00	Dissolved Fluoride	0.2	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Total Hardness	1800	1	mg/L as CaCO3
14S14E11N001M	8/23/1951 0:00	Dissolved Magnesium	257	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Nitrate	< R.L.	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Potassium	10	0.1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Silica (SiO2)	45	0.5	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Sodium	980	1	mg/L
14S14E11N001M	8/23/1951 0:00	Dissolved Sulfate	2230	1	mg/L
14S14E11N001M	8/23/1951 0:00	pH	8	0.1	pH Units
14S14E11N001M	8/12/1952 0:00	Total Alkalinity	208	1	mg/L as CaCO3
14S14E11N001M	8/12/1952 0:00	Dissolved Boron	2.1	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Calcium	286	1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Chloride	1040	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Conductance (EC)	6430	1	µS/cm
14S14E11N001M	8/12/1952 0:00	Dissolved Fluoride	0.6	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Total Hardness	1680	1	mg/L as CaCO3
14S14E11N001M	8/12/1952 0:00	Dissolved Magnesium	234	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Nitrate	1.7	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Potassium	13	0.1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Silica (SiO2)	44	0.5	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Sodium	935	1	mg/L
14S14E11N001M	8/12/1952 0:00	Dissolved Sulfate	2000	1	mg/L
14S14E11N001M	8/12/1952 0:00	pH	7.5	0.1	pH Units
14S14E11N001M	7/7/1953 12:01	Total Alkalinity	213	1	mg/L as CaCO3
14S14E11N001M	7/7/1953 12:01	Dissolved Boron	1.4	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Calcium	286	1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Chloride	1080	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Conductance (EC)	6510	1	µS/cm
14S14E11N001M	7/7/1953 12:01	Dissolved Fluoride	0.5	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Total Hardness	1710	1	mg/L as CaCO3
14S14E11N001M	7/7/1953 12:01	Dissolved Magnesium	242	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Nitrate	1	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Potassium	11	0.1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Silica (SiO2)	45	0.5	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Sodium	983	1	mg/L
14S14E11N001M	7/7/1953 12:01	Dissolved Sulfate	2080	1	mg/L
14S14E11N001M	7/7/1953 12:01	pH	7.6	0.1	pH Units
14S14E11N001M	7/28/1955 11:00	Dissolved Boron	2.2	0.1	mg/L
14S14E11N001M	7/28/1955 11:00	Dissolved Chloride	1010	0.1	mg/L
14S14E11N001M	7/28/1955 11:00	Conductance (EC)	6290	1	µS/cm
14S14E11N001M	7/28/1955 11:00	Dissolved Sodium	957	1	mg/L
14S14E11N001M	10/11/1955 15:25	Dissolved Chloride	1040	0.1	mg/L
14S14E11N001M	10/11/1955 15:25	Conductance (EC)	6420	1	µS/cm
14S14E11N001M	10/11/1955 15:25	Total Hardness	820	1	mg/L as CaCO3
14S14E11N001M	10/11/1955 15:25	Dissolved Sodium	963	1	mg/L
14S14E11N001M	6/26/1956 9:15	Dissolved Boron	1.67	0.1	mg/L
14S14E11N001M	6/26/1956 9:15	Dissolved Chloride	1070	0.1	mg/L
14S14E11N001M	6/26/1956 9:15	Conductance (EC)	6190	1	µS/cm
14S14E11N001M	6/26/1956 9:15	Total Hardness	1520	1	mg/L as CaCO3
14S14E11N001M	6/26/1956 9:15	Dissolved Sodium	1020	1	mg/L
14S14E11N001M	7/31/1957 14:15	Dissolved Boron	2.1	0.1	mg/L
14S14E11N001M	7/31/1957 14:15	Dissolved Chloride	525	1	mg/L
14S14E11N001M	7/31/1957 14:15	Conductance (EC)	4080	1	µS/cm
14S14E11N001M	7/31/1957 14:15	Total Hardness	1150	1	mg/L as CaCO3
14S14E11N001M	7/31/1957 14:15	Dissolved Sodium	568	1	mg/L
14S14E11N001M	6/24/1958 14:30	Total Alkalinity	177	1	mg/L as CaCO3

Table C2-1. 14S14E11N001M

Station Number	Collection Date	Analyte Name	Analytical Result	Report Limit	Report Units
14S14E11N001M	6/24/1958 14:30	Dissolved Boron	2.1	0.1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Calcium	188	1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Chloride	525	1	mg/L
14S14E11N001M	6/24/1958 14:30	Conductance (EC)	4040	1	µS/cm
14S14E11N001M	6/24/1958 14:30	Dissolved Fluoride	0.4	0.1	mg/L
14S14E11N001M	6/24/1958 14:30	Total Hardness	1100	1	mg/L as CaCO3
14S14E11N001M	6/24/1958 14:30	Dissolved Magnesium	153	0.1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Nitrate	1.8	0.1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Potassium	11	0.1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Silica (SiO2)	42	0.5	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Sodium	569	1	mg/L
14S14E11N001M	6/24/1958 14:30	Dissolved Sulfate	1360	1	mg/L
14S14E11N001M	6/24/1958 14:30	pH	7.4	0.1	pH Units
14S14E11N001M	7/14/1959 15:30	Total Alkalinity	213	1	mg/L as CaCO3
14S14E11N001M	7/14/1959 15:30	Dissolved Boron	2.5	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Calcium	246	1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Chloride	951	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Conductance (EC)	5990	1	µS/cm
14S14E11N001M	7/14/1959 15:30	Dissolved Fluoride	0.2	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Total Hardness	1460	1	mg/L as CaCO3
14S14E11N001M	7/14/1959 15:30	Dissolved Magnesium	205	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Nitrate	2.3	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Potassium	11	0.1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Silica (SiO2)	48	0.5	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Sodium	882	1	mg/L
14S14E11N001M	7/14/1959 15:30	Dissolved Sulfate	1740	1	mg/L
14S14E11N001M	7/14/1959 15:30	pH	7.4	0.1	pH Units
14S14E11N001M	7/19/1960 11:30	Total Alkalinity	205	1	mg/L as CaCO3
14S14E11N001M	7/19/1960 11:30	Dissolved Boron	2.1	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Calcium	242	1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Chloride	950	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Conductance (EC)	5880	1	µS/cm
14S14E11N001M	7/19/1960 11:30	Dissolved Fluoride	0.3	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Total Hardness	1450	1	mg/L as CaCO3
14S14E11N001M	7/19/1960 11:30	Dissolved Magnesium	205	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Nitrate	1.7	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Potassium	9	0.1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Silica (SiO2)	47	0.5	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Sodium	906	1	mg/L
14S14E11N001M	7/19/1960 11:30	Dissolved Sulfate	1860	1	mg/L
14S14E11N001M	7/19/1960 11:30	pH	7.8	0.1	pH Units

Table C2-2. 14S14E12M001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E12M001M	8/13/1951 0:00	Total Alkalinity	138	1	mg/L as CaCO ₃
14S14E12M001M	8/13/1951 0:00	Dissolved Boron	2.6	0.1	mg/L
14S14E12M001M	8/13/1951 0:00	Dissolved Chloride	436	0.1	mg/L
14S14E12M001M	8/13/1951 0:00	Conductance (EC)	2545	1	μS/cm
14S14E12M001M	8/13/1951 0:00	Total Hardness	190	1	mg/L as CaCO ₃
14S14E12M001M	8/13/1951 0:00	Dissolved Sodium	530	1	mg/L
14S14E12M001M	8/13/1951 0:00	Dissolved Sulfate	570	1	mg/L

Table C2-3. 14S14E12N001M

Station Number	Collection Date	Analyte Name	Analytical Result	Report Limit	Report Units
14S14E12N001M	5/18/1951 0:00	Total Alkalinity	142	1	mg/L as CaCO3
14S14E12N001M	5/18/1951 0:00	Dissolved Boron	1.81	0.1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Calcium	31	1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Chloride	375	0.1	mg/L
14S14E12N001M	5/18/1951 0:00	Conductance (EC)	2520	1	µS/cm
14S14E12N001M	5/18/1951 0:00	Total Hardness	104	1	mg/L as CaCO3
14S14E12N001M	5/18/1951 0:00	Dissolved Magnesium	6.3	0.1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Nitrate	1	0.1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Potassium	2.7	0.1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Silica (SiO2)	59	0.5	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Sodium	506	1	mg/L
14S14E12N001M	5/18/1951 0:00	Dissolved Sulfate	544	1	mg/L
14S14E12N001M	5/18/1951 0:00	pH	7.7	0.1	pH Units
14S14E12N001M	5/19/1951 0:00	Total Alkalinity	157	1	mg/L as CaCO3
14S14E12N001M	5/19/1951 0:00	Dissolved Boron	1.82	0.1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Calcium	20	1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Chloride	382	0.1	mg/L
14S14E12N001M	5/19/1951 0:00	Conductance (EC)	2560	1	µS/cm
14S14E12N001M	5/19/1951 0:00	Total Hardness	77	1	mg/L as CaCO3
14S14E12N001M	5/19/1951 0:00	Dissolved Magnesium	6.6	0.1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Nitrate	0.3	0.1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Potassium	2.9	0.1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Silica (SiO2)	45	0.5	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Sodium	588	1	mg/L
14S14E12N001M	5/19/1951 0:00	Dissolved Sulfate	540	1	mg/L
14S14E12N001M	5/19/1951 0:00	pH	8.9	0.1	pH Units
14S14E12N001M	8/13/1951 0:00	Total Alkalinity	143	1	mg/L as CaCO3
14S14E12N001M	8/13/1951 0:00	Dissolved Boron	1.6	0.1	mg/L
14S14E12N001M	8/13/1951 0:00	Dissolved Chloride	178	0.1	mg/L
14S14E12N001M	8/13/1951 0:00	Conductance (EC)	1790	1	µS/cm
14S14E12N001M	8/13/1951 0:00	Total Hardness	78	1	mg/L as CaCO3
14S14E12N001M	8/13/1951 0:00	Dissolved Sodium	385	1	mg/L
14S14E12N001M	8/13/1951 0:00	Dissolved Sulfate	590	1	mg/L
14S14E12N001M	8/13/1951 0:00	pH	7.5	0.1	pH Units
14S14E12N001M	11/13/1951 0:00	Total Alkalinity	143	1	mg/L as CaCO3
14S14E12N001M	11/13/1951 0:00	Dissolved Boron	0.53	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Calcium	26	1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Chloride	165	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Conductance (EC)	1860	1	µS/cm
14S14E12N001M	11/13/1951 0:00	Dissolved Fluoride	0.3	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Total Hardness	80	1	mg/L as CaCO3
14S14E12N001M	11/13/1951 0:00	Dissolved Magnesium	3.6	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Nitrate	3	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Potassium	5.2	0.1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Silica (SiO2)	69	0.5	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Sodium	385	1	mg/L
14S14E12N001M	11/13/1951 0:00	Dissolved Sulfate	514	1	mg/L
14S14E12N001M	11/13/1951 0:00	pH	8	0.1	pH Units
14S14E12N001M	8/12/1952 0:00	Total Alkalinity	144	1	mg/L as CaCO3
14S14E12N001M	8/12/1952 0:00	Dissolved Boron	1.4	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Calcium	25	1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Chloride	156	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Conductance (EC)	1960	1	µS/cm
14S14E12N001M	8/12/1952 0:00	Dissolved Fluoride	0.5	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Total Hardness	78	1	mg/L as CaCO3
14S14E12N001M	8/12/1952 0:00	Dissolved Magnesium	3.6	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Nitrate	< R.L.	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Potassium	3.7	0.1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Silica (SiO2)	68	0.5	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Sodium	377	1	mg/L
14S14E12N001M	8/12/1952 0:00	Dissolved Sulfate	525	1	mg/L
14S14E12N001M	8/12/1952 0:00	pH	8.3	0.1	pH Units
14S14E12N001M	7/7/1953 11:35	Total Alkalinity	144	1	mg/L as CaCO3
14S14E12N001M	7/7/1953 11:35	Dissolved Boron	0.66	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Calcium	26	1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Chloride	157	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Conductance (EC)	1850	1	µS/cm
14S14E12N001M	7/7/1953 11:35	Dissolved Fluoride	0.7	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Total Hardness	83	1	mg/L as CaCO3
14S14E12N001M	7/7/1953 11:35	Dissolved Magnesium	4.4	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Nitrate	< R.L.	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Potassium	4.1	0.1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Silica (SiO2)	68	0.5	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Sodium	385	1	mg/L
14S14E12N001M	7/7/1953 11:35	Dissolved Sulfate	507	1	mg/L
14S14E12N001M	7/7/1953 11:35	pH	7.8	0.1	pH Units
14S14E12N001M	7/20/1954 9:50	Total Alkalinity	150	1	mg/L as CaCO3
14S14E12N001M	7/20/1954 9:50	Dissolved Boron	1.2	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Calcium	29	1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Chloride	181	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Conductance (EC)	1980	1	µS/cm
14S14E12N001M	7/20/1954 9:50	Dissolved Fluoride	0.4	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Total Hardness	87	1	mg/L as CaCO3
14S14E12N001M	7/20/1954 9:50	Dissolved Magnesium	3.5	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Nitrate	1.5	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Potassium	3.5	0.1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Silica (SiO2)	67	0.5	mg/L

Table C2-3. 14S14E12N001M

Station Number	Collection Date	Analyte Name	Analytical Result	Report Limit	Report Units
14S14E12N001M	7/20/1954 9:50	Dissolved Sodium	409	1	mg/L
14S14E12N001M	7/20/1954 9:50	Dissolved Sulfate	526	1	mg/L
14S14E12N001M	7/20/1954 9:50	pH	8.4	0.1	pH Units
14S14E12N001M	7/28/1955 11:10	Dissolved Boron	1.6	0.1	mg/L
14S14E12N001M	7/28/1955 11:10	Dissolved Chloride	200	0.1	mg/L
14S14E12N001M	7/28/1955 11:10	Conductance (EC)	2050	1	µS/cm
14S14E12N001M	7/28/1955 11:10	Total Hardness	91	1	mg/L as CaCO3
14S14E12N001M	7/28/1955 11:10	Dissolved Sodium	420	1	mg/L
14S14E12N001M	10/11/1955 15:05	Dissolved Chloride	211	0.1	mg/L
14S14E12N001M	10/11/1955 15:05	Conductance (EC)	2040	1	µS/cm
14S14E12N001M	10/11/1955 15:05	Total Hardness	92	1	mg/L as CaCO3
14S14E12N001M	10/11/1955 15:05	Dissolved Sodium	414	1	mg/L
14S14E12N001M	7/31/1957 14:05	Dissolved Boron	1.5	0.1	mg/L
14S14E12N001M	7/31/1957 14:05	Dissolved Chloride	228	1	mg/L
14S14E12N001M	7/31/1957 14:05	Conductance (EC)	2110	1	µS/cm
14S14E12N001M	7/31/1957 14:05	Total Hardness	146	1	mg/L as CaCO3
14S14E12N001M	7/31/1957 14:05	Dissolved Sodium	413	1	mg/L
14S14E12N001M	6/24/1958 14:10	Total Alkalinity	146	1	mg/L as CaCO3
14S14E12N001M	6/24/1958 14:10	Dissolved Boron	1.5	0.1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Calcium	52	1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Chloride	280	1	mg/L
14S14E12N001M	6/24/1958 14:10	Conductance (EC)	2320	1	µS/cm
14S14E12N001M	6/24/1958 14:10	Dissolved Fluoride	0.5	0.1	mg/L
14S14E12N001M	6/24/1958 14:10	Total Hardness	157	1	mg/L as CaCO3
14S14E12N001M	6/24/1958 14:10	Dissolved Iron	< R.L.	0.001	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Magnesium	6.7	0.1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Nitrate	4.5	0.1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Potassium	8	0.1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Silica (SiO2)	68	0.5	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Sodium	445	1	mg/L
14S14E12N001M	6/24/1958 14:10	Dissolved Sulfate	576	1	mg/L
14S14E12N001M	6/24/1958 14:10	pH	7.6	0.1	pH Units

Table C2-4. 14S14E12N002M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E12N002M	5/18/1951 0:00	Total Alkalinity	181	1	mg/L as CaCO3
14S14E12N002M	5/18/1951 0:00	Dissolved Boron	1.33	0.1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Calcium	185	1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Chloride	1080	0.1	mg/L
14S14E12N002M	5/18/1951 0:00	Conductance (EC)	4810	1	µS/cm
14S14E12N002M	5/18/1951 0:00	Total Hardness	942	1	mg/L as CaCO3
14S14E12N002M	5/18/1951 0:00	Dissolved Magnesium	117	0.1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Nitrate	110	0.1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Potassium	12	0.1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Silica (SiO2)	72	0.5	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Sodium	737	1	mg/L
14S14E12N002M	5/18/1951 0:00	Dissolved Sulfate	742	1	mg/L
14S14E12N002M	5/18/1951 0:00	pH	7.3	0.1	pH Units
14S14E12N002M	5/19/1951 0:00	Total Alkalinity	174	1	mg/L as CaCO3
14S14E12N002M	5/19/1951 0:00	Dissolved Boron	1.64	0.1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Calcium	152	1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Chloride	1040	0.1	mg/L
14S14E12N002M	5/19/1951 0:00	Conductance (EC)	4480	1	µS/cm
14S14E12N002M	5/19/1951 0:00	Total Hardness	823	1	mg/L as CaCO3
14S14E12N002M	5/19/1951 0:00	Dissolved Magnesium	108	0.1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Nitrate	4.8	0.1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Potassium	11	0.1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Silica (SiO2)	49	0.5	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Sodium	673	1	mg/L
14S14E12N002M	5/19/1951 0:00	Dissolved Sulfate	614	1	mg/L
14S14E12N002M	5/19/1951 0:00	pH	7.2	0.1	pH Units
14S14E12N002M	5/20/1951 0:00	Total Alkalinity	181	1	mg/L as CaCO3
14S14E12N002M	5/20/1951 0:00	Dissolved Boron	1.69	0.1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Calcium	165	1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Chloride	1070	0.1	mg/L
14S14E12N002M	5/20/1951 0:00	Conductance (EC)	4550	1	µS/cm
14S14E12N002M	5/20/1951 0:00	Total Hardness	835	1	mg/L as CaCO3
14S14E12N002M	5/20/1951 0:00	Dissolved Magnesium	104	0.1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Nitrate	9.6	0.1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Potassium	14	0.1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Silica (SiO2)	75	0.5	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Sodium	640	1	mg/L
14S14E12N002M	5/20/1951 0:00	Dissolved Sulfate	571	1	mg/L
14S14E12N002M	5/20/1951 0:00	pH	7.8	0.1	pH Units

Table C2-5. 14S14E13E001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E13E001M	8/12/1952 0:00	Total Alkalinity	251	1	mg/L as CaCO3
14S14E13E001M	8/12/1952 0:00	Dissolved Boron	1.9	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Calcium	347	1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Chloride	1920	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Conductance (EC)	10100	1	µS/cm
14S14E13E001M	8/12/1952 0:00	Dissolved Fluoride	0.5	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Total Hardness	2010	1	mg/L as CaCO3
14S14E13E001M	8/12/1952 0:00	Dissolved Magnesium	279	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Nitrate	1.4	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Potassium	17	0.1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Silica (SiO2)	39	0.5	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Sodium	1800	1	mg/L
14S14E13E001M	8/12/1952 0:00	Dissolved Sulfate	2940	1	mg/L
14S14E13E001M	8/12/1952 0:00	pH	7.4	0.1	pH Units
14S14E13E001M	8/9/1966 0:00	Total Alkalinity	1403	1	mg/L as CaCO3
14S14E13E001M	8/9/1966 0:00	Dissolved Calcium	53	1	mg/L
14S14E13E001M	8/9/1966 0:00	Dissolved Chloride	3740	0.1	mg/L
14S14E13E001M	8/9/1966 0:00	Conductance (EC)	18600	1	µS/cm
14S14E13E001M	8/9/1966 0:00	Total Hardness	2650	1	mg/L as CaCO3
14S14E13E001M	8/9/1966 0:00	Dissolved Sodium	3850	1	mg/L
14S14E13E001M	8/9/1966 0:00	pH	8.1	0.1	pH Units

Table C2-6. 14S14E13E002M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E13E002M	8/9/1966 0:00	Total Alkalinity	372	1	mg/L as CaCO3
14S14E13E002M	8/9/1966 0:00	Dissolved Calcium	509	1	mg/L
14S14E13E002M	8/9/1966 0:00	Dissolved Chloride	1280	0.1	mg/L
14S14E13E002M	8/9/1966 0:00	Conductance (EC)	9780	1	μS/cm
14S14E13E002M	8/9/1966 0:00	Total Hardness	2210	1	mg/L as CaCO3
14S14E13E002M	8/9/1966 0:00	Dissolved Magnesium	228.2	0.1	mg/L
14S14E13E002M	8/9/1966 0:00	Dissolved Sodium	1500	1	mg/L
14S14E13E002M	8/9/1966 0:00	pH	7.9	0.1	pH Units

Table C2-7. 14S14E13E003M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E13E003M	6/20/1963 0:00	Total Alkalinity	71	1	mg/L as CaCO3
14S14E13E003M	6/20/1963 0:00	Dissolved Boron	3	0.1	mg/L
14S14E13E003M	6/20/1963 0:00	Dissolved Calcium	40	1	mg/L
14S14E13E003M	6/20/1963 0:00	Dissolved Chloride	216	1	mg/L
14S14E13E003M	6/20/1963 0:00	Conductance (EC)	2600	1	µS/cm
14S14E13E003M	6/20/1963 0:00	Total Hardness	244	1	mg/L as CaCO3
14S14E13E003M	6/20/1963 0:00	Dissolved Magnesium	35	0.1	mg/L
14S14E13E003M	6/20/1963 0:00	Dissolved Nitrate	< R.L.	0.1	mg/L
14S14E13E003M	6/20/1963 0:00	Dissolved Sodium	485	1	mg/L
14S14E13E003M	6/20/1963 0:00	Total Dissolved Solids	1722	1	mg/L at 180°C
14S14E13E003M	6/20/1963 0:00	Dissolved Sulfate	826	1	mg/L
14S14E13E003M	6/20/1963 0:00	pH	7.8	0.1	pH Units
14S14E13E003M	7/16/1963 11:50	Total Alkalinity	25	1	mg/L as CaCO3
14S14E13E003M	7/16/1963 11:50	Dissolved Boron	2.7	0.1	mg/L
14S14E13E003M	7/16/1963 11:50	Dissolved Calcium	78	1	mg/L
14S14E13E003M	7/16/1963 11:50	Dissolved Chloride	234	1	mg/L
14S14E13E003M	7/16/1963 11:50	Conductance (EC)	2330	1	µS/cm
14S14E13E003M	7/16/1963 11:50	Total Hardness	606	1	mg/L as CaCO3
14S14E13E003M	7/16/1963 11:50	Dissolved Magnesium	100	0.1	mg/L
14S14E13E003M	7/16/1963 11:50	Dissolved Sodium	322	1	mg/L
14S14E13E003M	7/16/1963 11:50	Total Dissolved Solids	1834	1	mg/L at 180°C
14S14E13E003M	7/16/1963 11:50	Dissolved Sulfate	869	1	mg/L

Table C2-8. 14S14E13N001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E13N001M	6/20/1943 0:00	Dissolved Boron	1.3	0.1	mg/L

Table C2-9. 14S14E14G001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E14G001M	8/13/1951 0:00	Total Alkalinity	210	1	mg/L as CaCO3
14S14E14G001M	8/13/1951 0:00	Dissolved Boron	3.8	0.1	mg/L
14S14E14G001M	8/13/1951 0:00	Dissolved Chloride	1090	0.1	mg/L
14S14E14G001M	8/13/1951 0:00	Conductance (EC)	6230	1	µS/cm
14S14E14G001M	8/13/1951 0:00	Total Hardness	1750	1	mg/L as CaCO3
14S14E14G001M	8/13/1951 0:00	Dissolved Sodium	1090	1	mg/L
14S14E14G001M	8/13/1951 0:00	Dissolved Sulfate	2800	1	mg/L
14S14E14G001M	8/13/1951 0:00	pH	7.5	0.1	pH Units
14S14E14G001M	8/12/1952 0:00	Total Alkalinity	216	1	mg/L as CaCO3
14S14E14G001M	8/12/1952 0:00	Dissolved Boron	2.4	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Calcium	352	1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Chloride	1140	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Conductance (EC)	7740	1	µS/cm
14S14E14G001M	8/12/1952 0:00	Dissolved Fluoride	0.7	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Total Hardness	2020	1	mg/L as CaCO3
14S14E14G001M	8/12/1952 0:00	Dissolved Magnesium	277	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Nitrate	5.3	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Potassium	14	0.1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Silica (SiO2)	39	0.5	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Sodium	1220	1	mg/L
14S14E14G001M	8/12/1952 0:00	Dissolved Sulfate	2750	1	mg/L
14S14E14G001M	8/12/1952 0:00	pH	7.4	0.1	pH Units
14S14E14G001M	10/28/1965 14:00	Total Alkalinity	189	1	mg/L as CaCO3
14S14E14G001M	10/28/1965 14:00	Dissolved Calcium	29	1	mg/L
14S14E14G001M	10/28/1965 14:00	Dissolved Chloride	100	0.1	mg/L
14S14E14G001M	10/28/1965 14:00	Conductance (EC)	1360	1	µS/cm
14S14E14G001M	10/28/1965 14:00	Total Hardness	131	1	mg/L as CaCO3
14S14E14G001M	10/28/1965 14:00	Dissolved Magnesium	14.2	0.1	mg/L
14S14E14G001M	10/28/1965 14:00	Dissolved Sodium	238	1	mg/L
14S14E14G001M	10/28/1965 14:00	pH	8.4	0.1	pH Units

Table C2-10. 14S14E23E001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S14E23E001M	9/11/1968 0:00	Dissolved Boron	1.6	0.1	mg/L
14S14E23E001M	9/11/1968 0:00	Dissolved Calcium	34	1	mg/L
14S14E23E001M	9/11/1968 0:00	Dissolved Chloride	290	1	mg/L
14S14E23E001M	9/11/1968 0:00	Conductance (EC)	2130	1	µS/cm
14S14E23E001M	9/11/1968 0:00	Total Hardness	100	1	mg/L as CaCO ₃
14S14E23E001M	9/11/1968 0:00	Dissolved Magnesium	4.8	0.1	mg/L
14S14E23E001M	9/11/1968 0:00	Dissolved Nitrate	1.4	0.1	mg/L
14S14E23E001M	9/11/1968 0:00	Dissolved Sodium	440	1	mg/L
14S14E23E001M	9/11/1968 0:00	Total Dissolved Solids	1400	1	mg/L at 180°C
14S14E23E001M	9/11/1968 0:00	Dissolved Sulfate	460	1	mg/L
14S14E23E001M	9/11/1968 0:00	pH	8	0.1	pH Units

Table C2-11. 14S15E18E001M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S15E18E001M	8/23/1951 0:00	Total Alkalinity	148	1	mg/L as CaCO3
14S15E18E001M	8/23/1951 0:00	Dissolved Boron	1.3	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Calcium	29	1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Chloride	118	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Conductance (EC)	1700	1	µS/cm
14S15E18E001M	8/23/1951 0:00	Dissolved Fluoride	0.4	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Total Hardness	88	1	mg/L as CaCO3
14S15E18E001M	8/23/1951 0:00	Dissolved Magnesium	3.9	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Nitrate	0.1	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Potassium	3.4	0.1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Silica (SiO2)	75	0.5	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Sodium	355	1	mg/L
14S15E18E001M	8/23/1951 0:00	Dissolved Sulfate	532	1	mg/L
14S15E18E001M	8/23/1951 0:00	pH	8.5	0.1	pH Units

Table C2-12. 14S15E18E002M

Station Number	Collection Date	Analyte name	Analytical Result	Report Limit	Report Units
14S15E18E002M	8/13/1951 0:00	Total Alkalinity	144	1	mg/L as CaCO3
14S15E18E002M	8/13/1951 0:00	Dissolved Boron	3.5	0.1	mg/L
14S15E18E002M	8/13/1951 0:00	Dissolved Chloride	236	0.1	mg/L
14S15E18E002M	8/13/1951 0:00	Conductance (EC)	1808	1	µS/cm
14S15E18E002M	8/13/1951 0:00	Total Hardness	92	1	mg/L as CaCO3
14S15E18E002M	8/13/1951 0:00	Dissolved Sodium	405	1	mg/L
14S15E18E002M	8/13/1951 0:00	Dissolved Sulfate	570	1	mg/L
14S15E18E002M	8/13/1951 0:00	pH	7.8	0.1	pH Units
14S15E18E002M	8/12/1952 0:00	Total Alkalinity	141	1	mg/L as CaCO3
14S15E18E002M	8/12/1952 0:00	Dissolved Boron	1.2	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Calcium	26	1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Chloride	239	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Conductance (EC)	2090	1	µS/cm
14S15E18E002M	8/12/1952 0:00	Dissolved Fluoride	0.7	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Total Hardness	80	1	mg/L as CaCO3
14S15E18E002M	8/12/1952 0:00	Dissolved Magnesium	3.6	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Nitrate	< R.L.	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Potassium	3.5	0.1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Silica (SiO2)	63	0.5	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Sodium	430	1	mg/L
14S15E18E002M	8/12/1952 0:00	Dissolved Sulfate	505	1	mg/L
14S15E18E002M	8/12/1952 0:00	pH	7.9	0.1	pH Units
14S15E18E002M	9/2/1954 0:00	Total Alkalinity	139	1	mg/L as CaCO3
14S15E18E002M	9/2/1954 0:00	Dissolved Boron	0.5	0.1	mg/L
14S15E18E002M	9/2/1954 0:00	Dissolved Chloride	258	0.1	mg/L
14S15E18E002M	9/2/1954 0:00	Conductance (EC)	2130	1	µS/cm
14S15E18E002M	9/2/1954 0:00	Total Hardness	82	1	mg/L as CaCO3
14S15E18E002M	9/2/1954 0:00	Dissolved Sulfate	500	1	mg/L
14S15E18E002M	9/2/1954 0:00	pH	7.9	0.1	pH Units
14S15E18E002M	7/17/1968 0:00	Dissolved Boron	1.5	0.1	mg/L
14S15E18E002M	7/17/1968 0:00	Dissolved Calcium	25	1	mg/L
14S15E18E002M	7/17/1968 0:00	Dissolved Chloride	310	1	mg/L
14S15E18E002M	7/17/1968 0:00	Conductance (EC)	2280	1	µS/cm
14S15E18E002M	7/17/1968 0:00	Total Hardness	82	1	mg/L as CaCO3
14S15E18E002M	7/17/1968 0:00	Dissolved Magnesium	4.9	0.1	mg/L
14S15E18E002M	7/17/1968 0:00	Dissolved Nitrate	1.6	0.1	mg/L
14S15E18E002M	7/17/1968 0:00	Dissolved Sodium	450	1	mg/L
14S15E18E002M	7/17/1968 0:00	Total Dissolved Solids	1450	1	mg/L at 180°C
14S15E18E002M	7/17/1968 0:00	Dissolved Sulfate	500	1	mg/L
14S15E18E002M	7/17/1968 0:00	pH	8.1	0.1	pH Units

Appendix J4

Water Supply



October 23, 2015

Mr. Scott Dawson
First Solar, Inc.
135 Main Street, 6th Floor
San Francisco, CA 94105

**Subject: Water Supply
First Solar- Little Bear Solar Project
Fresno County, California**

Dear Mr. Dawson:

1.0 INTRODUCTION

First Solar, Incorporated (First Solar) plans to construct the Little Bear Solar Project (Project) on approximately a 640-acre property, located southwest of the City of Mendota in Section 14, Township 14 South, Range 14 East, Mount Diablo Base and Meridian, Fresno County, California (Figure 1). The Project is located immediately south of West California Avenue and the recently constructed First Solar North Star solar project site. As part of the construction of the Project, an estimated 57-acre feet of water is needed to provide necessary water during construction and up to 4-acre feet of water is needed to provide necessary water during ongoing operations of the fully operational Project.

This proposal includes hydrogeologic services to evaluate the available water supply in existing wells located on the North Star site and the water supply requirements for Little Bear during project construction.

URS understands that the project site is divided into four equal sections and it is proposed to be constructed in two phases, with each phase consisting of two sections. Construction water is proposed to be supplied from two existing wells located on the North Star project, which is located across and north of West California Avenue. As part of the planning and preparation for the construction of the North Star project, hydrogeologic testing was conducted on the onsite water wells to identify a sustainable yield of water that could be extracted from the water wells and not adversely impact groundwater levels or regional supply. A copy of the

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Mr. Scott Dawson
First Solar
October 23, 2015
Page 2 of 5

Aquifer Pump Test Results report, prepared and dated by URS in March 2014, is included in Appendix A of this report.

The balance of this letter report is organized as follows:

- 2.0 – Little Bear Groundwater Supply
- 3.0 – Summary and Conclusions
- 4.0 – Limitations
- Attachments (References, Figures and Tables)
- Appendix A – *Aquifer Pump Test Results, First Solar North Star Project, Fresno County, California.*

2.0 LITTLE BEAR GROUNDWATER SUPPLY

The Little Bear project is a proposed solar development on approximately 640 acres of land. Of the 640 acres, only 550 acres are proposed to be developed, requiring grading activities and site development (Figure 2). The areal extent of site development is the primary factor for estimating the amount of water necessary for construction purposes. This is because the primary need for water is due to site grading activities, followed by watering of the site for dust control purposes.

For the purpose of estimating the amount of water necessary for the construction of the Little Bear project, water consumption records for the recently completed North Star project were reviewed. According to records maintained as part of a groundwater monitoring program during the construction of the North Star project, approximately 17,016,000 gallons of water was pumped during the construction of the project. This equates to a total of approximately 52.22 acre feet of water utilized for construction. The areal extent of development for the North Star project is 502.37 acres. The areal extent of development for the Little Bear project is estimated at 550 acres (Figure 2). The Little Bear project represents an approximately 10 percent increase in areal extent of development and therefore is estimated to require approximately 10 percent more water than the actual water utilized during the construction of the North Star project. Therefore, the estimated water needed to construct the Little Bear is calculated to be 57.44 acre feet. The annual operational water requirement for the Little Bear project is estimated at requiring up to 4 acre feet per year (afy). The operational water need of the project calculates to a pumping rate of 2 gpm, which is less than a single family residence use. Because the water demand during construction is the greatest water requirement during the life of the project and requires the highest pumping rates, the analysis of the construction water needs is the critical portion to understanding impact to groundwater resources.



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In addition to the monitored amount of actual water utilized during the construction of the North Star project, the following are other pertinent observations collected during construction:

- During groundwater pumping, observed drawdown was consistent with the estimated drawdowns based on the aquifer properties;
- When the water pumps were turned off, groundwater levels recharged to the static groundwater elevation of the aquifer prior to pumping. This indicates that the construction of the North Star project did not result in a deficit to the aquifer volume or lowering of the regional aquifer; and
- No impact to the regional aquifer or groundwater levels was observed from the construction of the North Star project and water wells were pumped at rates of up to 125 gpm for each of the two onsite wells, respectively. Groundwater monitoring of the aquifer pumping was conducted under the guidance, oversight, and monitoring of a California licensed Professional Geologist and Certified Engineering Geologist.

Construction of the Little Bear project is estimated to occur in two phases with the construction of Phase 1 comprised of Little Bear 1 and 2 and construction of Phase 2 comprised of Little Bear 3 and 4. Each Phase of construction is estimated to be 10 to 14 months in duration. For the purposes of estimating water consumption during a Phase of construction, we have assumed the average of 12 months for each phase of construction. Therefore, each phase of construction would require 28.72 afy. With the assumption that one well is pumped continuously to supply the 28.72 afy, a pumping rate of 18 gallons per minute (gpm) is calculated to generate the necessary volume of water for construction.

Utilizing the results of the aquifer testing and identification of the aquifer properties from the evaluation of the North Star water wells, it is possible to calculate the predicted drawdown from pumping of the North Star water wells at various rates and for various durations of pumping. The estimated drawdown for the pumping rates of 18 gpm, 36 gpm, and 125 gpm have been calculated and plotted for pumping periods of 1, 2, 3, 4, and 5 years, respectively. Figures 3, 4, and 5 present the respective graphical plots for the estimated drawdown at varying distances for the various pumping rates.

The estimated drawdown at varying distances for the rates of 18 gpm, 36 gpm, and 125 gpm were selected for the following reasons:

1. The rate of 18 gpm provides the estimated water consumption rate of 28.72 afy estimated for constructing Little Bear in two phases, each one year in duration.



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2. The rate of 36 gpm provides conservatively demonstrates that even if all of the required project construction water was extracted within one year, estimated drawdown is relatively insignificant.
3. The rate of 125 gpm provides another conservative demonstration that even if groundwater extraction occurred at this rate, less than 5 feet of drawdown would be observed in the nearest water well located to the water wells at the North Star project. According to the US Geological Survey water well database, the nearest water well is located approximately 3,626 feet away.

3.0 SUMMARY AND CONCLUSIONS

Based on analysis of the aquifer testing conducted on the North Star project, and that the water wells on that site are a proposed water source for construction of the Little Bear project, the construction and ongoing operations of the Little Bear project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a deficit in aquifer volume or a lowering of the local groundwater. The basis for this conclusion is from the following information:

- Estimated drawdown at varying distances for the pumping rates of 18 gpm, 36 gpm, and 125 gpm demonstrate that estimated drawdown and the nearest offsite water well is negligible;
- During groundwater pumping at the North Star project, observed drawdown was consistent with the estimated drawdowns based on the aquifer properties;
- When the water pumps were turned off at the North Star, groundwater levels recharged to the static groundwater elevation of the aquifer prior to pumping. This indicates that the construction of the North Star project did not result in a deficit to the aquifer volume or lowering of the regional aquifer; and
- No impact to the regional aquifer or groundwater levels was observed from the construction of the North Star project and water wells were pumped at rates of up to 125 gpm for each of the two onsite wells, respectively. Groundwater monitoring of the aquifer pumping was conducted under the guidance, oversight, and monitoring of a California licensed Professional Geologist and Certified Engineering Geologist.

4.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon the presented data. They are intended exclusively for the purpose outlined herein and the site



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location and project indicated. This report is for the sole use and benefit of the Client. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Given that the scope of services for this investigation was limited, and that conditions may vary between the points explored, it is possible that currently unrecognized subsurface conditions may be present at the site. Should site use or conditions change, the information and conclusions in this report may no longer apply. Opinions relating to environmental, geologic, and geotechnical conditions are based on limited data and actual conditions may vary from those encountered at the times and locations where data were obtained. No express or implied representation or warranty is included or intended in this report except that the work was performed within the limits prescribed by the Client with the customary thoroughness and competence of professionals working in the same area on similar projects.

URS is available to discuss the results of our assessment at your convenience. Please contact Robert Urban (805.361.1109) if you have any questions.

Sincerely,
URS Corporation,

Robert J. Urban, P.G., C.E.G.
Principal Engineering Geologist

Attachments: Figures 1-5
*Appendix A – Aquifer Pump Test Results, First Solar North Star Project,
Fresno County, California.*



LSA

LEGEND

 Project Site



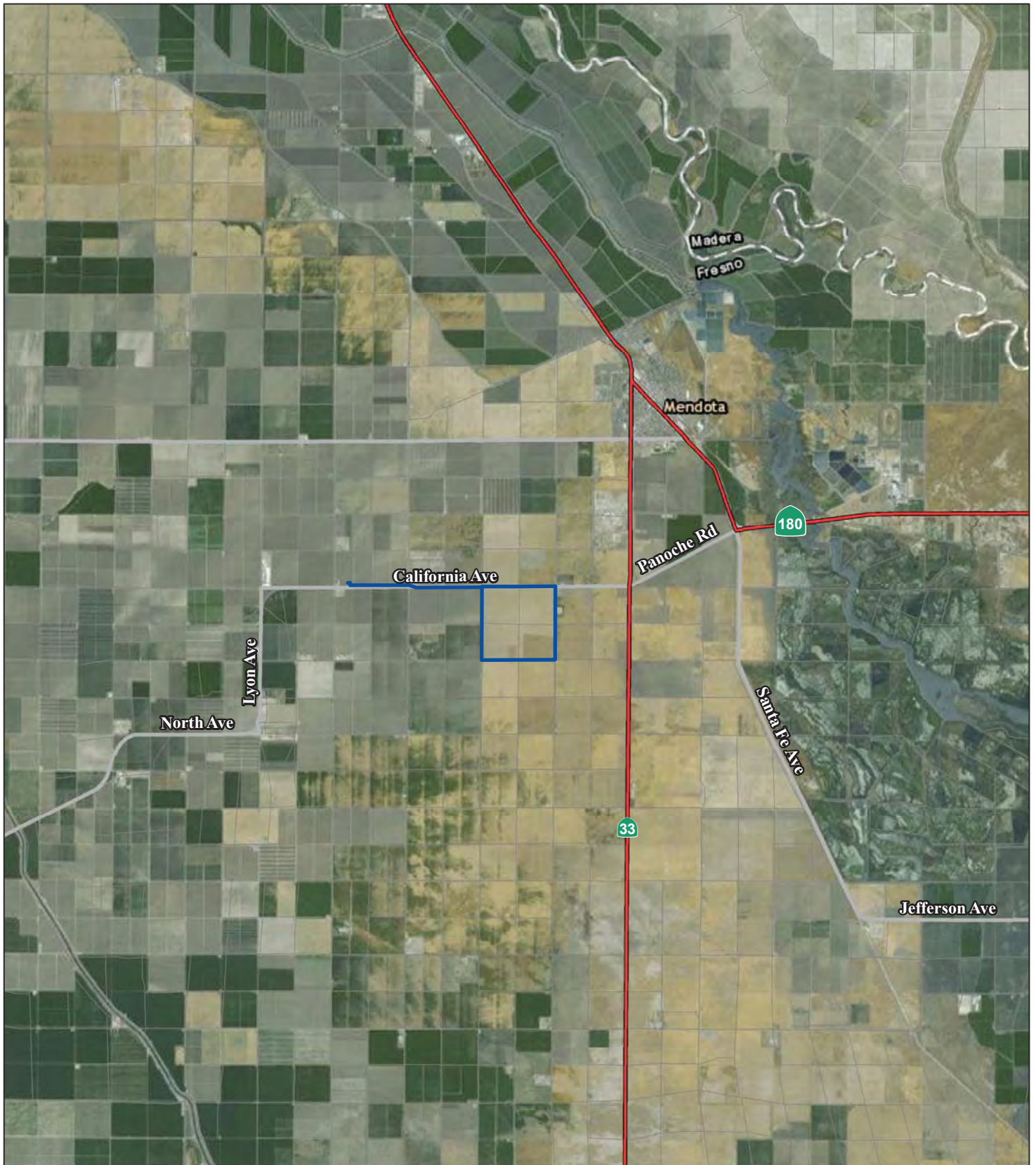
0 2.5 5
MILES

SOURCE: ESRI World Street Map (2015)

I:\Fts1408\AI\Project Description\Figure 1 Regional Location.ai and I:\Fts1408\GIS\bre_fig1-reg_vic.mxd (4/22/2015)

FIGURE 1

*Little Bear Solar Project
Little Bear Solar 1, LLC, Little Bear Solar 2, LLC
Little Bear Solar 3, LLC, and Little Bear Solar 4, LLC
Fresno County, California
Regional Location*



LSA

LEGEND

 Project Site

FIGURE 2



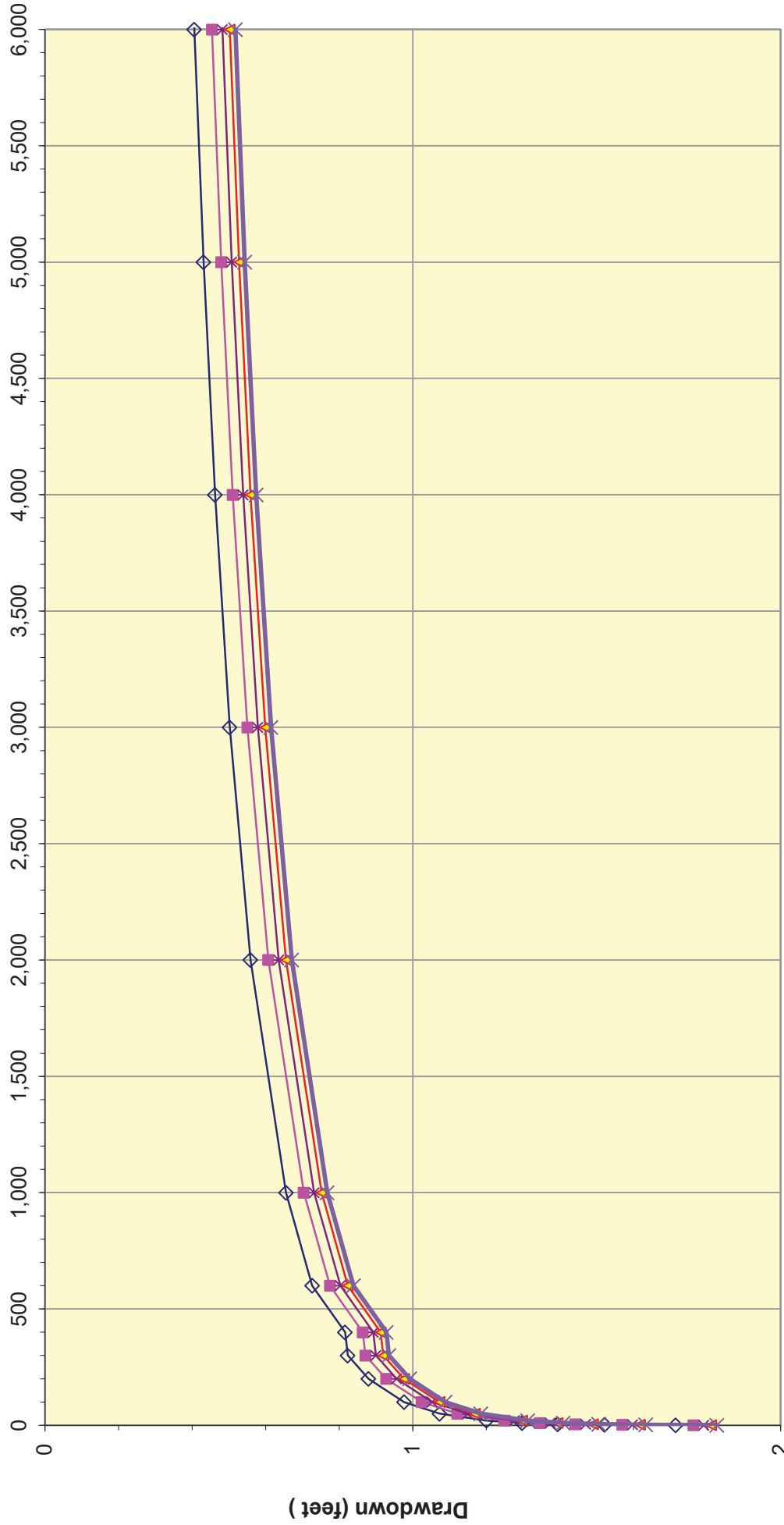
MILES

SOURCE: Microsoft Aerial Imagery (5/2010)

I:\Fts1408\GIS\CUP_fig2-prj_vic_aerial.mxd and I:\Fts1408\AI\Project Description\Figure 2 Project Vicinity.ai (4/22/15)

*Little Bear Solar Project
 Little Bear Solar 1, LLC, Little Bear Solar 2, LLC
 Little Bear Solar 3, LLC, and Little Bear Solar 4, LLC
 Fresno County, California
 Project Vicinity*

Distance (feet)



Legend: 1 year (blue diamond), 2 year (purple square), 3 year (pink asterisk), 4 year (orange triangle), 5 year (dark blue cross)

Based On Theis Equation: Q = 18 gpm
Pumping Period = 1, 2, 3, 4 and 5 years

First Solar
North Star Project Site
Fresno County
URS Corporation

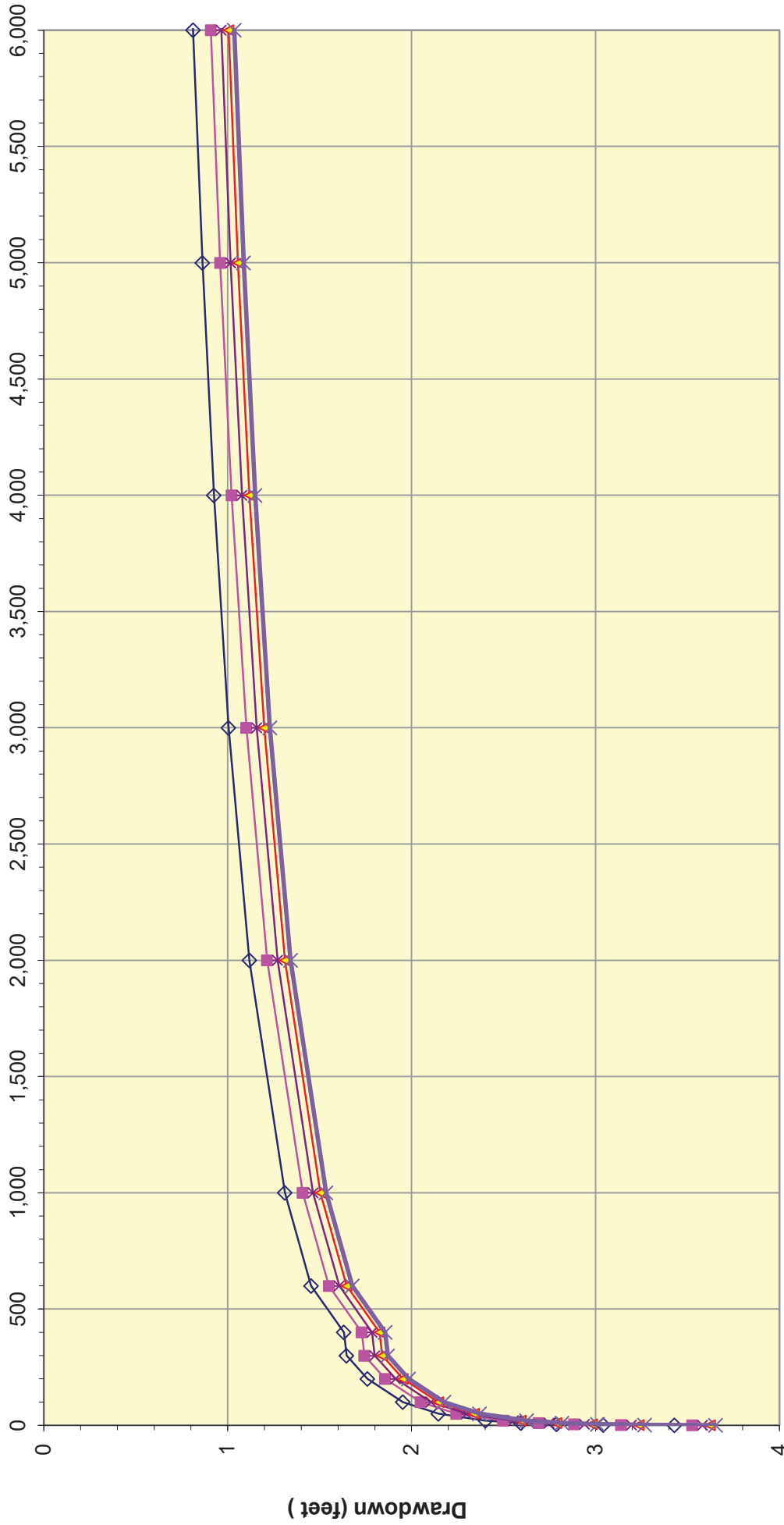


Figure 3. Estimated Drawdown (Feet) at Varying Distances with a Pumping Rate of 18 Gallons per Minute

2015

Source: URS recorded data.

Distance (feet)



◆ 1 year
 ■ 2 year
 * 3 year
 ▲ 4 year
 ✕ 5 year

Based On Theis Equation: Q = 36 gpm
 Pumping Period = 1, 2, 3, 4 and 5 years

First Solar
 North Star Project Site
 Fresno County
 URS Corporation

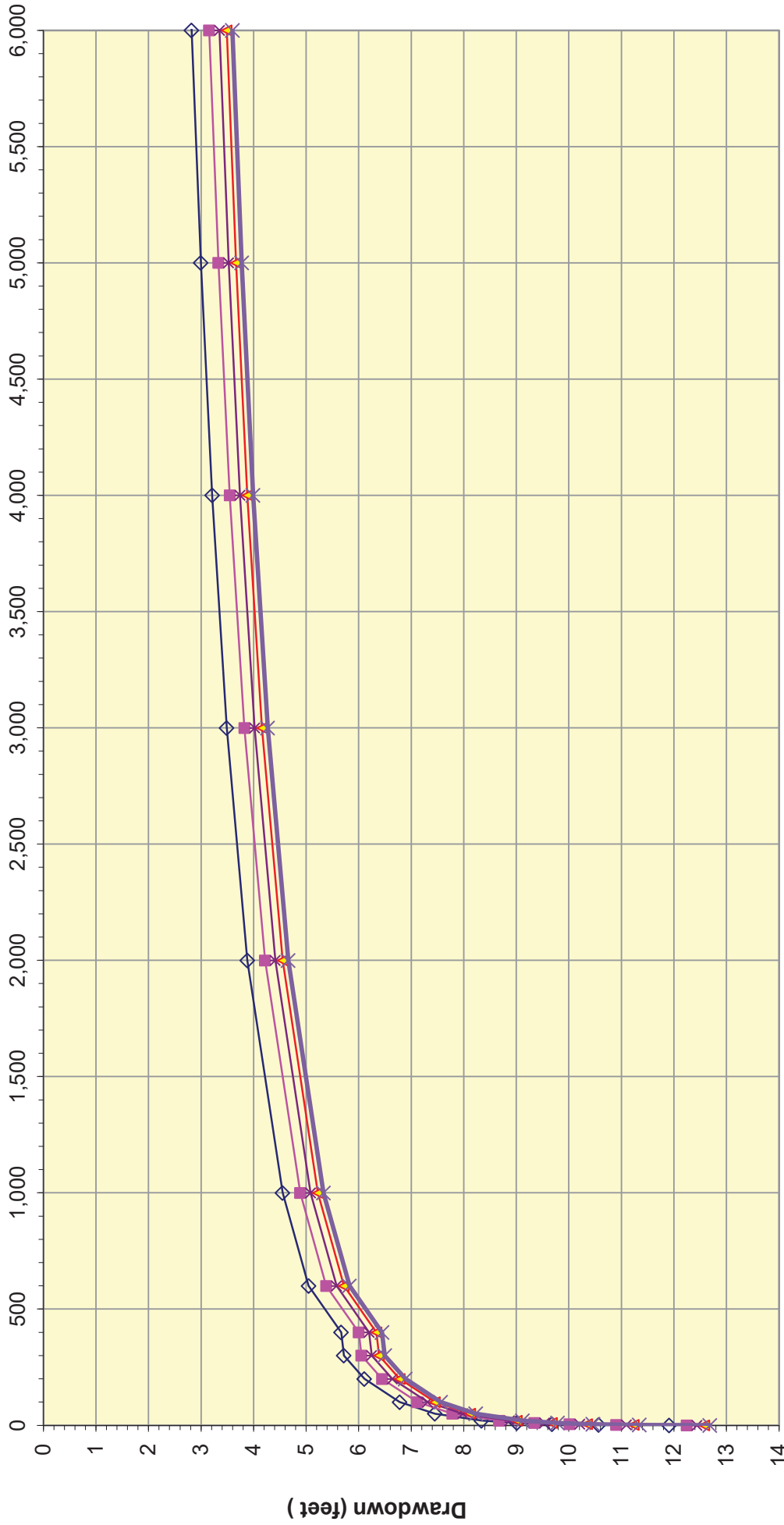
Source: URS recorded data.



Figure 4. Estimated Drawdown (Feet) at Varying Distances with a Pumping Rate of 36 Gallons per Minute

2015

Distance (feet)



Legend:
 1 year (blue diamond)
 2 year (purple square)
 3 year (pink asterisk)
 4 year (orange triangle)
 5 year (dark blue cross)

Based On This Equation: $Q = 125 \text{ gpm}$
 Pumping Period = 1, 2, 3, 4 and 5 years

First Solar
 North Star Project Site
 Fresno County
 URS Corporation



Figure 5. Estimated Drawdown (Feet) at Varying Distances with a Pumping Rate of 125 Gallons per Minute

2015

Source: URS recorded data.



March 17, 2014

Ms. Lien Dinh
First Solar, Inc.
135 Main Street, 6th Floor
San Francisco, CA 94105

**Subject: Aquifer Pump Test Results
First Solar- NorthStar Solar Project
Fresno County, California**

Dear Ms. Dinh:

1.0 INTRODUCTION

This letter report presents the results of the step-drawdown and 24-hour constant-rate aquifer pump tests conducted by URS Corporation (URS) from February 24 through 27, 2014 for the proposed NorthStar Solar Project. The project site is approximately a 640-acre property, Assessor Parcel Numbers (APNs) 019-050-55 and 019-050-56, located approximately 3 miles southwest of the City of Mendota in Section 11, Township 14 South, Range 14 East, Mount Diablo Base and Meridian, Fresno County, California (Figure 1).

The objective of the aquifer testing was to evaluate the aquifer characteristics to estimate well yield and long-term pumping suitability to achieve construction water usage needs of 32 gallons per minute (gpm) (equivalent to 51 acre feet per year (AFY)) for the proposed NorthStar Solar Project. The scope of services included conducting a water supply well evaluation of groundwater production supply well no. 14S/14E-11N10 (N10) which is located approximately 900 feet north of the intersection of West California Avenue and San Bernadino Avenue (Figure 2).

This letter report presents the results of URS' assessment of the predicted physical effects and consequences of multiple groundwater pumping scenarios at the existing on-site well N10 to support the potential water needs at the NorthStar Solar Project during construction activity. URS' constant-rate test involved pumping at a rate of approximately 32 gpm for 24 hours in order to calculate aquifer characteristics. URS' step-drawdown test involved the following four approximate pumping rates: 1) 10 gpm; 2) 20 gpm; 3) 30 gpm; and 4) 32 gpm.

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Ms. Lien Dinh
First Solar
March 17, 2014
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The aquifer assessment considered the aforementioned pumping rates was evaluated for the following time frames: 1 day, 90 days, 180 days, 1 year and 2 years. URS assumes that the 1-year scenario best matches First Solar's current plans as it relates to the NorthStar Solar Project proposed construction schedule.

In summary, URS' assessment indicates that the predicted groundwater level drawdown impacts for the proposed project requirements during construction (approximately 51 AFY or 32 gpm on a constant average pumping rate basis) would result in negligible drawdowns (less than one foot) and less than significant effects on nearby wells/users. The estimated annual demand of approximately 51 AFY includes consideration of all water demand requirements at the NorthStar Solar Project.

The balance of this letter report is organized as follows:

- 2.0 – Test Well
- 3.0 – Observation Well
- 4.0 – Pre-Test Water Level Monitoring
- 5.0 – Aquifer Tests
- 6.0 – Aquifer Test Analysis
- 7.0 – Aquifer Test Results
- 8.0 – Summary and Conclusions
- 9.0 – Limitations
- Attachments (References, Figures and Tables)
- Appendix A – Aquifer Test Analysis
- Appendix B – Field Data

2.0 TEST WELL

The test well used for pumping is referenced as N10 and is located on the site as shown on Figure 2. According to the available records, the test well was drilled in 2000 and is constructed of 16-inch (in.) diameter steel casing. The total depth of the well was not available, but has been reported by others to be 900 feet (ft.) deep. Complete well construction details were not available for either the test well or the observation well, but static water levels were similar which indicates that the wells are completed within the same aquifer.

3.0 OBSERVATION WELL

Observation well no. 14S/14E-11N07 (N07) was monitored during the pumping of the test well (Figure 1). Observation well N07 is located approximately 810 feet south from the test



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First Solar
March 17, 2014
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well. Well N07 was drilled in 1995 and is constructed of 16-in diameter steel casing to a total depth of 880 feet deep (Figure 2). Based on the information available, well screen was installed at depths from 560 feet below top of well casing (btoc) to 880 feet btoc. Well casing N07 was cut off at the surface of the concrete well pad.

It should be noted that groundwater appears to exist beneath the site within two separate aquifers, an upper unconfined aquifer and a lower confined aquifer. Water wells 14S/14E-11Q01 (Q01) and 14S/14E-11N03 (N03) are screened across the upper aquifer and depth-to-water measurement readings during the aquifer testing activities ranged from 65.62 feet btoc in Q01 to 71.61 feet btoc in N03. Water well nos. N07 and N10 are screened across the lower confined aquifer and initial depth-to-water measurement readings prior to the aquifer testing activities ranged from 265.79 to 262.98 feet btoc, respectively. Since water wells Q01 and N03 appear screened across the upper, unconfined aquifer, they were not evaluated as part of this study.

4.0 PRE-TEST WATER-LEVEL MONITORING

URS conducted baseline water level monitoring prior to starting the aquifer test. Water levels were monitored on February 21, 24 and 25, 2014 prior to the aquifer test activities to provide an evaluation of the groundwater level variability that could affect water levels during the aquifer test. Water levels in the two wells were measured using an electronic water level indicator prior to the aquifer testing. The static water level measured in the test well N10 was 262.98 feet btoc. The static water level in observation well N07 was measured at 265.79 feet btoc. Based on the results of monitoring, the variability in water level elevations appears to be minor and is not considered to be a factor in evaluation of the pump test data.

5.0 AQUIFER TESTS

To determine if the groundwater availability at the site is adequate for the proposed project water requirements, URS conducted a step-drawdown aquifer test and a 24 hour constant-rate test to evaluate the aquifer characteristics. The aquifer tests were conducted using pump which was placed in the test well at approximately 357 feet btoc.

A combination of manual water level measurements and data logging pressure transducers were used to monitor water levels in the test well and observation well before and during the test. Groundwater levels in both water wells were manually measured throughout the aquifer tests using an electronic water level indicator. The timers in each transducer/data logger unit were synchronized with a portable computer timer for uniform timing. Throughout the test, both data loggers were programmed to a linear data collection scale using a 1-second interval between readings.



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5.1 STEP-DRAWDOWN TEST

The main purpose of the step-drawdown test, which was conducted on February 25, 2014, was to determine well capacity (maximum rate at which a well will yield water under given conditions), well efficiency (a percent of the measured drawdown in the well divided by the theoretical drawdown of the aquifer), and specific capacity (gallons of water extracted per foot of drawdown) for the pumped well. Step-drawdown pumping was performed on N10 to assess well capacity (drawdown) in the well at different pumping rates and to predict an estimated transmissivity of the aquifer material. For this investigation, the step-drawdown tests consisted of four different pumping rates or “steps”, with each individual step lasting approximately one to one and half hours in duration.

The pumping steps conducted on test well N10 are summarized as follows:

- Pumping rates were established at approximately 10, 20, 30, and 32 gpm, for the respective steps.
- Water levels were monitored in the pumping well (N10) and one observation well (N07).

Following the pumping periods of the step-drawdown tests, field personnel continued to monitor water levels in the pumping well to determine when full recovery of the pre-test water level had occurred.

5.1.2 STEP-DRAWDOWN TEST PROCEDURE RESULTS

The step-drawdown aquifer test began at 9:25 a.m. on February 25, 2014. The test well was pumped at four different pumping rates (10, 20, 30 and 32 gpm). The initial pumping rate (10 gpm) was conducted for approximately 60 minutes and the remaining pumping rates (20, 30 and 32 gpm) were conducted for approximately 90 minutes. Static water level in the test well was measured at a depth of approximately 262.98 feet btoc prior to starting the pump.

Static water level was measured in the observation well immediately prior to the start of the test. The static water level in well N07 was measured at 265.79 feet btoc. The static water levels were consistent with background static water levels measured in the wells the preceding week. Field measurements indicate that the water level in N07 dropped 0.54 feet between the evening of February 27 and the morning of February 28, 2014, prior to starting the step-drawdown test. This data may be an indication that groundwater being pumped from neighboring offsite wells might be affecting water levels at observation well N07.

The step-drawdown aquifer test was concluded at 2:55 p.m. on February 25, 2014, at which time manual water level measurements continued for 45 minutes and electronic



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measurements continued until February 26, 2014 at 7:41 a.m. prior to the constant-rate test. Maximum drawdown in the test well N10 was approximately 29.37 feet after 272 minutes, before the pump was shut off. Maximum drawdown in observation well N07 was approximately 0.37 feet after 354 minutes, just after the pump was shut off. Step-rate drawdown results are presented in Figure 3.

Recovery to within 1 foot of static groundwater occurred within 33 minutes after the pump was shut off.

Groundwater discharged during the test was stored in two 20,000-gallon baker tanks located adjacent to the pumping well. The stored water was later distributed on-site by spraying the recovered well water using a water truck and by releasing the water onto the agricultural field utilizing a hose and energy dispensing system to eliminate soil disturbance.

Pumping water level plots for the test well and observation well data are provided as Figures 3 and 4. Field datasheets are provided as Appendix B.

5.2 CONSTANT-RATE TEST

A constant-rate aquifer test was conducted to evaluate the aquifer characteristics. The test also involves pumping a well at a known rate and monitoring water levels in an observation well and the test well. Measurements from the observation well during pumping and recovery provide the most reliable information with respect to the aquifer parameters of Transmissivity (T) and storativity (S). The estimation of these parameters can be used to estimate changes in water levels (head) as a result of pumping for a period of time (t).

Flow rate and totalizer readings from the flow meter installed in the discharge pipe of the test well (N10) were recorded periodically throughout the test. Groundwater discharged during the test was stored in two 20,000-gallon baker tanks located adjacent to the pumping well. The stored water was later distributed on-site by spraying the recovered well water using a water truck and by releasing the water onto the agricultural field utilizing a hose and energy dispensing system to eliminate soil disturbance.

5.2.2 CONSTANT TEST RESULTS

The constant-rate aquifer test began at 8:20 a.m. on February 26, 2014. The test well was pumped at a constant rate of approximately 32 gpm for 24 hours. Static water level in the test well was measured at a depth of approximately 264.44 feet btoc prior to starting the pump which was set at a depth of approximately 357 feet btoc.



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Static water level was measured in the observation well immediately prior to the start of the test at a depth of 266.14 feet btoc. The static water levels were consistent with background static water levels measured in the wells the preceding week and the preceding days.

The constant-rate test was concluded at 8:20 a.m. on February 27, 2014, at which time manual water level measurements continued during the recovery phase. The measurements were collected for approximately 3.3 hours, until the water level in the test well recovered to approximately 99.9 percent of its original pre-test water level. Water level recovery in the observation well was monitored manually using an electronic water level meter. Field datasheets are provided as Appendix A. Pumping water level plots for the test and the observation wells are provided as Appendix B.

Maximum drawdown in the test well N10 was approximately 26.94 feet after 120 minutes. Generally, the total amount of drawdown decreased from 120 minutes to the end of the test indicating that the well efficiency could be improved by redevelopment. There was a maximum drawdown of approximately 0.41 feet in observation well N07 (located approximately 810 feet south of the pumping well) when the pump was shut down. Recovery to within 1 foot of static groundwater occurred within approximately 34 minutes after the pump as shut off. The constant-rate drawdown results are presented in Figure 4.

It should be noted that no discernable drawdown attributable to pumping of the test well was observed in water well N03 (located approximately 194 feet north of the observation well) which is screened in the upper aquifer. This indicates that the upper and lower aquifers are not connected.

6.0 Aquifer Test Analysis

Graphical representations of the aquifer analysis plots for wells N07 and N10 are included in Appendix A. A summary of the estimated drawdown calculations over the 1 day, 90 day, 180 day, 1 year and 2 year timeframes is listed in Table 1.

Analysis of the step-drawdown test data was conducted using the computer program AQTESOLV© (Duffield 2006), which provides automatic test computations of commonly used mathematical solutions, including the Theis Type-Curve Method (Theis 1935). Both pumping time-drawdown and post-pumping time-recovery data were generated during the step-drawdown pumping test and utilized in the aquifer analysis. The results of each analysis provided values for the aquifer characteristics of transmissivity (T) and storativity (S) based on a specific measure of response to groundwater pumping. The analytical assessment consisted of matching the program-generated type curves with drawdown data from the observation well. Background data was also used in the curve-matching to gauge the level of



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drawdown interference from outside sources, such as barometric fluctuations and diurnal effects.

Following an analysis of the T and S aquifer characteristics, the hydraulic conductivity (K) of the aquifer at each test location was estimated using the following equation:

$$K = T / b'$$

Where:

- K = Hydraulic conductivity in gallons per day per square foot (gpd/ft²)
- T = Transmissivity in gallons per day per foot (gpd/ft)
- b' = Aquifer thickness in feet (ft)

The aquifer thickness (b') was based on the thickness of saturated aquifer material penetrated by each well.

Well efficiency is the ratio between drawdown in the formation adjacent to the wellbore to drawdown measured within the pumped well. Specific capacity, a common measure of well production efficiency, is defined as well discharge divided by drawdown (Q/s), typically expressed as gpm per foot (gpm/ft) of drawdown. In fully developed wells, specific capacity generally decreases at higher pumping rates due to increasing well losses, and will decrease over time as drawdown increases. During the pumping period, the specific capacity was calculated for each of the four steps. The results are summarized as follows:

- Step 1 (10 gpm) = Specific Capacity of 1.56 gpm/ft
- Step 2 (20 gpm) = Specific Capacity of 1.15 gpm/ft
- Step 3 (30 gpm) = Specific Capacity of 1.07 gpm/ft
- Step 4 (32 gpm) = Specific Capacity of 1.10 gpm/ft

Well efficiency during the step test was evaluated using the methodology outlined by Clark (1977). This method uses Jacob's equation and a regression analysis of well discharge rates against specific drawdown (drawdown/discharge) to obtain well-specific coefficients that provide an accurate prediction of water level drawdown. Well efficiency during each pumping step is then calculated as the ratio of predicted drawdown to measured drawdown. The well efficiency was calculated at 57%, indicating that the well is not fully developed.

7.0 AQUIFER TEST RESULTS



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Results of the aquifer test analyses are presented in Appendix A, Table 1 and summarized below.

AQUIFER TEST RESULTS SUMMARY

Pumping Well Test Area	Pumping Test Method	Well Transmissivity (T)		Estimated Aquifer Hydraulic Conductivity (K)	Storativity (S) (unitless)	Well Efficiency (percent)
		gpd/ft	ft ² /day	ft/day		
Well N10	Step-Rate	NA	NA	NA	NA	57%
	Constant-Rate	29,583	3,954	11.300	0.000266	NA
	Recovery	29,628	3,961	11.317	NA	NA

NA = Not applicable

Results of the aquifer test analyses indicate that aquifer material permeability in the pumping well test area is moderate and the range of K values corresponds to the anticipated well sorted sand. The T and K results are very similar for well N10. An S value of 0.000266 reflects confined aquifer conditions (Driscoll 1986).

The overall permeability of aquifer material in the pumping well test area is moderately high. Low drawdown was observed in the observation well at a distance of approximately 810 feet. Based on the specific capacity and well efficiency, this well is not fully developed and could benefit from well rehabilitation.

Calculated Drawdown from Long-Term Pumping

In order to estimate the amount of drawdown expected during long-term pumping, URS used an analytical model which incorporates the Theis (1935) aquifer equation to determine the drawdown radially from a pumping well once the transmissivity (T) and storativity (S) values of the aquifer material have been determined. For reference, the transmissivity (T) is the rate at which water is transmitted through a unit width of the aquifer for its full thickness at a unit hydraulic gradient, usually in feet squared per day. Storativity (S) is the ratio of the volume



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of water a rock or soil will yield to the volume of rock or soil, a dimensionless number. Q is the pumping rate in either AFY or gallons per minute (note: 1 AFY equals 325,851 gallons).

Using the results of the February 27, 2014 step-drawdown testing, a transmissivity (T) of 3,954 ft²/day was calculated for N10. A storativity (S) of 0.000266 for N10 was calculated and a series of drawdown projections in the pumping well and at selected radial distances away from the pumping well were estimated (Table 1). The analysis yielded the calculated drawdown results depicted graphically on Figures 5 through 8.

The results represent continuous pumping rates of approximately 10, 20, 30 and 32 gpm for N10 over 1-day, 90-day, 180-day, 1-year and 2-year time periods. Table 1 provides a detailed listing of pumping rates for specified durations and the respective calculated drawdowns at respective distances. The following summarizes the calculated drawdown projections at the varying pumping rates and specified distances over a 1-year period:

- For N10 pumping at 10 gpm for 1 year, the calculated drawdown projections are approximately 0.54 feet at a distance of 100 feet away from the well; 0.40 feet at a radial distance of 600 feet away from the pumping well; and 0.24 feet at a radial distance of 5,000 feet away from the pumping well.
- For N10 pumping at 20 gpm for 1 year, the calculated drawdown projections are approximately 1.09 feet at a distance of 100 feet away from the well; 0.81 feet at a radial distance of 600 feet away from the pumping well; and 0.48 feet at a radial distance of 5,000 feet away from the pumping well.
- For N10 pumping at 30 gpm for 1 year, the calculated drawdown projections are approximately 1.63 feet at a distance of 100 feet away from the well; 1.21 feet at a radial distance of 600 feet away from the pumping well; and 0.72 feet at a radial distance of 5,000 feet away from the pumping well.
- For N10 pumping at 32 gpm for 1 year, the calculated drawdown projections are approximately 1.74 feet at a distance of 100 feet away from the well; 1.29 feet at a radial distance of 600 feet away from the pumping well and 0.77 feet at a radial distance of 5,000 feet away from the pumping well.

8.0 SUMMARY AND CONCLUSIONS

Based on the results of the step-drawdown test and constant-rate test on N10, the following general conclusions are made:



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- Specific capacity ranged from 1.07 to 1.56 gpm/ft within a discharge range of 10 to 32 gpm.
- The well is not fully developed and could benefit from well rehabilitation.
- Safe yield for this analysis is being defined as the maximum quantity of water that can be withdrawn annually from groundwater under a given set of conditions without causing an undesirable result. The phrase “undesirable result” is being defined in this report as the gradual lowering of the groundwater levels outside of the property boundary resulting in depletion of the supply. Based on the results of the aquifer testing activities, the impact from pumping at the project water requirement of 32 gpm on groundwater levels outside the property will not result in depletion of the water supply or cause significant drawdown to groundwater level.
- URS’ analysis and calculations indicate that the effects of groundwater pumpage at the NorthStar site in order to supply a maximum groundwater usage rate of approximately 51 AFY (approximately 32 gpm on a constant-rate basis) over a 1-year period of anticipated construction will not have a significant impact to water supply and the drawn-upon aquifer in the area.
- The calculated drawdowns resulting from this analysis do not appear to be significant enough to cause concern for water supply reliability, aquifer drawdown, and/or potential aquifer collapse especially considering the projected maximum demand and usage of only 51 AFY (32 gpm on a constant rate basis).

9.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon the presented data. They are intended exclusively for the purpose outlined herein and the site location and project indicated. This report is for the sole use and benefit of the Client. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Given that the scope of services for this investigation was limited, and that conditions may vary between the points explored, it is possible that currently unrecognized subsurface conditions may be present at the site. Should site use or conditions change, the information and conclusions in this report may no longer apply. Opinions relating to environmental, geologic, and geotechnical conditions are based on limited data and actual conditions may vary from those encountered at the times and locations where data were obtained. No express or implied representation or warranty is included or intended in this report except



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that the work was performed within the limits prescribed by the Client with the customary thoroughness and competence of professionals working in the same area on similar projects.

URS is available to discuss the results of our assessment at your convenience. Please contact Robert Urban (805.361.1109) if you have any questions.

Sincerely,
URS Corporation,

Robert J. Urban, P.G., C.E.G.
Senior Engineering Geologist

Attachments: References
Figures 1-8
Table 1
Appendix A – Aquifer Test Analysis
Appendix B – Field Data



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REFERENCES

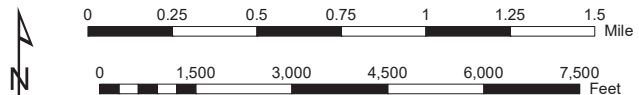
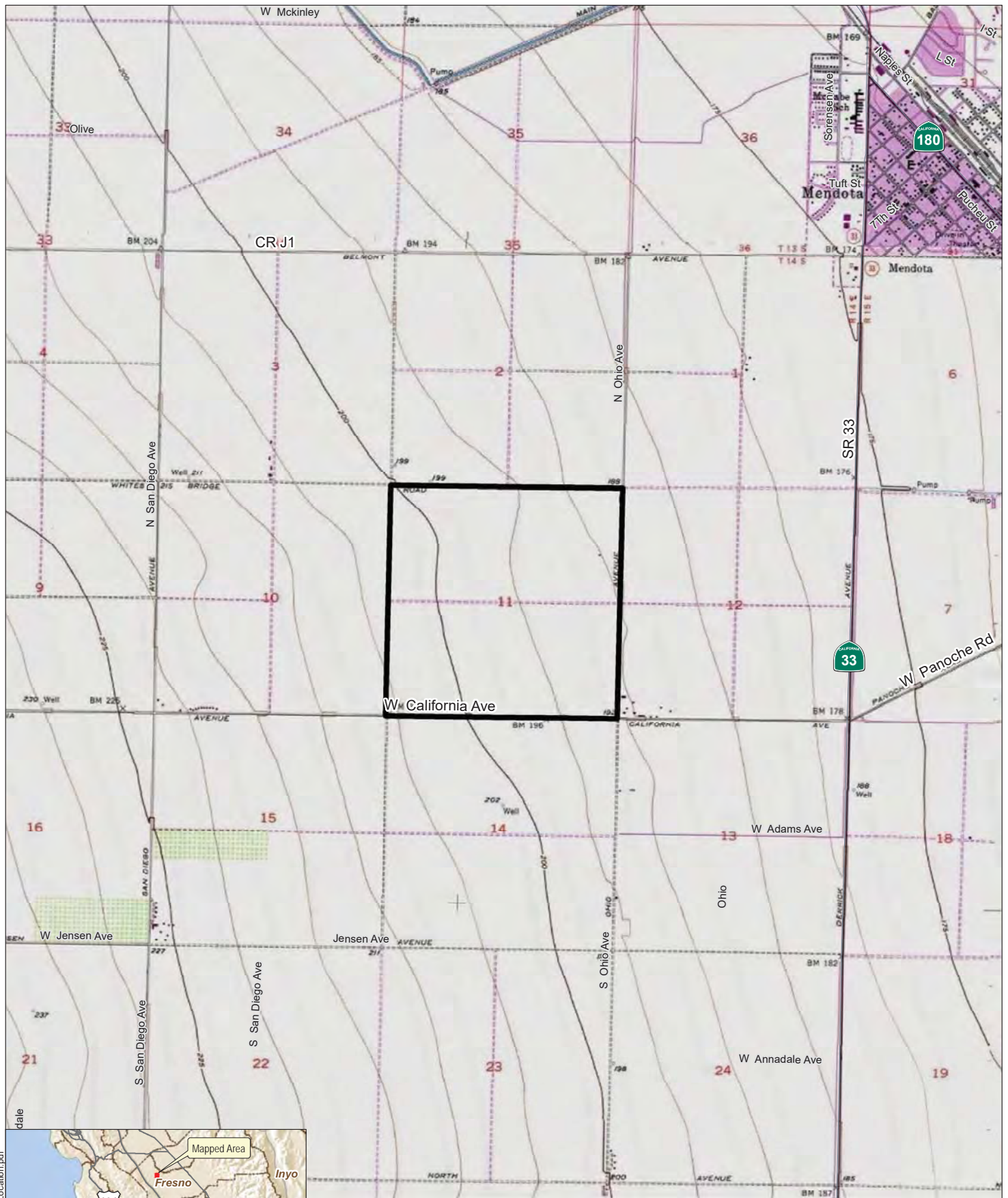
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TABLES

Fresno County, California

Drawdown (feet) - 10 gpm	Drawdown (feet) - 20 gpm					Drawdown (feet) - 30 gpm					Drawdown (feet) - 40 gpm			
	180 days	365 days (1 year)	730 days (2 years)	1 day	90 days	180 days	365 days (1 year)	730 days (2 years)	1 day	90 days		180 days	365 days (1 year)	730 days (2 years)
0.93	0.95	0.98	1.45	1.80	1.85	1.91	1.96	2.18	2.70	2.78	2.86	2.94	2.32	2.88
0.82	0.85	0.87	1.24	1.58	1.64	1.69	1.75	1.85	2.38	2.46	2.54	2.62	1.98	2.53
0.75	0.78	0.80	1.09	1.44	1.50	1.55	1.60	1.64	2.16	2.24	2.33	2.41	1.75	2.31
0.69	0.72	0.75	0.99	1.33	1.39	1.44	1.50	1.48	2.00	2.08	2.16	2.25	1.58	2.14
0.64	0.67	0.69	0.88	1.23	1.28	1.34	1.39	1.32	1.84	1.92	2.00	2.08	1.41	1.96
0.57	0.60	0.62	0.74	1.09	1.14	1.19	1.25	1.11	1.63	1.71	1.79	1.87	1.18	1.74
0.52	0.54	0.57	0.63	0.98	1.03	1.09	1.14	0.94	1.47	1.55	1.63	1.71	1.01	1.57
0.46	0.49	0.52	0.52	0.87	0.92	0.98	1.03	0.78	1.31	1.39	1.47	1.55	0.84	1.39
0.43	0.46	0.49	0.46	0.81	0.86	0.92	0.97	0.69	1.21	1.29	1.37	1.46	0.74	1.29
0.41	0.44	0.46	0.42	0.76	0.82	0.87	0.93	0.62	1.15	1.23	1.31	1.39	0.66	1.22
0.38	0.40	0.43	0.35	0.70	0.75	0.81	0.86	0.53	1.05	1.13	1.21	1.29	0.56	1.12
0.35	0.38	0.41	0.31	0.66	0.71	0.76	0.82	0.46	0.98	1.06	1.15	1.23	0.49	1.05
0.34	0.37	0.39	0.27	0.62	0.68	0.73	0.78	0.41	0.93	1.01	1.10	1.18	0.44	0.99
0.28	0.31	0.34	0.17	0.51	0.57	0.62	0.68	0.26	0.77	0.85	0.93	1.01	0.27	0.82
0.25	0.28	0.31	0.11	0.45	0.51	0.56	0.61	0.17	0.68	0.76	0.84	0.92	0.18	0.72
0.23	0.26	0.28	0.08	0.41	0.46	0.52	0.57	0.12	0.61	0.69	0.77	0.85	0.12	0.65
0.21	0.24	0.27	0.05	0.37	0.43	0.48	0.53	0.08	0.56	0.64	0.72	0.80	0.08	0.60
0.20	0.23	0.25	0.04	0.34	0.40	0.45	0.51	0.05	0.52	0.60	0.68	0.76	0.06	0.55
0.19	0.21	0.24	0.02	0.32	0.37	0.43	0.48	0.04	0.48	0.56	0.64	0.72	0.04	0.51

FIGURES



Legend
 North Star Site Boundary

**First Solar - North Star
 Fresno County**

URS Corporation

Source: [1] USGS 1:24,000-scale topographic map created with TOPOI, (c)2007 National Geographic Maps, [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1. Site Location Map



T:\PROJECTS\North Star\Maps\Fig1_SiteLocation.pdf



Test Well

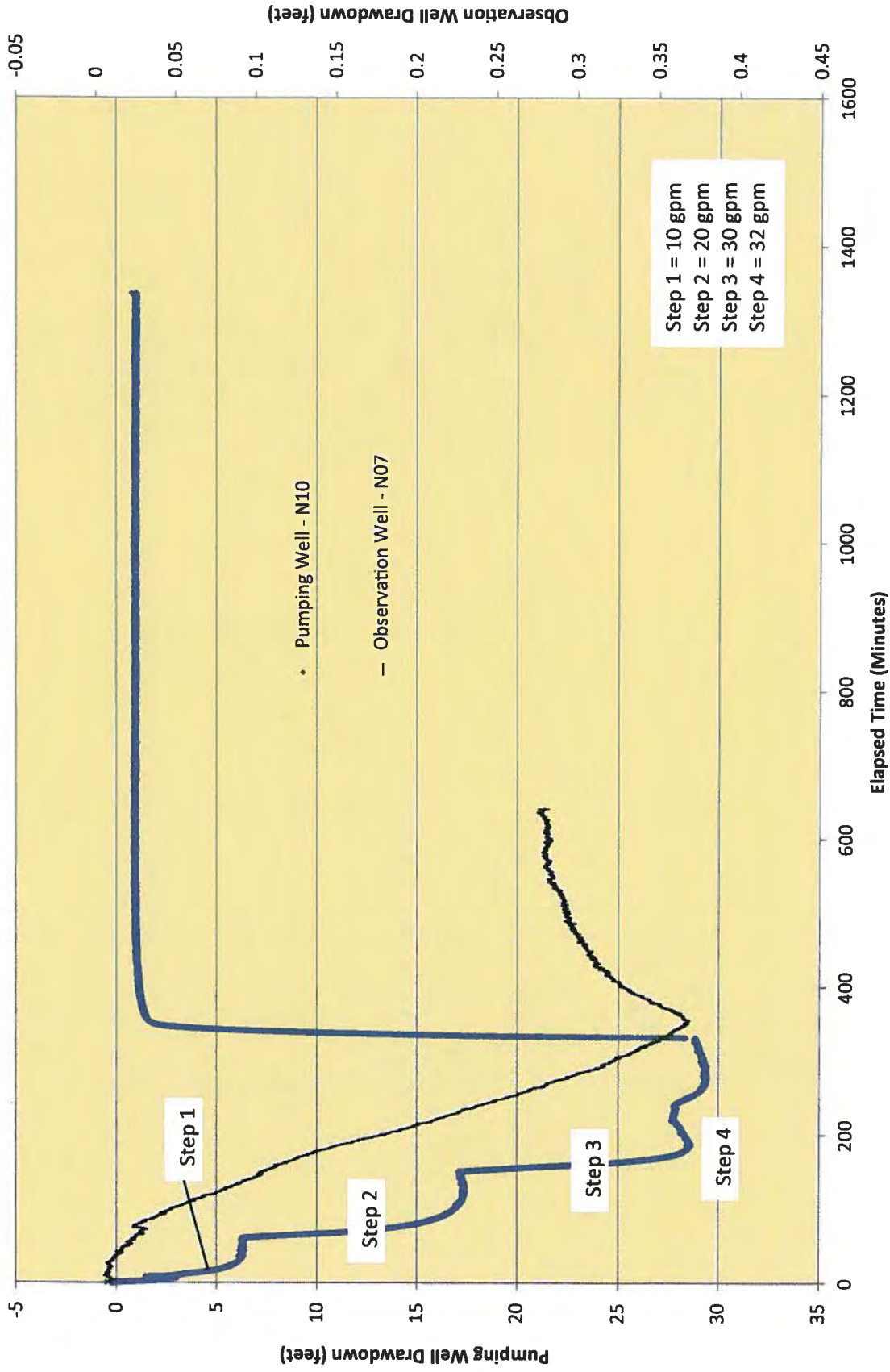
Observation Well

14S/14E-11N10

14S/14E-11N03

14S/14E-11N07

14S/14E-11Q01



FIGURE

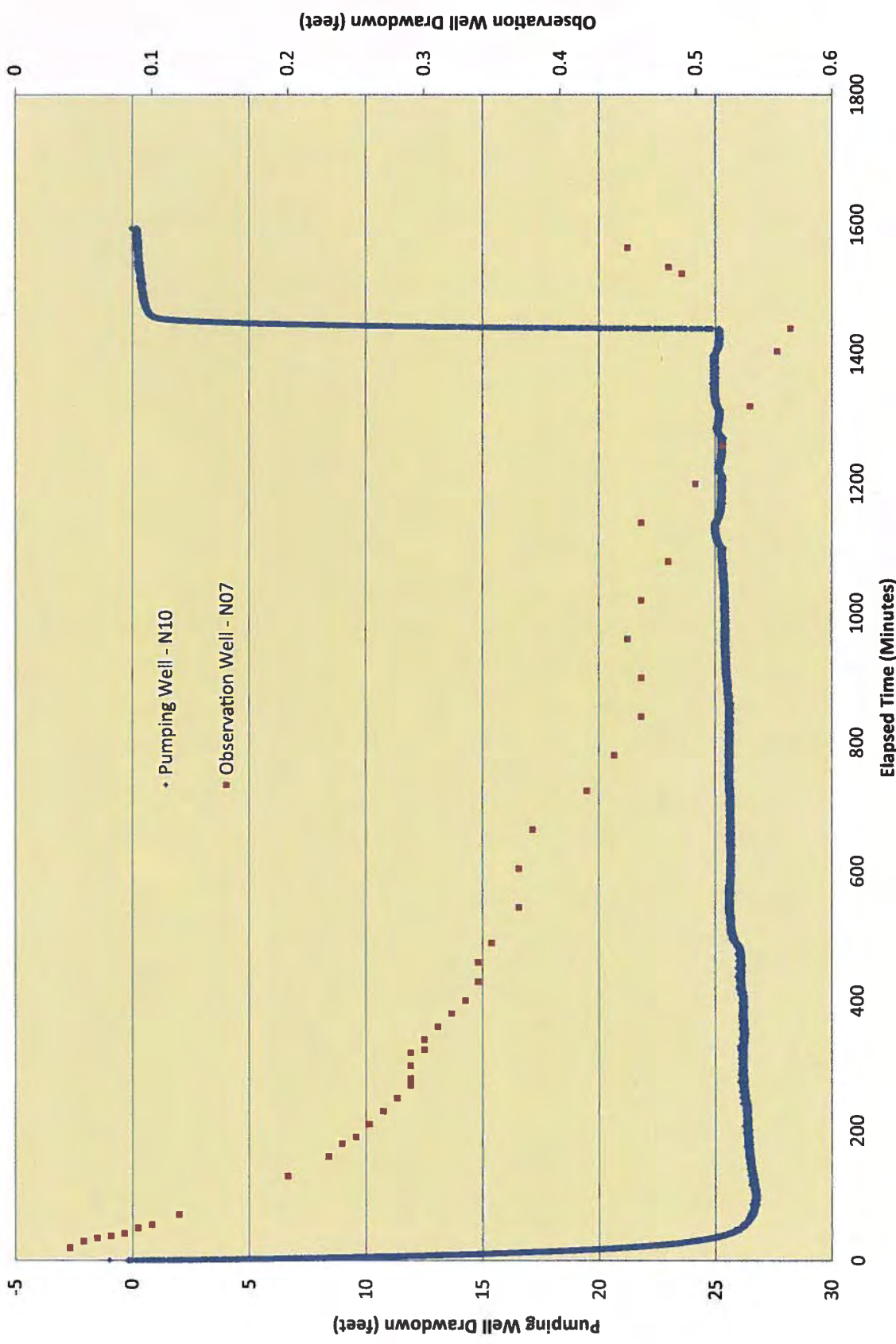
3


STEP-RATE DRAWDOWN RESULTS

NORTHSTAR SOLAR PROJECT
FIRST SOLAR, INC.
FRESNO COUNTY, CALIFORNIA

PROJECT NO.	28910240
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DRAWN BY	JG
CHECKED BY	RU
FILE NAME	SRT Graph.ai







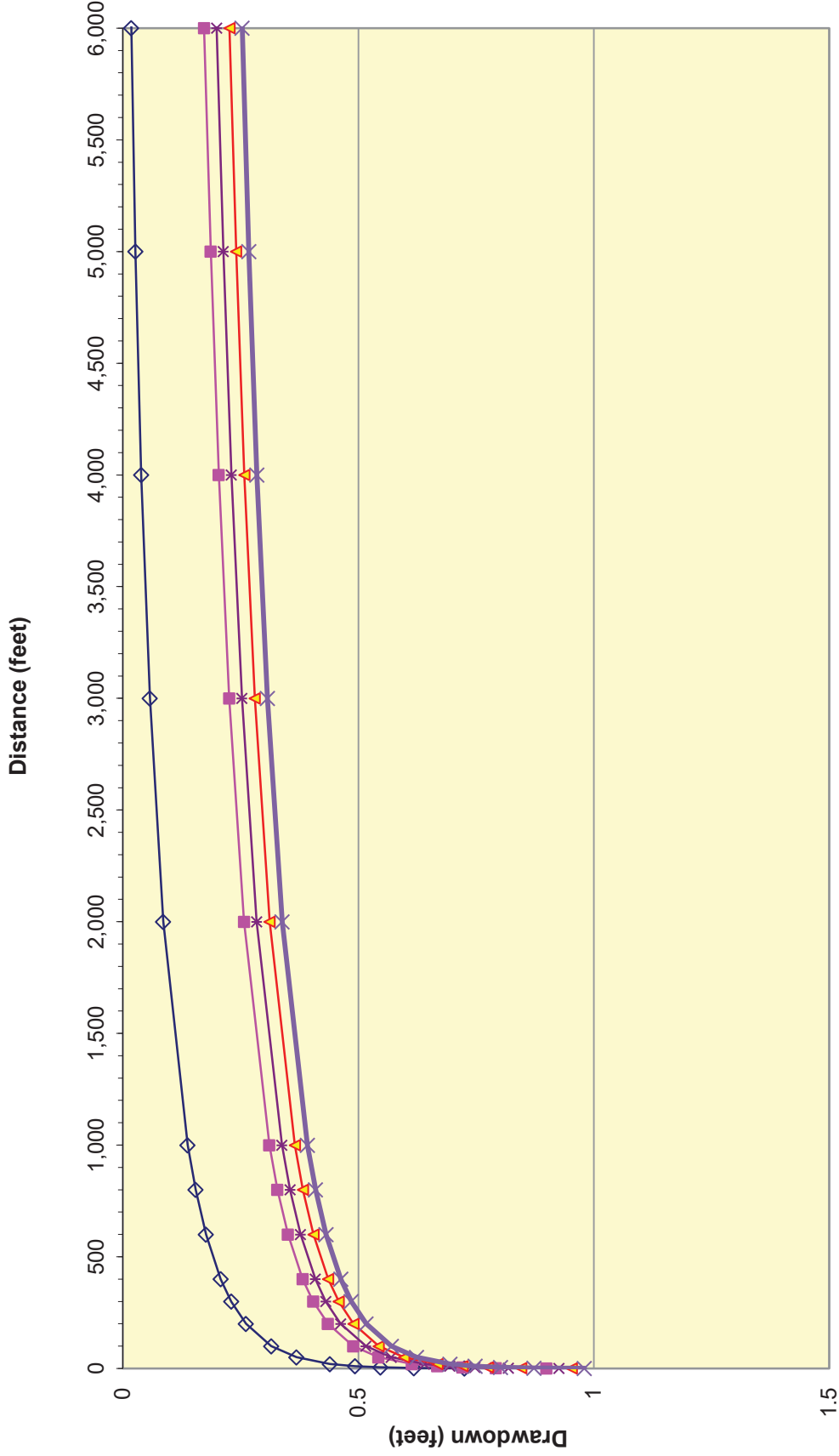
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DRAWN	MAR 2014
DRAWN BY	JG
CHECKED BY	RU
FILE NAME	CRT Graph.ai

CONSTANT-RATE DRAWDOWN RESULTS

NORTHSTAR SOLAR PROJECT
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FRESNO COUNTY, CALIFORNIA

FIGURE 4

Estimated Drawdown at Varying Distances
 Based On Theis Equation. Q = 10 gpm
 Pumping Period = 1, 90, 180, 365 and 730 days



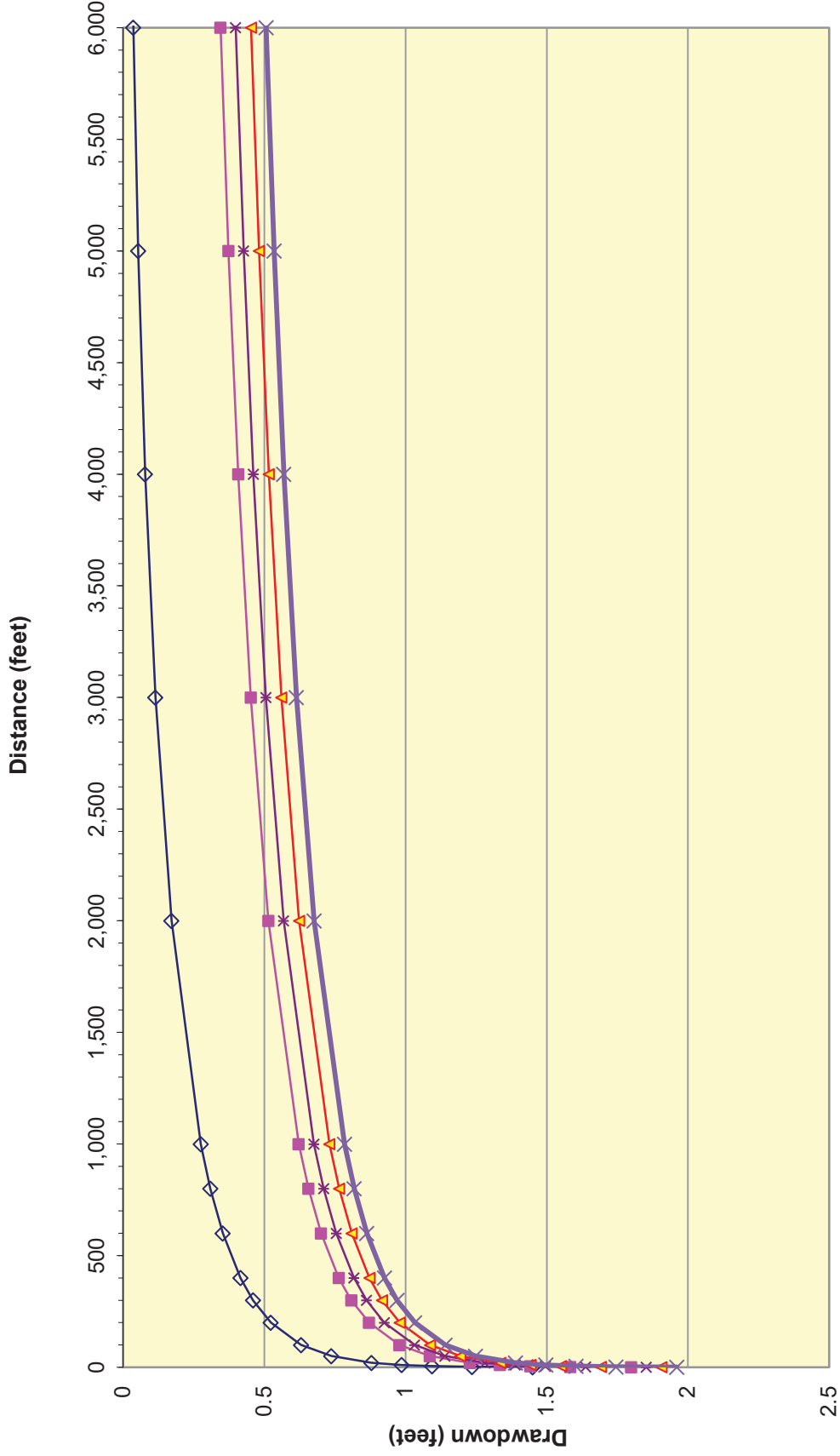
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CHECKED BY	RU
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ESTIMATED DRAWDOWN VS.
 DISTANCE AT 10 GPM

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 FRESNO COUNTY, CALIFORNIA

FIGURE
 5

Estimated Drawdown at Varying Distances
 Based On Theis Equation. Q = 20 gpm
 Pumping Period = 1, 90, 180, 365 and 730 days



◆ 1 day
 ■ 90 days
 * 180 days
 ▲ 365 days
 ✕ 730 days



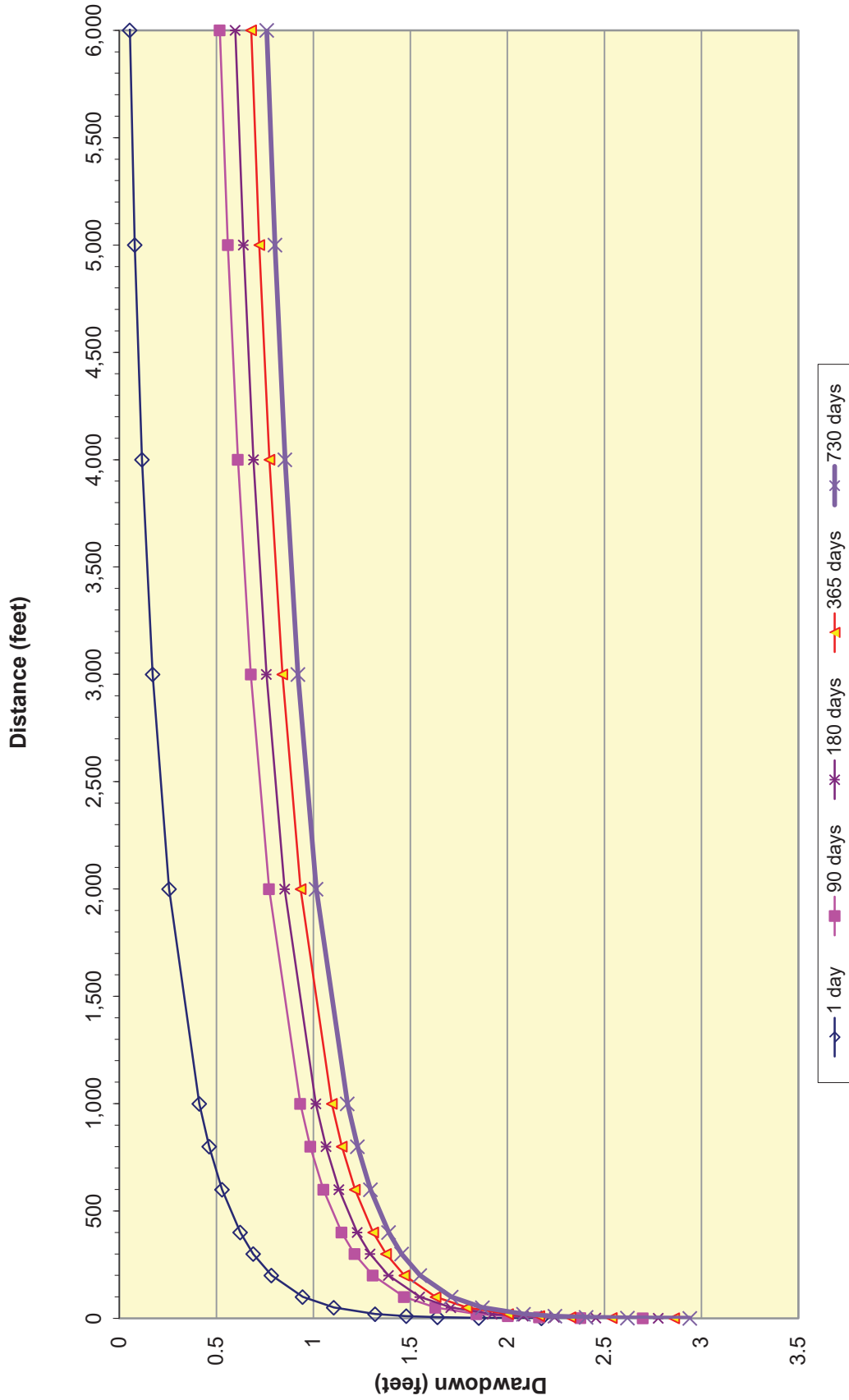
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FILE NAME	20GPM Graph.ai

ESTIMATED DRAWDOWN VS.
 DISTANCE AT 20 GPM

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 FRESNO COUNTY, CALIFORNIA

FIGURE
 6

Estimated Drawdown at Varying Distances
 Based On Theis Equation. Q = 30 gpm
 Pumping Period = 1, 90, 180, 365 and 730 days



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DRAWN BY	JG
CHECKED BY	RU
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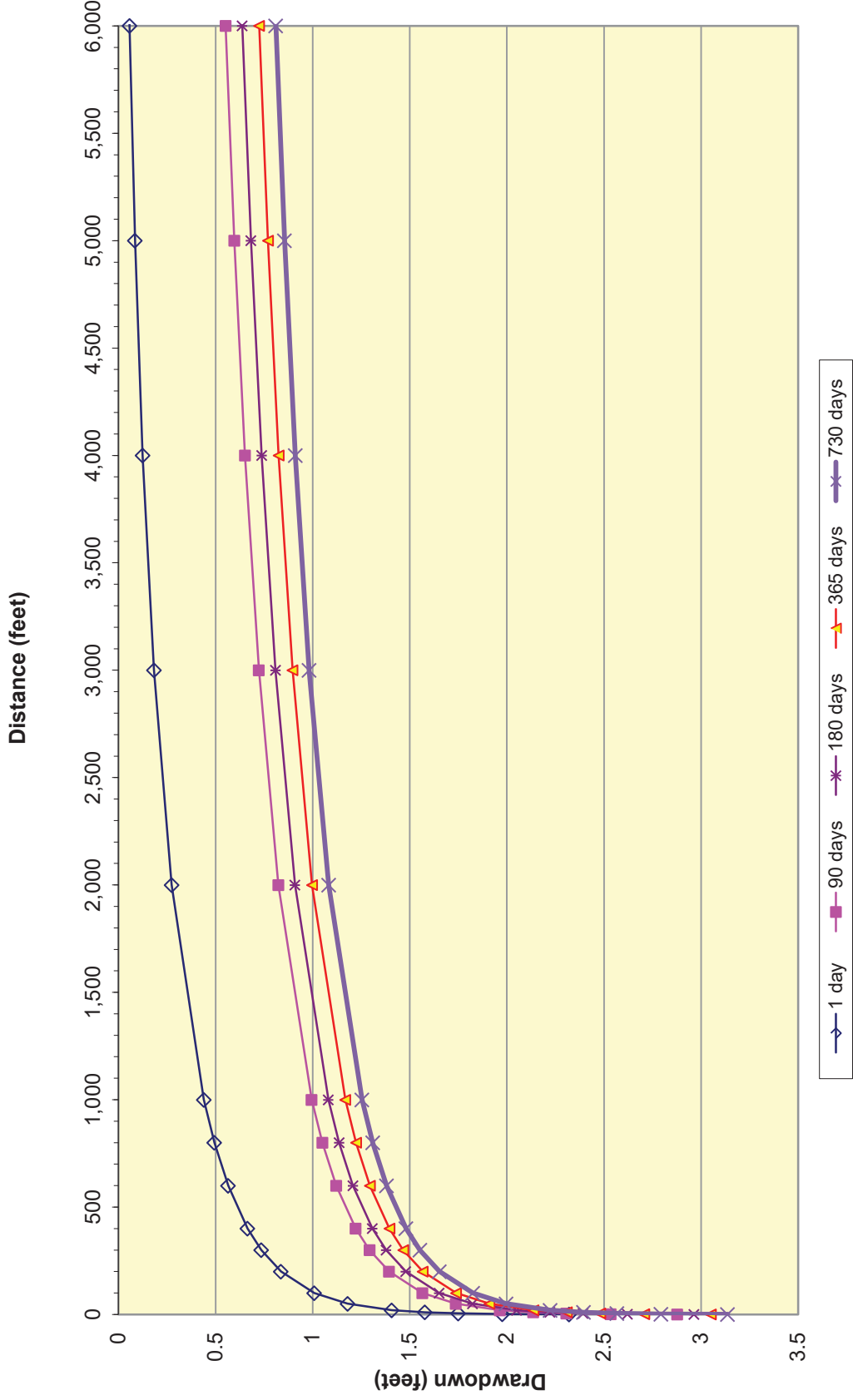
ESTIMATED DRAWDOWN VS.
 DISTANCE AT 30 GPM

NORTHSTAR SOLAR PROJECT
 FIRST SOLAR, INC.
 FRESNO COUNTY, CALIFORNIA

FIGURE

7

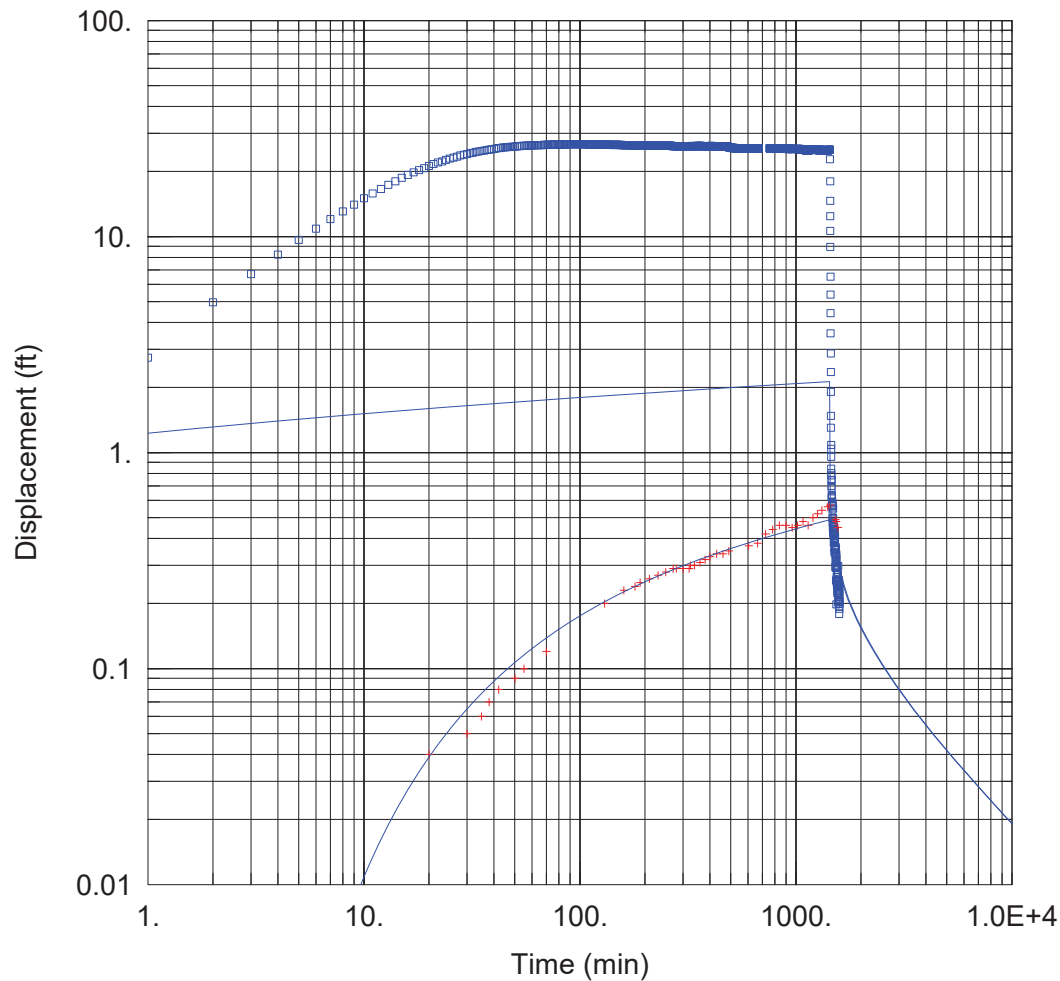
Estimated Drawdown at Varying Distances
 Based On Theis Equation. Q = 32 gpm
 Pumping Period = 1, 90, 180, 365 and 730 days



PROJECT NO. 28910240
 DRAWN MAR 2014
 DRAWN BY JG
 CHECKED BY RU
 FILE NAME 32GPM Graph.ai

ESTIMATED DRAWDOWN VS.
 DISTANCE AT 32 GPM
 NORTHSTAR SOLAR PROJECT
 FIRST SOLAR, INC.
 FRESNO COUNTY, CALIFORNIA

APPENDIX A
AQUIFER TEST ANALYSIS



WELL TEST ANALYSIS

Data Set: G:\Storage\Projects\Project for Maui\First Solar\CRT_This_Confined3152014.aqt
 Date: 03/17/14 Time: 12:04:55

PROJECT INFORMATION

Company: URS
 Client: First Solar
 Location: Mendota, CA
 Test Well: EGW018
 Test Date: 2/26/14 - 2/27/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
N10	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
□ N10	0	0
+ N07	0	810

SOLUTION

Aquifer Model: Confined

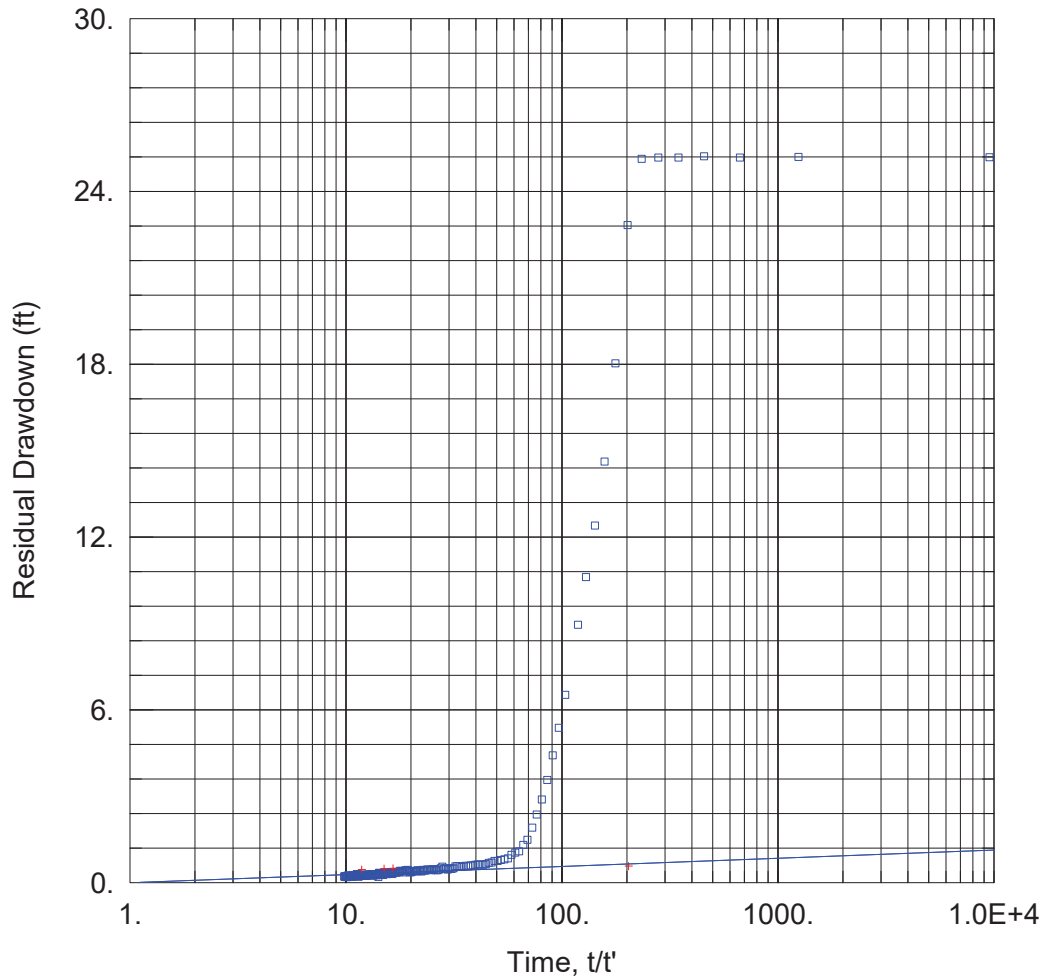
Solution Method: Thisis

T = 3953.5 ft²/day

S = 0.0002664

Kz/Kr = 1.

b = 350. ft



WELL TEST ANALYSIS

Data Set: G:\Storage\Projects\Project for Maui\First Solar\CRT_Recovery_3152014.aqt
 Date: 03/17/14 Time: 12:06:02

PROJECT INFORMATION

Company: URS
 Client: First Solar
 Location: Mendota, CA
 Test Well: EGW018
 Test Date: 2/26/14 - 2/27/14

AQUIFER DATA

Saturated Thickness: 350. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Observation Wells

Well Name	X (ft)	Y (ft)
N10	0	0

Well Name	X (ft)	Y (ft)
□ N10	0	0
+ N07	0	810

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)
 $T = 3960.7 \text{ ft}^2/\text{day}$ $S/S' = 1.103$

APPENDIX B

FIELD DATA

AQUIFER TEST DATA

Project: <u>NORTH STAR, MENDOTA</u>			Project No.: <u>28910240.30000</u>			Static Water Level [c]: <u>264.68 = 262.98</u>					
Well Location:			Well No.: <u>N10 - STEP</u>			Measuring Point: <u>TOC - PVC RISER</u>					
Well Diameter: <u>16"</u>			Measured By: <u>J. BRANDON</u>			Elevation Measuring Point:					
Pump Setting: <u>357'</u>			Pump On: Date <u>2/25/14</u>		Time: <u>0925</u>		Available Drawdown: <u>92.32'</u>				
Screen Interval(s): <u>560 - 880</u>			Pump Off: Date <u>2/25/14</u>		Time: <u>1455</u>		Distance From Pumping Well:				
How Q Measured: <u>PRECISION FLOW METER</u>			Duration of Aquifer Test: <u>5.5 HRS</u>			Initial Totalizer Reading: <u>1893.6</u>					
Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time - time since pump off (minutes) [t']	[t/t'] required for recovery analysis	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
0926	1			265.83	1.7	264.13	1.15	10	8.70	1893.6	
0927	2			266.56		264.86	1.88		5.32		
0928	3			267.24		265.54	2.56		3.91		
0929	4			267.55		265.85	2.87		3.48		WATER @ TOP OF LINE
0930	5			267.70		266.00	3.02		3.31		
0931	6			267.78		266.08	3.10		3.22		CHANGING WIRING - PUMP RUNNING BACKWARDS
0932	7			267.86		266.16	3.18		3.14		
0933	8			267.58		265.88	2.90		3.45		PUMP BACK ON
0934	9			267.86		266.16	3.18		3.14		
0935	10			268.16		266.46	3.48		2.87		
0936	11			268.90		267.20	4.22		2.37		
0937	12			268.90		267.28	4.30		2.33		
0938	13			269.05		267.35	4.37		2.28		
0939	14			269.61		267.91	4.93		2.03		
0940	15			269.98		268.28	5.30		1.89		
0945	20			270.23		268.53	5.55		1.80		
0950	25			270.75		269.05	6.07		1.65		

AQUIFER TEST DATA

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
0955	30			270.98	1.7	269.28	6.30	10	1.59		
1000	35			271.10		269.40	6.42		1.56	1893.8	
1005	40			271.10		269.40	6.42		1.56		
1010	45			271.12		269.42	6.44		1.55		
1015	50			271.12		269.42	6.44		1.55		
1020	55			271.12		269.42	6.44		1.55		
1025	60			271.11		269.41	6.43	↓	1.56		
1026	61			272.31		270.61	7.63	20	2.62		step to 20gpm
1027	62			272.78		271.08	8.10		2.50		
1028	63			273.48		271.78	8.80		2.27		
1029	64			274.25		272.55	9.57		2.09		
1030	65			274.73		273.03	10.05		1.99		
1031	66			275.36		273.66	10.68		1.87		
1032	67			276.04		274.34	11.36		1.76		
1033	68			276.58		274.88	11.90		1.68		
1034	69			277.12		275.42	12.44		1.60		
1035	70			277.80		276.10	13.12		1.52		
1036	71			278.18		276.48	13.50		1.48		
1037	72			278.40		276.70	13.72		1.46		
1038	73			278.53		276.83	13.85		1.44		
1039	74			278.78		277.08	14.10		1.42	1894.3	
1040	75			278.97		277.27	14.29		1.40		
1045	80			280.05	↓	278.35	15.37	↓	1.30		

AQUIFER TEST DATA

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
1050	85			280.72	1.7	279.02	16.04	20	1.25		
1055	90			281.20		279.50	16.52		1.21		
1100	95			281.55		279.55	16.87		1.19		
1105	100			281.80		280.10	17.12		1.17		
1110	105			281.90		280.20	17.22		1.16		
1115	110			282.10		280.40	17.42		1.15		
1120	115			282.18		280.48	17.50		1.14		
1125	120			282.20		280.50	17.52		1.14		① IHR MARK BUT WL STILL DROPPING KEEP @ 20gpm TO SEE IF IT STABILIZES
1130	125			282.23		280.53	17.55		1.14		
1135	130			282.24		280.54	17.56		1.14		
1140	135			282.21		280.51	17.53		1.14		
1145	140			282.10		280.40	17.42		1.15		
1150	140 145			282.10		280.40	17.42		1.15		
1155	145 150			282.10		280.40	17.42		1.15		
1156	146 151			282.09 282.68		280.98	18.00	30	1.67	1895.6	STEP TO 30gpm
1157	147 152			283.32		281.62	18.64		1.61		
1158	148 153			284.07		282.37	19.39		1.55		
1159	149 154			284.63		282.93	19.95		1.50		
1200	150 155			285.28		283.58	20.60		1.46		
1201	151 156			286.06		284.36	21.38		1.40		
1202	152 157			286.68		284.98	22.00		1.36		
1203	153 158			287.35		285.65	22.67		1.32		
1204	154 159			288.05		286.35	23.37		1.28		

AQUIFER TEST DATA

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
1205	160			288.59	1.7	286.89	23.91	30	1.25		
1210	165			291.07		289.37	26.39		1.14		
1215	170			292.48		290.78	27.80		1.08		
1220	175			293.06		291.36	28.38		1.06		
1225	180			293.38		291.68	28.70		1.05		
1230	185			293.45		291.75	28.77		1.04		
1235	190			293.43		291.73	28.75		1.04		
1240	195			293.29		291.59	28.61		1.04		
1245	200			293.17		291.47	28.49		1.05		Flow Adjusted @ 28 back to 30
1250	205			293.11		291.41	28.43		1.06		
1255	210			292.95		291.25	28.27		1.06		
1300	215			292.85		291.15	28.17		1.06		
1305	220			292.79		291.09	28.11		1.07		
1310	225			292.71		291.01	28.03		1.07		
1315	230			292.76		291.06	28.08		1.07		
1320	235			292.78		291.06	28.08		1.07		
1325	240			292.76		291.06	28.08	+	1.07		
1326	241			292.81		291.11	28.13	40 32	1.14 1.14		STEP TO 40 gpm
1327	242			292.92		291.22	28.24		1.13		
1328	243			293.00		291.30	28.32		1.13		
1329	244			293.02		291.32	28.34		1.13		
1330	245			293.12		291.42	28.44		1.13		
1331	246			293.19	-	291.49	28.51	-	1.12		

AQUIFER TEST DATA

Step-Test NØ7 (observation well)

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	NØ7 Remarks (Observation well)
0922	-3			265.79			0	~10			measurements taken from 16" steel casing (TOC)
0925	Ø			265.79			0				
0926	Ø+1			265.79			0				
0930	+5			265.79			0				
0940	+15			265.79			0				
0945	+20			265.80			.01				
0955	+30			265.80			.01				
1005	+40			265.81			.02				
1020	+55			265.82			.03				
1030	+65			265.82			.03	~20			
1040 1040	+75			265.83			.04				
1100	+95			265.85			.06				
1107	+102			265.86			.07				
1115	+110			265.86			.07				
1125	+120			265.87			.08				
1135	+130			265.87			.08				
1140	+135			265.88			.09				
1150	+145			265.89			0.10				
1200	+155			265.90			0.11	-30			
1215	+170			265.91			0.12				
1230	+185			265.91			0.12				
1240	+195			265.93			0.14				
1245	+200			265.94				~40			

AQUIFER TEST DATA

Project: <u>North Star Mendota</u>			Project No.: <u>28910240.30000</u>				Static Water Level [c]: <u>264.44</u>				
Well Location:			Well No.: <u>N10 - CONSTANT</u>				Measuring Point: <u>PVC Riser</u>				
Well Diameter: <u>16"</u>			Measured By: <u>J. BRANDON</u>				Elevation Measuring Point:				
Pump Setting: <u>357'</u>			Pump On: Date <u>2/26/14</u>		Time: <u>0820</u>		Available Drawdown: <u>92.56</u>				
Screen Interval(s): <u>560 - 880</u>			Pump Off: Date <u>2/27/14</u>		Time:		Distance From Pumping Well:				
How Q Measured:			Duration of Aquifer Test: <u>24 HRS</u>				Initial Totalizer Reading: <u>1901.1</u>				
Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time - time since pump off (minutes) [t']	[t/t'] required for recovery analysis	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
0920	60			292.76	1.7	291.06	26.62	32	1.2021	1903.0	
1020	120			293.08		291.38	26.94		1.1878	1904.7	
1120	180			292.87		291.17	26.73		1.1971	1906.7	
1220	240			292.80		291.10	26.66		1.2003	1908.6	
1320	300			292.65		290.95	26.51		1.2071	1910.5	
1420	360			292.67		290.97	26.53		1.2062	1912.4	
1520	420			292.62		290.92	26.48		1.2085	1914.3	
1620	480			292.51		290.81	26.37		1.2135	1916.1	
1720	540			292.06		290.36	25.92		1.2346	1918.1	
1820	600			292.07		290.37	25.93		1.2341	1919.1	
1920	660			292.07		290.37	25.93		1.2341	1921.8	
2020	720			292.07		290.37	25.93		1.2341	1923.7	
2120	780			292.02		290.32	25.88		1.2365	1925.6	
2220	840			292.05		290.35	25.91		1.2350	1927.5	
2320	900			291.93		290.23	25.79		1.2408	1929.4	
2420	960			291.88		290.18	25.74		1.2432	1931.4	
0120	1020			291.86		290.16	25.72		1.2442	1933.4	

AQUIFER TEST DATA

24 hr Constant Test

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
0640	0			266.14				0		1901075	0820 Pump start
0840	+20			266.18				32		1901125	821 30 gpm
0850	+30			266.19						1901162	822 37
0855	+35			266.20						1901192	823 30
0858	+38			266.21						1901224	824 32
0902	+42			266.22						1901255	825 31
0910	+50			266.23						1901285	826 30
0915	+55			266.24						1901315	827 30
0930	+70			266.26						1901347	828 32
1030	+130			266.34						1901378	829 31
1100	+160			266.37						1901409	830 31
1120	+170			266.38						1901442	831 31
1130	+180			266.39						1901473	832 31
1150	+200			266.40						1901505	833 32
1210	+220			266.41						1901537	834 32
1230	+240			266.42						1901568	835 31
1250	+260			266.43							
1300	+270			266.43							
1320	+290			266.43							
1340	+310			266.43							
1345	+315			266.44							
1400	+330			266.44							
1420	+350			266.45							

AQUIFER TEST DATA

2/27/14

Time of Measurement	Time Since Pumping Started (minutes) [t]	Recovery Time (since pump off) (minutes) [t']	[t/t']	Sounder Reading (feet) [a]	Correction (feet) [b]	Water Level (feet) [a-b]	Drawdown (feet) [d]	Discharge (gpm) [Q]	Specific Capacity (gpm/ft) [Q/d]	Totalizer Reading (gallons) [f]	Remarks
1440	+370			266.46							
1500	+390			266.47							
1530	+420			266.48							
1600	+450			266.48							
1630	+480			266.49							
1725				266.50	266.51						
1825				266.51							
1925				266.52							
2025				266.56							
2120				266.58							
2220				266.60							
2320				266.60							
2420				266.59							
0120				266.60							
0220				266.62							
0320				266.60							
0420				266.64							
0520				266.66							
0620				266.68							
0745				266.70							
0820				266.71							
0945				266.63							
0955				266.62							

Feb 26 14
4:27 PM



Field Report

Date: 2/21/14
Project: Northstar
Project No: 28910240 Task No: 30000
Location: Menlo Park, CA
Weather: Sunny clear Temperature: 65°
Client: First Solar
Contractor: Bradley & Sons
URS Representative(s): Jeff Gaines & Anthony Schuetz

URS Corporation
2625 South Miller Street, Suite 104
Santa Maria, CA 93455

Scope of Work: Pump test
Demolition Assessment Remediation

Page 1 of

0800 Arrived onsite to conduct water level measurements, coordinate with subcontractor and oversee baker tank delivery

0905 Bradley & Sons arrive onsite

0930-1000 H&S meeting

1000 - B&S starts installing 2" pipe for pump test in N10.

1005-1045 Collected groundwater measurements at water wells N03, N07 and N10.

1100 Semi truck onsite to pickup existing baker tank left from previous jobs.

1145 B&S completes 2" pipe install.

1215 B&S to lunch → 1315 return

1250 Collected GW measurements from N03, N07 and N10.

1555 Baker tank arrives onsite

1625 Semi truck off site

1630 URS off site

Equipment Used: Ford F-150 (rental)

Drop Off/Pick Ups: Thurs 6pm to Wed withhrs next week

Contractor Hours: Field Hours: 12 hrs Mileage:
Copies To: Project Manager: Robert Urban
Reviewed By:

**Field Report**

Date	2/24/14		
Project	Northstar		
Project No.	28910240.30000	Task No.	
Location	Mercede, CA		
Weather	Sunny & Clear	Temperature	60-70's
Client	First Solar, Inc		
Contractor	Bradley & Sons		
URS Representative(s)	Justin Brandon & Jeff Galois		

URS Corporation
2625 South Miller Street, Suite 104
Santa Maria, CA 93455

Scope of Work: Aquifer Pump Test
 Demolition Assessment Remediation

Page 1 of

0800 Justin ~~Brandon~~ Brandon onsite - Baker tank just leaving.

0810 Arrive onsite to conduct aquifer pump test on well N10

0850 Wayne S. arrived onsite (Bradley & Sons)

0850 - 0905 Health & safety meeting, ISAs hospital route.

0915 Water truck operator onsite to check Baker tank fittings -
offsite at 0940

0945 Collect depth to water (DTW) measurements:
N03 = 71.59' btoc Totalizer reading: 01892827 gallons
N07 = 265.22' btoc
N10 = 263.26' btoc

1030 Set transducer, test pump, overflow line, check software

1100 Start test

1105 Stop test to fix water leak / wait for recharge

1200 Re-start test

1207 stop test due to leaks in piping

1215 Change piping setup & test pipes.

1240 10 gen - no leaks Stop pump and recharge well

1300 Called PM to discuss whether to continue test or start

1300 Test post-poned until 2/25/14 on 2/25/14.

Equipment Used:
Generator and piping

Drop Off/Pick Ups: _____

Contractor Hours	~ 7.5 hrs	Field Hours	8.5 hrs	Mileage:
Copies To:		Project Manager	Robert Urban	
		Reviewed By:		



Field Report

Date: 2/25/2014
Project: Northstar
Project No. 28910240 Task No. 30000
Location: Mendota, CA
Weather: Sunny warm Temperature: 65-75°
Client:
Contractor: Bradley & Sons
URS Representative(s): Justin Brander & Jeff Garrow

URS Corporation
2625 South Miller Street, Suite 104
Santa Maria, CA 93455

Scope of Work: Step drawdown test
 Demolition Assessment Remediation

Page 1 of

0645 Arrive onsite to conduct step drawdown aquifer test on well N10.
0708 Wayne (Bradley & Sons) onsite
0715-0730 Health & Safety meeting
0730-0915 - Set transducers in wells N10 and W07
- Set up generator, control panel and wiring.
N10 DTW @ 0717 = 264.68'
- Used 3" transducer due to original tangled with pump wiring in well at depth (~200'±)
0925 Start step test: 10 gpm for 1hr
20 gpm for 1.5 hr
30 gpm for 1.5 hr
* 32 gpm for 1.5 hr * Max pump discharge rate
1345 Water truck unable to empty Baker tank today. Overflow valve was opened to drain ~7000 gallons into field. Energy dissipater was used and soil was not disturbed
1500 Test ended

Equipment Used:
Drop Oil/Pick Ups:
Contractor Hours: Field Hours: Mileage:
Copies To: Project Manager:
Reviewed By:

**Field Report**

Date 2/26/2014
Project Northstar
Project No. 28910240 Task No. 30000
Location Mendota, CA
Weather Overcast, rain expected Temperature 65°
Client:
Contractor Bradley & Sons
URS Representative(s) Jeff Gaines, Justin Brandon

URS Corporation
2825 South Miller Street, Suite 104
Santa Maria, CA 93455

Scope of Work: 24hr pump test
 Demolition Assessment Remediation

Page 1 of

0630 arriving onsite to conduct constant 24hr test on well N10.
0715 Wayne from Bradley & Sons onsite
0725-0735 Health & Safety Meeting - Change in site conditions
How rain will affect work/hazards
0800 Water truck onsite
0820 24hr Constant aquifer test starts
0930 water truck begins filling up. water truck filled up approximately 7 times (6.5-7 full tanks) from 0930-1700
1430 DTW @ N03 = 71.51' bblc - Upper aquifer does not appear to be affected by pump test conducted on the lower aquifer.
1640 Jeff Gaines offsite
2045-2245 Jeff Gaines onsite to collect groundwater measurements and check on site conditions during storm.
2130 Justin Brandon onsite w/ Robbie from Bradley & Sons (Robbie arrived at 1630)

Equipment Used: 25 KVA Generator & Panel for pump

Drop Off/Pick Ups:

Contractor Hours	Field Hours:	Mileage:
Copies To:	Project Manager:	
	Reviewed By:	

**Field Report**

Date 2/27/2014

Project: Northstar

Project No. 28910240

Task No. 30000

URS Corporation

2625 South Miller Street, Suite 104

Santa Maria, CA 93455

Location Mendota CA

Weather Partly Cloudy, warm

Temperature 60's

Client: First Solar

Scope of Work: 24hr Pump Test

 Demolition Assessment Remediation

Contractor Bradley & Sons Drilling

URS Representative(s) Justin Brandon / Jeff Coates

Page 1 of

0600 Arrive onsite to finish 24hr pump test

0645 Justin onsite

Spoke w/ Robbie from Bradley & Sons. No problems with the test equipment were reported overnight.

0620 - Continue collecting water level data with water level meter

0820 Test ended - start collecting rebound data

1000 Check transducer data

1045 Lock wells 001, N03 and N07

1100 Transducers removed

1230 Jeff Coates offsite

1300 - Pump and piping removed from N10.

Baker tanks left to slowly drain using outfall and energy dissipater.

Equipment Used:

Drop Off/Pick Ups:

Contractor Hours:

Field Hours:

Mileage:

Copies To:

Project Manager:

Reviewed By:

Appendix K

Land Use and Planning

Appendix K1, Consistency with Fresno County
General Plan

Appendix K2, Consistency with Fresno County's
Solar Facility Guidelines

Appendix K1

Consistency with Fresno County General Plan

APPENDIX K1

Consistency with Fresno County General Plan

K.1 Approach to Analysis

Pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), this analysis describes applicable general plans and regional plans and policies and the manner in which they apply to the Little Bear Solar Project (the Project), and then evaluates the consistency of the Project with these plans and policies. Each environmental resource section in Chapter 3, *Environmental Analysis*, identifies the applicable statutes, regulations, ordinances, plans, policies, and standards that pertain to that resource. The following analysis specifically addresses the Project's consistency with the Fresno County General Plan. The consistency analysis for other applicable plans, policies, and regulations is provided in the pertinent topical sections of Chapter 3, in the context of the subject resource area. **Table K1-1** provides an index of such discussions, listing both CEQA significance criteria and location in this document where the reader can find the impact evaluation.

The Fresno County General Plan contains seven policy elements that guide physical development within the County: Economic Development; Agriculture and Land Use; Transportation and Circulation; Public Facilities and Services; Open Space and Conservation; Health and Safety; and Housing. Consistent with CEQA Guidelines section 15125(d), General Plan policies that are not relevant to the Project are not discussed here. For example, policies guiding County review of specific plans or policies related to land use designations that are not present within the Project boundary are not addressed.

Because the policy language found in a general plan is susceptible to varying interpretations, it is often difficult to determine whether a proposed project is consistent or inconsistent with such policies. Furthermore, because plans often contain numerous policies emphasizing differing legislative goals, a project may be consistent with a general plan, taken as a whole, even though it may appear to be inconsistent with specific policies within the plan. The board or commission that enacted the plan or policy generally determines the meaning of such policies; these interpretations prevail if they are "reasonable," even though other reasonable interpretations may also exist. In light of these considerations, the consistency evaluation in this Draft EIR reflects the County's determination that, as a whole, that the Project is consistent with applicable plans and policies.¹ Finally, the Project is compared to policies in each of the General Plan elements.

¹ Direct and indirect physical impacts resulting from Project implementation are not addressed in this section, but in the appropriate technical sections of this Draft EIR (See Chapter 3, *Environmental Analysis*). Any conflict between the Project and General Plan policies that relates to physical environmental issues are discussed in Chapter 3. The compatibility of the Project with Fresno County General Plan policies that do not relate to physical environmental issues will be considered by decision-makers as part of their decision about whether to approve or deny the Project. Any potential conflicts identified as part of the process would not alter the physical environmental effects of the Project.

**TABLE K1-1
 CEQA SIGNIFICANCE CRITERIA REQUIRING EVALUATION OF
 CONSISTENCY WITH PLANS AND POLICIES**

Significance Criteria (from Appendix G of the CEQA Guidelines)	EIR Section
Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway	Section 3.2, <i>Aesthetics</i>
Conflict with existing zoning for agricultural use, or a Williamson Act contract	Section 3.3, <i>Agriculture and Forestry Resources</i>
Conflict with or obstruct implementation of the applicable air quality plan	Section 3.4, <i>Air Quality</i>
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance	Section 3.5, <i>Biological Resources</i>
Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	Section 3.5, <i>Biological Resources</i>
Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.	Section 3.9, <i>Greenhouse Gas Emissions</i>
Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	Section 3.12, <i>Land Use and Planning</i>
Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan	Section 3.13, <i>Mineral Resources</i>
Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	Section 3.14, <i>Noise and Acoustics</i>
Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	Section 3.18, <i>Transportation and Traffic</i>
Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	Section 3.18, <i>Transportation and Traffic</i>

Tables K1-2 through K1-6 summarizes the Project’s consistency with applicable objectives, goals, and policies of the Fresno County General Plan is discussed below. As shown in the table, after the implementation of the various mitigation measures identified in this Draft EIR, the Project would be consistent with applicable objectives, goals, and policies.

K.2 Consistency with the Fresno County General Plan Agriculture and Land Use Element

The Agriculture and Land Use Element describes the Countywide land use concept and is intended to help the County achieve integrated and coordinated land use, open space, and transportation by defining areas of intended growth and areas that should be preserved.

The Project site is zoned AE20, Exclusive Agricultural with a minimum lot size of 20 acres (Fresno County 2011). As indicated in Section 816 of the Fresno County Zoning Code, permitted uses in AE districts include raising livestock, poultry, and plant crops; single-family residences

and accessory and farm buildings; and other agricultural and home occupation uses. Electrical transmission and distribution substations are allowed in AE districts subject to director review and approval (Section 816.2(D)). Additionally, Fresno County processes PV solar facilities through the Unclassified Conditional Use Permit process based on Section 853.B(14) of the Zoning Ordinance. Although the Project would occupy land designated as agriculture, it would not conflict with the County’s preservation and conservation objectives. The Project’s physical environmental impacts on habitat, recreation, scenic values, mineral resource extraction, and natural resource preservation are discussed in Chapter 3 of this Draft EIR. **Table K1-2** evaluates the Project’s consistency with the Countywide agriculture and land use policies.

**TABLE K1-2
FRESNO COUNTY GENERAL PLAN AGRICULTURE AND LAND USE ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy LU-A.1: The County shall maintain agriculturally-designated areas for agriculture use and shall direct urban growth away from valuable agricultural lands to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available.</p>	<p>Consistent. The Project site is zoned AE20, Exclusive Agricultural. As indicated in Section 816.2(D) of the Fresno County Zoning Code, permitted uses in AE districts include electrical transmission and distribution.</p>
<p>Policy LU-A.2: The County shall allow by right in areas designated Agriculture activities related to the production of food and fiber and support uses incidental and secondary to the on-site agricultural operation. Uses listed in Table LU-3 are illustrative of the range of uses allowed in areas designated Agriculture.</p>	<p>Consistent. The Project site is zoned AE20, Exclusive Agricultural. As indicated in Section 816.2(D) of the Fresno County Zoning Code, permitted uses in AE districts include electrical transmission and distribution.</p>
<p>Policy LU-A.3: The County may allow by discretionary permit in areas designated Agriculture, special agricultural uses and agriculturally-related activities, including value added processing facilities, and certain non-agricultural uses listed in Table LU-3. Approval of these and similar uses in areas designated Agriculture shall be subject to the following applicable criteria:</p> <ol style="list-style-type: none"> a. The use shall provide a needed service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operational characteristics; b. The use should not be sited on productive agricultural lands if less productive land is available in the vicinity; c. The operational or physical characteristics of the use shall not have a detrimental impact on water resources or the use or management of surrounding properties within at least one-quarter (1/4) mile radius; d. A probable workforce should be located nearby or be readily available 	<p>Not applicable. Through the County’s review and approval of the five Unclassified Conditional Use Permit applications, the Project would be consistent with this policy. Section 2.6.2.2, <i>Alternative Sites</i>, describes why no other sites were considered for the Project including other degraded, impaired, or underutilized lands. The Project’s impacts to water resources are described in Section 3.11, <i>Hydrology and Water Quality</i>. The Project’s potential impacts to the management of surrounding properties is analyzed within each resource section. The availability of a local workforce is analyzed in Section 3.15, <i>Population and Housing</i>.</p>
<p>Policy LU-A.4: The County shall require that the recovery of mineral resources and the exploration and extraction of oil and natural gas in areas designated Agriculture comply with the Mineral Resources Section of the Open Space and Conservation Element.</p>	<p>Not Applicable. The Project does not include mineral resources recovery of oil and natural gas extraction.</p>
<p>Policy LU-A.5: The County shall allow the Agricultural Commercial (AC) center zone district to remain in areas designated Agriculture if the land was so zoned prior to September 20, 1990. Commercial uses legally established prior to that date shall be deemed conforming, but expansion or the addition of new commercial uses shall require a discretionary permit as provided in Policy LU-A.3.</p>	<p>Not Applicable. The Project site is zoned AE20, Exclusive Agricultural.</p>

TABLE K1-2 (CONTINUED)
FRESNO COUNTY GENERAL PLAN AGRICULTURE AND LAND USE ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy LU-A.6: The County shall maintain twenty (20) acres as the minimum permitted parcel size in areas designated Agriculture, except as provided in Policies LU-A.9, LUA. 10, and LU-A.11. The County may require parcel sizes larger than twenty (20) acres based on zoning, local agricultural conditions, and to help ensure the viability of agricultural operations.</p>	<p>Not Applicable. The Project does not include subdivision of land into smaller parcels.</p>
<p>Policy LU-A.7: The County shall generally deny requests to create parcels less than the minimum size specified in Policy LU-A.6 based on concerns that these parcels are less viable economic farming units, and that the resultant increase in residential density increases the potential for conflict with normal agricultural practices on adjacent parcels. Evidence that the affected parcel may be an uneconomic farming unit due to its current size, soil conditions, or other factors shall not alone be considered a sufficient basis to grant an exception. The decision-making body shall consider the negative incremental and cumulative effects such land divisions have on the agricultural community.</p>	<p>Not Applicable. The Project does not include subdivision of land into smaller parcels.</p>
<p>Policy LU-A.8: The County shall allow by right on each parcel designated Agriculture and zoned for agricultural use one (1) single family residential unit. One (1) additional single family residential unit shall be allowed for each twenty (20) acres in excess of twenty (20) acres where the required minimum parcel size is twenty (20) acres. One (1) additional single family residential unit shall be allowed for each forty (40) acres in excess of forty (40) acres where the required minimum parcel size is forty (40) acres. The County may, by discretionary permit, allow a second unit on parcels otherwise limited by this policy to a single unit.</p>	<p>Not Applicable. The Project does not propose any dwelling units.</p>
<p>Policy LU-A.9: The County may allow creation of homesite parcels smaller than the minimum parcel size required by Policy LU-A.6, if the parcel involved in the division is at least twenty (20) acres in size, subject to the following criteria: a. The minimum lot size shall be sixty thousand (60,000) square feet of gross area, except that a lesser area shall be permitted when the owner submits evidence satisfactory to the Health Officer that the soils meet the Water Quality Control Board Guidelines for liquid waste disposal, but in no event shall the lot be less than one (1) gross acre; and b. One of the following conditions exists: 1. A lot less than twenty (20) acres is required for financing construction of a residence to be owned and occupied by the owner of abutting property; or 2. The lot or lots to be created are intended for use by persons involved in the farming operation and related to the owner by adoption, blood, or marriage within the second degree of consanguinity, there is only one (1) lot per related person, and there is no more than one (1) gift lot per twenty (20) acres; or 3. The present owner owned the property prior to the date these policies were implemented and wishes to retain his/her homesite and sell the remaining acreage for agricultural purposes. Each homesite created pursuant to this policy shall reduce by one (1) the number of residential units otherwise authorized on the remainder parcel created from the original parcel. The remainder parcel shall be entitled to no less than one residential unit.</p>	<p>Not Applicable. The Project does not propose an agricultural commercial center.</p>
<p>Policy LU-A.10: The County may allow by discretionary permit creation of substandard lots when necessary for the development of an agricultural commercial center pursuant to Policy LU-A.3 or in conjunction with development within a designated commercial interchange within the Westside Freeway Corridor Overlay. Approval of such parcels shall take into consideration the proposed use of the property, surrounding uses, and the potential for abandonment of the planned commercial use at a future date. Appropriate conditions shall be applied to minimize adverse impacts on surrounding agricultural operations. Parcels for agricultural commercial centers shall in no case be less than one (1) gross acre.</p>	<p>Not Applicable. The Project does not propose an agricultural commercial center.</p>

TABLE K1-2 (CONTINUED)
FRESNO COUNTY GENERAL PLAN AGRICULTURE AND LAND USE ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy LU-A.11: The County may allow by discretionary permit creation of substandard size lots when such action is deemed necessary by the Board of Supervisors for the recovery of mineral resources and the exploration and extraction of oil and gas in accordance with the policies of Section OS-C, Mineral Resources, of the Open Space and Conservation Element. In no case shall such action result in creation of lots less than five (5) gross acres in size.</p>	<p>Not Applicable. The Project does not include mineral resources recovery of oil and natural gas extraction.</p>
<p>Policy LU-A.12: In adopting land uses policies, regulations and programs, the County shall seek to protect agricultural activities from encroachment of incompatible land uses.</p>	<p>Consistent. This policy is intended to guide the efficient use of land within the County. The General Plan acknowledges the need to provide the necessary infrastructure, services, and resources to accommodate planned growth. The Project would not be an inefficient use of land because it would not adversely affect the County's ability to direct growth into strategically located centers or existing developed areas; rather, it would be remotely located but would serve the County's anticipated growth.</p> <p>This Draft EIR represents the process of evaluating the Project's impacts to the environment, infrastructure, and services, and the County will consider its impacts to the economy when making decisions regarding approval or disapproval of the permit applications.</p>
<p>Policy LU-A.13: The County shall protect agricultural operations from conflicts with nonagricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations.</p>	<p>Consistent. The Project would maintain a buffer between the Project and adjacent agricultural operations and would implement a reclamation plan to return the site to a state of readiness for agricultural use after Project decommissioning. The Project would be subject to review as part of the UCUP process. Section 3.3, <i>Agriculture and Forestry Resources</i> discusses potential impacts to agricultural resources.</p>
<p>Policy LU-A.14: The County shall ensure that the review of discretionary permits includes an assessment of the conversion of productive agricultural land and that mitigation be required where appropriate.</p>	<p>Consistent. The Project site is zoned AE20, Exclusive Agricultural. As indicated in Section 816.2(D) of the Fresno County Zoning Code, permitted uses in AE districts include electrical transmission and distribution substations.</p>
<p>Policy LU-A.15: The County shall generally condition discretionary permits for residential development within or adjacent to agricultural areas upon the recording of a Right-to-Farm Notice, which is an acknowledgment that residents in the area should be prepared to accept the inconveniences and discomfort associated with normal farming activities and that an established agricultural operation shall not be considered a nuisance due to changes in the surrounding area.</p>	<p>Consistent. Although the Project does not include residential development, the Applicant would be required to record with the County recorder a Right-to-Farm Notice indicating that adjacent agricultural operations shall not become a nuisance due to the changed condition of the Project site.</p>
<p>Policy LU-A.16: The County should consider the use of agricultural land preservation programs that improve the competitive capabilities of farms and ranches, thereby ensuring long-term conservation of viable agricultural operations. Examples of programs to be considered should include: land trusts; conservation easements; dedication incentives; new and continued Williamson Act contracts; Farmland Security Act contracts; the California Farmland Conservancy Program Fund; agricultural education programs; zoning regulations; agricultural mitigation fee program; urban growth boundaries; transfer of development rights; purchase of development rights; and agricultural buffer policies.</p>	<p>Not Applicable. The Project does not conflict with the County's ability to establish agricultural preservation programs. The Project site is not under Williamson Act contract.</p>

**TABLE K1-2 (CONTINUED)
 FRESNO COUNTY GENERAL PLAN AGRICULTURE AND LAND USE ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy LU-A.17: The County shall accept California Land Conservation contracts on all designated agricultural land subject to location, acreage, and use limitations established by the County.</p>	<p>Not Applicable. The Project site is not under Williamson Act contract and project implementation would not conflict with the County's ability to review Williamson Act contracts.</p>
<p>Policy LU-A.18: The County shall encourage land improvement programs to increase soil productivity in areas containing lesser quality agricultural soils.</p>	<p>Not Applicable. The Project would not conflict with the County's ability to encourage land improvement programs.</p>
<p>Policy LU-A.19: The County shall encourage landowners to participate in programs that reduce soil erosion and increase soil productivity. To this end, the County shall promote coordination between the Natural Resources Conservation Service, Resource Conservation Districts, UC Cooperative Extension, and other agencies and organizations.</p>	<p>Consistent. Section 3.8, <i>Geology, Soils, and Paleontological Resources</i> includes an evaluation of potential erosion-related impacts, and associated mitigation. The Project would comply with a Construction General Permit, and implementation of a Stormwater Pollution Prevention Plan (SWPPP) would limit the impact of construction-related soil erosion by enacting best management practices (BMPs) to address sediment control and limit erosion, such as installation of silt fencing and implementation of temporary sediment disposal measures. Operation of the Project would not include activities that are likely to cause erosion. Following construction, the site would be replanted with a rangeland seed mix of grasses and forage crops if required.</p>
<p>Policy LU-A.20: Water Resources. The County shall adopt and support policies and programs that seek to protect and enhance surface water and groundwater resources critical to agriculture.</p>	<p>Generally Consistent. The impact of the Project on surface water quality would be less than significant, surface water movement and infiltration is not expected to change significantly. Additionally, the Project would have a less than significant impact on groundwater supplies and groundwater recharge.</p>
<p>Program LU-A.C: The County shall develop and implement guidelines for design and maintenance of buffers to be required when new non-agricultural uses are approved in agricultural areas. Buffer design and maintenance guidelines shall include, but not be limited to, the following:</p> <ol style="list-style-type: none"> a. Buffers shall be physically and biologically designed to avoid conflicts between agriculture and non-agricultural uses. b. Buffers shall be located on the parcel for which a permit is sought and shall protect the maximum amount of farmable land, c. Buffers generally shall consist of a physical separation between agricultural and non-agricultural uses. The appropriate width shall be determined on a site-by-site basis taking into account the type of existing agricultural uses, the nature of the proposed development, the natural features of the site, and any other factors that affect the specific situation. d. Appropriate types of land uses for buffers include compatible agriculture, open space and recreational uses such as parks and golf courses, industrial uses, and cemeteries. e. The County may condition its approval of a project on the ongoing maintenance of buffers. f. A homeowners' association or other appropriate entity shall be required to maintain buffers to control litter, fire hazards, pests, and other maintenance problems. g. Buffer restrictions may be removed if agricultural uses on all adjacent parcels have permanently ceased. (See Policy LU-A.16) 	<p>Consistent. A Pest Management Plan would be implemented to control the introduction or establishment of pests or weeds during Project activities. Implementation of this plan would prevent the Project site from becoming a nuisance to adjacent agricultural operations through the introduction of pests or weeds. Consistent with the Fresno County Solar Facility guidelines, the Project would include a sufficient buffer to minimize impacts of the operation to adjacent properties.</p>

TABLE K1-2 (CONTINUED)
FRESNO COUNTY GENERAL PLAN AGRICULTURE AND LAND USE ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
Program LU-A.E: The County shall continue to implement the County’s Right-to-Farm Ordinance, and will provide information to the local real estate industry to help make the public aware of the right-to-farm provisions in their area. (See Policy LU-A.15)	Consistent. Although the Project does not include residential development, the Applicant would be required to record with the County recorder a Right-to-Farm Notice indicating that adjacent agricultural operations shall not become a nuisance due to the changed condition of the Project site.
Policies LU-B.1 – LU-B.14	Not Applicable. The Project is not Located within the Westside Rangelands Area.
Policies LU-C.1 – LU-C.10	Not Applicable. The Project is not Located within the River Influence Areas.
Policies LU-D.1 – LU-D.7	Not Applicable. The Project is not Located within the Westside Freeway Corridor.
Policies LU-E.1 – LU-E.28	Not Applicable. The Project does not include Rural Residential development.
Policies LU-F.1 – LU-F.42	Not Applicable. The Project does not include Urban Transit, Residential, Commercial, or Industrial development.
Policies LU-G.1 – LU-G.23	Not Applicable. The Project is not Located within the incorporated or City fringe areas or an unincorporated community.

K.3 Consistency with Other Elements of the Fresno County General Plan

K.3.1 Transportation and Circulation Element

Fresno County’s General Plan includes policies regarding access and safety standards of roadway facilities, bike facilities, and public transit. Although the General Plan seeks to coordinate multiple forms of transportation, including cars, commercial vehicles, buses, transit, bicycles, and pedestrian traffic, the General Plan does not contain specific policies governing pedestrian traffic. Fresno County also has adopted a Regional Bicycle and Recreational Trails Master Plan (Fresno County, 2013) that addresses non-motorized transportation systems and identifies barriers to trails and bikeways.

The Project would not conflict with the objectives and policies of the Transportation and Circulation Element. As described in Section 3.18, *Transportation and Traffic*, no public transportation services or dedicated pedestrian or bicycle facilities are on roads that access the Project site, and neither State Route (SR) 33 nor other roadways that would be traveled by Project traffic are listed within the Transportation and Circulation Element as an “existing or planned bikeway.” The traffic generated by the Project would have a less than significant impact on levels of service on area roadways after the incorporation of Mitigation Measure 3.18-1, Traffic Management Plan, and Mitigation Measure 3.18-2, Temporary Traffic Signal. Similarly, the Project site would not introduce a barrier to non-motorized travel. Although the Project would not be located near mass transit services, it would not impede the future development of the types of

circulation systems envisioned by the General Plan because it would not occupy land that would be needed to create transportation corridors or result in any other long-term changes that would adversely affect transportation in the County.

Project consistency with specific Transportation and Circulation Element policies is presented in **Table K1-3** below.

**TABLE K1-3
 FRESNO COUNTY GENERAL PLAN TRANSPORTATION AND CIRCULATION ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy TR-A.3: The County shall require that new or modified access to property abutting a roadway and to intersecting roads conform to access specifications in the Circulation Diagram and Standards section. Exceptions to the access standards may be permitted in the manner and form prescribed in the Fresno County Zoning and Subdivision Ordinances, provided that the designed safety and operational characteristics of the existing and planned roadway facility will not be substantially diminished.</p>	<p>Consistent. Project related traffic would have a less than significant impact related to LOS standards of local roadways abutting the Project site after the implementation of Mitigation Measure 3.18-1 and 3.18-2. Design and construction of Project access road intersections with West California Avenue would conform with Fresno County standards (per General Plan Policies). Among the applicable requirements are rights-of-way and setback requirements.</p>
<p>Policy TR-A.5: The County shall require dedication of right-of-way or dedication and construction of planned road facilities as a condition of land development, and require an analysis of impacts of traffic from all land development projects including impacts from truck traffic. Each such project shall construct or fund improvements necessary to mitigate the effects of traffic from the project. The County may allow a project to fund a fair share of improvements that provide significant benefit to others through traffic impact fees.</p>	<p>Consistent. An assessment of potential traffic impacts, including truck traffic, is provided in Section 3.18.</p>
<p>Policy TR-A.8: The County shall ensure that land development that affects roadway use or operation or requires roadway access to plan, dedicate, and construct required improvements consistent with the criteria in the Circulation Diagram and Standards section of this element.</p>	<p>Consistent. Local access to the Project site is provided from multiple points along West California Avenue. This road primarily serves agriculturally-related traffic, with corresponding low existing traffic volumes.</p>

K.3.2 Public Facilities and Services Element

The Public Facilities and Services Element of the Fresno County General Plan contains goals, policies, and implementation program measures to ensure public facilities and services are adequately available and accessible in a timely fashion to serve new development. The Project’s impacts with respect to public services, including police, fire, and education services, are primarily addressed in Sections 3.16, *Public Services*, and 3.10, *Hazards and Hazardous Materials*. Project consistency with specific Public Facilities and Services Element policies is presented in **Table K1-4** below.

**TABLE K1-4
FRESNO COUNTY GENERAL PLAN PUBLIC FACILITIES AND SERVICES ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
Policy PF-C.3: To reduce demand on the County's groundwater resources, the County shall encourage the use of surface water to the maximum extent feasible.	Consistent. The Project would have a less than significant impact to groundwater resources. Groundwater extraction associated with construction, operation, and decommissioning would not cause substantial depletion of the groundwater basin. An analysis of the Project's impact to groundwater resources is provided in Section 3.11, <i>Hydrology and Water Quality</i> .
Policy PF-C.25: The County shall require that all new development within the County use water conservation technologies, methods, and practices as established by the County.	Consistent. The Project would comply with the Fresno County Water Conservation Ordinance (Effective October 30, 2014). The Project would comply with water conservation measures outlined in the ordinance, as necessary.
Policy PF-D.6: The County shall permit individual on-site sewage disposal systems on parcels that have the area, soils, and other characteristics that permit installation of such disposal facilities without threatening surface or groundwater quality or posing any other health hazards and where community sewer service is not available and cannot be provided.	Consistent. The Project would use portable restrooms or a septic system, which would be installed for sanitary facilities in the O&M building. If an in-ground septic system is constructed it would include a 750-gallon septic tank and an approximately 3,000 square foot leech field. Either the septic tank and leech field or portable restrooms would be installed and maintained in accordance with County and state requirements.
Policy PF-E.7: The County shall require new development to pay its fair share of the costs of Fresno County storm drainage and flood control improvements within unincorporated areas.	Consistent. The Project is not located in an area with an existing or planned stormwater drainage system. The Project's preliminary design includes detention basins to collect and treat runoff generated from the site prior to discharge offsite.
Policy PF-E.11: The County shall encourage project designs that minimize drainage concentrations and maintain, to the extent feasible, natural site drainage patterns.	Consistent. The Project would not substantially alter the existing drainage pattern of the area. The site has a gentle slope from west to east. The Project would be designed to minimize substantial alterations to drainage patterns on the Project site. Peak discharge volumes generated by the Project are expected to increase by 1.7 percent. The slight increase in runoff generated from the impervious surfaces would likely infiltrate into the ground over a short distance. Rain falling onto the solar arrays would drain onto the ground underneath, which would remain pervious.
Policy PF-E.13: The County shall encourage the use of natural storm water drainage systems to preserve and enhance natural drainage features.	Consistent. The Project is not located in an area with an existing or planned stormwater drainage system. The Project's preliminary design includes detention basins to collect and treat runoff generated from the site prior to discharge offsite.
Policy PF-E.14: The County shall encourage the use of retention-recharge basins for the conservation of water and the recharging of the groundwater supply.	Consistent. Runoff generated from the impervious surfaces would be minimal and likely infiltrate into the ground over a short distance. Rain falling onto the solar arrays would drain onto the ground underneath, which would remain pervious. The Project could include the construction of detention basins designed to collect and treat runoff generated from the site prior to discharge offsite.
Policy PF-E.21: The County shall require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities, and shall encourage the urban storm drainage systems and agricultural activities to use BMPs.	Consistent. None of the new impervious surfaces would be adjacent to or otherwise directly connected to a stream.
Policy PF-F.1: The County shall continue to promote maximum use of solid waste source reduction, reuse, recycling, composting, and environmentally-safe transformation of wastes.	Consistent. The Project would be required to comply with Fresno County's Construction and Demolition (C&D) Debris Recycling Program which requires a Waste Management Plan for recycling a minimum of 50 percent of all non-hazardous waste. Wooden construction waste would be sold, recycled, or chipped and spread on the Project site for weed control as appropriate. Other compostable materials, such as vegetation, might also be composted off-site. Operation and maintenance activities would produce negligible volumes of solid and liquid wastes that would be disposed of in accordance with all applicable requirements.

**TABLE K1-4 (CONTINUED)
 FRESNO COUNTY GENERAL PLAN PUBLIC FACILITIES AND SERVICES ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy PF-F.4: The County shall ensure that all new development complies with applicable provisions of the County Integrated Waste Management Plan.</p>	<p>Consistent. The Project would generate solid waste during construction, operation and maintenance, and decommissioning activities. All handling and processing of construction, demolition, and inert debris would be in accordance with applicable regulatory requirements. Landfill waste generated by the Project would not exceed its permitted daily tonnage or deplete substantial long-term capacity.</p>
<p>Policy PF-J.3: The County shall require all new residential development along with new urban commercial and industrial development to underground utility lines onsite.</p>	<p>Generally Consistent. The Project would include both underground and overhead interconnection and distribution lines.</p>
<p>Goal PF-G. To protect life and property by deterring crime and ensuring the prompt and efficient provision of law enforcement service and facility needs to meet the growing demand for police services associated with an increasing population.</p>	<p>Consistent. The Project would not conflict with the County's ability to provide efficient law enforcement services. Police protection primarily may be required for incidents such as the theft of construction equipment and/or vandalism of the Project. To ensure Facility security, offsite security personnel could be dispatched during nighttime hours or could be onsite. In addition, appropriate security measures would be implemented to ensure control of site access and minimize security risks.</p>
<p>Policy PF-G.2: The County shall strive to maintain a staffing ratio of two (2) sworn officers serving unincorporated residents per 1,000 residents served. (This count of officers includes all ranks of deputy sheriff personnel and excludes all support positions and all sworn officers serving county wide population interests such as bailiffs, and sworn officers serving contract cities and grant specific populations).</p>	<p>Consistent. The Project would not conflict with the County's ability to meet the desired staffing ratio; the Project would not result in new residents that could contribute to the demand for police services.</p>
<p>Policy PF-G.6: The County shall promote the incorporation of safe design features (e.g., lighting, adequate view from streets into parks) into new development by providing Sheriff Department review of development proposals.</p>	<p>Consistent. Nighttime lighting for site security or maintenance requirements would be directed downward and shielded to focus illumination on the desired work areas only, and to prevent light spillage onto adjacent properties.</p>
<p>Goal PF-H. To ensure the prompt and efficient provision of fire and emergency medical facility and service needs, to protect residents of and visitors to Fresno County from injury and loss of life, and to protect property from fire.</p>	<p>Consistent. Temporary construction- or decommissioning-related increases in demand on fire protection services would not affect the ability of Fresno County Fire Protection District (FCFPD) to respond to incidents within the recommended time periods. Operation personnel would not contribute to a significant population increase, and would not result in an increase to the demand for fire protection services or require new or altered facilities.</p>
<p>Policy PF-H.1: The County shall work cooperatively with local fire protection districts to ensure the provision of effective fire and emergency medical services to unincorporated areas within the county.</p>	<p>Consistent. The Project would not conflict with the County's ability to provide effective emergency services. The Project would not result in new residents that could contribute to the demand for police services, and would incorporate onsite security measures.</p>
<p>Implementation Program PF-H.B: The County shall work with the California Department of Forestry and Fire Protection, local fire protection agencies, and city fire departments to maximize the use of resources to develop functional and/or operational consolidations and standardization of services and to maximize the efficient use of fire protection resources. (See Policy PF-H.1).</p>	<p>Consistent. The Project would not affect the County's ability to develop interagency coordination.</p>

TABLE K1-4 (CONTINUED)
FRESNO COUNTY GENERAL PLAN PUBLIC FACILITIES AND SERVICES ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy PF-H.2: Prior to the approval of development projects, the County shall determine the need for fire protection services. New development in unincorporated areas of the County shall not be approved unless adequate fire protection facilities are provided.</p>	<p>Consistent. Increases in long-term demand for fire protection services typically are associated with substantial increases in population. Once operational, up to 8 permanent staff (FTE) could be on the site at any one time which would not contribute to a significant population increase, and would not result in an increase to the demand for fire protection services or require new or altered facilities.</p>
<p>Policy PF-H.5: The County shall require that new development be designed to maximize safety and minimize fire hazard risks to life and property.</p>	<p>Consistent. Section 3.10 includes an evaluation of potential fire hazards. The Project is not located in a zone of very high fire severity hazard as defined by CAL FIRE. Regardless, best management practice/ fire prevention measures would be implemented to minimize fire risk.</p>
<p>Policy PF-H.8: The County shall encourage local fire protection agencies in the County to maintain the following as minimum standards for average first alarm response times to emergency calls:</p> <ul style="list-style-type: none"> a. 5 minutes in urban areas; b. 15 minutes in suburban areas; and c. 20 minutes in rural areas. 	<p>Consistent. Temporary construction- or decommissioning-related increases in demand on fire protection services would not affect the FCFPD's ability to respond to incidents within the recommended time periods.</p>
<p>Policy PF-H.10: The County shall ensure that all proposed developments are reviewed for compliance with fire safety standards by responsible local fire agencies per the Uniform Fire Code and other State and local ordinances.</p>	<p>Consistent. Section 3.10 includes an evaluation of potential fire hazards. The Project is not located in a zone of very high fire severity hazard as defined by CAL FIRE. Regardless, best management practice/ fire prevention measures would be implemented in order to minimize fire risk.</p>
<p>Policy PF-H.11: The County shall encourage local fire protection agencies to provide and maintain advanced levels of emergency medical services (EMS) to the public, consistent with current practice.</p>	<p>Consistent. The Project would not affect emergency response agencies' ability to provide and maintain advanced emergency services. Construction and operation would not require road closures that could affect emergency routes.</p>
<p>Goal PF-I. To provide for the educational needs of Fresno County and provide libraries for the educational, recreational, and literary needs of Fresno County residents.</p>	<p>Consistent. No residences are proposed as part of the Project, so it would not generate a demand for new school facilities, nor require the alteration of existing school facilities.</p>
<p>Policy PF-I.1: The County shall encourage school districts to provide quality educational facilities to accommodate projected student growth in locations consistent with land use policies of the General Plan.</p>	<p>Consistent. No residences are proposed as part of the Project, so it would not generate a demand for new school facilities, nor require the alteration of existing school facilities.</p>
<p>Policy PF-I.4: The County shall work cooperatively with school districts in monitoring housing, population, and school enrollment trends and in planning for future school facility needs and shall assist school districts in locating appropriate sites for new schools.</p>	<p>Consistent. No residences are proposed as part of the Project, so it would not generate a demand for new school facilities, nor require the alteration of existing school facilities.</p>

K.3.3 Open Space and Conservation Element

This purpose of this element is to guide the conservation, preservation, and/or development of open space and natural resources, including biological, cultural, mineral, and scenic resources. The Project's impacts with respect to species and habitat preservation, mineral resource extraction, and aesthetics are primarily addressed in Sections 3.2, *Aesthetics*, 3.5, *Biological Resources*, 3.6, *Cultural Resources*, and 3.13, *Mineral Resources*. The Project site intermittently has been

cultivated for agricultural use for at least the past 10 years; no naturally occurring plant communities are present. The physical environmental impacts of the Project are described throughout the Draft EIR. Generally speaking, the Project would not contribute substantially to the degradation of natural resources after the implementation of mitigation measures. It would provide a source of renewable energy for use within California, increasing the productive capacity of the land while avoiding the types of pollution traditionally associated with fossil fuel energy sources.

The Open Space and Conservation Element of the Fresno County General Plan also evaluates the scenic resources of Fresno County and provides policies intended to protect the scenic resources of the County and ensure that development enhances those resources through various measures including identification, development review, acquisition, and other methods. The Project site has not been identified as a scenic resource. The Fresno County General Plan also includes policies intended to protect scenic resources along roadways of the County by identifying, developing, and maintaining scenic amenities along roads and highways in the County and ensuring that development enhances those resources. According to Policy OS-L.1, Fresno County has designated a system of scenic roadways that includes landscaped drives, scenic drives, and scenic highways. According to this element, the only designated scenic roadway in the vicinity of the Project site is Interstate 5 (13 miles west of the Project), which is designated as a scenic highway.

Project consistency with specific Open Space and Conservation Element policies is presented in **Table K1-5** below.

**TABLE K1-5
 FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy OS-A.25: The County shall minimize sedimentation and erosion through control of grading, cutting of trees, removal of vegetation, placement of roads and bridges, and use of off-road vehicles. The County shall discourage grading activities during the rainy season unless adequately mitigated to avoid sedimentation of creeks and damage to riparian habitat.</p>	<p>Consistent. Section 3.8, <i>Geology, Soils, and Paleontological Resources</i>, includes an evaluation of potential erosion-related impacts and associated mitigation. The Project would comply with a Construction General Permit, and implementation of a SWPPP would limit the impact of construction-related soil erosion by enacting BMPs to address sediment control and limit erosion, such as installation of silt fencing and implementation of temporary sediment disposal measures. Operation of the Project would not include activities that are likely to cause erosion. Following construction, the site could be replanted with low-growing plant species appropriate for maintaining soil quality. The Project does not include tree removal or construction in creeks or riparian areas.</p>
<p>Policy OS-A.26: The County shall continue to require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities and urban runoff.</p>	<p>Consistent. The new impervious surfaces would not be adjacent to or otherwise directly connected to a distinct drainage channel. Section 3.8, <i>Geology, Soils, and Paleontological Resources</i>, includes an evaluation of potential erosion-related impacts. The Project would comply with a Construction General Permit, and implementation of a SWPPP would limit the impact of construction-related soil erosion by enacting BMPs to address sediment control and limit erosion, such as installation of silt fencing and implementation of temporary sediment disposal measures. Operation of the Project would not include activities that are likely to cause erosion. Following construction, the site could be replanted with low-growing plant species appropriate for maintaining soil quality. The Project does not include tree removal or construction in creeks or riparian areas.</p>

TABLE K1-5 (CONTINUED)
FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>OS-C.1: Incompatible Mining Uses. The County shall not permit incompatible land uses within the impact area of existing or potential surface mining areas.</p>	<p>Consistent. There is no current surface mining onsite. There is no indication or evidence that the clay, silt, and sand present on the Project site would be suitable for aggregate production of statewide or regional significance. Aggregate resources are widely available throughout the region and neither the SMGB nor Fresno County has officially designated the area as an aggregate resource area or mineral deposit of statewide or regional significance.</p>
<p>OS-C.2: Mineral Resource Zones. The County shall not permit land uses incompatible with mineral resource recovery within areas designated as Mineral Resource Zone 2 (MRZ-2).</p>	<p>Consistent. The Project site is not within an MRZ with adequate information of significant mineral deposits</p>
<p>OS-C.7: Mining Buffers. The County shall require that new non-mining land uses adjacent to existing mining operations be designed to provide a buffer between the new development and the mining operations. The buffer distance shall be based on an evaluation of noise, aesthetics, drainage, operating conditions, biological resources, topography, lighting, traffic, operating hours, and air quality.</p>	<p>Consistent. There are no active mining claims within 25 miles of the Project site, nor is there any locatable mineral extraction activity within the Project site boundary.</p>
<p>OS-C.10: Mineral Resource Lands Protection. The County shall not permit land uses that threaten the future availability of mineral resource or prelude future extraction of those resources.</p>	<p>Consistent. There is no current surface mining onsite. There is no indication or evidence that the materials present on the Project site would be suitable for aggregate production of statewide or regional significance. Neither the SMGB nor Fresno County has officially designated the area as an aggregate resource area or mineral deposit of statewide or regional significance.</p>
<p>OS-C.12: New Development Compatibility. The County shall ensure that new discretionary land use developments are compatible with existing and potential surface mining areas and operations as identified on the Mineral Resource Zone Maps prepared by the State Division of Mines and Geology and other mineral resource areas identified by the County.</p>	<p>Consistent. The Project site is not within an MRZ that has adequate information of significant mineral deposits. There are no active mining claims within 25 miles of the Project site, nor is there any locatable mineral activity within the Project site boundary.</p>
<p>OS-C.13: Oil and Gas Regulation Areas. Fresno County shall be divided into three areas for the regulation of oil and gas development.</p> <ul style="list-style-type: none"> A) Urban areas including all land within one- fourth mile of the planned urban boundaries shown on adopted community plans. B) Established oil and gas fields as determined and updated by the California Division of Oil and Gas, excluding urban areas except where specifically included in these policies. C) Non-urban areas including all land not within either established oil and gas fields or urban areas. 	<p>Consistent. The California Division of Oil, Gas, and Geothermal Resources (DOGGR) indicates that no oil, gas, or geothermal resources are present within the Project site (DOGGR 2018). Six oil and gas wells did exist on the Project site but all have been plugged and abandoned, for the majority of these wells, closure and abandonment occurred nearly 30 years ago (DOGGR 2018).</p>
<p>Policy OS-E.1: The County shall support efforts to avoid the "net" loss of important wildlife habitat where practicable. In cases where habitat loss cannot be avoided, the County shall impose adequate mitigation for the loss of wildlife habitat that is critical to supporting special-status species and/or other valuable or unique wildlife resources. Mitigation shall be at sufficient ratios to replace the function, and value of the habitat that was removed or degraded. Mitigation may be achieved through any combination of creation, restoration, conservation easements, and/or mitigation banking. Conservation easements should include provisions for maintenance and management in perpetuity. The County shall recommend coordination with the U.S. Fish</p>	<p>Consistent. The Project site does contain potentially suitable migratory corridors and breeding or nesting habitat for wildlife species, including San Joaquin kit fox; burrowing owls and other raptors, including Swainson's hawk, red-tailed hawk, and American kestrel; and migratory birds. The site does not include suitable foraging habitat. Implementation of Mitigation Measures 3.5-1 through 3.5-5, including preconstruction nesting bird surveys, would prevent potential impacts to these species. The Project Applicant would provide Worker Environmental Awareness Training, pre-construction surveys, develop a Bird Conservation Strategy, monitor ground disturbing activities, restrict project activities to designated staging and access areas, cover exposed trenches and pipes to prevent entrapment, impose speed limits onsite, and use wildlife-friendly fencing.</p>

TABLE K1-5 (CONTINUED)
FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>and Wildlife Service and the California Department of Fish and Game to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed. Important habitat and habitat components include nesting, breeding, and foraging areas, important spawning grounds, migratory routes, migratory stopover areas, oak woodlands, vernal pools, wildlife movement corridors, and other unique wildlife habitats (e.g., alkali scrub) critical to protecting and sustaining wildlife populations.</p>	
<p>Policy OS-E.2: The County shall require adequate buffer zones between construction activities and significant wildlife resources, including both on-site habitats that are purposely avoided and significant habitats that are adjacent to the project site, in order to avoid the degradation and disruption of critical life cycle activities such as breeding and feeding. The width of the buffer zone should vary depending on the location, species, etc. A final determination shall be made based on informal consultation with the U.S. Fish and Wildlife Service and/or the California Department of Fish and Game.</p>	<p>Consistent. Several special-status species were identified that have the potential to winter or nest on the Project site: San Joaquin kit fox, burrowing owl, ferruginous hawk, northern harrier, California horned lark, and loggerhead shrike. Preconstruction clearance surveys and other minimization measures as described in Mitigation Measures 3.5-1 through 3.5-5 would ensure that no birds or San Joaquin kit fox are impacted during construction.</p>
<p>Policy OS-E.3: The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the value of the habitat for wildlife is maintained.</p>	<p>Consistent. The Project site does contain potentially suitable migratory corridors and breeding or nesting habitat for wildlife species, including San Joaquin kit fox; burrowing owls and other raptors, including Swainson's hawk, red-tailed hawk, and American kestrel; and migratory birds. The site does not include suitable foraging habitat. Implementation of Mitigation Measures 3.5-1 through 3.5-5, including preconstruction nesting bird surveys, would prevent potential impacts to these species. The Project Applicant would provide Worker Environmental Awareness Training, pre-construction surveys, develop a Bird Conservation Strategy, monitor ground disturbing activities, restrict project activities to designated staging and access areas, cover exposed trenches and pipes to prevent entrapment, impose speed limits onsite, and use wildlife-friendly fencing.</p>
<p>Policy OS-E.4: The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.</p>	<p>Consistent. The Project Applicant would provide Worker Environmental Awareness training, pre-construction surveys, develop a Bird Conservation Strategy, monitor ground disturbing activities, restrict project activities to designated staging and access areas, cover exposed trenches and pipes to prevent entrapment, impose speed limits onsite, and use wildlife-friendly fencing.</p>
<p>Policy OS-E.6: The County shall ensure the conservation of large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife populations, as long as this preservation does not threaten the economic well-being of the County.</p>	<p>Consistent. This Project does not conflict with the County's ability to implement land conservation.</p>
<p>Policy OS-E.9: Prior to approval of discretionary development permits, the County shall require, as part of any required environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant resources and/or special-status plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible mitigation measures or indicate why mitigation is not feasible.</p>	<p>Consistent. Section 3.5 contains an analysis of potential impacts to biological resources. The analysis presented in this section is based on a review of relevant literature, field reconnaissance surveys, and focused biological surveys. It also relies upon a Biological Technical Report prepared by Dudek (2017), which documents existing conditions and the findings of various biological surveys on the Project site and in the surrounding vicinity.</p>

TABLE K1-5 (CONTINUED)
FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
Policy OS-E.10: The County shall support State and Federal programs to acquire significant fish and wildlife habitat areas for permanent protection and/or passive recreation use.	Not Applicable. The Project would not conflict with the County's ability to support programs.
Policy OS-E.16: The County should preserve, to the maximum extent practicable, significant wildlife migration routes such as the North Kings Deer Herd migration corridors and fawn production areas.	Consistent. Potential Impacts to migration routes are described in Section 3.5, <i>Biological Resources</i> . The Project site is within the Pacific Flyway, a significant avian migration route. The Mendota Wildlife Area, located approximately 2.5 miles east of the Project site, is a recognized stopover location for migratory birds travelling along the Pacific Flyway. The Project would not physically affect the Pacific Flyway. There are no other important migratory routes, corridors, or wildlife nursery sites near the Project site.
Policy OS-E.18: The County should preserve, to the maximum possible extent, areas defined as habitats for rare or endangered animal and plant species in a natural state consistent with State and Federal endangered species laws.	Consistent. There is potential habitat for burrowing owl, nesting raptors, and San Joaquin kit fox; however, pre-construction surveys will ensure nesting areas are avoided.
Policy OS-E.19: The County should preserve areas identified as habitats for rare or endangered plant and animal species primarily through the use of open space easements and appropriate zoning that restrict development in these sensitive areas.	Consistent. The Project site is zoned AE20, Exclusive Agricultural.
Policy OS-F.5: The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. The County shall require, as part of the environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based on field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant plant resources and/or special-status plant species. Such evaluation shall consider the potential for significant impact on these resources and shall either identify feasible mitigation measures or indicate why mitigation is not feasible.	Consistent. Habitat types that could support special-status plants were not identified onsite. Based on the lack of suitably moist habitats, the lack of suitable soils, and ongoing agricultural activities, no special status plant species are expected to occur onsite.
Policy OS-F.7: The County should encourage landowners to maintain natural vegetation or plant suitable vegetation along fence lines, drainage and irrigation ditches and on unused or marginal land for the benefit of wildlife.	Consistent. The Project site does not currently have natural vegetation and the Project does not include the planting of vegetation. Project reclamation would include revegetation using rangeland seed grasses.
Policy OS-G.12: The County shall continue, through its land use planning processes, to avoid inappropriate location of residential uses and sensitive receptors in relation to uses that include but are not limited to industrial and manufacturing uses and any other use which have the potential for creating a hazardous or nuisance effect.	Consistent. The nearest sensitive receptors to the Project site are scattered rural residential land uses, including a residential structure 3,850 feet west of the Project site. Based on the results of a health risk assessment, the predicted worst case increase in cancer risk is below the San Joaquin Valley Air Pollution Control District (SJVAPCD) threshold. The Project would not be a significant source of criteria pollutant emissions or fugitive dust during operation and maintenance. With implementation of Mitigation Measure 3.4-2 and 4.4-1b, impacts to sensitive receptors would be less than significant during construction, operation and maintenance, and decommissioning.
Policy OS-G.13: The County shall include fugitive dust control measures as a requirement for subdivision maps, site plans, and grading permits. This will assist in implementing the SJVUAPCD's particulate matter of less than ten (10) microns (PM ₁₀) regulation (Regulation VIII). Enforcement actions can be coordinated with the Air District's Compliance Division.	Consistent. The Applicant would implement Mitigation Measure 3.4-2 to address fugitive dust. The Applicant would submit a Fugitive Dust Control Plan to the SJVAPCD for review and approval. The Dust Control Plan shall meet the requirements in Rule 8021-1 and incorporate the Regulation VIII recommended fugitive dust control measures to reduce PM ₁₀ emissions to the extent practical.

TABLE K1-5 (CONTINUED)
FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy OS-G.14: The County shall require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.</p>	<p>Consistent. All disturbed areas, including storage piles, which are not being actively used for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. Additional measures are included in Mitigation Measure 3.4-2.</p>
<p>Policy OS-G.15: The County shall continue to work to reduce PM₁₀ and PM_{2.5} emissions from County-maintained roads by considering shoulder treatments for dust control as part of road reconstruction projects.</p>	<p>Consistent. The Project does not involve road reconstruction. Construction and operation of the Project will be implemented in compliance with SJVAPCD's Regulation VIII, Fugitive PM₁₀ Prohibitions and the 2008 and 2013 PM_{2.5} Plan.</p>
<p>Policy OS-H.2: The County shall strive to maintain a standard of five (5) to eight (8) acres of County-owned improved parkland per one thousand (1,000) residents in the unincorporated areas.</p>	<p>Consistent. The Project would not be located on designated parkland, affect the amount of County-owned parkland, nor result in population growth within Fresno County. Therefore the Project would not conflict with the County's ability to maintain the parkland ratio established in this policy.</p>
<p>Goal OS-J: To identify, protect, and enhance Fresno County's important historical, archeological, paleontological, geological, and cultural sites and their contributing environment, and promote and encourage preservation, restoration, and rehabilitation of Fresno County's historically significant resources in order to promote historical awareness, community identify, and to recognize the County's valued assets that have contributed to past County events, trends, styles of architecture, and economy.</p>	<p>Consistent. The Project would not conflict with the County's ability to protect cultural resources because the Project would not affect cultural resources. No cultural resources previously have been recorded within 1 mile of the Project site. There are no historic structures remaining on the Project site.</p>
<p>Policy OS-J.1: Preservation of Historic Resources. The County shall encourage preservation of any sites and/or buildings identified as having historical significance pursuant to the list maintained by the Fresno County Historic Landmarks and Records Advisory Commission.</p>	<p>Consistent. The Project would not impact preservation of historic sites or buildings. There are no historic structures remaining on the Project site.</p>
<p>Policy OS-J.2: Historic Resources Consideration. The County shall consider historic resources during preparation or evaluation of plans and discretionary development projects.</p>	<p>Consistent. Section 3.6 contains results of a records search and field survey for the County's consideration of the Project.</p>
<p>Policy OS-J.14: Sites Protection and Mitigation. The County shall require that discretionary development projects, as part of any required CEQA review, identify and protect important historical, archeological, paleontological, and cultural sites and their contributing environment from damage, destruction, and abuse to the maximum extent feasible. Project-level mitigation shall include accurate site surveys, consideration of project alternatives to preserve archeological and historic resources, and provision for resource recovery and preservation when displacement is unavoidable.</p>	<p>Consistent. Section 3.6 provides an evaluation of potential Project impacts to cultural, archaeological, and historic resources. Section 3.8 analyzes potential impacts to paleontological resources. To evaluate the Project's potential effects on significant cultural resources, including prehistoric and historic archaeological sites, a cultural resources characterization and evaluation of the Project site were undertaken (Dudek 2017, LSA 2015). These efforts included a literature review, a Native American contact program, geoarchaeological review, and field surveys for areas of potential permanent and temporary impacts where facilities would be installed. In the event that unknown archaeological resources are discovered during Project construction, the Applicant would implement Mitigation Measure 3.6-1, which requires the retention of a qualified archaeologist and cultural resources awareness training, and which governs procedures in the event of inadvertent discovery of archaeological materials.</p>
<p>Goal OS-K: To conserve, protect, and maintain the scenic quality of Fresno County and discourage development that degrades areas of scenic quality.</p>	<p>Consistent. Project facilities including fencing, solar panels, and substation would be visible and would transform the landscape from a residential/agriculture visual character to an industrial character. However, the Project would not block or impair any existing significant visual resources or significantly impact the local visual character.</p>

TABLE K1-5 (CONTINUED)
FRESNO COUNTY GENERAL PLAN OPEN SPACE AND CONSERVATION ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
Policy OS-K.1: The County shall encourage the preservation of outstanding scenic views, panoramas, and vistas wherever possible. Methods to achieve this may include encouraging private property owners to enter into open space easements for designated scenic areas.	Consistent. There are no designated scenic vistas within the viewshed of the entire Project site.
Policy OS-K.4: The County should require development adjacent to scenic areas, vistas, and roadways to incorporate natural features of the site and be developed to minimize impacts to the scenic qualities of the site.	Consistent. There are no designated scenic vistas within the viewshed of the entire Project site.
Goal OS-L: To conserve, protect, and maintain the scenic quality of land and landscape adjacent to scenic roads in Fresno County.	Consistent. There are no designated state scenic highways within the Project vicinity; nor roadways that are eligible for scenic designation within the Project viewshed.
Policy OS-L.1: The County designates a system of scenic roadways that includes landscaped drives, scenic drives, and scenic highways.	Consistent. There are no designated state scenic highways within the Project vicinity or roadways eligible for scenic designation within the Project viewshed.
Policy OS-L.3: The County shall manage the use of land adjacent to scenic drives and scenic highways based on the following principles: b. Proposed high voltage overhead transmission lines, transmission line towers, and cell towers shall be routed and placed to minimize detrimental effects on scenic amenities visible from the right-of-way.	Consistent. There are no designated state scenic highways or roadways eligible for scenic designation within the Project viewshed.

K.3.4 Health and Safety Element

The Health and Safety Element outlines Fresno County’s planning strategies regarding emergency management and response, fire hazards, flood hazards, seismic and geological hazards, airport hazards, hazardous materials, and noise. The Project’s impacts with respect to safety are primarily addressed in Section 3.8, *Geology, Soils, and Paleontological Resources*, Section 3.10, *Hazards and Hazardous Materials*, and Section 3.14, *Noise and Acoustics*. The design of the Project, as well as mitigation measures recommended in this Draft EIR, consider the potential seismic, soil instability, flood, fire, waste, and other hazards that are present in the Project area or that could result as a consequence of Project implementation. Although the Project would not avoid all hazards, even with Project consistency with specific Health and Safety Element policies is presented in **Table K1-6** below.

K.3.5 Housing Element

The Housing Element provides the County’s goals, policies, and programs for the development, improvement, and maintenance of housing within the unincorporated areas of the County. As described in Section 3.15, *Population and Housing*, the Project would not induce growth, nor would it displace people or housing. The Project does not propose or require new housing. This element is therefore not applicable to the Project.

**TABLE K1-6
 FRESNO COUNTY GENERAL PLAN HEALTH AND SAFETY ELEMENT POLICIES**

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy HS-B.1: The County shall review project proposals to identify potential fire hazards and to evaluate the effectiveness of preventive measures to reduce the risk to life and property.</p>	<p>Consistent. Section 3.10 includes an evaluation of potential fire hazards. The Project is not located in a zone of very high fire severity hazard as defined by CAL FIRE. Regardless, fire prevention measures would be implemented in order to minimize fire risk.</p>
<p>Policy HS-B.5: The County shall require development to have adequate access for fire and emergency vehicles and equipment.</p>	<p>Consistent. The Project site would be accessible to emergency vehicles.</p>
<p>Policy HS-B.8: The County shall refer development proposals in the unincorporated county to the appropriate local fire agencies for review of compliance with fire safety standards. If dual responsibility exists, both agencies shall review and comment relative to their area of responsibility. If standards are different or conflicting, the more stringent standards shall apply.</p>	<p>Consistent. The Applicant would coordinate as needed with the Fresno County Fire District to address potential exposure to fire and other hazards in the Project site and would incorporated any standards or requirements required by the district.</p>
<p>Policy HS-D.3: The County shall require that a soils engineering and geologic-seismic analysis be prepared by a California-registered engineer or engineering geologist prior to permitting development, including public infrastructure projects, in areas prone to geologic or seismic hazards (i.e., fault rupture, groundshaking, lateral spreading, lurchcracking, fault creep, liquefaction, subsidence, settlement, landslides, mudslides, unstable slopes, or avalanche).</p>	<p>Consistent. According to two geotechnical investigations prepared for the Project site (see Appendix H2), geologic hazards at the site are not significant. There is no risk of fault rupture, and the Project would not lead to significant impacts related to seismic ground shaking, liquefaction, erosion, or subsidence.</p>
<p>Policy HS-D.4: The County shall require all proposed structures, additions to structures, utilities, or public facilities situated within areas subject to geologic-seismic hazards as identified in the soils engineering and geologic-seismic analysis to be sited, designed, and constructed in accordance with applicable provisions of the Uniform Building Code (Title 24 of the California Code of Regulations) and other relevant professional standards to minimize or prevent damage or loss and to minimize the risk to public safety.</p>	<p>Consistent. Two site-specific soils engineering and geologic-seismic analysis have been prepared for the Project site (see Appendix H2). The Project would be constructed in compliance with the geotechnical and seismic design criteria required for construction in accordance with the California Building Code (CBC).</p>
<p>Policy HS-D.5: Pursuant to the Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code, Chapter 7.5), the County shall not permit any structure for human occupancy to be placed within designated Earthquake Fault Zones unless the specific provisions of the Act and Title 14 of the California Code of Regulations have been satisfied.</p>	<p>Consistent. While the Project site is not within a mapped Seismic Hazard Zone, the site may be subject to strong earthquake-related ground shaking at some point during the lifetime of the facility due to the potential for relatively large earthquakes to the south and west of the Project site. The Project would be constructed in compliance with the geotechnical and seismic design criteria required for construction in accordance with the CBC. The Project does not include structures for human occupancy.</p>
<p>Policy HS-D.8: The County shall require a soils report by a California-registered engineer or engineering geologist for any proposed development, including public infrastructure projects, that requires a County permit and is located in an area containing soils with high “expansive” or “shrink-swell” properties. Development in such areas shall be prohibited unless suitable design and construction measures are incorporated to reduce the potential risks associated with these conditions.</p>	<p>Consistent. The geotechnical investigation indicated that soils present at the Project site have a moderate potential for expansion. The Project would be required to comply with applicable building codes and structural improvements which would address any expansive soil hazards.</p>

TABLE K1-6 (CONTINUED)
FRESNO COUNTY GENERAL PLAN HEALTH AND SAFETY ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy HS-D.9: The County shall seek to minimize soil erosion by maintaining compatible land uses, suitable building designs, and appropriate construction techniques. Contour grading, where feasible, and revegetation shall be required to mitigate the appearance of engineered slopes and to control erosion.</p>	<p>Consistent. The Project would comply with a Construction General Permit, and implementation of a SWPPP would limit the impact of construction-related soil erosion by enacting BMPs to address sediment control and limit erosion, such as installation of silt fencing and implementation of temporary sediment disposal measures. Operation of the Project would not include activities that are likely to cause erosion. Following construction, the site could be replanted with low-growing plant species appropriate for maintaining soil quality.</p>
<p>Goal HS-F: To minimize the risk of loss of life, injury, serious illness, and damage to property resulting from the use, transport, treatment, and disposal of hazardous materials and hazardous wastes.</p>	<p>Consistent. The use, storage, transport, and disposal of hazardous materials in connection with the Project would be carried out in accordance with federal, state, and local regulations. BMPs in the SWPPP would minimize the risk of hazardous materials leakage include: reporting of spills of hazardous materials to the appropriate regulatory entities; immediate cleanup of hazardous materials spills; and excavation and appropriate disposal of contaminated soils.</p>
<p>Policy HS-F.1: The County shall require that facilities that handle hazardous materials or hazardous wastes be designed, constructed, and operated in accordance with applicable hazardous materials and waste management laws and regulations.</p>	<p>Consistent. The use, storage, transport, and disposal of hazardous materials in connection with the Project would be carried out in accordance with federal, state, and local regulations.</p>
<p>Policy HS-F.3: The County, through its Hazardous Materials Incident Response Plan, shall coordinate and cooperate with emergency response agencies to ensure adequate Countywide response to hazardous materials incidents.</p>	<p>Consistent. As identified in Section 3.10, <i>Hazards and Hazardous Materials</i>, the Project would not interfere with emergency response plans or times.</p>
<p>Policy HS-G.1: The County shall require that all proposed development incorporate design elements necessary to minimize adverse noise impacts on surrounding land uses.</p>	<p>Consistent. Short-term construction and decommissioning activities would be exempt from the County's noise policies and standards because activities would occur between the hours of 6:00 a.m. and 9:00 p.m. on weekdays, or 7:00 a.m. and 9:00 p.m. on Saturdays and Sundays. If ESS HVAC equipment is required to operate in the nighttime hours, noise levels could exceed the County standards. Therefore, Mitigation Measure 3.14-1, which includes but is not limited to the following noise control techniques: locating the transformers with as much setback from the existing residential properties as possible, use of noise walls or equivalent sound attenuation devices, and the use of a transformer with special noise control specifications designed in a way to specifically achieve acceptable regulatory noise standards.</p>
<p>Policy HS-G.4: So that noise mitigation may be considered in the design of new projects, the County shall require an acoustical analysis as part of the environmental review process where:</p> <ul style="list-style-type: none"> a) Noise sensitive land uses are proposed in areas exposed to existing or projected noise levels that are "generally unacceptable" or higher according to the Chart HS-1: "Land Use Compatibility for Community Noise Environments;" b) Proposed projects are likely to produce noise levels exceeding the levels shown in the County's Noise Control Ordinance at existing or planned noise-sensitive uses. 	<p>Consistent. Section 3.14 includes an analysis of noise impacts associated with the Project.</p>

TABLE K1-6 (CONTINUED)
FRESNO COUNTY GENERAL PLAN HEALTH AND SAFETY ELEMENT POLICIES

Goal/Objective/Policy Text	Project Consistency Evaluation
<p>Policy HS-G.6: The County shall regulate construction-related noise to reduce impacts on adjacent uses in accordance with the County's Noise Control Ordinance.</p>	<p>Consistent. Short-term construction and decommissioning Project activities would be exempt from the County's noise policies and standards because activities would occur between the hours of 6:00 a.m. and 9:00 p.m. on weekdays, or 7:00 a.m. and 9:00 p.m. on Saturdays and Sundays.</p>
<p>Policy HS-G.8: The County shall evaluate the compatibility of proposed projects with existing and future noise levels through a comparison to Chart HS-1, "Land Use Compatibility for Community Noise Environments."</p>	<p>Consistent. With the incorporation of Mitigation Measure 3.14-1, the Project would not exceed County noise standards and would not have a significant impact to noise levels. Specifically, ambient noise levels are not expected to increase more than 5 dB above existing ambient noise levels. The use of ESS HVAC units could increase the impact to ambient noise. However, Mitigation Measure 3.14-1 would reduce the impact to less than significant.</p>

K.4 References

California Division of Oil, Gas, and Geothermal Resources (DOGGR), 2018. 2018 Resources Well Finder tool. <https://maps.conservation.ca.gov/doggr/wellfinder/#close>. Accessed March 21, 2018.

Dudek. 2017. Biological Technical Report for the Little Bear Solar Project. Fresno County, California. November.

Fresno County, 2013. Fresno County Regional Bicycle & Recreational Trails Master Plan. September 24, 2013. <http://www.co.fresno.ca.us/ViewDocument.aspx?id=50346>.

Fresno County, 2011. Fresno County Zoning Map.

Appendix K2

Consistency with Fresno County's Solar Facility Guidelines

APPENDIX K2

Consistency with Fresno County’s Solar Facility Guidelines

**TABLE K2-1
PROJECT CONSISTENCY WITH FRESNO COUNTY SOLAR FACILITY GUIDELINES**

Guideline	Consistency
1) Information shall be submitted regarding the historical agricultural operational/usage of the parcel including, specific crop type, for the last 10 years (if no agricultural operation in the last 10 years, specify when land was last in agricultural use).	Information regarding the historical agricultural operation of the Project site is provided in Section 3.3, <i>Agriculture and Forestry Resources</i> . A detailed 10-year crop history for the Project site was provided with the UCUP applications submitted in October 2016.
2) Information shall be submitted that identifies the source of water for the subject parcel (surface water from irrigation district, individual well(s), conjunctive system). If the source of water is via district delivery, the applicant shall submit information documenting the allocations received from the irrigation district and the actual disposition of the water (i.e., utilized on-site or moved to other locations) for the last 10 years. If an individual well system is used, provide production capacity of each well, water quality data and data regarding the existing water table depth.	Information regarding Project water sources is described in Section 2.5.3.1, <i>Water and Wastewater</i> , and Section 3.20, <i>Utilities and Service Systems</i> . A Water Supply Assessment and Water Supply Evaluation for the Project are provided in Appendix J.
3) Identify the current status of the parcel (Williamson Act Contract, Conservation Easement, retired land, etc.), the purpose of any easement and limitations of the parcel. The applicant shall submit a Title Report or Lot Book Guarantee for verification.	The current status of the parcels is detailed in Section 3.3, <i>Agriculture and Forestry Resources</i> . Title reports were provided as part of the Little Bear UCUP Applications submitted in October 2016.
4) Identify (with supporting data) the current soil type and mapping units of the parcel pursuant to the standards of the California State Department of Conservation and the Natural Resources Conservation Service,	Soil types found on the Project site are described in Section 3.8, <i>Geology, Soils and Paleontological Resources</i> . An analysis of Project site soils was included as part of the Little Bear UCUP applications.
5) List all proposed measures and improvements intended to create a buffer between the proposed solar facility and adjacent agricultural operations (detailed information must be shown on site-plan) and provide factual/technical data supporting the effectiveness of said proposed buffering measures,	Proposed buffers are described in Section 2.5, <i>Description of the Project</i> , in and Section 3.3, <i>Agriculture and Forestry Resources</i> .
6) Provide a Reclamation Plan detailing the lease life, timeline for removal of the improvements and specific measures to return the site to the agricultural capability prior to installation of solar improvements. If the project is approved, adequate financial security to the satisfaction of the County shall be provided to ensure site reclamation. Financial security can be in the form of a cash deposit to be placed in a trust account by the County with additional deposits required as needed to adjust for inflation and/or a Letter of Credit to be renewed every year to adjust for inflation.	The Reclamation Plan is described in Section 2.5.6, <i>Decommissioning and Site Reclamation</i> . A Preliminary Closure, Decommissioning, and Reclamation Plan for the Project is provided in Appendix B1. This analysis assumes the Applicant would provide appropriate financial security to ensure site reclamation.

TABLE K2-1 (CONTINUED)
PROJECT CONSISTENCY WITH FRESNO COUNTY SOLAR FACILITY GUIDELINES

Guideline	Consistency
7) Provide information documenting efforts to locate the proposed solar facility on non-agricultural lands and non-contracted parcels and detailed information explaining why the subject site was selected.	The evaluation of project alternatives is described in Section 2.6, <i>Description of Alternatives</i> .
8) Develop and submit a project site pest management plan to identify methods and frequency to manage weeds, insects, disease and vertebrate pests that may impact adjacent sites.	A Draft Pest Plan is provided in Appendix B2.
9) The applicant must acknowledge the County's Right to Farm Ordinance and shall be required to record a Right to Farm Notice prior to issuance of any permits. This shall be included as a recommended condition of approval of the land use entitlement.	The Applicants' Little Bear UCUP Applications submitted in October 2016 note that acknowledgement of the County's right to Farm Ordinance will be included as a condition of approval.
10) Note: The life of the approved land use permit will expire upon expiration of the initial life of the solar lease. If the solar lease is to be extended, approval of new land use permit will need to be obtained.	As described in Section 2.5.6, Decommissioning and Site Reclamation, if the solar lease were to be extended, the Project would apply for any new or amended permits required.
11) If the project is approved, the applicant shall make all reasonable efforts to establish a point of sale in Fresno County for equipment and construction related items necessary for the project.	The Applicant has committed to making a reasonable effort to establish a point of sale in Fresno County for equipment and construction related items necessary for the project.
12) If the project is approved, the applicant shall make all reasonable efforts to conduct local recruitment efforts and/or coordinate with employment agencies in an attempt to hire from the local workforce.	The Applicant would make a reasonable effort to hire from the local workforce by encouraging its Engineering, Procurement and Construction (EPC) contractors to provide hiring opportunities to qualified local personnel.
13) In addition to disclosing the number of trips in the required project Operational Statement, the applicant shall disclose the weight of the shipments anticipated to the site. If the project is approved, pursuant to the CEQA analysis and based upon the existing road conditions and the weight/frequency of shipments to the site, the applicant shall mitigate impacts to County roads.	Vehicle class data has been provided from which vehicle weights can be derived. See Section 3.18, <i>Transportation and Traffic</i> .
14) If the project is approved, the applicant shall make all reasonable efforts to purchase products and equipment from local (Fresno County) manufacturing facilities and/or vendors.	Where applicable, the Applicant would make a reasonable effort to purchase products and equipment from local manufacturers and vendors.

NOTE:

The life of the approved land use permit will expire upon expiration of the initial life of the solar lease. If the solar lease is to be extended, approval of new land use permit would need to be obtained.

Appendix L

Noise and Acoustics

**Acoustical Assessment Report
for the
Little Bear Solar Project
Fresno County, California**

Project Applicant:

**Little Bear Solar 1, LLC
Little Bear Solar 3, LLC
Little Bear Solar 4, LLC
Little Bear Solar 5, LLC
Little Bear Solar 6, LLC**

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SEPTEMBER 2017

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
dB	Decibel
dBA	A-weighted decibel
CEQA	California Environmental Quality Act
CNEL	community noise equivalent level
FHWA	Federal Highway Administration
I-5	Interstate 5
L _{eq}	equivalent sound level
L _{xx}	statistical noise level, where xx indicates a percentage of time
MW	megawatt
PPV	peak particle velocity
PV	photovoltaic
SR-33	State Route 33
VdB	velocity decibel

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1 INTRODUCTION

The Little Bear Solar Project (referred to hereafter as the “Project”) will consist of the development of a solar photovoltaic (PV) power-generating project on 1,288 acres of private agricultural lands in western Fresno County. As proposed, the Project is expected to have an electric generating capacity of approximately 180 megawatts (MW).

1.1 Purpose

This report is intended to provide a noise analysis of the construction and operation of the Project for purposes of environmental review under the California Environmental Quality Act (CEQA). The report includes evaluation of the potential noise impacts associated with construction and operation of the Project in regards to relevant local, state, and federal regulations and thresholds.

1.2 Project Location

The Project site is located in the San Joaquin Valley, approximately 13 miles east of Interstate 5 (I-5), approximately 2.5 miles southwest of the City of Mendota, and immediately west of State Route 33 (SR-33), in unincorporated Fresno County (see Figure 1). Specifically, the Project site is bounded by West California Avenue to the north, West Jensen Avenue to the south, San Bernardino Avenue to the west, and SR-33 to the east (See Figure 2).

The Project site is agricultural land that has been intermittently dry-farmed or lain fallow in recent years. Existing structures on the site include an approximately 5,000 square-foot metal storage shed with neighboring metal storage silos (approx. 2,500 sq. ft.) located on parcel 019-110-06ST, just east of S. Ohio Avenue that will be removed as part of Project construction.

Surrounding land uses include agriculture, the Federal Correctional Institution Mendota and the adjacent North Star Solar Project (60 MW). There are several residences in the area, the nearest of which is approximately 3,850 feet west of the Project site.

1.3 Project Description

The Project proposes to construct and operate an approximately 180 MW solar photovoltaic power generation facility on lands located near Mendota in unincorporated Fresno County, California. The Project will consist of up to five facilities; two 20 MW facilities, one 40 MW facility, and two 50 MW facilities. The Project will interconnect to the electrical grid at Pacific Gas and Electric’s (PG&E) Mendota Substation, located approximately two miles west of the Project site. The Project is expected to require 16 months to construct.

Acoustical Assessment Report for the Little Bear Solar Project

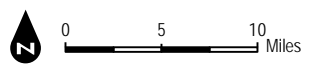
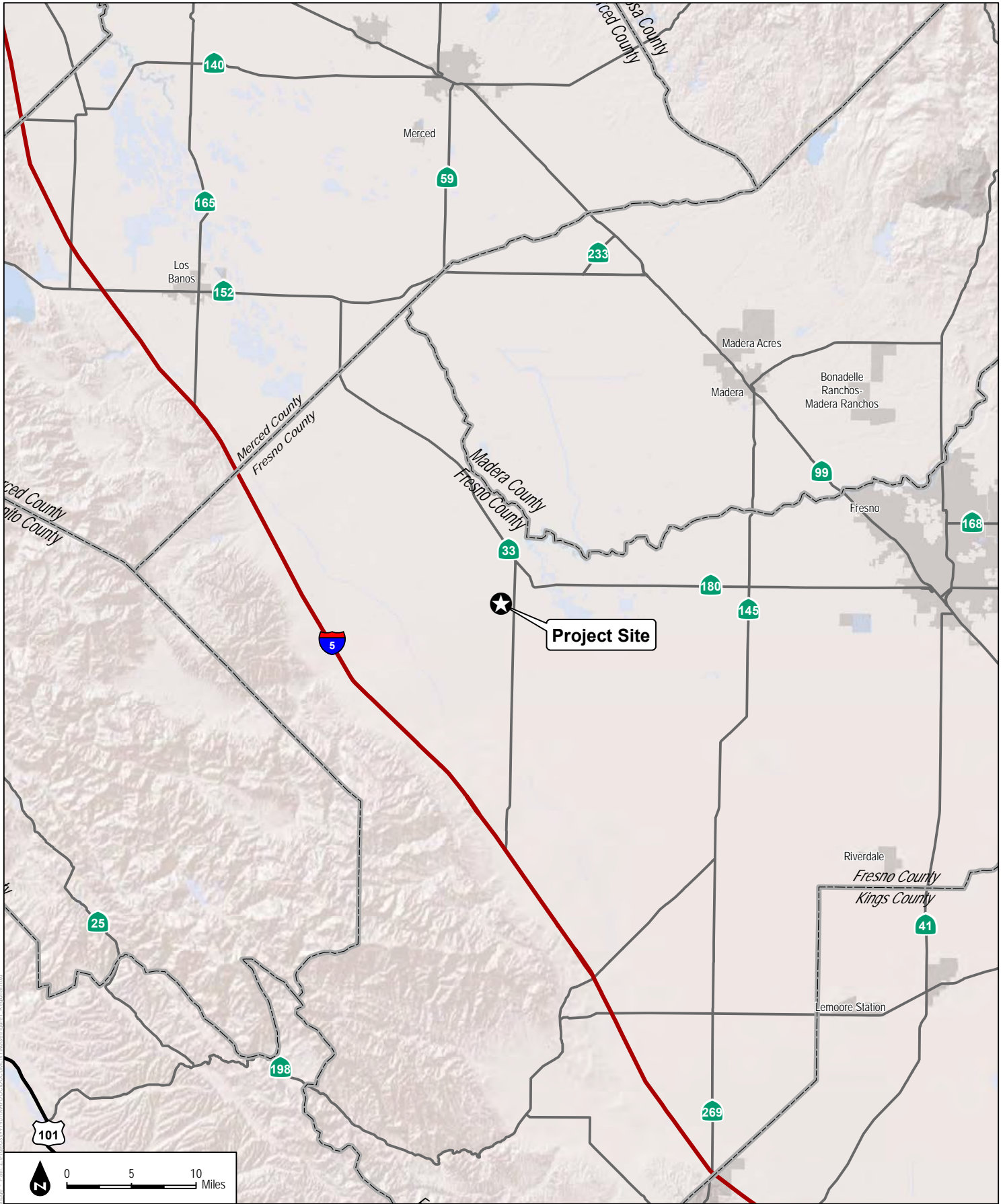
Each generation facility within the Project will include the following main elements: modular photovoltaic solar panels (either fixed-tilt or on single-axis trackers); direct current to alternating current power inverters mounted on concrete pads; three-phase transformers mounted on concrete pads that convert the output of each inverter to 34.5 kilovolts (kV), a 34.5 kV collection system either overhead or underground, a 34.5 kV to 115 kV substation, meteorology towers, security fencing and lighting and other on-site facilities as required. Earthen basins will be constructed to contain storm water runoff from the Project site. There will be a common control/administration building and parking lot that will be shared by each generation facility. Each generation facility may also optionally include an Energy Storage Systems (ESS) that will provide up to four hours of electrical storage. The ESS will be sited on an approximately one-acre area, in a separate outside rated enclosure and will consist of self-contained battery storage modules placed in racks, converters, switchboards, integrated heating, ventilation, and air conditioning (HVAC) units, inverters, transformers, and controls in prefabricated metal containers or in a building.

The Project will interconnect to the Mendota Substation using the existing 115 kV gen-tie line that interconnects with the North Star Solar Project. One generation facility will interconnect with the North Star gen-tie line by way of the North Star Solar Project switchyard. The remaining generation facilities will each connect to a new, approximately 1.25-mile 115 kV gen-tie line that will lead to the North Star gen-tie line and continue from that point to the Mendota Substation as a second electrical circuit added to the existing towers of the North Star gen-tie line.

The Project will have private perimeter roads and interior access ways for construction and operation. Perimeter roads and interior access ways are proposed to be composed of native compacted soil. The Project will have driveways connecting at up to ten points with local county roads.

Construction will generally occur during daylight hours, Monday through Friday. Non-daylight work hours and work on weekends may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid work during high ambient temperatures. Further, construction requirements will necessitate some nighttime activity for installation, service or electrical connection, inspection and testing activities.

Refer to Figure 3, Noise Monitoring Locations, for an aerial view of the site and the surrounding area.



SOURCE: ESRI Basemaps



Little Bear Solar Project Acoustical Assessment Report

FIGURE 1
Regional Location

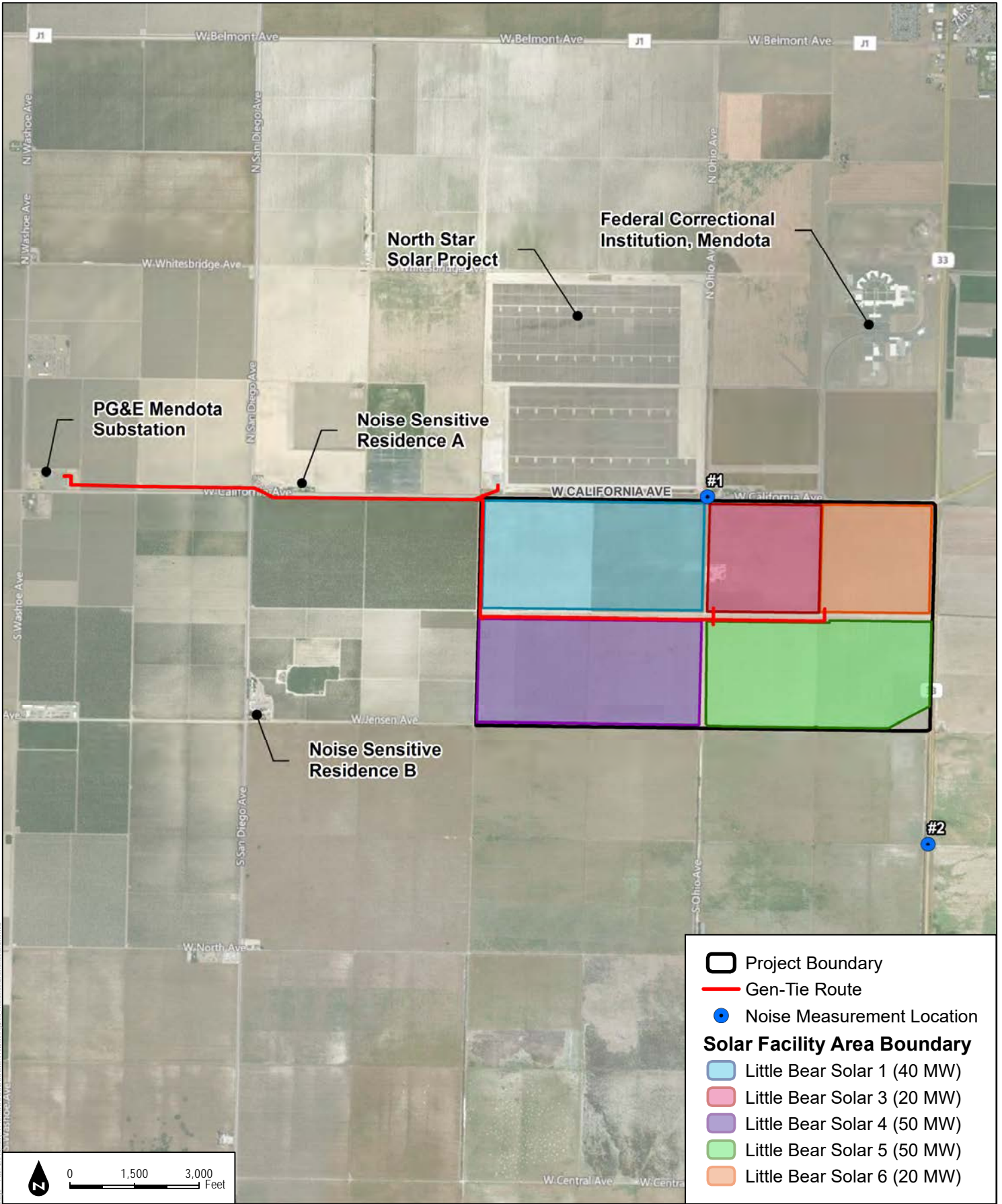
10/18/2017 11:14:30 AM - Little Bear Solar Project - Acoustical Assessment Report - Figure 1 - Regional Location - ESRI Basemaps

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- Project Boundary
- Gen-Tie Route
- Noise Measurement Location
- Solar Facility Area Boundary**
- Little Bear Solar 1 (40 MW)
- Little Bear Solar 3 (20 MW)
- Little Bear Solar 4 (50 MW)
- Little Bear Solar 5 (50 MW)
- Little Bear Solar 6 (20 MW)

0 1,500 3,000 Feet

SOURCE: Bing Maps (Accessed 2017)



FIGURE 3
Noise Monitoring Locations

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2 FUNDAMENTALS OF NOISE AND VIBRATION

The following is a brief discussion of fundamental noise concepts and basic terminology.

2.1 Sound, Noise, and Acoustics

Sound propagation is a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to propagate. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound transmitted. Finally, sound must reach a receiver; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is unpleasant, unexpected, or undesired.

2.2 Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.0000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).

2.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

Acoustical Assessment Report for the Little Bear Solar Project

The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
—	110	Rock band
Jet fly over at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quite urban, daytime	50	Large business office; dishwasher next room
Quite urban, nighttime	40	Theater; large conference room (background)
Quite suburban, nighttime	30	Library
Quite rural, nighttime	20	Bedroom at night; concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013

2.4 Human Response to Changes in Noise Levels

“It is generally accepted that the average healthy ear...can barely perceive a noise level change of 3 dB” (Caltrans 2013). A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice or half as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the average daily numbers of traffic on a road) would result in a barely perceptible change in sound level.

2.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical

Acoustical Assessment Report for the Little Bear Solar Project

energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a 1-hour period. Another common sound level metric is the statistical or percent level. Statistical levels are indicated by L_{xx} where xx is the percent of time a level was exceeded over the duration of the measurement interval. Table 2 shows statistical levels translated to number of minutes out of an hour-long measurement.

**Table 2
Cumulative Period to Statistical Level**

Cumulative Duration of Intrusive Sound	Statistical Level
Cumulative period of 30 minutes per hour	L_{50}
Cumulative period of 15 minutes per hour	L_{75}
Cumulative period of 5 minutes per hour	$L_{8.3}$
Cumulative period of 1 minute per hour	$L_{1.6}$
Level not to be exceeded for any time per hour	L_{max} or L_{peak}

People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7 p.m. to 10 p.m.) and nighttime hours (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during the evening and nighttime hours. The CNEL noise metric (or a similar noise metric the Day Night Level (L_{dn} ¹) is the basis for the County’s standards for mobile source noise such as traffic or rail noise.

2.6 Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by geometric spreading, ground absorption, atmospheric effects, and shielding by natural and/or built features. Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Atmospheric conditions such as humidity, temperature, and wind gradients can also temporarily alter sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects. Additional sound attenuation

¹ L_{dn} (also known as DNL) is comparable to CNEL, except that there is no evening component: the period from 7 a.m. to 10 p.m. is classified as daytime, and no adjustment to the noise levels is made during these hours; the period from 10 p.m. to 7 a.m. is classified as nighttime and 10 decibels is added to the hourly L_{eqs} occurring during these hours.

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can result from built features such as intervening walls and buildings, and by natural features such as hills and dense woods.

2.7 Groundborne Vibration Fundamentals

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration are peak particle velocity (PPV), in units of inches per second, and velocity decibel (VdB). The calculation to determine PPV at a given distance is as follows:

$$PPV_{\text{distance}} = PPV_{\text{ref}} * (25/D)^{1.5}$$

Where:

PPV_{equip} = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receiver

The vibration velocity parameter correlates well with human perception of vibration. Thus, the response of humans, buildings, and sensitive equipment to vibration is described in this section in terms of the root-mean square velocity level in VdB units relative to 1 micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). The calculation to determine the root-mean square at a given distance is as follows:

$$L_v(D) = L_v(25 \text{ feet}) - 30 * \log(D/25)$$

Where:

$L_v(D)$ = the vibration level at the receiver

$L_v(25 \text{ feet})$ = the reference source vibration level

D = the distance from the vibration activity to the receiver

Typical background vibration levels are between 50 and 60 VdB, and the level for minor cosmetic damage to fragile buildings or blasting generally begins at 100 VdB.

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3 REGULATORY SETTING

Federal

Federal Transit Administration Standards and Federal Railroad Administration Standards

Although the Federal Transit Administration (FTA) standards are intended for federally funded mass transit projects, the impact assessment procedures and criteria included in the FTA (2006) Transit Noise and Vibration Impact Assessment Manual are routinely used for projects under review by local jurisdictions that have not adopted their own vibration impact standards. The FTA and Federal Railroad Administration (FRA) have published guidelines for assessing the impacts of groundborne vibration associated with rail projects, which have been applied by other jurisdictions to other types of projects. The FTA measure of the threshold of architectural damage for conventional sensitive structures from groundborne vibration is 0.2 inches/second PPV or 94 VdB (re: 1micro –inch/second).

State

California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, finds that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of noise impact thresholds, which can include standards established in the local general plan or noise ordinance.

Local

Fresno County has two documents that address noise:

- The Code of Ordinances includes Chapter 8.40: Noise Control and
- The General Plan Update from 2000 includes Chapter 4.15: Noise

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County of Fresno Noise Ordinance

The County Noise Ordinance specifically lists “any affected single- or multiple-family residence, school, hospital, church or public library” as noise sensitive receptors. Table 3 summarizes maximum acceptable noise levels.

**Table 3
Fresno County Exterior Noise Level Standards**

Category	Cumulative Number of minutes in any one-hour time period	Noise Level Standards, dBA	
		Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

If existing measured ambient noise levels exceed the levels in Table 2, then the limit becomes the existing ambient level. A penalty of 5 dBA shall be given to simple tone noise, noises consisting primarily of speech or music, or for recurring impulsive noises.

The following activities are identified to be exempted from the provisions of this Noise Ordinance chapter:

- B. Any mechanical device, apparatus or equipment used, related to or connected with emergency activities or emergency work;
- C. Noise sources associated with construction, provided such activities do not take place before six a.m. or after nine p.m. on any day except Saturday or Sunday, or before seven a.m. or after five p.m. on Saturday or Sunday;
- G. Noise sources associated with work performed by private or public utilities in the maintenance or modification of its facilities;
- H. Noise sources associate with the drilling or redrilling of petroleum, gas, injection or water wells;
- I. Noise sources associated with the collection of waste or garbage from property devoted to commercial or industrial uses;(Ord. 602, § 1, 1978)

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The Ordinance also contains specific limitations to particular land uses or activities:

Air conditioning and refrigeration exterior noise level shall not exceed fifty dBA for such equipment installed or in use after July 1, 1980. (Ord. 602, § 1, 1978)

Waste and garbage collection equipment shall not take place before six a.m. or after seven p.m., and the noise level created by such activities when measured at a distance of fifty feet in an open area shall not exceed the following standards:

- Seventy-five dBA for new equipment purchased or leased after thirty-six months from the effective date of this chapter.
- Electrical substations notwithstanding the provisions of Section 8.40.040, noise sources associated with the operation of electrical substations shall not exceed fifty dBA when measured as provided in Section 8.40.030. (Ord. 602, § 1, 1978)

The Ordinance also provides limits on interior noise levels of “dwelling unit[s].” Table 4 shows the interior noise level limits.

**Table 4
Fresno County Interior Noise Level Standards**

Category	Cumulative Number of minutes in any one-hour time period	Noise Level Standards, dBA	
		<i>Daytime 7 a.m. to 10 p.m.</i>	<i>Nighttime 10 p.m. to 7 a.m.</i>
1	5	45	35
2	1	50	40
3	0	55	45

If existing measured ambient noise levels exceed the levels in Table 3, then the limit becomes the existing ambient level. A penalty of 5 dBA shall be given to simple tone noise, noises consisting primarily of speech or music, or for recurring impulsive noises.

Assuming a standard 25 dBA of transmission loss (exterior to interior) for buildings in California, the Category 1 Standard can be interpreted as an $L_{8.3}$ limit of 60 dBA at the exterior building during nighttime hours and 70 dBA during daytime. Alternatively, the limit could be in the $L_{1.6}$ form at 65 dBA during nighttime and 75 dBA during daytime. Finally, the L_{max} limit would be 70 dBA during the nighttime and 80 dBA during the daytime. The extra penalty for impulsive noises would reduce these limits by 5 dBA. Thus, an L_{max} of 65 dBA during nighttime and 75 dBA during daytime.

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General Plan Update

According to the Fresno County General Plan Update from February 2000, “the County standards apply specifically to noise exposure at residences, school, hospitals, churches, and libraries.” Prisons are not included in this list.

The General Plan Update also contains the following policies to address noise:

Policy HS-G.6 The County shall regulate construction-related noise to reduce impacts on adjacent uses in accordance with the County’s Noise Control Ordinance.

Policy HS-G.7 Where existing noise-sensitive uses may be exposed to increased noise levels due to roadway improvement projects, the County shall apply the following criteria to determine the significance of impact:

- a. Where existing noise levels are less than 60 dB_{Ldn} at outdoor activity areas of noise-sensitive uses, a 5 dB Ldn increase in noise levels will be considered significant;
- b. Where existing noise levels are between 60 and 65 dB_{Ldn} at outdoor activity areas of noise-sensitive uses, a 3 dB_{Ldn} increase in noise levels will be considered significant; and
- c. Where existing noise levels are greater than 65 dB_{Ldn} at outdoor activity areas of noise-sensitive uses, a 1.5 dB_{Ldn} increase in noise levels will be considered significant.

Policy HS-G.8 The County shall evaluate the compatibility of Proposed Projects with existing and future noise levels through a comparison to Table 5, “Land Use Compatibility for Community Noise Environments.”

**Table 5
Maximum Allowable Noise Exposure by Land Use**

	Noise Level (CNEL)						
	0-55	56-60	61-65	66-70	71-75	75-80	81-85
Residential – Low Density Single Family, Mobile Homes							
Residential: Multiple Family							

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**Table 5
Maximum Allowable Noise Exposure by Land Use**

Noise Level (CNEL)							
	0-55	56-60	61-65	66-70	71-75	75-80	81-85
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Notes:

- Normally acceptable. Specified land use is satisfactory, based on the assumption that any buildings involved are of normal, conventional construction, without any special noise insulation requirements.
- Conditionally Acceptable. New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
- Generally Unacceptable. New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
- Land Use Discouraged. New construction or development should generally not be undertaken.

The analysis of future traffic noise levels is performed using the Federal Highway Administration’s Highway Traffic Noise Prediction Model (FHWA-RD-77-108). Increases in the average daily traffic that would be associated with the development anticipated under the plan are applied to the existing noise levels to model L_{dn} under baseline conditions and conditions considering implementation of the Proposed Project (County of Fresno 2000).

The Background Report that is referenced in the General Plan update also includes Table 6 summarizing the cumulative duration of time that intrusive noise is allowed to exceed the baseline standards.

**Table 6
Maximum Allowable Intrusive Noise Above Baseline Exterior Noise Limits**

Cumulative Duration of the Intrusive Sound	Maximum Amount By Which Intrusive Noise May Exceed Baseline Standards Indicated Above (dBA)
Cumulative period of 30 minutes per hour	0
Cumulative period of 15 minutes per hour	+5
Cumulative period of 5 minutes per hour	+10
Cumulative period of 1 minutes per hour	+15

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Table 6
Maximum Allowable Intrusive Noise Above Baseline Exterior Noise Limits

Cumulative Duration of the Intrusive Sound	Maximum Amount By Which Intrusive Noise May Exceed Baseline Standards Indicated Above (dBA)
Levels not to be exceeded for any time per hour	+20

Source: County of Fresno 2000

This summary can be translated into statistical levels, which are commonly reported with sound level measurements. Refer to Table 2.

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4 EXISTING CONDITIONS

Residences exist approximately 3,850 feet west of the Project site boundary along California Avenue (see Figure 3 (Noise Sensitive Residence A)). These same residences are approximately 9,400 feet from the center of the Project site (see Figure 3 (Noise Sensitive Residence A)). There are also some residences located to the west of the Project site, at the corner of West Jensen Avenue and South San Diego Avenue. These western residences are located approximately 4,800 feet from the Project boundary and approximately 10,200 feet from the center of the Project site (see Figure 3 (Noise Sensitive Residence B)). A federal correctional facility is located north of the site approximately 3,150 feet north of the site boundary, and 6,670 feet from the center of the site (see Figure 3 (Federal Correctional Institution, Mendota)). In general, the existing land use of the site and the majority of the surrounding areas is agricultural or open space.

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5 AMBIENT NOISE MONITORING

Noise measurements were conducted using a Rion NL-62 sound-level meter equipped with a 0.5-inch pre-polarized condenser microphone and pre-amplifier. The sound-level meter meets the current American National Standards Institute standard for a Type 1 (Precision) sound-level meter. The sound-level meter was calibrated before the measurements. The microphone was positioned approximately 5 feet above the ground and covered with a windscreen during measurements.

Short-term noise measurements were conducted at two locations in the Project vicinity between 9:00 a.m. and 12:20 p.m. on December 19, 2016 as depicted in Figure 1. The sites are described as follows:

- Site ST1 – Location north of Project site across West California Avenue
- Site ST2 – Location south-southeast of Project site next to Road 33

The noise measurement data is summarized in Table 7 and provided in detail in Appendix A. As shown in Table 7, a wide range exists between the statistical levels. This indicates a wide variation between the noise levels encountered during the measurement period.

**Table 7
Measured Noise Levels (dBA)**

Site/ Measurement	Description	Start Time	Duration (minutes)	L_{eq}^a	L_{max}^b	L5	L10	L50	L90	L95
ST1	North of Site across California Avenue	12/19/2016 9:29 a.m.	30	67.7	86.6	75.0	67.4	42.6	34.0	33.4
ST2	South-southeast of site next to Road 33	12/19/2016 11:24 a.m.	30	69.9	88.5	77.0	68.6	38.2	31.0	30.5

Notes:

^a Equivalent continuous sound level (time-average sound level)

^b Maximum noise level

The L_{90} and L_{95} are good indicators of what the ambient levels are in the Project vicinity when no traffic is present. Based on those measurements, we expect the general ambient noise levels in the area to be in the mid to low 30s dBA in the absence of traffic. The L_{dn} will likely be much lower than the measured L_{eq} . The L_{eq} , L_{max} and lower numbered statistical levels are all strongly influenced by the traffic events. Logs of the number and type of vehicle were kept during the measurements. Table 8 shows the traffic counts associated with the two measurements.

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**Table 8
Short-Term Sound Level Measurements and Traffic Counts**

Site/ Measurement	Distance to Roadway Centerline	Vehicle Speed (mph)	L_{eq}^1	Cars	MT ²	HT ³
ST1	34 feet	50	67.7 dBA	23	4	4
ST2	23 feet	60	69.9 dBA	26	3	4

Notes:

¹ Equivalent Continuous Sound Level (Time-Average Sound Level)

² Medium Trucks

³ Heavy Trucks

Temperature 38 degrees Fahrenheit, clear sky, 3-mile-per-hour northeast wind.

The measured noise levels shown in Table 8 were used to calibrate a traffic noise model of the major roads in the Project vicinity.

Nearest Noise Sensitive Land Uses

Generally, noise sensitive land uses (NSLUs) include residential, schools, hospitals, hotels, daycare facilities, and passive recreational parks. The Project would consist of a solar energy generation facility with no residential components; therefore, the Project would not create any NSLU. The nearest NSLUs to the Project site are residences approximately 3,900 feet to the west of the Project boundary. About 12 residential buildings exist at this distance extending to the corner of N San Diego Avenue and W California Avenue. Some of these buildings are located as close as 100 feet from West California Avenue with the closest approximately 80 feet from the road. This NSLU is identified as Noise Sensitive Residence A on Figure 3. Another group of residences exists near the corner of S San Diego Avenue and West Jensen Avenue, over 4,700 feet from the Project boundary. This NSLU is identified as Noise Sensitive Residence B on Figure 3. These noise sensitive land uses have the potential to be impacted by Project construction and operational noise. No other NSLU types exist within several thousand feet of the Project.

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6 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) and applicable Fresno County standards, a significant impact related to noise would occur if the project would result in:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Regarding significance criterion 1, Fresno Noise Ordinance, Table 2 shows noise level standards. Category 1 can be interpreted as the L_{50} or close to the L_{eq} metric and states that for these levels 50 dBA is the standard for daytime (7 a.m. to 10 p.m.) and 45 dBA is the standard for nighttime (10 p.m. to 7 a.m.). Therefore, if a proposed project would generate noise levels in excess of 50 dBA L_{eq} during the daytime or 45 L_{eq} during the nighttime, such noise generation would constitute a significant noise impact.

2. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Regarding significance criterion 2, the FTA threshold of 0.2 inches/second for damage for conventional sensitive structures will be used as a criterion for construction related vibration. Therefore, if construction-related groundborne vibration were to exceed 0.2 inches/second at existing residences in the project vicinity, this would constitute a significant vibration impact.

3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Regarding significance criterion 3, traffic and stationary equipment are analyzed for their noise impacts in this report. Based upon the local standards, a significant impact could occur if a 5 dB increase in the L_{dn} occurs where the existing L_{dn} is less than 60 dB L_{dn} . Because ambient noise levels were measured and calculated to be well below 60 dB L_{dn} , a 5 dB increase is used as the significance criterion for increases associated with Project operation.

4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Regarding significance criterion 4, construction is the most common source of temporary noise increases for projects like the Little Bear Solar project. Construction noise increases are not considered significant due to an exemption in the Fresno County Noise Ordinance addressing construction activities, as long as the construction hours are limited to between 6:00 a.m. and 9:00 p.m. on any day except for Saturday and Sunday. On Saturday and Sunday construction can occur between 7:00 a.m. and 5:00 p.m.. A quantitative analysis of

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the construction noise using Roadway Construction Noise Model (RCNM) is still included in this report, to examine if there is a need for mitigation in the event that construction activities occur outside of the allowable hours. Outside of the allowable hours, construction would be subject to the noise level standards listed in Table 2 at the nearest residential receptors.

5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Regarding significance criterion 5, the project is not within an airport land use planning area and not within two miles of a public airport. Therefore, this significance criterion is not applicable.

6. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Regarding significance criterion 6, the nearest air strip is located north east of Mendota. That small airport is approximately 2.75 miles away from the Project site. As such, the proposed Project would not be affected by airport-related noise sources. Consequently, airport noise is not evaluated in this report.

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7 NOISE IMPACTS ANALYSIS

This section contains the noise impact analyses for the different expected noise sources related to construction and operation of the facility.

7.1 Construction Noise and Vibration

This impact analysis focuses on noise and vibration impacts from construction of the Project. The Fresno County Noise Ordinance exempts noise sources associated with construction between the hours of 6:00 a.m. and 9:00 p.m. on weekdays and 7:00 a.m. and 5:00 p.m. on Saturday and Sunday.

7.1.1 Construction Noise

Project construction would consist of several phases, including site grading where necessary, development of a staging area and site access roads, solar photovoltaic (PV) system assembly and installation, and construction of other on site structures including fencing. Construction would primarily occur during the County's allowable hours of construction activities. Occasional construction activities may occur outside of these hours. Most deliveries are expected to also occur during the allowable hours of construction. The noise levels generated by construction equipment would vary greatly, depending on factors such as the type and specific model of the equipment, the operation being performed, and the condition of the equipment. The average sound level of the construction activity also depends on the amount of time that the equipment operates and the intensity of the construction during periods of activity.

Construction equipment would include standard equipment such as post drivers, graders, scrapers, backhoes, loaders, cranes, dozers, water trucks, portable generators and air compressors, and miscellaneous trucks. The maximum noise level ranges for various pieces of construction equipment at a distance of 50 feet are presented in Table 9. The maximum noise levels at 50 feet for typical equipment would range up to 90 dBA for the type of equipment normally used for this type of project. We expect construction equipment to be used throughout the site and at different intervals. The typical operating cycles for construction equipment involve one or two minutes of full power operation followed by three or four minutes at lower power settings. These expected construction conditions lead us to consider those noise levels shown in Table 9 as conservative assumptions.

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Table 9
Typical Construction Equipment Noise Levels

CA/T Noise Emission Reference Levels and Usage Factors					
<i>Equipment Description</i>	<i>Impact Device?</i>	<i>Acoustical Use Factor (%)</i>	<i>Spec 721.560 Lmax @ 50ft (dBA, slow)</i>	<i>Actual Measured Lmax @50ft (dBA, slow) samples averaged*</i>	<i>Number of Actual Data Samples (Count)</i>
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Grader	No	40	85	-- N/A --	0
Man Lift	No	20	85	75	23
Pickup Truck	No	40	55	75	1
Roller	No	20	85	80	16
Scraper	No	40	85	84	12
Tractor	No	40	84	-- N/A --	0

Source: DOT 2007.

The construction equipment is expected to be spread out over the entire site, with some equipment operating along the perimeter of the site while the rest of the equipment may be located several hundred feet further away from the noise sensitive receptors.

The magnitude of the impact would depend on the type of construction activity, equipment, duration of the construction phase, distance between the noise source and receiver, and any intervening structures. Noise from construction equipment generally exhibits point source acoustical characteristics. A point source sound is attenuated (is reduced) at a rate of 6 decibels per doubling of distance from the source for “hard site” conditions (ground cover such as pavement, rock, or hard packed soil) and at 7.5 decibels per doubling of distance for “soft site” conditions (ground cover such as loose soil, grass, or vegetation). These rules apply to the propagation of sound waves with no obstacles between source and receivers, such as topography (ridges or berms) or structures.

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The Federal Highway Administration (FHWA) has developed the Roadway Construction Noise Model (RCNM) software, which can be used to evaluate construction noise. RCNM contains a large database of construction equipment, including noise generation level and load factor (percentage of time each piece of equipment is active on a typical construction site). Dudek used RCNM to assess construction noise impacts of the proposed Project.

Table 10 shows the calculated noise levels at the property line of the closest noise-sensitive receptor (i.e., the residential property west of the Project site along West California Avenue (see Figure 3 (Noise Sensitive Residence A)) during construction phases for this Project, employing the RCNM software and based on construction equipment data provided by the client. The noise levels shown in Table 10 take into account operation of multiple pieces of construction equipment simultaneously for the L_{eq} results. More details from the RCNM analysis can be found in Appendix B. These noise levels are based on surveys conducted by the United States Environmental Protection Agency in 1971. In the time since 1971, regulations to reduce noise generated by certain types of construction equipment in order to meet worker noise exposure standards. Also because of stringent air quality emissions standards, newer, cleaner, and quieter heavy equipment is used on most construction projects in California. Thus, construction phase noise levels indicated in Table 10 represent worst-case conditions. L_{max} levels are focused on the single piece of equipment with the highest L_{max} . These L_{max} results do not account for multiple pieces of equipment producing maximum levels at the same time, since this is an unlikely occurrence. For this reason and because in some phases of construction include more than 20 pieces of equipment expected to be operating, the calculated L_{eq} levels are higher than the L_{max} .

Table 10
Outdoor Construction Noise Levels by Phase at Closest Noise-Sensitive Receptor

Construction Phase	L_{max} (dBA)	L_{eq} (dBA)
<i>Shared Facilities</i>		
Move On Phase	47	57
Substation Construction	47	53
Gen-Tie Line Installation	47	52
<i>Little Bear 1-6</i>		
Site Preparation and Grading Phase	47	56
Underground Work (Trenching)	47	54
System Installation	47	60
Cleanup/Testing/Restoration	47	50

With respect to Table 10, the “Move On Phase” would consist of equipment mobilization to the site, stockpiling of project materials in a lay-down area, installation of a perimeter security fence,

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and vegetation removal (grubbing). Substation construction entails building structures, trenching for underground transmission lines, and installation of electrical equipment and transmission towers. Gen-tie installation would involve the erection of support poles or towers, and stringing of electrical transmission lines. Underground work involves trenching for the burial of collection lines from inverters to be located throughout the arrays, to the sub-station. System installation includes driving of support posts, assembly of the racks to accommodate solar arrays, and the fastening and cabling of the solar arrays. Clean-up, testing, and restoration involve removal of construction debris, testing of the system operation, and restoration of disturbed surface area. As the table shows, the highest noise levels are expected to occur during the Move On Phase for the Shared Facilities work and during the System Installation for the individual Little Bear sites.

Pile or post driving is a construction activity that is not accounted for in the results shown in Table 10. The RCNM default data for pile drivers is for large equipment intended to set piles for highway tunneling purposes. No foundation piles of this type are included in the project, instead substantially shorter posts will be installed to support the rack system for the solar arrays. The post driving activities for the Project are expected to use smaller equipment, drive the posts only a few feet into the ground, and thus produce lower noise levels than contained in RCNM. Based on published noise levels of smaller post drivers, we expect the Project post driving activities to produce approximately 84 dBA at 50 feet. This equipment use would be expected to increase the construction noise levels presented on Table 10 by 1 dB or less.

As shown in Table 10, max construction-related noise levels could reach up to 60 dBA L_{eq} at residential property lines to the west of the Project site along West California Avenue. The analysis indicates this maximum noise level is not the result any particular equipment or activity but rather the cumulative noise of widespread activity on the Project site. The County of Fresno Noise Ordinance exempts construction activity noise from standard exterior noise exposure limits if conducted during specific hours. As described the by Project Description most Project-related construction activity is expected to occur within the window of time covered by the Noise Ordinance exemption. The nighttime $L_{8,3}$ limit is 60 dBA based on the Fresno County Interior Noise Level Standard Category 1, with an additional 5 dBA penalty applied for impulsive sounds. According to the Project Description, some construction-related activities could occur outside the hours the Noise Ordinance exemption, however these activities typically include testing or inspection work that is not expected to be a noteworthy source of noise. Thus construction-related activity associated with the Project is not expected to generate noise in excess of any locally established standard.

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7.1.2 Construction Traffic Noise

There are two major roads in the Project vicinity: West California Avenue and SR-33. The Traffic Technical Report (VRPA Technologies Inc. 2017) prepared for the Project evaluated the increase in construction-related traffic on these two roads. The Traffic Technical Report estimates that heavy vehicles account for 20% of current vehicle traffic on SR-33 and 5% of traffic on West California Avenue. Table 11 shows the existing average daily traffic (ADT) data for the two major roads in the Project vicinity based on the data included in the Traffic Technical Report (VRPA Technologies Inc. 2017).

**Table 11
Existing Average Daily Traffic (ADT)**

Road Segment	Average Daily Traffic (ADT)
SR-33 (West California Avenue to Jensen Avenue)	2,300
West California Avenue (Washoe Avenue to SR-33)	940

Table 12 shows the calculated existing traffic day night level in L_{dn} at the residence on West California Avenue. We have assumed that the ADT on West California Avenue extends past the residences, since there are no major turn offs between the residence location of interest and SR-33.

**Table 12
Calculated Existing Traffic Day Night Level**

Receiver	L_{dn} (dBA)
Residence along West California Avenue	55

Based on the ADT values presented in the Traffic Technical Report (VRPA Technologies Inc. 2017), and employing calculations from the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108), the noise sensitive receptors west along West California Avenue currently have existing traffic noise levels calculated to be 55 dBA L_{dn} .

Table 13 shows the existing plus Project construction ADT numbers based on the Traffic Technical Report (VRPA Technologies Inc. 2017).

**Table 13
Existing Plus Project (Construction) Average Daily Traffic Segment Operations**

Road Segment	ADT
SR-33 (West California Avenue to Jensen Avenue)	2,434

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Table 13
Existing Plus Project (Construction) Average Daily Traffic Segment Operations

Road Segment	ADT
West California Avenue (Washoe Avenue to SR-33)	2,282

These calculations (using FHWA-RD-77-108) address averages across a full day. The results show these average noise level increases will be less than a perceptible difference for the residential locations.

7.1.3 Construction Vibration

During land grading, trenching, and construction activities for the proposed project ground-borne vibration would be produced by the construction equipment. The construction equipment most likely to create vibration is summarized in Table 14. Peak particle velocity (PPV) in inches per second and corresponding vibration levels are included in the table for specific equipment.

Table 14
Vibration Velocities for Typical Construction Equipment

Equipment	PPV at 25 Feet (Inches Per Second)	Approximate Ground Vibration Level 25 feet (VdB re 1 microinch/second)
Large Bulldozer	0.089	87
Pile Driver (impact) [Upper Range]	1.518	112
Pile Driver (impact) [Typical]	0.644	104
Pile Driver (sonic) [Upper Range]	0.734	105
Pile Driver (sonic) [Typical]	0.170	93
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: FTA 2006

As shown in Table 14, use of heavy equipment (e.g., a large bulldozer) generates vibration levels of 0.089 inches per second PPV at a distance of 25 feet and the upper range for pile driving is 1.518 inches per second PPV at 25 feet. Based on the distance to the sensitive receptors (approximately 3,900 feet) and the equation for vibration attenuation included in Section 2.7, Dudek calculated the expected PPV at the nearest receptors. The resulting PPV is less than 33 VdB for the bulldozer. The resulting PPV for the upper range of pile driving is less than 58 VdB. These vibration levels are below the barely perceptible range for humans of 70 VdB (U.S. Department of Interior and California Department of Fish and Game 2011). Furthermore, vibration levels at these receptors would not exceed the FTA building damage threshold of 0.2 inches per second

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PPV (re: 1 micro-inch/second) or 94 VdB. As such, construction-related vibration associated with the proposed project would result in a less-than-significant impact.

The Project construction would not have the potential to generate significant short-term ground-borne vibration or noise at the noise sensitive receptors due to distance attenuation. Consequently, groundborne vibration impacts would be less than significant for Project construction.

7.2 Operational Noise and Vibration

This section includes details and analyses related to the operational noise impacts of the project.

7.2.1 Traffic Noise

The Project could have approximately eight full-time-equivalent O&M staff. Most O&M-related activities will occur during typical, daytime hours although nighttime work may be required on occasion. Operational traffic was not included in the traffic impact data, however, due to the low numbers of O&M-related traffic, we do not expect significant increase in traffic noise due to Project operation.

7.2.2 Operational Equipment Noise

The Project will include the following main elements:

1. modular photovoltaic solar panels on single-axis trackers;
2. direct current to alternating current power inverters;
3. three-phase transformers mounted on concrete pads that convert the output of each inverter to 34.5 kilovolts (kV), a 34.5 kV collection system either overhead or underground,
4. Facility substations, each including at least one 34.5 kV to 115 kV transformer,
5. a control/administration building and parking lot,
6. meteorology towers,
7. security fencing and
8. lighting and other on-site facilities as required.

The Project may optionally include as many as five Energy Storage Systems (ESS) that will provide up to four hours of electrical storage. The ESS will be sited on an approximately one-acre area within each of the five facilities, in separate outside rated enclosures and will consist of self-contained battery storage modules placed in racks, converters, switchboards, integrated heating,

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ventilation, and air conditioning (HVAC) units, inverters, transformers, and controls in prefabricated metal containers or in a building. Figure 4 shows the site layout with the important noise generating equipment.

On-site noise sources associated with the Project would include:

1. solar panel single-axis trackers,
2. DC to AC inverters,
3. Transformers, and
4. Electronic Storage Systems (including associated inverters, transformers, and HVAC equipment)

Each of these noise sources is discussed in the following text. Although the Project is a solar facility which would be active and operational primarily during daytime hours, the inverters and step up transformer may operate during the early morning hours. Therefore, to provide the most conservative assessment of potential noise impacts and to account for a “worst-case” scenario, the County’s nighttime (10 p.m. to 7 a.m.) noise standard for stationary source noise is used. HVAC is expected to primarily operate during the day when temperatures are the highest. HVAC noise is only applied to the daytime noise standard calculations. According to Table 2 the noise level standard specifies 45 dBA at residential land uses for 30 minutes in an hour during nighttime (10 p.m. to 7 a.m.) and 50 dBA for daytime.

Trackers

Noise from the tracker motors which would make brief, incremental adjustments to the angle of the PV panels throughout the day is not included in the analysis because their noise levels are very low (approximately 40 dBA at a distance of 10 feet) and they operate for only a few seconds at a time. The noise level from the tracker motors is therefore negligible.

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Power Conversion Stations

Based on the NEMA 2015 Transformer ratings, we assume a worse case 67 dBA at 1 foot from the transformers. Calculating the sound pressure level at the nearest residence shows that expected noise level from the PCS transformers are expected to be less than 5 dBA L_{eq} . Please refer to Appendix C for a spreadsheet with calculation results for the noise level from the proposed PCS transformers at the closest residence

Inverters

GE 1500V 4MVA inverters have a noise level rating of 61.5 dBA at 3 feet, 49.5 dBA at 12 feet, and 37.4 at 50 feet (GE 2015). Sunny Central 2500-EV inverter units have sound pressure levels of 64.3 dBA at 32.8 feet according to specification sheets for the units (SMA Solar Technology 2017). These Sunny Central units are designed with enclosures which reduce the radiated noise. Other inverter units can be acceptable. The project plans to only use enclosed inverters. If unenclosed inverters are used, enclosures should be added to the units and field tests may be necessary to assure the noise levels from the units are acceptable.

Assuming that these inverter units are spread out like the PCS, we calculate that the noise levels due to the inverters from all of the little bear sites, will be less than 39 dBA at the nearest residence. Calculated noise levels for facility equipment is listed in Appendix C.

Power Conversion Station Transformers

In the same manners as the inverters, Dudek has assumed that one smaller transformer is associated with each Power Conversion Station. Based on the NEMA 2015 Transformer ratings, we assume a worse case 67 dBA at 1 foot from the transformers. Calculating the sound pressure level at the nearest residence shows that expected noise level from the PCS transformers are expected to be less than 5 dBA L_{eq} . Please refer to Appendix C for a spreadsheet with calculation results for the noise level from the proposed PCS transformers at the closest residence

Medium and High Voltage Transformers

Other larger transformers are also included in the project plan. The Project is expected to include three-phase transformers mounted on concrete pads that convert the output of each inverter to 34.5 kilovolts (kV). Output from 34.5 kV transformers are combined at the facility substation, where transformer increases the voltage to 115 kV prior to interconnection with the Project gen-tie line.

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The National Electrical Manufacturers Association (NEMA) has published standards for transformers. According to the ST 20-2014 NEMA document, noise level limits are specified for Equivalent Winding kVA Ranges and cooling systems. 67 dBA is the highest acceptable noise level at 1 foot from the transformers.

Dudek has assumed one main transformer for each individual facility substation. The transformers are expected to be located in the vicinity of the electronic storage system for each site. The resulting sound pressure level at the nearest residence due to these transformers were calculated to be less than 5 dBA. Calculated noise levels for facility transformers are listed in Appendix C. Other transformers related to the power conversion stations for the PV arrays are addressed in the next section.

Energy Storage System

Noise from the Energy Storage System (ESS) would be created by the associated heating, ventilation and air conditioning (HVAC) units, power inverters, and transformers associated with this type of unit. Detailed plans are not yet available for the energy storage systems, but based on other solar projects with ESS, we assumed that 10 HVAC units, 30 transformers and 15 power inverters would be utilized for each ESS on the Little Bear Site.

Information from the vendor for a similar energy storage project (Dudek 2014) indicates the HVAC unit that is supplied as standard equipment for these types of projects produces 68 dBA at a distance of 50 feet during full operation for a NACO Model 30RB120. This unit includes an air-cooled condenser and a scroll compressor. Octave band data was reviewed for the frequency range from 31 Hz to 8 kHz. This octave band data did not reveal any significant tones. Based on site layout information and the assumption that 10 HVAC units will be utilized for each ESS, Dudek calculated the expected noise levels at the nearest residences to be about 44 dBA due to only the HVAC operations. Please refer to Appendix C for a spreadsheet with calculation results for the noise level from the proposed inverters at the closest residence ESS HVAC operations. Since HVAC is expected to be used primarily during the daytime, the calculated noise level is not expected to exceed the Fresno County Exterior Noise Level Standards for 50 dBA for 30 minutes in an hour during daytime. We expect that the HVAC systems will not be running during nighttime hours.

A typical step-up transformer that might be used for the ESS(s) has a sound rating of 60 dB at 5 feet based on National Electric Manufacturers Association ratings for the size of transformer anticipated to be used with storage battery systems (NEMA 2000). Using the assumption that 30 transformers are used in each ESS, and they are all located at the ESS site for each Little Bear site, we calculated the noise level at the nearest residences. Our calculations showed that the sound

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pressure levels at the nearest residences will be less than 23 dBA. Calculated noise levels for facility equipment is listed in Appendix C.

An Xantrex model power inverter has a noise level rating of 77 dB at about 6 feet (Schneider Electric 2011). Using this reference data, and accounting for 15 power inverters per ESS, we calculated the noise level from the inverters at the nearest residence to be approximately 38 dBA. Calculated noise levels for facility equipment is listed in Appendix C.

Table 15 summarizes these results, and provides total expected operational noise levels for daytime and nighttime. Daytime includes the ESS HVAC noise, while nighttime does not.

Table 15
Unmitigated Operational Noise Summary (dBA L_{eq})

Component	Unmitigated Noise Level at Nearest Noise Sensitive Receptor	Total Daytime	Total Nighttime
Tie-In Transformers	<5	45	41
PCS Transformers	<5		
PCS Inverters	39		
ESS HVAC	43		
ESS Transformers	23		
ESS Inverters	38		

The results in Table 15, show that the operational noise is expected to be less than the Fresno County noise standards at the nearest noise sensitive receptor. Therefore, operational noise is expected to be less than significant. There is one other residential receptor in the project area, but that location is at least an additional 500 feet further from the equipment than the residential receptor used for all of the above-referenced calculations. Therefore, we conclude that since the operational noise is acceptable at the modeled receptor, it is also acceptable at all sensitive receptors located at further distances from the site.

7.2.3 Operational Vibration

The Project does not propose the use of large, rotating equipment, and therefore there is no potential for significant impact resulting from vibration. Thus, Dudek expects that operational vibration impacts will be less than significant.

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8 MITIGATION MEASURES

As proposed, the Project is not expected to be a significant source of noise or vibration during either construction or operation. Construction will generally occur during daylight hours, Monday through Friday. Construction may require some nighttime activity for installation, service or electrical connection, inspection and testing activities, but these activities have a relatively limited potential for noise or vibration generation compared to the sitewide construction activities determined to have the greatest noise generation potential. For these reasons, no mitigation measures are recommended.

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9 SUMMARY AND CONCLUSIONS

The noise impact analysis evaluates the potential for significant adverse impacts due to construction and operation of the proposed project. The closest noise sensitive receptors are residences located approximately 3,900 feet from the project site. Based on the Fresno Noise Ordinance noise level standards, the operational noise will not have a significant impact on the residences. During the daytime, when HVAC is expected to be necessary noise levels are expected to be as high as 45 dBA L_{eq} at the residences. During nighttime without the HVAC equipment running, noise levels at the residences were calculated to be approximately 41 dBA L_{eq} .

For construction noise, peak unmitigated levels have the potential to exceed the Fresno County Exterior Noise Level Standards. However, the Project operations most likely to cause these peak activities will occur during typical, daytime hours when construction noise sources are exempt under Fresno County's Noise Ordinance (between 6:00 a.m. and 9:00 p.m. on weekdays and between 7:00 a.m. and 5:00 p.m. on weekends). The Project-related construction activities that may occur outside these exempt hours include testing, inspection and electrical interconnection work that does not have the same potential for generating offsite noise and are therefore not considered a significant source of noise. The results of the noise analysis in terms of the CEQA significance criteria are summarized below:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

The proposed project would produce a significant noise impact if noise levels exceed 50 dBA L_{eq} during daytime or 45 dBA L_{eq} during nighttime. Analysis of the project shows that noise impacts from the project on the nearest noise sensitive receptors will be less than these levels. Therefore, less-than-significant impacts from noise are expected.

2. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

The project would produce a significant vibration impact if vibration levels produced by the project exceed 0.2 inches/second. No large rotating equipment is planned for the project. Thus, operational vibration is expected to be below this threshold. Construction vibration levels were analyzed and are expected to be below this threshold at the nearest sensitive receptors. Groundborne vibration or groundborne noise levels from construction and operation of the project will be less-than-significant.

3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

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Operational noise from the project that exceeds a 5 dB increase in the existing Ldn is considered a significant impact. The analysis of traffic and stationary noise sources shows that the ambient levels are not expected to increase more than 5 dB above the existing ambient. Therefore, a significant permanent increase in noise is not expected at the nearest sensitive receptors due to the project.

4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Project construction will result in a temporary increase in ambient noise. The Fresno County Noise Ordinance exempts construction-related noise between 6:00 a.m. and 9:00 p.m. on any day except for Saturday and Sunday. On Saturday and Sunday construction-related noise is exempt between 7:00 a.m. and 5:00 p.m.. Most project construction is expected to occur within these exempt hours. Some construction activity may occur outside of these hours and this activity will be subject to the noise threshold limits previously described in this report. However, this activity will not involve the numbers and types of equipment and activities that could contribute to offsite noise in excess of Fresno County exterior noise standards. Therefore no impact would result from construction activities relative to this criterion.

5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

The project is not within an airport land use planning area and not within two miles of a public airport. Therefore, this significance criterion is not applicable.

6. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The nearest air strip is located north east of Mendota. That small airport is approximately 2.75 miles away from the Project site. As such, the proposed Project would not be affected by airport-related noise sources. Consequently, airport noise is not evaluated in this report.

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10 REFERENCES

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- VRPA Technologies Inc. 2017. *Little Bear Solar Project Traffic Technical Report*. Prepared for Dudek. Fresno, California: VRPA Technologies Inc.

APPENDIX A
Field Noise Measurement Data

Field Noise Measurement Data

Record: 280

Project Name	Little Bear Solar
Project #	9974
Observer(s)	Christopher Barnobi
Date	2016-12-19
autoemail	cbarnobi@dudek.com

Meteorological Conditions

Upload NOAA Forecast	
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Temp (F)	38
Humidity % (R.H.)	80
Wind	Calm
Wind Speed (MPH)	3
Wind Direction	North West
Sky	Clear

Instrument and Calibrator Information

Instrument Name List	(AUB) NL-62
Instrument Name	(AUB) NL-62
Instrument Name Lookup Key	(AUB) NL-62
Manufacturer	Rion
Model	NL-62
Serial Number	350815
Calibration Date	2/10/2016
Calibrator Name	(SAC) Rion NC-74
Calibrator Name	(SAC) Rion NC-74
Calibrator Name Lookup Key	(SAC) Rion NC-74
Calibrator Manufacturer	Rion
Calibrator Model	NC-74
Calibrator Serial #	34167529
GPS Assistance Used	No
Pre-Test (dBA SPL)	94
Weighting?	A-WTD
Slow/Fast?	Slow

Recordings	
Record #	1
Site ID	North center of project site
Site Location	Latitude:36.720207, Longitude:-120.405397, Altitude:49.554504, Speed:0.180000, Horizontal Accuracy:10.000000, Vertical Accuracy:4.000000, Time:9:40:16 AM PST
Begin (Time)	09:29:00
End (Time)	09:59:00
Leq	67.7
Lmax	86.6
Other Lx?	L90, L10
L90	34.0
L10	67.4
Other (Specify Metric)	
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Distant Industrial, Distant Traffic
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	Yes

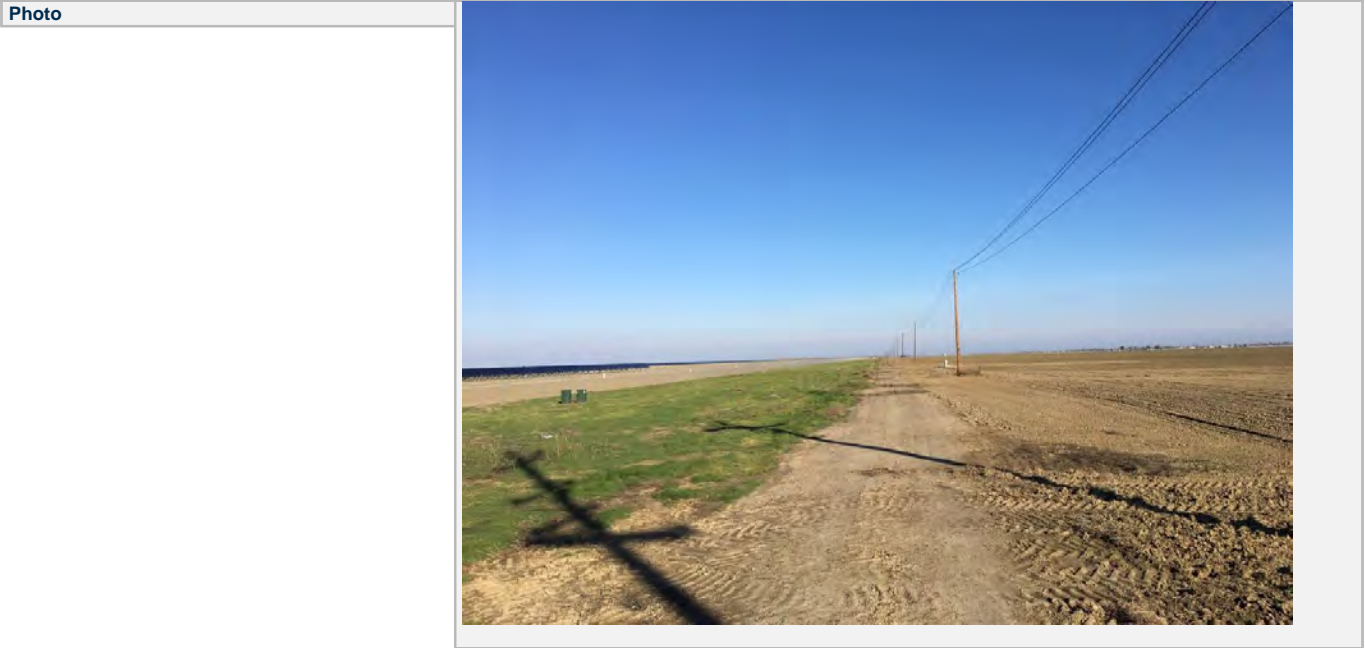
Source Info and Traffic Counts	
Distance to Roadway (feet)	34
Distance to Roadway - Centerline/Edge of Pavement	Centerline
Roadway Type	Hard paved
Estimated Vehicle Speed (MPH)	50
Count Duration (Min)	30
Speeds Estimated by:	Driving the Pace
Posted Speed Limit Sign (MPH)	45

Traffic Counts	
Counting Both Directions?	Yes
Autos	1
Number of Vehicles - Autos	23
Medium Trucks	1
Number of Vehicles - Medium Trucks	4
Heavy Trucks	1
Number of Vehicles - Heavy Trucks	4
Buses	0
Motorcycles	0

Description / Photos

Terrain	Hard
---------	------

Site Photos



Recordings

Record #	2
Site ID	Highway 33 south east of site
Site Location	Latitude:36.698264, Longitude:-120.387530, Altitude:53.317902, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000, Time:11:26:23 AM PST
Begin (Time)	11:24:00
End (Time)	11:54:00
Leq	69.9
Lmax	88.5
Other Lx?	L90, L10
L90	31.0
L10	68.6
Other (Specify Metric)	
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	Yes

Source Info and Traffic Counts

Distance to Roadway (feet)	23
Distance to Roadway - Centerline/Edge of Pavement	Centerline
Roadway Type	Hard paved
Estimated Vehicle Speed (MPH)	60
Count Duration (Min)	30
Speeds Estimated by:	Driving the Pace

Traffic Counts

Counting Both Directions?	Yes
Autos	1
Number of Vehicles - Autos	26
Medium Trucks	1
Number of Vehicles - Medium Trucks	3
Heavy Trucks	1
Number of Vehicles - Heavy Trucks	4
Buses	0
Motorcycles	0

Description / Photos

Upload Google Maps Data



Site Photos

Photo



APPENDIX B
Construction Noise Models

Report date: 2/8/2017	Case Descript	Shared Facilities	Move-on Phase Pt.1	*Calculated Lmax is the Loudest value.	No Shielding was Included for Any of the Reports				
Description: Part 1	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	8	No	50	85		3850	47.3	44.3	
Grader	3	No	40	85		3850	47.3	43.3	
Dozer	1	No	40		81.7	3850	43.9	40	
Scraper	3	No	40		83.6	3850	45.9	41.9	
Front End Loader	2	No	40		79.1	3850	41.4	37.4	
Roller	1	No	20		80	3850	42.3	35.3	
							Total	47.3	55.4
Report date: 2/8/2017	Case Descript	Shared Facilities	Move-on Phase Pt.2	*Calculated Lmax is the Loudest value.	No Shielding was Included for Any of the Reports				
Description: Part 2	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	3	No	50	85		3850	47.3	44.3	
Pickup Truck	10	No	40		75	3850	37.3	33.3	
							Total	47.3	50.1
Report date: 2/8/2017	Case Descript	Shared Facilities	Substation Construction Phase	*Calculated Lmax is the Loudest value.	No Shielding was Included for Any of the Reports				
Description: Total	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
Auger Drill Rig	1	No	20		84.4	3850	46.6	39.6	
Backhoe	1	No	40		77.6	3850	39.8	35.9	
Crane	1	No	16		80.6	3850	42.8	34.9	
All Other Equipment > 5 HP	3	No	50	85		3850	47.3	44.3	
Man Lift	1	No	20		74.7	3850	37	30	
Grader	1	No	40	85		3850	47.3	43.3	
Dozer	1	No	40		81.7	3850	43.9	40	
Scraper	1	No	40		83.6	3850	45.9	41.9	
Front End Loader	1	No	40		79.1	3850	41.4	37.4	
Excavator	1	No	40		80.7	3850	43	39	
Tractor	1	No	40	84		3850	46.3	42.3	
Pickup Truck	4	No	40		75	3850	37.3	33.3	
Dump Truck	1	No	40		76.5	3850	38.7	34.7	
Flat Bed Truck	1	No	40		74.3	3850	36.5	32.5	
							Total	47.3	52.7
Report date: 2/8/2017	Case Descript	Shared Facilities	Gen-tie Line Installation Phase	*Calculated Lmax is the Loudest value.	No Shielding was Included for Any of the Reports				
Description: Total	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	5	No	50	85		3850	47.3	44.3	
Backhoe	1	No	40		77.6	3850	39.8	35.9	
Crane	1	No	16		80.6	3850	42.8	34.9	
Tractor	1	No	40	84		3850	46.3	42.3	
Generator	1	No	50		80.6	3850	42.9	39.9	
Pickup Truck	4	No	40		75	3850	37.3	33.3	
							Total	47.3	52.4
Report date: 2/8/2017	Case Descript	Little Bear 1-6 Site Preparation and Grading Pha	*Calculated Lmax is the Loudest value.	No Shielding was Included for Any of the Reports					
Description: Part 1	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	10	No	50	85		3850	47.3	44.3	
Grader	2	No	40	85		3850	47.3	43.3	
Dozer	1	No	40		81.7	3850	43.9	40	
Scraper	1	No	40		83.6	3850	45.9	41.9	
Front End Loader	2	No	40		79.1	3850	41.4	37.4	
Roller		No	20		80	3850	42.3	35.3	
							Total	47.3	55.6
Report date: 2/8/2017	Case Descript	Little Bear 1-6 Site Prep and Grading Phase Pt 2	*Calculated Lmax is the Loudest value.	No Shielding was included for Any of the Reports					
Description: Part 2	Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60					

Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
Pickup Truck	5	No	40		75	3850	37.3	33.3	
							Total	37.3	40.3
Report date: 2/8/2017				Case Description Little Bear 1-6 Underground work (Trenching) Pt 1		*Calculated Lmax is the Loudest value. No Shielding was included for Any of the Reports			
Description: Total			Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60			
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	9	No	50	85		3850	47.3	44.3	
Compactor (ground)	1	No	20		83.2	3850	45.5	38.5	
Excavator	1	No	40		80.7	3850	43	39	
Backhoe	2	No	40		77.6	3850	39.8	35.9	
Roller	1	No	20		80	3850	42.3	35.3	
Dump Truck	1	No	40		76.5	3850	38.7	34.7	
							Total	47.3	54.4
Report date: 2/8/2017				Case Description Little Bear 1-6 System Installation Phase Pt 1		*Calculated Lmax is the Loudest value. No Shielding was included for Any of the Reports			
Description: Part 1			Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60			
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	20	No	50	85		3850	47.3	44.3	
							Total	47.3	57.3
Report date: 2/8/2017				Case Description Little Bear 1-6 System Installation Phase Pt 2		*Calculated Lmax is the Loudest value. No Shielding was included for Any of the Reports			
Description: Part 2			Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60			
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
All Other Equipment > 5 HP	10	No	50	85		3850	47.3	44.3	
Compressor (air)	1	No	40		77.7	3850	39.9	36	
Crane	1	No	16		80.6	3850	36.5	32.5	
Flat Bed Truck	2	No	40		74.3	3850	47.3	54.4	
							Total	47.3	54.4
Report date: 2/8/2017				Case Description Little Bear 1-6 System Installation Phase Pt 3		*Calculated Lmax is the Loudest value. No Shielding was included for Any of the Reports			
Description: Part 3			Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60			
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
Pickup Truck	10	No	40		75	3850	37.3	33.3	
All Other Equipment > 5 HP	7	No	50	85		3850	47.3	44.3	
							Total	47.3	53.2
Report date: 2/8/2017				Case Description Little Bear 1-6 Cleanup/Testing/Restoration Phase Pt 1		*Calculated Lmax is the Loudest value. No Shielding was included for Any of the Reports			
Description: Total			Land Use: Residential	Daytime Baseline (dBA): 60	Evening Baseline (dBA): 60	Night Baseline (dBA): 60			
Description	# of Devices	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Calculated Lmax* (dBA)	Calculated Leq (dBA)	
Pickup Truck	3	No	40		75	3850	37.3	33.3	
All Other Equipment > 5 HP	1	No	50	85		3850	47.3	44.3	
Backhoe	1	No	40		77.6	3850	39.8	35.9	
Grader	1	No	40	85		3850	47.3	43.3	
Scraper	2	No	40		83.6	3850	45.9	41.9	
							Total	47.3	49.5

APPENDIX C
Operational Noise Measurement Summary

APPENDIX C

Operational Noise Measurement Summary

Summary of Modeled Operational Noise Equipment

Equipment	Approximate Distance from Nearest Unit to Receiver (Feet)	Sound Pressure Level at Nearest Residence (dBA)
Main Tie-In Transformer	4000	<5
LB3 Tie-In Transformer	9600	<5
LB4 Tie-In Transformer	4970	<5
LB5 Tie-In Transformer	9700	<5
LB6 Tie-In Transformer	12100	<5
LB1 PCS Transformer	4000	7.6
LB3 PCS Transformer	9400	2.8
LB4 PCS Transformer	5100	2.8
LB5 PCS Transformer	7400	5.8
LB6 PCS Transformer	12100	4.5
LB1 PCS Inverters (Near Half)	4000	33.3
LB1 PCS Inverters (Far Half)	6700	28.8
LB3 PCS Inverters	9400	25.8
LB4 PCS Inverters (Near Half)	5700	33.4
LB4 PCS Inverters (Far Half)	7700	30.4
LB5 PCS Inverters	10100	30.4
LB6 PCS Inverters	12100	23.8
LB1 ESS HVAC	4000	40.5
LB3 ESS HVAC	9600	33
LB4 ESS HVAC	4970	36.0
LB5 ESS HVAC	9700	33
LB6 ESS HVAC	12100	31
LB1 ESS Transformer	4000	17.8
LB3 ESS Transformer	9600	11.8
LB4 ESS Transformer	4970	14.8
LB5 ESS Transformer	9700	14.8
LB6 ESS Transformer	12100	11.8
LB1 ESS Inverters	4000	33.3
LB3 ESS Inverters	9600	25.8
LB4 ESS Inverters	4970	31.8
LB5 ESS Inverters	9700	28.8
LB6 ESS Inverters	12100	25.8
Total daytime noise level (including HVAC)		45
Total nighttime noise level (excluding HVAC)		41

Notes: PCS = Power Conversion Station; ESS = Electric Storage System; Near Half/ Far Half = Used when spread out equipment was modeled as one piece of equipment placed at the nearest piece of equipment location; The latest plans do not include a Little Bear Solar 2 site.

APPENDIX C (Continued)

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Appendix M

Traffic Technical Report for the Little Bear Solar Project

**Traffic Technical Report
for the
Little Bear Solar Project,
Fresno County, California**

Prepared for:

**Little Bear Soar I, LLC,
Little Bear Solar 3, LLC,
Little Bear Solar 4, LLC,
Little Bear Solar 5, LLC, and
Little Bear Solar 6, LLC**

135 Main Street, 6th Floor
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Prepared by:



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JUNE 2017

Little Bear Solar Project Traffic Technical Report

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This Traffic Technical Report has been prepared for the purpose of analyzing traffic conditions related to the Little Bear Solar Project (or Project). The Project will consist of up to five facilities; two 20 MW facilities, one 40 MW facility and two 50 MW facilities. The Project will interconnect to the electrical grid at Pacific Gas and Electric’s (PG&E) Mendota Substation, located approximately two miles west of the Project site.

1.0 Introduction

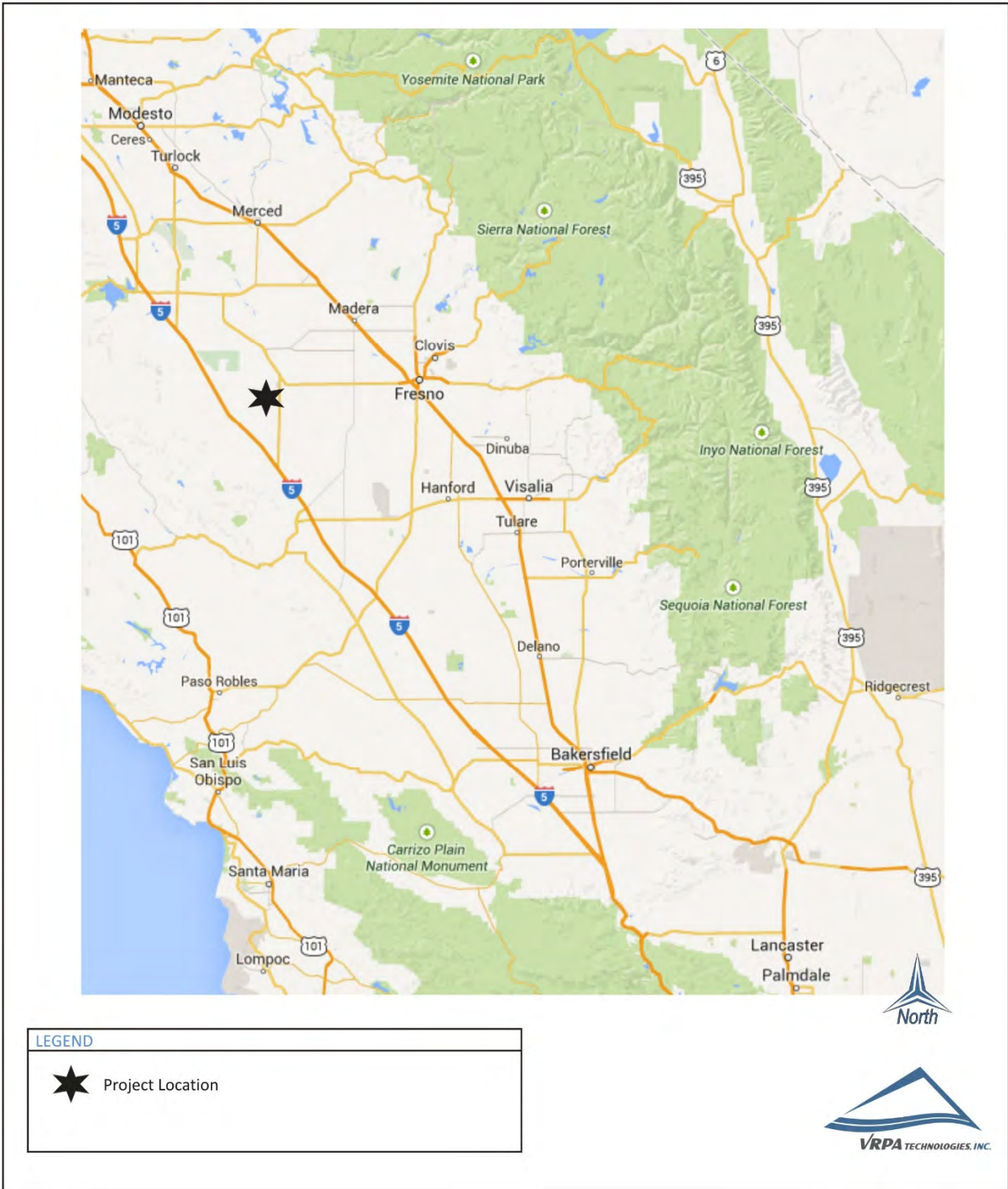
1.1 Description of the Region/Project

The Little Bear Solar Project, proposes to construct, own and operate an approximately 180 megawatt (MW) solar photovoltaic power generation facility (Project) on lands located near Mendota in unincorporated Fresno County, California. The Project will be located on approximately 1288 acres of private land. The Project site is zoned AE-20 (Exclusive Agricultural District, 20-acre minimum parcel size) and has been intermittently dry-farmed or lain fallow in recent years. Surrounding land uses include agriculture, the Federal Correctional Institution Mendota and the adjacent North Star Solar Project (60 MW). The Project will consist of up to five facilities; two 20 MW facilities, one 40 MW facility and two 50 MW facilities. Each generation facility within the Project will include the following main elements: modular photovoltaic solar panels (either fixed-tilt or on single-axis trackers); direct current to alternating current power inverters mounted on concrete pads; three-phase transformers mounted on concrete pads that convert the output of each inverter to 34.5 kilovolts (kV), a 34.5 kV collection system either overhead or underground, a 34.5 kV to 115 kV substation, meteorology towers, security fencing and lighting and other on-site facilities as required.

The Project site is located in the San Joaquin Valley, approximately 13 miles east of Interstate 5 (I-5), approximately 2.5 miles southwest of the City of Mendota, and immediately west of State Route 33 (SR-33), within Sections 13 and 14, Township 14 South, Range 14 East, Mount Diablo Base and Meridian. Specifically, the Project site is bounded by West California Avenue to the north, West Jensen Avenue to the south, San Bernardino Avenue to the west, and SR-33 to the east. Figures 1 and 2 show the location of the Project along with major roadways and highways in the Project area. The Project will interconnect to the Mendota Substation using the existing North Star 115 kV gen-tie line that interconnects the North Star Solar Project. One generation facility will interconnect with the North Star gen-tie line by way of the North Star Solar Project switchyard. The remaining generation facilities will each connect to a new, approximately 1.25-mile 115 kV gen-tie line that will lead to the North Star gen-tie line and continue from that point to the Mendota Substation as a second electrical circuit added to the existing towers of the North Star gen-tie line.

**Little Bear Solar Project
Regional Location**

**Figure
1**



Little Bear Solar Project
Project Location

Figure
2



1.1.1 Project Access

Access to the Project will be provided at driveways along California Avenue, Ohio Avenue and San Bernardino Avenue which will meet applicable County standards. The Project will also have private perimeter roads, and interior access ways for construction and operation. The final design for internal access roads and driveways will be subject to Fresno County Fire Department review prior to construction.

1.1.2 Study Area

The following intersections and roadway segments evaluated in this Traffic Technical Report are provided below. The traffic analysis study area for a proposed project is typically dictated by the amount of trips generated by the operation of the project. The proposed Project will not generate a substantial amount trips during its operation, but will generate a large amount of trips during the construction phase of the Project. Most construction workers are expected to arrive at the Project site in the morning and leave during the afternoon each weekday. Workers are also expected to use SR-180 to commute from the Fresno area, although some commutes from the north and south using SR-33 are also expected. The main access point to the study area and adjacent roadways are sufficient in determining impacts from the proposed Project since impacts from the construction phase of the Project would be temporary in nature.

Intersections

- ✓ SR-33 / California Avenue-Panoche Avenue

Roadway Segments

- ✓ SR-33 between California Avenue and Jensen Avenue
- ✓ California Avenue between Washoe Avenue and SR 33

1.1.3 Study Scenarios

The TIS completed for the proposed Project includes level of service (LOS) analysis for the following traffic scenarios. As noted above, the proposed Project will not generate a substantial amount trips during its operation, but will generate a large amount of trips during the construction phase of the Project. As a result, the construction phase of the Project was evaluated against existing conditions and analysis of future year scenarios was not warranted since impacts from the construction phase of the Project would be temporary in nature.

- ✓ Existing Conditions
- ✓ Existing Plus Project (Construction) Conditions

1.2 Methodology

When preparing a Traffic Technical Report, guidelines set by affected agencies are followed. In analyzing street and intersection capacities the Level of Service (LOS) methodologies are applied. LOS standards are applied by transportation agencies to quantitatively assess a street and highway system's performance. In addition, safety concerns are analyzed to determine the need for appropriate mitigation resulting from increased traffic near sensitive uses, the need for dedicated ingress and egress access lanes to the project, and other evaluations such as the need for signalized intersections or other improvements.

1.2.1 Intersection Analysis

Intersection LOS analysis was conducted using the Synchro 9 software program. Synchro 9 supports the Highway Capacity Manual (HCM) 2010 and 2000 methodologies and is an acceptable program by Fresno County and Caltrans staff for assessment of traffic impacts. Levels of Service can be determined for both signalized and unsignalized intersections. The SR-33 and California Avenue-Panoche Road intersection is currently unsignalized.

Table 1 indicates the ranges in the amounts of average delay for a vehicle at unsignalized intersections for the various levels of service ranging from LOS "A" to "F". When an unsignalized intersection does not meet acceptable LOS standards, the investigation of the need for a traffic signal shall be evaluated. The California Manual on Uniform Traffic Control Devices for Streets and Highways (California MUTCD) dated November 7, 2014 introduces standards for determining the need for traffic signals. The California MUTCD indicates that the satisfaction of one or more traffic signal warrants does not in itself require the installation of a traffic signal. In addition to the warrant analysis, an engineering study of the current or expected traffic conditions should be conducted to determine whether the installation of a traffic signal is justified. The California MUTCD Peak Hour Warrant (Warrant 3) was used to determine if a traffic signal is warranted at unsignalized intersections that fall below current LOS standards.

1.2.2 Roadway Segment Analysis

According to the HCM, LOS is categorized by two parameters of traffic: uninterrupted and interrupted flow. Uninterrupted flow facilities do not have fixed elements such as traffic signals that cause interruptions in traffic flow. Interrupted flow facilities do have fixed elements that cause an interruption in the flow of traffic, such as stop signs and signalized intersections along arterial roads. A roadway segment is defined as a stretch of roadway generally located between signalized or controlled intersections.

Segment LOS is important in order to understand whether the capacity of a roadway can accommodate future traffic volumes. Table 2 provides a definition of segment LOS. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Modified HCM-Based LOS Tables (Florida

Tables), which are commonly utilized in the central valley. The tables consider the capacity of individual road and highway segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, saturation flow, etc.). These variables were identified and applied to reflect segment LOS conditions. Additional information is included in Appendix A. Street segment capacity was determined using information shown in Tables 3 and 4, which come from the Modified Arterial Level of Service Tables included in Appendix A.

1.3 Policies to Maintain Level of Service

An important goal is to maintain acceptable levels of service along the highway, street, and road network. To accomplish this, Fresno County and Caltrans adopted minimum levels of service in an attempt to control congestion that may result as new development occurs.

Fresno County’s 2000 General Plan, policy number TR-A.2, identifies a minimum LOS standard of D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county. Given the location of the Project, a minimum LOS standard of C was utilized in assessing impacts of the proposed Project.

Based on guidance from Caltrans, the LOS for operating State highway facilities is based on Measures of Effectiveness (MOE) identified in the HCM. Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” on State highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing MOE should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadways segments, and intersections is “D”. For undeveloped or not densely developed locations, the goal may be to achieve LOS “C”.

Table 1
Unsignalized Intersections Level of Service Definitions
(2010 Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION	AVERAGE TOTAL DELAY (sec/veh)
A	No delay for stop-controlled approaches.	0 - 10.0
B	Describes operations with minor delay.	> 10.0 - 15.0
C	Describes operations with moderate delays.	> 15.0 - 25.0
D	Describes operations with some delays.	> 25.0 - 35.0
E	Describes operations with high delays and long queues.	> 35.0 - 50.0
F	Describes operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50.0

Table 2
Roadway Segment Level of Service Definitions
(2010 Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION
A	Represents free flow. Individual vehicles are virtually unaffected by the presence of others in the traffic stream.
B	Is in the range of stable flow, but the presence of other vehicles in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
C	Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual vehicles becomes significantly affected by interactions with other vehicles in the traffic stream.
D	Is a crowded segment of roadway with a large number of vehicles restricting mobility and a stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
E	Represents operating conditions at or near the level capacity. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.
F	Is used to define forced or breakdown flow (stop-and-go gridlock). This condition exists when the amount of traffic approaches a point where the amount of traffic exceeds the amount that can travel to a destination. Operations within the queues are characterized by stop and go waves, and they are extremely unstable.

Table 3
Peak Hour One-Way Volumes

Level of Service					
Lanes	Divided	B	C	D	E
State Highways					
1	Undivided	450	850	1,200	1,640
2	Divided	1,740	2,450	3,110	3,440
3	Divided	2,610	3,680	4,660	5,170
Non-State Roadways					
1	Undivided	**	639	720	**
2	Divided	**	1,566	1,638	**
3	Divided	**	2,349	2,466	**

** Not applicable for that level of service letter grade. Volumes greater than level of service D become F because intersection capacities have been reached.

Table 4
Average Daily Volumes

Level of Service					
Lanes	Divided	B	C	D	E
State Highways					
2	Undivided	9,200	17,300	24,400	33,300
4	Divided	35,300	49,600	62,900	69,600
6	Divided	52,800	74,500	94,300	104,500
Non-State Roadways					
2	Undivided	**	12,960	14,580	**
4	Divided	**	30,600	31,950	**
6	Divided	**	46,890	48,150	**

** Not applicable for that level of service letter grade. Volumes greater than level of service D become F because intersection capacities have been reached.

2.0 Existing Conditions

2.1 Existing Traffic Counts and Roadway Geometrics

The first step toward assessing Project impacts is to assess existing traffic conditions. Existing AM and PM peak hour turning movements were collected at each Project intersection by National Data and Surveying Services. Traffic counts were conducted for the peak hour periods of 7:00-9:00 AM and 4:00-6:00 PM for all key intersections on Tuesday, November 29, 2016. Traffic count data worksheets are provided in Appendix B. The traffic counts were conducted during fair weather conditions, while schools in the study area were in session. The traffic counts represent typical volumes experienced in the study area. Peak hour roadway segment volumes were determined from the intersection turning movement counts discussed above. Average Daily Traffic (ADT) counts were also conducted along California Avenue west of SR 33 (Derrick Avenue) on Tuesday, November 29, 2016. ADT counts along SR 33 in the study area are based on traffic counts conducted by the California Department of Transportation (Caltrans), which are available on their website.

The existing lane geometry at study area intersections is shown in Figure 3. The SR-33 and California Avenue-Panoche Road intersection is currently unsignalized. Figure 3 also provides existing traffic volumes for the AM and PM peak hours in the study area.

2.2 Level of Service

2.2.1 Intersection Capacity Analysis

All intersection LOS analyses were estimated using Synchro 9 Software. Various roadway geometrics, traffic volumes, and properties (peak hour factors, storage pocket length, etc) were input into the Synchro 9 Software program in order to accurately determine the travel delay and LOS for each Study scenario.

The intersection LOS and delays reported represent the 2010 HCM outputs. Synchro assumptions, listed below, show the various Synchro inputs and methodologies used in the analysis.

✓ Lane Geometry

- Storage lengths for turn lanes for existing intersections were obtained from aerial photos and rounded to the nearest 25 feet.

✓ Traffic Conditions

- The peak hour factor used for Existing conditions was determined from the existing counts.
- Heavy vehicle percentages were applied as follows:
 - SR 33 – 20%
 - All other roadways – 5% (HCM Default is 3%)

Little Bear Solar Project
Existing Lane Geometry/Traffic Conditions

Figure 3



Results of the analysis show that the SR-33 and California Avenue-Panoche Road intersection is currently operating at acceptable levels of service during the AM and PM peak hour. Table 5 shows the intersection LOS for the existing conditions. Synchro 9 (HCM 2010) Worksheets are provided in Appendix C.

2.2.2 Roadway Segment Capacity Analysis

Results of the AM and PM peak hour LOS segment analysis along the existing street and highway system are reflected in Table 6. Roadway segment analysis was based on the Florida Department of Transportation, Generalized Peak Hour Directional Volumes for Florida’s Urbanized Areas (Non-State Roadways, Major City/County Roadways), which are commonly utilized in the central valley. The Tables generated by the Florida Department of Transportation are based on the 2010 HCM. Table 7 provides ADT levels of service results for California Avenue and SR 33. Results of the analysis show that all of the study roadway segments are operating at acceptable levels of service.

Table 5
Existing Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	EXISTING	
				DELAY	LOS
1. SR 33 / California Avenue-Panoche Road	Two-Way Stop Sign	C	AM	10.5	B
			PM	12.2	B

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

Table 6
Existing Peak Hour Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	DIRECTION	TARGET LOS	PEAK HOUR	EXISTING	
					VOLUME	LOS
SR 33						
California Avenue to Jensen Avenue	1 lane	NB	C	AM	25	B
				PM	129	B
	1 lane	SB		AM	37	B
				PM	43	B
California Avenue						
Washoe Avenue to SR 33	1 lane	EB	D	AM	17	C
				PM	157	C
	1 lane	WB		AM	80	C
				PM	17	C

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

Table 7
Existing ADT Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	TARGET LOS	EXISTING	
			ADT	LOS
SR 33				
California Avenue to Jensen Avenue	2 lanes	C	2,300	B
California Avenue				
Washoe Avenue to SR 33	2 lanes	D	940	C

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

3.0 Traffic Impacts

This chapter provides an assessment of the traffic the Project (construction) is expected to generate and the impact of that traffic on the surrounding street system. The traffic analysis for a proposed project typically evaluates the trips generated by the operation of the project. The proposed Project will not generate a substantial amount trips during its operation, but will generate a large amount of trips during the construction phase of the Project. As a result, the construction phase of the Project was assessed for impacts as opposed to the operational phase of the Project.

3.1 Trip Generation

To assess the impacts that Project construction trips may have on the surrounding street and highway segments and intersections, the first step is to determine Project Construction trip generation. Project trip generation was estimated as shown in Table 8. The trip generation was based on information provided by Project representatives/engineers. Total AM and PM peak hour trips were estimated to reflect 40% of the daily trip information provided by Project representatives/engineers.

Table 8
Project Trip Generation

PHASE	Duration (Days)	DAILY	AM PEAK HOUR				PM PEAK HOUR			
		VOLUME	IN:OUT	VOLUME			IN:OUT	VOLUME		
			SPLIT	IN	OUT	TOTAL	SPLIT	IN	OUT	TOTAL
Peak Activity During Construction	90	1,234	90:10	445	49	494	10:90	43	389	494
TOTAL PROJECT TRIPS		1,234		445	49	494		49	445	494
TOTAL PROJECT TRIPS W/ PCE		1,342		483	54	537		54	483	537

Trip ends are one-way traffic movements, entering or leaving.

Considering the trip generation process described above, the proposed Project’s construction operation is estimated to generate 1,234 daily trips, 494 trips during the AM peak hour, and 494 trips during the PM peak hour. The trips reflected above represent the worst-case traffic conditions at any point of the Project’s construction phase. The capacity analysis was performed utilizing appropriate passenger car equivalents (PCE) for the Project’s construction operation. The PCE’s are reflected in the figures and operations tables included in this report.

3.2 Trip Distribution

Most construction workers are expected to arrive at the Project site in the morning and leave during the afternoon each weekday. Most workers are expected to use SR-180 to commute from the Fresno area, although some commutes from the north and south using SR-33 are also

expected. Deliveries of equipment and material will occur throughout the day and it is expected that most such deliveries will use SR-33 to reach California Ave., mostly arriving from the south. Some deliveries, particularly locally sourced equipment, material or supplies may come from the Fresno area by way of SR-180.

Access to the Project will be provided at driveways along California Avenue, Ohio Avenue and San Bernardino Avenue which will meet applicable County standards. The Project will also have private perimeter roads, and interior access ways for construction and operation. The proposed Project's trip distribution is provided in Figure 4.

3.3 Project Traffic

Project traffic as shown in Table 8 was distributed to the roadway system using the trip distribution percentages shown in Figure 4. A graphical representation of the resulting Project trips used is shown in Figure 5.

3.4 Existing Plus Project Traffic Conditions

An Existing Plus Project scenario was analyzed to include existing traffic plus traffic generated by the proposed Project. The resulting traffic is shown in Figure 6. Results of the analysis show that the SR-33 and California Avenue-Panoche Road intersection is projected to operate at an unacceptable level of service during the AM and PM peak hour during peak construction conditions. It should be noted that the projected traffic volumes at the intersection will not meet peak hour traffic signal warrants. Further, the westbound movement during the AM peak hour and the eastbound movement during the PM peak hour create the reported level of service deficiency. All other movements are operating at acceptable levels of service. Table 9 shows the intersection LOS for the existing conditions.

Results of the AM and PM peak hour LOS segment analysis along the existing street and highway system are reflected in Table 10. Roadway segment analysis was based on the Florida Department of Transportation, Generalized Peak Hour Directional Volumes for Florida's Urbanized Areas (Non-State Roadways, Major City/County Roadways), which are commonly utilized in the central valley. Table 11 provides ADT levels of service results for California Avenue and SR 33. Results of the analysis show that all of the study roadway segments are projected to operate at acceptable levels of service during peak construction operations.

**Little Bear Solar Project
Project Trip Distribution**

**Figure
4**



**Little Bear Solar Project
Proposed Project Traffic**

**Figure
5**



Little Bear Solar Project
Existing Plus Project Traffic Conditions

Figure 6

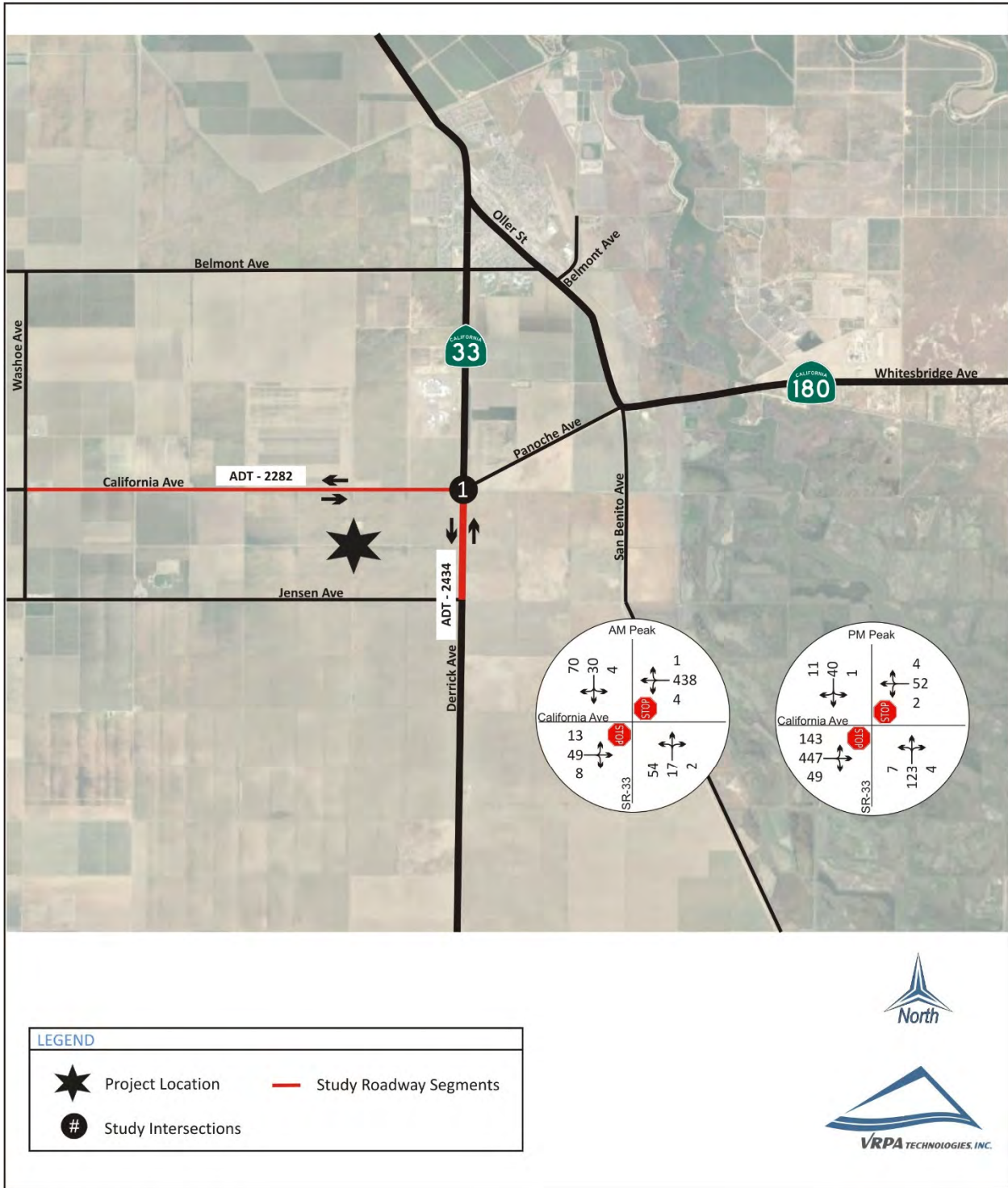


Table 9
Existing Plus Project Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	EXISTING PLUS PROJECT	
				DELAY	LOS
1. SR 33 / California Avenue-Panoche Road	Two-Way Stop Sign	C	AM	-- ⁺	F ⁺⁺
			PM	140.7	F ⁺⁺

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

+ Delay Exceeds 300 seconds.

++ Does not meet peak hour signal warrants.

Table 10
Existing Plus Project Peak Hour Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	DIRECTION	TARGET LOS	PEAK HOUR	EXISTING PLUS PROJECT	
					VOLUME	LOS
SR 33						
California Avenue to Jensen Avenue	1 lane	NB	C	AM	73	B
				PM	134	B
	1 lane	SB		AM	42	B
				PM	91	B
California Avenue						
Washoe Avenue to SR 33	1 lane	EB	D	AM	70	C
				PM	639	C
	1 lane	WB		AM	562	C
				PM	70	C

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

Table 11
Existing Plus Project ADT Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	TARGET LOS	EXISTING PLUS PROJECT	
			ADT	LOS
SR 33				
California Avenue to Jensen Avenue	2 lanes	C	2,434	B
California Avenue				
Washoe Avenue to SR 33	2 lanes	D	2,282	C

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

4.0 Mitigation

This section describes potential improvements to mitigate temporary traffic impacts related to Project construction operations. Described below are potential mitigation measures at the SR-33 and California Avenue-Panoche Road intersection.

As noted in Section 3, the SR-33 and California Avenue-Panoche Road intersection is projected to operate at an unacceptable level of service during the AM and PM peak hour during peak construction conditions. The westbound movement during the AM peak hour and the eastbound movement during the PM peak hour create the reported level of service deficiency. The following is a list of potential mitigation strategies to minimize construction-related vehicle delay and ensure the safety of all road users.

- ✓ Development of a Traffic Management Plan (TMP) for SR-33 and California Avenue consistent with California's Manual on Uniform Traffic Control Devices (MUTCD).
 - The TMP shall contain a Temporary Traffic Control (TTC) plan that addresses traffic safety and control through the work zone.
- ✓ Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow.

Currently, the SR-33 and California Avenue-Panoche Road intersection is a two-way stop controlled intersection. The addition of Project construction traffic will cause unacceptable levels of service in the westbound movement during the AM peak hour and the eastbound movement during the PM peak hour. As delay incurred along the westbound and eastbound approach increases, there is a natural tendency for drivers to accept shorter and shorter gaps in the major road traffic stream to complete their crossing or turning maneuver. As a result, the potential for a traffic collision increases.

Incorporating a temporary four-way stop or traffic signal at this intersection during peak construction activities would substantially reduce the delay experienced by the westbound movement during the AM peak hour and the eastbound movement during the PM peak hour while still maintaining acceptable levels of service at all other approaches. With the installation of four-way stop the projected delay at the westbound movement during the AM peak hour would be reduced from 325.3 seconds to 55.4 seconds. The projected delay at the eastbound movement during the PM peak hour would be reduced from 140.7 seconds to 54.7 seconds. With the installation of a temporary traffic signal the projected delay at the westbound movement during the AM peak hour would be reduced from 325.3 seconds to 6.7 seconds. The projected delay at the eastbound movement during the PM peak hour would be reduced from 140.7 seconds to 6.9 seconds. Results of the analysis are shown in Table 12. Appropriate warning signs and plaques, as well as advance warning signs, would need to be present along SR-33 to alert drivers of the modified traffic control at California Avenue.

Table 12
Existing Plus Project Intersection Operations with Mitigation

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	EXISTING PLUS PROJECT	
				DELAY	LOS
1. SR 33 / California Avenue-Panoche Road	Four-Way Stop Sign	C	AM	42.8	E
			PM	43.0	E
	Traffic Signal	C	AM	8.3	A
			PM	8.4	A

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

Appendix N

Tribal Cultural Resources



Inter Office Memo

DATE: **June 19, 2018**

TO: File

FROM: Chrissy Monfette, Development Services and Capital Projects *cmw*

SUBJECT: Environmental Impact Report No. 7225 AB 52 Consultation
Conditional Use Permit Application Nos. 3550-53 and 3577
Little Bear Solar Project

Notification was provided to the Tribes as part of the mailed distribution of the Notice of Preparation, dated August 31, 2018. Under the provisions of Assembly Bill 52 (AB 52), the County provided additional notice on October 10, 2017 that this application was complete to the following Tribal Governments: Table Mountain Rancheria (TMR), Dumna Wo Wah (DWW), and Santa Rosa Rancheria (SRR); and provided notice to the Picayune Rancheria of the Chukchansi Indians (PRCI) on October 27, 2018. Notification included the language required by AB 52 and was sent by certified letter, which provided a date of receipt. Requests for consultation must be postmarked within 30 days of such receipt.

TMR requested consultation on October 2, 2018 (after receipt of the Notice of Preparation); DWW requested consultation on October 17, 2018; and PRCI requested consultation on October 31, 2018. Staff did not receive a response from SRR.

Staff sent letters by certified mail dated December 6, 2017 inviting TMR, DWW, and PRCI to schedule a meeting where potential impacts to Tribal Cultural Resources could be discussed. There was no response from any of the Tribes.

On December 18, 2017, staff emailed copies of the cultural report prepared for the Little Bear Project to Robert Pennell of TMR; Chris Acree and Robert Ledger of DWW; and Tara Harter of PRCI. Copies were also sent to Kim Taylor and Sara Barnett of TMR on October 27, 2017. There was no response from any of the Tribes.

On April 3, 2018, staff sent emails to Tara Harter (PRCI), Robert Ledger (DWW), and Robert Pennell, Kim Taylor, and Sara Barnett (TMR) describing the project and providing another copy of the cultural studies report and requesting that the Tribes provide comments regarding known Tribal Cultural Resources by April 13, 2018. Tara Harter requested clarification regarding the address of the project site, but did not provide comments. Staff did not receive any other response.

On May 21, 2018, TMR provided a request to consult regarding this project and referenced a letter dated December 6, 2017. As noted earlier, the December 6, 2017 letter was a follow-up request with TMR to set up a meeting. Despite the oddity of the timing related to this letter, staff followed up with TMR by providing a copy of the cultural resources study on May 25, 2018. Comments were requested by June 6, 2018. Staff did not receive a response.

Based on the lack of response from the Tribes, staff believes that we have made a good faith effort to consult regarding potential tribal cultural resources. Letters confirming the conclusion of consultation were sent to Tara Harter (PRCI), Robert Ledger (DWW), and Robert Pennell (TMR) on June 20, 2018.

Therefore, the requirements of AB 52 has been met for the subject application. Please let me know if you have any questions: cmonfette@FresnoCountyCA.gov or by phone at (559) 600-4245.