Appendix M

Water Supply Assessment

Kimley»Horn

LOCKHART SOLAR PV II
WATER SUPPLY ASSESSMENT

PREPARED FOR

LOCKHART SOLAR PV II, LLC

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Acronym List

Acronym	**Term**
AF	acre-feet
BAP	Base Annual Production
BESS	Battery Energy Storage System
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CUP	Conditional Use Permit
DWR	Department of Water Resources
GSA	Groundwater Sustainability Act
GSP	Groundwater Sustainability Plan
GWh	gigawatt hours
IRWM	Integrated Regional Water Management
MW	megawatts
MWA	Mojave Water Agency
PSY	Production Safe Yield
PV	photovoltaic
RECE	Renewable Energy and Conservation Element
SB	Senate Bill
SEGS	Solar Energy Generating System
SWP	State Water Project
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment
WSCP	Water Shortage Contingency Plan

Section 1 - Introduction

On behalf of Lockhart Solar PV II, LLC, Michael Baker International (Michael Baker) has prepared this Water Supply Assessment (WSA) for the Lockhart Solar PV II Project (Project).

1.1 Project Location

The Project Site is in unincorporated Hinkley, CA, approximately 7 miles north of the intersection of Harper Lake Road and Mojave-Barstow Highway 58 (See Figure 1-1). The Project Site consists of area within three parcels, each of which contains vacant, previously disturbed land, miscellaneous concrete foundations, various electrical lines and poles, as well as existing facilities within the Shared Facilities Area. The Project Site is bordered on the south by the existing Solar Energy Generating System (SEGS) VIII and IX Solar Thermal Power Plants, which the County of San Bernardino (County) approved for repowering to photovoltaic (PV) solar and battery storage in 2019 as part of the Lockhart Solar I Facility (CUP Project #201900125 approved in 2019); Harper Lake Road to the east; Hoffman Road to the west; and vacant land to the north.

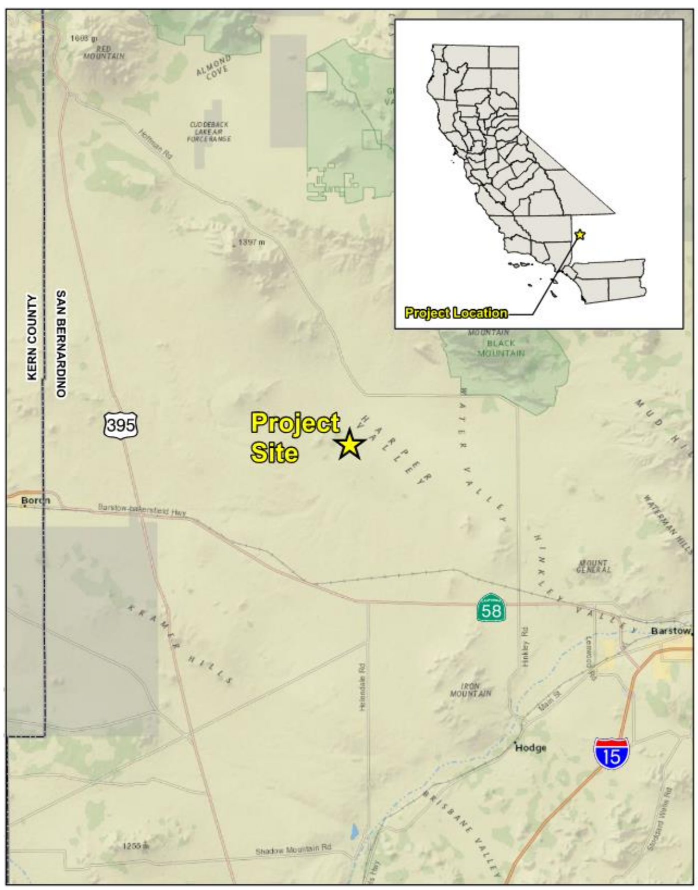

Figure 1-1 Lockhart Solar PV II Project Regional Vicinity

1.2 Project Description

The Lockhart Solar PV II Project (Project) includes development of a utility scale, solar PV electricity generation and energy storage facility that would produce up to 150 megawatts (MW) of solar power and include up to 4 gigawatt hours (GWh) of energy storage capacity rate in a battery energy storage system (BESS) within the approximately 755-acre Project Site. The Project is bordered on the south by the approved Lockhart Solar I Facility. The Project would share existing operations and maintenance (O&M) facilities (i.e., O&M building, warehouse and employee building), water and septic systems, as well as switchyard and electrical transmission infrastructure, and a new collector substation (approved and to be constructed) with the Lockhart Solar I Facility to connect the Project to the existing transmission line which runs to the Southern California Edison (SCE)-owned Kramer Junction substation. The Project is largely sited on land previously approved by the California Energy Commission (CEC) for development of SEGS X, a solar thermal power facility which was never fully constructed. The Project Site has been subject to near complete surface disturbance associated with past agricultural use, grading during partial construction of the SEGS X facility, as well as construction of the Shared Facilities Area for the existing SEGS VIII and IX Solar Thermal Power Plants. Development includes demolition of existing SEGS X concrete foundations (as needed) to allow for construction of Project facilities. The Project is subject to conditional use permit (CUP) approval from the County.

1.3 Purpose of Water Supply Assessment

California Water Code sections 10910 et seq., commonly referred to as SB 610, requires the preparation of a Water Supply Assessment (WSA) for certain new development projects (See Water Code §§ 10910(a), 10912). The primary purpose of a WSA is to determine whether the identified water supply or water supplier will be able to meet projected demands for a project, in addition to existing and planned future uses, over a 20-year planning period in normal, single-dry, and multiple-dry water years. Secondarily, a WSA provides decision-makers a regional framework on which to base a decision about the sufficiency of water supplies for a proposed project.

Water Code § 10910 states that a "project," as defined in Water Code § 10912 and subject to the California Environmental Quality Act (CEQA), requires the preparation of a WSA. In accordance with SB 610 and as defined under Water Code § 10912(a), "projects" that would be subject to the WSA requirements include:

(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 above;

(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.

As the Project is considered an industrial site and would occupy up to approximately 755 acres of land, preparation of a WSA is required.

The goal of this WSA is to determine whether the water supply available during normal (non-drought), single-dry (limited drought), and multiple dry (extended drought) water years will be sufficient in accommodating the anticipated demand of the Project in addition to the existing and future water uses of the area within a 20-year projection. Additionally, it is intended to assist lead agencies considering approval of a project by validating that the available water supply is sufficient to serve the proposed development. The County, as the Lead Agency under CEQA, has determined that the Project is subject to CEQA and has requested a WSA. Pursuant to SB 221, this report will be used as an evidentiary basis for County approval.

The Project will source its non-potable water supply entirely from the Mojave River Groundwater Basin, with MWA as the Basin's regulating authority. A more detailed description of the water source is provided in Section 3 of this WSA. According to the Urban Water Management Planning Act, "every urban water supplier that either provides over 3,000 acre-feet of water annually or serves more than 3,000 urban connections is required to submit an UWMP." The Urban Water Management Plan (UWMP) evaluates the water source reliability over a 20-year planning period and is prepared by urban water suppliers once every five years. MWA's 2020 UWMP, adopted on May 27, 2021, evaluates trends in population, water use, and water supplies within the MWA service area for a 45-year planning period through 2065.

Section 2 - Project Summary

The Project includes development of a utility scale, solar PV electricity generation and energy storage facility that would produce up to 150 MW of solar power and include up to 4 GWh of energy storage capacity rate in a BESS on up to approximately 755 acres of land. Construction and operation of the Project would generate water demand above the existing water demand on the Project Site.

2.1 Project Site Background

During the early 1990s, construction of the SEGS X solar thermal facility was initiated on the Project Site. SEGS X was part of a series of three solar thermal power plants certified by the CEC which were to be built adjacent to each other in order to share supporting facilities. SEGS X was fully permitted and certified as an 80 MW solar thermal facility. Approximately 600-acres were identified for the SEGS X power plant including land for associated facilities to be shared with the two adjacent solar thermal power plants (SEGS VIII and IX). In 1991, the SEGS X owner was unable to continue construction due to lack of financing and construction was halted. Prior to work stoppage, several concrete foundations for the power block as well as concrete foundations for solar racking and various electrical lines and poles had been installed in portions of the Project Site, and currently remain on site.

2.2 Project Water Demand

The non-potable water supply for the Project would be sourced from the four existing groundwater wells that were originally installed to provide non-potable water supply to the previously approved and existing SEGS facilities. Two existing groundwater wells, along with existing SEGS VIII and IX O&M buildings, warehouse and the employee building, are located within the 110-acre Shared Facilities Area. Two additional existing groundwater wells are located within the SEGS IX site. The wells depend on groundwater supply drawn from the adjudicated Mojave Basin Area, which is managed by the MWA. The existing groundwater wells would serve both the approved Lockhart Solar I Facility and the Project. The Project would also be served by shared, and already approved, water conveyance and septic systems within the adjacent Lockhart Solar I Facility site.

During Project construction, non-potable water would be required for common construction-related activities, including but not limited to dust suppression, soil compaction and grading. As determined by the Applicant, the overall construction water usage is anticipated to be approximately 240 acre-feet (AF) during the approximately 14-month construction period. It should be noted that the SEGS X project anticipated approximately 4,300 AF of water use during construction. At the time, the CEC concluded the overall construction water usage for the SEGS X project would not have any measurable impact on the groundwater supplies as a one-time use (See Appendix A).

As stated, Project operations would share the existing O&M facilities (i.e., O&M building, warehouse and employee building) with the Lockhart Solar I Facility. No increase in existing operations staff would be required for Project operations. Thus, the Project would not increase the demand for non-potable water use in the existing O&M facilities. During Project operation, non-potable water would be required for panel washing, equipment washing, and other site maintenance. Solar panel washing is expected to occur one to four times per year and general labor (up to 10 individuals) may assist in the panel cleaning. Although the Applicant only expects to wash the PV panels once per year, the panels may need to be washed more frequently based on site conditions. Conditions that may necessitate increased wash requirements include unusual weather occurrences, local air pollutants, and other similar conditions. Therefore, the annual water usage for four panel cleaning cycles is anticipated to be approximately 4.5 AF. Additionally, a small amount of groundwater (approximately 0.45 AF) is anticipated to be required for equipment washing and other site maintenance. It should be noted that the previously approved SEGS X project, a solar thermal facility that would have required a more intensive water demand, was estimated to use 820 AF per year for O&M (See Appendix A). As the Project is a PV solar project, the Project would use significantly less water than what was required for the previously approved SEGS X project.

Section 3 - Mojave Water Agency

3.1 Mojave Water Agency Service Area Adjudication History

MWA was established in 1960 with the primary goal to "do any and every act necessary so that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the Agency's jurisdiction" (Mojave Water Agency Law § 97-1.5). The legal process which established water production rights and obligations for the available natural water supply was the Adjudication of the Mojave Basin Area. The first Adjudication effort was made in 1964 when MWA realized that the Mojave River Basin had been in serious overdraft since the 1950s. Groundwater overdraft occurs when the water extraction rate is higher than the aquifer recharge rate. This Adjudication effort concluded that water rights must be determined to effectively manage the basin's groundwater supply. MWA was able to determine the water rights through State legislation under the Water Recordation Act of 1955, which requires water purveyors to annually report water extractions within the County to the State Water Rights Board.

A second attempt to Adjudicate the Mojave Water Basin was initiated in 1990 when the City of Barstow and the Southern California Water Company filed a court action suit, claiming that an approved major development in the City of Hesperia sources water from upstream of the Mojave Groundwater Basin which as a result would reduce natural groundwater flow to the downstream users. The lawsuit requested that 30,000 AF of water be allocated to the City of Barstow annually. MWA filed a cross-complaint a year after the initial lawsuit contending that the Mojave Groundwater Basin's water supply was insufficient to meet the water demands within MWA service area. The case grew in complexity as other municipalities and agencies joined the court action suit. Negotiations persisted over the next two years until the parties involved eventually agreed to produce a Stipulated Judgment (the "Mojave Basin Judgment"). The Mojave Basin Judgment provided a physical solution to the overdraft and directed MWA to establish a procedure that would allow minimal producers (those who use 10 AF of water per year or less) the opportunity to fairly participate in the offered solution. In 1993, the Riverside Superior Court bound the Mojave Basin Judgment, appointing MWA as the Watermaster over the Mojave Basin Area Adjudication. Non-stipulating parties were subsequently bound after 1996. Nine non-stipulating parties, referred to as the "Cardozo Group", continued to appeal the Judgement and this group was subsequently excluded from the Mojave Basin Judgment in 1998.

The Mojave Basin Area Adjudication divided the Mojave Basin Area into five hydrologic subareas: Este (East Basin), Oeste (West Basin), Alto (Upper Basin), Centro (Middle Basin) and Baja (Lower Basin) (See Figure 3-1 – MWA Water Service Boundary with Adjudicated Subareas).

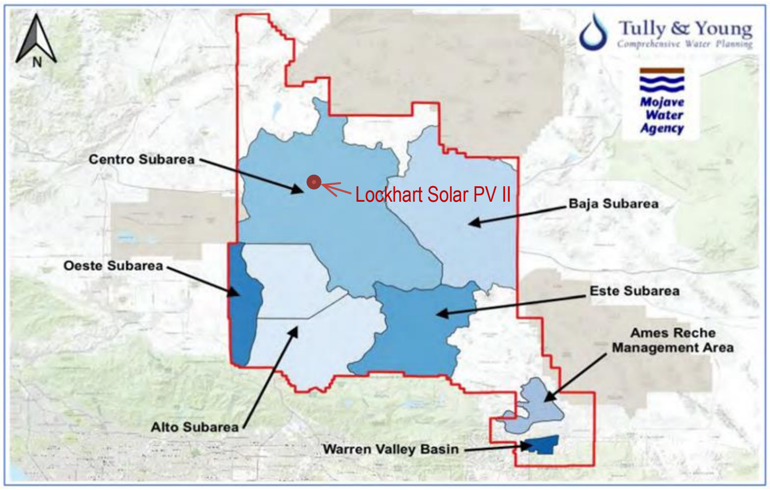

Figure 3-1: MWA Water Service Boundary with Adjudicated Subareas (MWA 2020 UWMP)

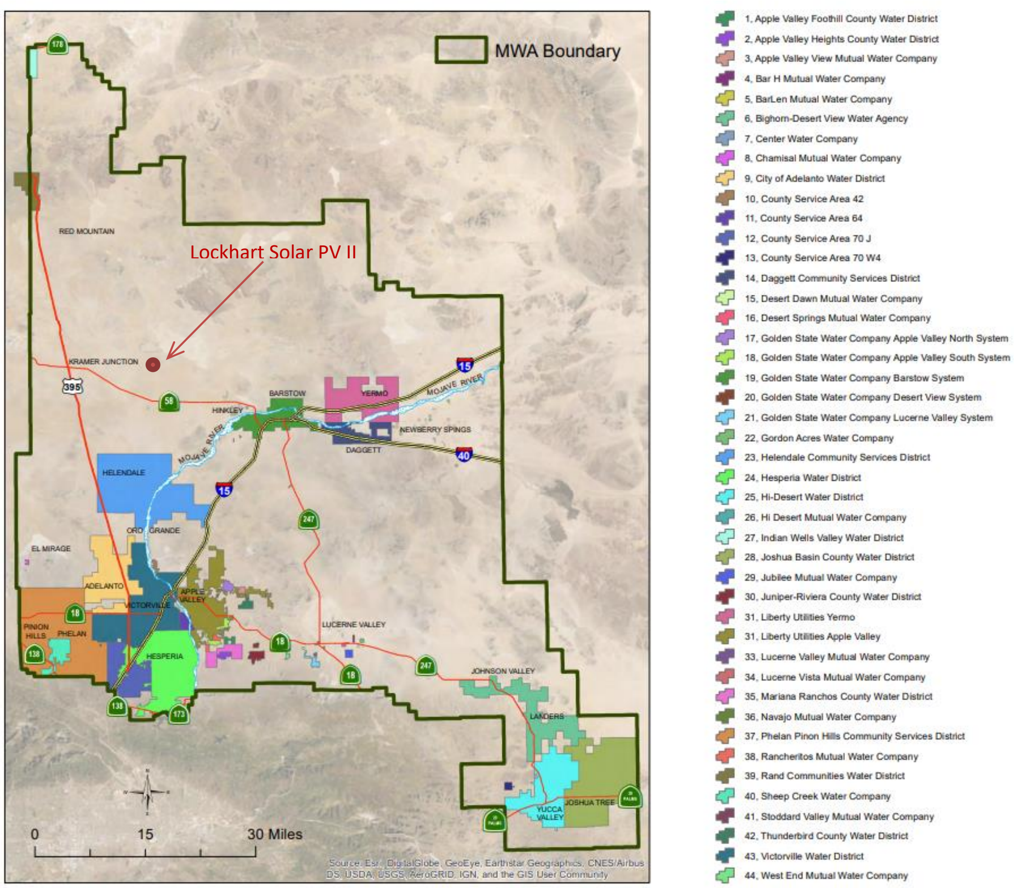

Figure 3-2: Water Purveyors Regional Location (MWA Water Purveyor Guide 2012)

As the Watermaster, MWA is responsible for managing water resources, maintaining water quality, and promoting efficient use of local water supplies through conservation programs and public awareness. In addition to being the Watermaster for the Mojave Basin Area Adjudication, MWA is a State Water Project (SWP) contractor, administrator for the Warren Valley Basin Judgment, and a wholesale water supplier to numerous retail water purveyors that provide water service to communities within MWA service area (See Figure 3-2 - Water Purveyors Regional Location). Base Annual Production (BAP) rights were assigned to each producer using 10 AF or more and were determined according to average annual natural flow baselines. The Judgement also established a variable Free Production Allowance (FPA) – percentage share of the BAP set by the Watermaster. The Judgment states that, the FPA must be reduced over time until it comes within 5 percent of the Production Safe Yield (PSY).

The FPA for each Subarea for water year 2020-2021 is set as follows:

- Alto Subarea - 65 percent of BAP for agriculture and 55 percent of BAP for municipal and industrial
- Oeste Subarea - 65 percent of BAP
- Este Subarea - 70 percent of BAP
- Centro Subarea - 70 percent of BAP
- Baja Subarea – 25 percent of BAP

The MWA has assigned the Centro subarea a BAP of 56,657 AF, with a resulting FPA of 39,660 AF. The MWA includes its allocations under the Adjudication for the Centro Subarea in its assumptions for its existing and projected water supply in the MWA 2020 UWMP.

3.2 Water Service Area Description

MWA has an approximate water service area of 4,900 square miles in eastern San Bernardino County, California. MWA service area is part of the Mojave Desert, known as the driest desert in North America, and supports large communities with significant water demands.

The SWP is the largest state-built, multi-purpose water project in the country. MWA imports water from the California Aqueduct to recharge the groundwater basins. As a SWP contractor, MWA is entitled to receive annual allotment amounts of water from the California Aqueduct. Since most of MWA’s water supply is sourced from groundwater basins, subbasins, and aquifers within the Mojave Basin Area, MWA developed two pipelines aimed to deliver additional water supply from outside the MWA service area. The Morongo Basin Pipeline, which was completed in 1995, supplies more than 60,000 people in Morongo Basin. In 2006, the Mojave River Pipeline was completed to provide critical recharge to the Mojave River Basin, running 76 miles with the ability to deliver up to 45,000 AF per year.

3.3 Mojave Basin Area

MWA derives its water supply almost entirely from managed groundwater resources from the Mojave River Groundwater Basin, commonly referred to as the Mojave Basin Area. Multiple subbasins comprise the Mojave Groundwater Basin that supply various portions of MWA service area. The Mojave Basin Area expands to approximately 3,400 square miles and is bounded by the San Bernardino and San Gabriel Mountains, Afton Canyon, Lucerne Valley, and the Antelope Valley. The Basin Area consists of subbasins that are grouped into two major hydrogeologic distinct areas – the South Lahontan Hydrologic Region and the Colorado River Hydrologic Region (See Figure 3-3 - South Lahontan and Colorado River Hydrologic Regions). The remaining basins in the southeastern Mojave Region are referred to as the Morongo Basin/Johnson Valley Area or "Morongo Area." The primary source of groundwater recharge in the Mojave River groundwater basin is water flow from the Mojave River, which originates from the San Bernardino Mountains, and imported water from the SWP.

DWR Basin	Groundwater Basin Name	DWR Basin	Groundwater Basin Name
South Lahontan Hydrologic Region		**Colorado River**	
6-35	Cronise Valley	7-10	Twentynine Palms Valley
6-36	Langford Valley	7-11	Copper Mountain Valley
6-37	Coyote Lake Valley	7-12	Warren Valley
6-38	Caves Canyon Valley	7-13	Deadman Valley
6-40	Lower Mojave River Valley	7-13	Deadman Valley
6-41	Middle Mojave River Valley	7-15	Bessemer Valley
6-42	Upper Mojave River Valley	7-16	Ames Valley
6-43	El Mirage Valley	7-17	Means Valley
6-44	Antelope Valley	7-18	Johnson Valley
6-46	Fremont Valley	7-18	Johnson Valley
6-47	Harper Valley	7-19	Lucerne Valley
6-48	Goldstone Valley	7-20	Morongo Valley
6-49	Superior Valley	7-50	Iron Ridge Area
6-50	Cuddeback Valley	7-51	Lost Horse Valley
6-51	Pilot Knob Valley	7-62	Joshua Tree
6-52	Searles Valley	8-2	Upper Santa Ana Valley
6-53	Salt Wells Valley		
6-54	Indian Wells Valley		
6-77	Grass Valley		
6-89	Kane Wash Area		

Figure 3-3: South Lahontan and Colorado River Hydrologic Regions (MWA 2020 UWMP)

There are three adjacent groundwater basins that drain along the Mojave River – the Upper, Middle, and Lower Mojave Valley Groundwater Basins. These basins underlie approximately 910,000 acres with boundaries extending to the Shadow Mountains, El Mirage Valley, and Harper Valley.

The following are the basin characteristics of the Mojave River Groundwater Basin as stated in MWA's 2020 UWMP:

- *The upper, lower and middle basins are bounded on the north by Harper Valley, Waterman and Calico mountains, and Coyote Lake Valley; on the east by the Cady Mountains and Pisgah fault; and on the south by Daggett Ridge, the Newberry, Rodman, and San Bernardino mountains.*
- *The faults that affect groundwater flow are the northwest-trending Helendale, Mount General, Lenwood, Camp Rock-Harper Lake, Calico-Newberry, and Pisgah faults (California Department of Water Resources 2003).*
- *Groundwater conditions are generally unconfined in the Mojave River Valley groundwater basins (California Department of Water Resources 2003).*
- *A regional alluvial-fan unit and an overlying floodplain unit are the primary water-bearing units of the basin.*
- *The regional fan unit is composed of Pliocene and Quaternary unconsolidated-to-partially-consolidated alluvial-fan deposits. This unit has a maximum thickness ranging from 1,000 feet in the Upper Mojave River Valley to 2,000 feet in the Middle and Lower Mojave River Valley basins, with an average thickness of approximately 300 feet in all basins (California Department of Water Resources 1967).*
- *The overlying floodplain unit is Pleistocene age and is the more productive water-bearing unit. The floodplain unit has an average thickness of 150 feet in the Upper Mojave River Valley basin and 200 feet in the Middle and Lower Mojave River Valley basins.*

The basin recharge occurs by surface water infiltration and by artificial recharge. The Mojave River Pipeline and the Morongo Pipeline are responsible for delivering imported water from the California Aqueduct to the Mojave Desert Region. There are several recharge facilities and basins across the service area, including the Deep Creek, Amethyst Basin, and Ames – Reche, that help restore water supply in the MWA service area. Groundwater is discharged from the Mojave Basin Area primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River. The Project is located within the Centro (Middle Basin) subarea, which draws its water supply entirely from the Harper Valley Groundwater Basin, a subbasin of the Mojave Groundwater Basin.

3.4 Harper Valley Basin

The Harper Valley Groundwater Basin encompasses 640 square miles and underlies Harper Valley in western San Bernardino and eastern Kern Counties of the central Mojave Desert (See Figure 3-4 - Harper Valley Basin Boundary). The total capacity of the Harper Valley Groundwater Basin is approximately 6,975,000 AF. The Harper Valley Groundwater Basin is part of the South Lahontan Hydrologic Region, with 20 basins and subbasins in the MWA service area. The western portion of the Harper Valley Groundwater Basin is bounded by a combination of surface drainage divides, portions of the Harper, Kramer Hills and Lockhart faults, and low-lying basement hills. On the southern portion, the Harper Valley Groundwater

Basin is bounded by Mount General, Iron Mountain, and the Waterman Hills, as well as subsurface drainage patterns. The Harper Valley Groundwater Basin is bounded on the north by the Rand Mountains. Majority of the Harper Valley Groundwater Basin is considered unconfined and allows recharge via rainfall infiltration and percolation of surface runoff through the edges of Harper Valley. Confined conditions are found near Harper Lake. The Harper Valley Groundwater Basin also receives groundwater flow from Middle Mojave River Valley and Cuddeback Valley groundwater basins that are regularly recharged by MWA.

Figure 3-4: Harper Valley Basin Boundary (California Groundwater Bulletin 118, MWA region)

3.4.1 Sustainable Groundwater Management Act

In 2015, Sustainable Groundwater Management Act (SGMA) 2019 was enacted to provide for the sustainable management of groundwater basins in California. SGMA planning requirements are mandatory for the high- and medium-priority groundwater basins identified by DWR. In these basins, qualifying local agencies are required to create a Groundwater Sustainability Agency (GSA) and adopt a SGMA-compliant Groundwater Sustainability Plan (GSP). Under SGMA, groundwater basin boundaries are as identified in DWR Bulletin 118.

The SGMA 2019 Basin Prioritization process was conducted to reassess the priority of the groundwater basins following the 2016 basin boundary modifications, as required by the Water Code. For the SGMA 2019 Basin Prioritization, DWR followed the process and methodology developed for the CASGEM 2014 Basin Prioritization, adjusted as required by SGMA and related legislation. DWR used the following list of components to re-evaluate prioritization:

1. The population overlying the basin or subbasin.
2. The rate of current and projected growth of the population overlying the basin or subbasin.
3. The number of public supply wells that draw from the basin or subbasin.
4. The total number of wells that draw from the basin or subbasin.
5. The irrigated acreage overlying the basin or subbasin.
6. The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water.
7. Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation.
8. Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflow.

The Harper Valley Groundwater Basin (DWR Basin No. 6-047) has been classified as a very low-priority basin and is not required to form a GSA and adopt a GSP or submit an alternative to a GSP. DWR determined that as a “Basin with Adjudication & Non-Adjudicated GW Use <9,500 af,” under Component 8C&D of DWR’s review, the Basin is a “very low-priority basin.”

3.4.2 Climate

The Harper Valley Groundwater Basin is in the High Desert region of the County, within the Mojave Desert. The area is very arid because of the rain shadow effect of the surrounding mountains. The summertime temperature is 95 to 105 degrees Fahrenheit (35 to 40.5 Celsius), with occasional thunderstorms that can cause flash flooding and bring hail. During the winter, the temperature drops to between 20 and 30 Fahrenheit (-7 to -1 Celsius) with the possibility of light snowfall.

3.5 Climate Change

Climate change is an impending threat to the Mojave Basin Area’s groundwater supply, facilities, and operations. Given the nature of its location, extended drought periods and unpredictable rainfall can impact reliability. MWA’s primary climate change efforts focus on ensuring continuous access to SWP’s imported water that recharges the groundwater basin. Basin recharge is crucial in combating the effects of climate change in the Mojave Basin Area.

Although California does not have a specific law or regulation regarding addressing the potential impact of climate change in WSAs, state programs and policies emphasize that climate change should be considered in preparing drought-risk assessments, supply and demand analyses, and water conservation efforts for both present and future projections within an UWMP or Integrated Regional Water

Management (IRWM) Plan. The Mojave 2014 IRWM Plan included a Climate Change Assessment that evaluated the vulnerability of the region's surface water supplies, future frequency of flooding, and a complete inventory of greenhouse gas emissions from the water sector. The Mojave IRWM Plan provides a roadmap for the MWA to cooperate with its retail suppliers to meet federal and State requirements for conservation.

Section 4 - Existing and Projected Supply and Demand

The Project would source its non-potable water from existing groundwater wells that were originally installed to provide non-potable water supply to the previously approved and existing SEGS facilities. These existing groundwater wells pump water from the Harper Valley Groundwater Basin. This section evaluates the capacity of the water source to meet the construction and operational demands of the Project in addition to the existing and future water uses of the area within a 20-year projection.

4.1 Mojave Water Agency

4.1.1 Groundwater Supply

Managed groundwater is the primary source of water supply within MWA service area. Groundwater pumped from production wells supply retail agencies and consumers alike. Given the history of California's depleting groundwater stores and the resulting legal regulations, MWA must purchase and import water into its service area to replenish its extracted groundwater. The water used to recharge groundwater basins include SWP water, return flow, and wastewater imports. However, MWA's total managed groundwater supplies also include natural supplies and stored water, described in more detail below.

A portion of MWA's groundwater comes from natural supplies fed by percolated stream flow or natural runoff as well as infiltrating precipitation. MWA estimates an available natural supply of approximately 57,349 AF per year. Despite annual variations in natural supplies, MWA projects long-term averages to be relatively constant, as depicted in Table 4-1.

Table 4-1: MWA Natural Supplies from 2025-2045 (in AF)

Total Supply		2025	2030	2035	2040	2045
Normal		57,349	57,349	57,349	57,349	57,349
Single-Dry Year		57,349	57,349	57,349	57,349	57,349
Multi-Year Drought	Year 1	57,349	57,349	57,349	57,349	57,349
	Year 2	57,349	57,349	57,349	57,349	57,349
	Year 3	57,349	57,349	57,349	57,349	57,349
	Year 4	57,349	57,349	57,349	57,349	57,349
	Year 5	57,349	57,349	57,349	57,349	57,349

Source: 2020 UWMP (MWA), Table 3-14

Return flows are described as "percolated supplies that are derived from non-consumptive uses including septic system percolation, applied irrigation water, treated wastewater, and returns through storm drains or non-revenue water supplies" (2020 UWMP, pg. 3-21). MWA estimates, on a regional basis, 42 percent of groundwater production to be return flow. Table 4-2 is a summary of return flow supplies calculated as a percentage of the previous years' water production for each water use category over the 20-year planning horizon.

Table 4-2: MWA Return Flow Supplies from 2025-2045 (in AF)

Total Supply		2025	2030	2035	2040	2045
Normal		47,655	49,913	51,180	52,454	53,865
Single-Dry Year		47,655	49,913	51,180	52,454	53,865
Multi-Year Drought	Year 1	47,655	49,913	51,180	52,454	53,865
	Year 2	47,655	49,913	51,180	52,454	53,865
	Year 3	47,655	49,913	51,180	52,454	53,865
	Year 4	47,655	49,913	51,180	52,454	53,865
	Year 5	47,655	49,913	51,180	52,454	53,865

Source: 2020 UWMP (MWA), Table 3-15

Treated wastewater effluent is imported from three wastewater entities including the Lake Arrowhead Community Services District, Big Bear Area Wastewater Agency, and the Crestline Sanitation District. Wastewater imports represent a small percentage of MWA's overall water supply portfolio. Table 4-3 shows the long-term available imported wastewater supply.

Table 4-3: MWA Imported Wastewater Supplies from 2025-2045 (in AF)

Total Supply		2025	2030	2035	2040	2045
Normal		2,800	2,800	2,800	2,800	2,800
Single-Dry Year		2,800	2,800	2,800	2,800	2,800
Multi-Year Drought	Year 1	2,800	2,800	2,800	2,800	2,800
	Year 2	2,800	2,800	2,800	2,800	2,800
	Year 3	2,800	2,800	2,800	2,800	2,800
	Year 4	2,800	2,800	2,800	2,800	2,800
	Year 5	2,800	2,800	2,800	2,800	2,800

Source: 2020 UWMP (MWA), Table 3-16

4.1.2 Surface Water Supply

The SWP grants MWA an appropriative water right to annual allotments under certain terms and conditions. MWA is among 29 other water agencies who are contracted with DWR under the SWP.

The main source of SWP water is the 3,900-square mile Feather River watershed that originates from the high country of Plumas and Sierra counties. The runoff from the Feather River headwaters leads to three reservoirs that are commonly referred to as Upper Feather River Lakes – The Antelope, Frenchman, and Davis reservoirs. Together these reservoirs have a storage capacity of approximately 162,000 acre-feet. Water released from the Upper Feather River system flows into Lake Oroville which has approximately 3.54 million acre-feet of storage capacity. From Lake Oroville the water flows to the Sacramento–San Joaquin River Delta and then into the California Aqueduct.

The SWP was originally expected to provide up to 4.23 million AF of water per year, by way of 28 dams and reservoirs, 26 pumping facilities, and approximately 660 miles of aqueducts. Currently, the SWP's maximum water supply availability totals 4.133 million AF. However, SWP water deliveries are typically less than 100 percent of a participating agency's maximum allocation amount, which DWR suggests will continue in the future. Table 4-4 details the variations of MWA's actual annual SWP water deliveries compared to their maximum contracted amount. Variations in SWP allocations can typically be associated with hydrology, water storage, and regulatory criteria.

Table 4-4: SWP Entitlement and Deliveries (in AF) to MWA

Year	SWP Entitlement	Percent Allocation	Actual Allocation Amount
2010	82,800	50%	41,400
2011	82,800	80%	66,240
2012	82,800	65%	53,820
2013	82,800	35%	28,980
2014	82,800	5%	4,140
2015	85,800	20%	17,160
2016	85,800	60%	51,480
2017	85,800	85%	72,930
2018	85,800	35%	30,030
2019	85,800	75%	64,350
2020	89,800	20%	17,960

Source: 2020 UWMP (MWA), Table 3-1

Table 4-5 illustrates the current SWP allocation by hydrologic year type, during normal year, single-dry year, and multi-year drought. MWA used the single lowest historical SWP allocation to date to inform drought planning projections for a single-dry year, which occurred in 2014 at 5 percent allocation. MWA characterizes the multi-year drought as a critical drought over five consecutive years with two extreme drought years (5 percent of maximum SWP entitlement).

Table 4-5: Future SWP Allocations by Year Type (in AF)

Year		SWP Contract Table A	Percent Allocation	Allocation Amount
Normal		89,800	58%	52,084
Single-Dry		89,800	5%	4,490
Multi-Year Drought	2021 (1st year)	89,800	35%	31,430
	2022 (2nd year)	89,800	5%	4,490
	2023 (3rd year)	89,800	5%	4,490
	2024 (4th year)	89,800	20%	17,960
	2025 (5th year)	89,800	35%	31,430

Source: 2020 UWMP (MWA), Table 3-4

SWP deliveries are projected to trend downward over the 20-year planning horizon. According to MWA's 2020 UWMP, the SWP percentage of actual water deliveries to maximum entitlements averaged

58 percent in 2020 and is projected to decline to 52 percent by 2040. Table 4-6 summarizes MWA's projected SWP allocations by year type over the 20-year planning horizon and depicts this general downward trend during "normal" year deliveries over the 20-year planning horizon.

According to MWA's 2020 UWMP, the long-term reliability of SWP allocation amounts is affected by numerous hydrological and regulatory issues, which are incorporated into MWA's planning and supply characterizations referenced in this assessment.

Table 4-6: Future SWP Allocations by Year Type from 2025-2045 (in AF)

Total Supply		2025	2030	2035	2040	2045
Normal		50,737	49,390	48,043	46,696	46,696
Single-Dry Year		4,490	4,490	4,490	4,490	4,490
Multi-Year Drought	Year 1	31,430	31,430	31,430	31,430	31,430
	Year 2	4,490	4,490	4,490	4,490	4,490
	Year 3	4,490	4,490	4,490	4,490	4,490
	Year 4	17,960	17,960	17,960	17,960	17,960
	Year 5	31,430	31,430	31,430	31,430	31,430

Source: 2020 UWMP (MWA), Table 3-5

4.1.3 Stored Water

Fluctuations in annual SWP allocations during dry periods are mitigated by MWA's water storage capacity. MWA can choose to forego SWP delivery of a portion of their allocated supply to store water for future use. This stored supply is known as "carryover" and is held in the San Luis Reservoir located in the City of Santa Nella. All SWP contractors can utilize carryover but the amount allowed is regulated and is subject to change in any given year. Based on historical averages, MWA has conservatively projected carryover supplies to be approximately 20,000 AF during a "normal" year and to be approximately 2,000 AF during a "dry" year.

MWA also imports water to be recharged within its adjudicated basins. As of September 2020, the total stored water within the MWA service area was 191,915 AF. This process is known as groundwater banking. According to the Mojave Basin Adjudication, MWA must use what is currently banked by 2036. However, MWA plans to extend this timeline by continuing to replenish banked supplies.

MWA's stored groundwater budget, which includes groundwater stored in local basins and SWP carryover, is conservatively estimated to be 200,000 AF. MWA projects their baseline storage to remain constant over the 20-year planning horizon and plans to continue to employ necessary groundwater management practices to mitigate impacts of extended dry periods.

4.2 Existing and Future Water Demand

Approximately every five years, MWA calculates projected water demands within its service area for planning purposes as part of the UWMP. Table 4-7 summarizes the existing and projected water demands within the MWA service area for the twelve large water retailers, small potable water systems and domestic users, agricultural users, and other users including golf courses, industry, and recreational users. MWA anticipates a stable increase in water use in line with increases to land use and population growth.

Table 4-7: Existing and Projected Future Water Demands from 2020-2045 (in AF)

Water Use Category	2020	2025	2030	2035	2040	2045
Large Retailer	69,900	74,900	79,100	81,400	83,600	86,200
Small Water Systems and Rural Domestic	11,100	13,500	13,800	14,000	14,200	14,500
Other (industrial, golf course, recreational)	21,800	21,800	21,800	21,800	21,800	21,800
Agricultural	26,600	20,600	20,600	20,600	20,600	20,600
Total Water Demands	**129,400**	**130,800**	**135,300**	**137,800**	**140,200**	**143,100**

Source: 2020 UWMP (MWA), Table 4-3

Section 5 - Impact Analysis

5.1 Supply and Demand Comparison

This WSA compares water supplies against adjusted water demands by accounting for the additional project water demands. Given the Project Site's history with SEGS X being an approved project but never constructed, MWA's 2020 UWMP assumes the water demand associated with the SEGS X project as a present and future water demand within its service area. Accordingly, MWA's total demand, as defined in their 2020 UWMP, is actually expected to decrease with implementation of the Project. As stated under Section 2.2, *Project Water Demand,* above, construction of the Project would require an overall water usage of 240 AF during the approximately 14-month construction period. During Project operation, four cycles of PV panel cleaning per year would require an annual water usage of up to approximately 4.5 AF. The approval of this Project would effectively reduce the water demand associated with the use of the property as compared to the approved SEGS X project by 815 AF of water annually and 4,060 AF of water during construction. Therefore, the existing and projected demands presented in MWA's 2020 UWMP provide a conservative estimate of total water demands within their service area including this Project as part of its future projected water demands because the demand associated with the Project site is overstated in the MWA's 2020 UWMP if the Project is approved, making it impossible to construct the approved SEGS X project.

The tables in this section provide a comparison of normal year, single-dry year, and multi-year drought supply and demand in five-year increments over the 20-year planning horizon. MWA defines a normal year condition as one that allows the agency to obtain water supplies from all sources under its water supply portfolio under normalized conditions. Table 5-8 compares the supply and demand during a normal year hydrologic condition and demonstrates MWA's ability to capture and store excess water for later use during periods of water shortage.

Table 5-1: Normal Year Water Supply and Demand from 2025-2045

Normal Year	2025	2030	2035	2040	2045
Supply	158,541	159,452	159,372	159,299	160,710
Demand	130,800	135,300	137,700	140,200	142,900
Difference	27,741	24,152	21,672	19,099	17,810

Source: 2020 UWMP (MWA), Table 5-2y

Table 5-9 presents MWA's supply and demand during a single-dry climate year, in which MWA only plans to receive 5 percent of their annual SWP allocation amount out of an abundance of caution. Nonetheless, MWA projects to have sufficient water storage, either in the form of SWP carryover or banked groundwater, to supplement supplies during extremely dry years over the 20-year projection.

Table 5-2: Single-Dry Year Water Supply and Demand from 2025-2045

Dry Year	2025	2030	2035	2040	2045
Supply	130,800	135,300	137,700	140,200	142,900
Demand	130,800	135,300	137,700	140,200	142,900
Difference	0	0	0	0	0

Source: 2020 UWMP (MWA), Table 5-2

Table 5-10 shows the projected supply and demand during multi-year drought, defined as five consecutive critically dry years including two extreme drought years. In the scenario, much like the single-dry year scenario, MWA is prepared to satisfy water demands by use of stored water during extremely dry years and still maintain the ability to capture and store excess water during the other years.

Table 5-3: Five Consecutive Dry Years Water Supply and Demand from 2025-2045

		2025	2030	2035	2040	2045
Year 1	Supply	139,234	141,492	144,033	142,759	145,444
	Demand	130,800	135,300	140,200	137,700	142,900
	Difference	8,434	6,192	3,833	5,059	2,544
Year 2	Supply	130,800	135,300	140,200	137,700	142,900
	Demand	130,800	135,300	140,200	137,700	142,900
	Difference	0	0	0	0	0
Year 3	Supply	130,800	135,300	140,200	137,700	142,900
	Demand	130,800	135,300	140,200	137,700	142,900
	Difference	0	0	0	0	0
Year 4	Supply	130,800	135,300	140,200	137,700	142,900
	Demand	130,800	135,300	140,200	137,700	142,900
	Difference	0	0	0	0	0
Year 5	Supply	139,234	141,492	144,033	142,759	145,444
	Demand	130,800	135,300	140,200	137,700	142,900
	Difference	8,434	6,192	3,833	5,059	2,544

Source: 2020 UWMP (MWA), Table 5-3

5.2 Water Shortage Contingency Planning

MWA plans to continue to manage and further reduce water demands through water conservation measures. Additionally, MWA is confident that their stored water is sufficient in quantity to prevent water shortages during dry periods. However, if supply shortages do occur, MWA may invoke its Water Shortage Contingency Plan (WSCP) in compliance with Water Code Section 10632(a). MWA's 2020 UWMP provides a WSCP that formalizes stages of action in response to varying degrees of supply interruptions. Table 5-11 summarizes the stages of action planned in response to the degree of water shortage.

Table 5-4: Water Shortage Contingency Stages and Response Actions

Stage	Percentage	Response	
1	Up to 10%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction	• 0-100% met by storage • 0-100% met by flexible supplies • 0-10% met by communicating voluntary demand reduction
2	10%-20%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction • Reduce R^3 Deliveries	• 0-100% met by storage • 0-100% met by flexible supplies • 0-20% met by communicating voluntary demand reduction • 0-20% through reduced R^3 deliveries
3	20%-30%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction • Reduce R^3 Deliveries	• 0-100% met by storage • 0-100% met by flexible supplies • 0-30% met by communicating voluntary demand reduction • 0-30% through reduced R^3 deliveries
4	30%-40%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction • Reduce R^3 Deliveries	• 0-100% met by storage • 0-100% met by flexible supplies • 0-30% met by communicating voluntary demand reduction • 0-30% through reduced R^3 deliveries
5	40%-50%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction • Reduce R^3 Deliveries	• 0-100% met by storage • 0-100% met by flexible supplies • 0-30% met by communicating voluntary demand reduction • 0-30% through reduced R^3 deliveries
6	More than 50%	• Access stored supplies, as needed • Access flexible supplies, as needed • Implement voluntary demand reduction • Reduce R^3 Deliveries	• 0-100% met by storage • 0-100% met by flexible supplies • 0-30% met by communicating voluntary demand reduction • 0-30% through reduced R^3 deliveries

Source: 2020 UWMP (MWA), Table 6-1

In addition to the shortage responses shown in Table 4-11, MWA also implements the following measures during stages 1-6:

- Encourage Voluntary Water Conservation Measures.

- Public information campaign consisting of distribution of literature, speaking engagements, website updates, bill inserts, and conversation messages printed in local newspapers.
- Educational programs in area schools.
- Initiate a Conservation Hotline, a toll-free number with trained Conservation Representatives to answer customer questions about conservation and water use efficiency.
- Coordinate with government bodies and water purveyors, as needed.

Section 6 - Conclusion

The purpose of this WSA is to analyze whether the total projected water supplies available to MWA during normal year, single-dry year, and multi-year drought hydrologic conditions will meet the projected water demand associated with the Project over a 20-year period, in addition to MWA's existing and planned future uses. The projected water demand for the Project is approximately 240 AF during the 14-month construction period and 4.5 AF annually for four panel cleaning cycles. The non-potable water supply for the Project would be sourced from the four existing groundwater wells that were originally installed to provide non-potable water supply to the previously approved and existing SEGS facilities. The wells depend on groundwater supply drawn from the adjudicated Mojave Basin Area, which is managed by MWA. MWA's 2020 UWMP assessed existing and projected water supply and demand over the planning period. In doing so, MWA has proven to have a robust water supply portfolio equipped to endure drought periods regardless of SWP entitlement allocations. This WSA concludes that MWA's supplies and groundwater allocations are sufficient to serve their customer base, including groundwater use from the Project during normal, single-dry, and multi-year drought year conditions over the next 20 years.

In addition, the Project's water demands are less than the water demands previously approved for the SEGS X project that was never fully constructed. The Project is sited within the same land area, intended for renewable energy (solar) use, but would use only a fraction of the same available groundwater water supplies.

This WSA does not create a right or any entitlement to water service. It is not a commitment to serve the Project but is a review of MWA's total projected water supplies and an analysis of MWA's ability to serve the Project based on presently available information.

Section 7 - Source Documents

California Department of Water Resources, Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001, October 2003

https://water.ca.gov/LegacyFiles/pubs/use/sb_610_sb_221_guidebook/guidebook.pdf

Department of Water Resources, California's Groundwater (Bulletin 118)

https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118

Department of Water Resources, State Water Project

https://water.ca.gov/Programs/State-Water-Project

https://www.watereducation.org/sites/main/files/file-attachments/state_water_project_slideshow_water_education_foundation.pdf

https://en.wikipedia.org/wiki/California_State_Water_Project

Harper Valley Groundwater Basin, February 2004

https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/6_047_KernRiverValley.pdf

Mojave Basin Area Watermaster, Watermaster Annual Report for Water Year 2019-20, May 2021

https://www.mojavewater.org/files/27AR1920.pdf

Mojave Water Agency, 2020 Urban Water Management Plan, May 2021

https://www.mojavewater.org/files/MWA2020UWMP_Final061621.pdf

Mojave Water Agency, Integrated Regional Water Management Plan, June 2014

https://www.mojavewater.org/files/Mojave_IRWM-Plan_Final_62614.pdf

Mojave Water Agency Law, July 2005

https://www.mojavewater.org/files/27AR1920.pdf

Mojave Water Agency

https://www.mojavewater.org/history.html

U.S. Geological Survey, Water-Level, Water-Quality and Land-Subsidence Studies in the Mojave River and Morongo Groundwater Basins

https://ca.water.usgs.gov/mojave/

Section 8 - Appendix

A. Commission Decision Application for Certification for Luz Engineering Corporation, Luz SEGS IX & X Projects (Harper Lake)

B. Correspondence Between Michael Baker International and Mojave Water Agency, SUB: 2020 Urban Water Management Plan – Project Water Demands, 10 August 2021

APPENDIX A – Commission Decision Application for Certification for Luz Engineering Corporation, Luz SEGS IX & X Projects (Harper Lake)

COMMISSION DECISION
Application For Certification For

LUZ ENGINEERING CORPORATION
Luz SEGS IX & X PROJECTS
(HARPER LAKE)

Docket No. 89-AFC-1

FEBRUARY 1990

CALIFORNIA ENERGY COMMISSION

George Deukmejian, Governor

P800-90-002

COMMISSION DECISION

Application For Certification For

LUZ ENGINEERING CORPORATION

Luz SEGS IX & X PROJECTS

(HARPER LAKE)

Docket No. 89-AFC-1

FEBRUARY 1990

CALIFORNIA ENERGY COMMISSION

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WATER RESOURCES

INTRODUCTION

This review presents an analysis of the water resource aspects of both projects, including water supply, water quality, and flood hazards. Potential impacts on both surface water and groundwater resources are considered in evaluating the technical adequacy of the proposed projects and their compliance with regulatory requirements.

The Luz SEGS Units IX and X are the latest in a series of solar facilities completed or presently under construction in the Kramer Junction and Harper Valley areas. The SEGS Unit VIII project is complete and adjacent to and west of the SEGS Unit IX site. SEGS Unit X will be directly north of SEGS Unit VIII and IX sites. The SEGS Units IX & X will be similar in configuration and operation to the SEGS Unit VIII facility. The following analysis considers the adequacy and reliability of water supply, the effects of groundwater withdrawals on groundwater levels, the extent of flood hazards and the adequacy of proposed flood-flow routing and control measures, and the adequacy of waste treatment and disposal methods to protect the area's surface and ground water quality.

ENVIRONMENTAL SETTING

REGIONAL DESCRIPTION

Surface Water

The sites lie within the Harper Valley Basin in the Harper hydrologic subunit of the Mojave hydrologic unit, as defined by the California Department of Water Resources (DWR, 1967. p. 10). All areas of the Harper subarea drain into the Harper Lake, a dry lake or playa common to the desert area. The drainage basin contains approximately 510 square miles of surface area. The area tributary to the sites contains approximately 235 square miles.

The SEGS Units IX & X project site locations are classified as having a high desert climate characterized by dry summers with occasional intense thunderstorms and cool, dry winters. The California Department of Water Resources estimates the annual average precipitation for the Harper Valley Basin is 4.5 inches (DWR 1967, p. 64). Annual average evaporation in the project area is estimated to be up to 91 inches per year based on average values for desert sites in the project vicinity (Luz 1988f, Malcolm Pirnie, Inc). Precipitation is generally sufficient only to satisfy the water requirements of native vegetation. Runoff occurs during infrequent storms, and excess water recharges the groundwater basin during the years of above-average rainfall.

Thus, surface water sources in the project area are not considered a usable water supply.

Groundwater

Detailed information regarding groundwater conditions in the Harper Valley Basin are limited to hydrogeologic investigations performed by Leroy Crandall and Associates (Luz, 1988f) and Robert C. Fox (Fox 1988 and 1989) and The Mark Group (MG, 1989) in the immediate vicinity of the project sites. The water-bearing materials consist of semi-consolidated to unconsolidated continental sedimentary deposits which underlie the basin within the mountain boundaries. The water-bearing materials range in size from coarse gravel to fine clays. Coarser materials are more prevalent at the edge of the basin nearest the mountain ranges, while finer deposits predominate in the central portion of the basin at Harper Lake.

Current groundwater use is limited to agricultural irrigation and to domestic supply of scattered individual homesites. Several of these homesites have been purchased by Luz and no longer draw water from the groundwater basin. Estimated use of groundwater from the basin is 6660 acre-feet per year (AFY). The typical depth of the water table varies from 160 to 240 feet below the ground surface (Luz 1988f, Crandall p. 23). These depths are taken from measurements of a well in the vicinity of SEGS Unit VIII and represent water levels in the shallow and intermediate aquifers only (Fox 1988 p. 10). Well logs indicate that the area is underlain by three aquifers (Fox 1988. p. 6). The upper aquifer extends from the surface to a depth of about 75 feet. Below this aquifer lies the intermediate aquifer. This aquifer is separated from the upper by lenses and stringers of silt and clay approximately 150 feet in thickness. This intermediate aquifer extends to a depth of about 500 feet. The third or deep aquifer is separated from the overlying intermediate aquifer by clays and basalt flows. The deep aquifer extends to a depth of 1000 feet below ground surface in the vicinity of Harper Lake (Fox 1989, p. 9). A program of test hole drilling and aquifer sampling conducted in the fall of 1988 confirms the existence and viability of this three aquifer system (Fox, 1989, p. 11).

Total groundwater storage in the Harper Valley Basin is estimated to be as much as 15.8 million acre feet (MAF) with about 8 MAF contained in the immediate area proposed for present and future plant construction (Fox 1989 p. 17). Surface recharge of the basin is limited because of the low precipitation, high evaporation, and minimal runoff. What recharge the basin receives is from high intensity thunderstorm percolation, subsurface flows from the middle Mojave River Basin to the southeast and across the Lockhart fault southwest of the Luz site. This subsurface recharge is estimated to be approximately 1500 acre feet per year (Fox 1989 p. 22).

SITE AND VICINITY DESCRIPTION

Water Supply

Water supplies in the Harper Valley Basin are adequate for present purposes, as described above in the groundwater section. Present irrigation development is served entirely by groundwater. The previously referenced hydrogeologic investigations performed for the project site conclude that a reliable long-term source of water can be produced from the basin (Fox 1988 p. 26, 1989, p. 22; MG 1989, p. 8-1). These reports conclude that local groundwater sources historically used for irrigation are more than sufficient to satisfy existing and proposed long-term solar facility requirements. Luz intends to discontinue irrigation of existing parcels under their control as solar generating facilities are built and put into operation. Luz presently owns approximately 5,000 acres in the area west of Harper Lake (Pritchard, 1989).

Surface Water Quality

There are no perennial surface flows in the project area. Therefore, there is no water quality data for naturally occurring surface waters. The surface water existing in the marsh areas on the southwest fringe of Harper Lake is pumped into the south and central marshes from irrigation drainage waters from adjacent cropland. Analyses of these waters appear in Tables 1 and 2.

Groundwater Quality

The presently utilized groundwater underlying the project site and vicinity is generally brackish, predominately sodium chloride in character with total dissolved solids (TDS) ranging from 1100 to 2600 milligrams per liter. These waters, representative of the shallow and intermediate aquifers, generally increase in salinity approaching Harper Lake. Groundwater quality of representative wells in the area appear in Table 3.

Although water quality in the upper aquifers is suitable for present and proposed uses, there is a deeper untapped aquifer which may be useable. No data exists on the quality of the deeper aquifer, although Fox in his 1988 report stated "It is highly probable that groundwaters of the intermediate and deep aquifers are of much more suitable quality and character [than the upper aquifer]."

Flood Hazards

Flowing only during major storms, ephemeral streams tributary to the project site drain a combined area of approximately 235 square miles (150,000 + acres). As shown in Figure 2, drainage tributary to the site flows toward the central part of the basin from the Kramer Junction area to the west (Subarea B) and from adjoining mountain highlands to the north (Subareas C and D). Subarea A is tributary to future SEGS developments and is not considered further at this time. In the site vicinity flows are presently intercepted by the flood protection facilities of SEGS Unit VIII and are directed north to the natural drainage of subarea D north of the sites, eventually discharging to the east into Harper Lake.

TABLE 2
Heavy Metal Analyses of Harper Lake Marsh Areas

METAL[1]	CENTRAL MARSH		SOUTH MARSH
Antimony	1.5	1.6	0.5
Arsenic	21	19	19
Barium	50	50	45
Beryllium	ND<0.3[2]	ND<0.3	ND<0.3
Boron	19000	19000	6000
Cadmium	ND<0.9	ND<0.9	ND<0.10
Cobalt	0.8	0.9	0.8
Chromium	3	3	3
Copper	8.7	6.6	10
Lead	ND<0.4	ND<0.4	ND<0.4
Mercury	ND<0.5	ND<0.5	ND<0.5
Molybdenum	281	266	46
Nickel	ND<9	ND<9	ND<16
Silver	ND<0.10	ND<0.10	ND<0.105
Thallium	ND<0.10	ND<0.10	ND<0.105
Vanadium	24	27	38
Zinc	5	ND<2	ND<2
Selenium			9.4

1. All values ppb.
2. ND< = Not detectable, less than.

Source: Adapted From LUZ 1989b, Tables 11 and 15

APPLICABLE LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Federal, state, and local laws, ordinances, regulations, and standards (LORS) are designed to ensure that the project does not cause unacceptable impacts on water resources, including water supplies, water quality, and flood hazards. The Luz project must comply with the following LORS:

FEDERAL

- The Clean Water Act, 33 USC section 1251 et seq., states that any point-source waste that discharges into U.S. waters requires a national pollution discharge elimination system (NPDES) permit. In California, the Regional Water Quality Control Boards (RWQCB) administer the federal NPDES program. The proposed project is under the jurisdiction of the Lahontan Regional Water Quality Board (LRWQCB).

- The Safe Drinking Water Act (SDWA) of 1974, as amended in 1986, requires the Environmental Protection Agency (EPA) to establish a program which provides for the safety of our nation's drinking water.

STATE

- California Water Code, section 461, articulates the Department of Water Resources' water use policy, namely, that "the primary interest of the people of the state in the conservation of all available water resources requires the maximum reuse of water in the satisfaction of the beneficial uses of water."

- California Water Code, section 100, prohibits the waste or unreasonable use or method of use or method of diversion of water.

- California Water Code, sections 4999 through 5008, requires filing with the SWRCB, a Notice of Extraction and Diversion of Water for extractions in excess of 25 acre-feet per year from groundwater basins in San Bernardino County.

- The Porter-Cologne Water Quality Control Act 1967, Water Code section 13260 et seq., requires the RWQCB to adopt waste discharge requirements in order to protect state waters for the use and enjoyment of the people of California.

- California Code of Regulations (CCR), Title 22, section 64401 et seq., establishes standards for domestic water quality and monitoring.

- o CCR, Title 23, section 2510 et seq., sets forth regulations pertaining to water quality aspects of waste discharge to land.
- o The State Water Resources Control Board (SWRCB), Resolution 75-58 (Water Quality Control Policy for the Use and Disposal of Inland Waters Used for Power Plant Cooling), establishes a hierarchy for the use of available water sources in power plant cooling applications.
- o The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) which was added to the Health and Safety Code, sections 25249.5 et seq., prohibits the discharge or release of certain chemicals into drinking water sources.

LOCAL

- o San Bernardino County Code, Chapter 5, specifies requirements for establishing and permitting septic systems within San Bernardino County.
- o San Bernardino County, Board Order No. 6-86-108, requires that all facilities used in the collection, transport, treatment, or disposal of waste shall be adequately protected against overflow, inundation, structural damage, or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

ENVIRONMENTAL IMPACT

PROJECT SPECIFIC

Flood Hazard

The Luz SEGS Units IX & X sites are subject to flooding from runoff of ephemeral desert streams. Prior to the construction of SEGS Unit VIII, runoff either sheet flowed across the site or was diverted into existing road drainage channels depending on the amount of runoff generated. The SEGS Unit VIII facility caused major surface grading and changes to the existing surface flow conditions. Grading and flood protection facilities for SEGS Unit VIII will eliminate sheet flow over the sites. Supplementary flood control structures will extend existing SEGS Unit VIII structures, provide diversion of flows to the north of SEGS Unit X and result in a final flood control system shown in Figure 3.

Flows affecting the SEGS Unit X site are primarily generated by runoff from tributary subareas B and C, and D shown on Figures 2 and 3. The flows from areas "B" and "C" will be intercepted by the SEGS Unit VIII flood control channel and dikes. These intercepted flows will join those from subarea D northwest of the corner of the SEGS Unit X site. The northeast trending dike provided for in the SEGS Unit VIII design, will be extended to provide flood protection to the west side of the SEGS Unit X site. At the northwest corner of the SEGS Unit X site the dike extension will turn due east and divert flows into the Harper Lake bed. A diversion dike across the north side of Section 13 will prevent overflow onto the privately held property in Section 12. A diversion corridor between the dikes of approximately 1,800 feet in width will be formed by these dikes extending from the northwest corner of SEGS Unit X to Harper Lake.

Flood protection for SEGS Unit IX requires no additional facilities as the structures provided for SEGS Units VIII and X will protect this site.

Flows for 1 in 100-year recurrence interval storms appear in Table 4 for the areas tributary to the SEGS Units VIII, IX and X sites. Williamson and Schmid developed these flows for the Luz Corporation (Luz 1988b, App. C). The CEC Staff estimates correlate well with the Luz flow estimates.

TABLE 4

PEAK FLOOD RUNOFF RATES FOR 100-YEAR RECURRENCE STORM EVENTS (ft^3/sec)

Tributary Area	Luz Estimates (1)	CEC Staff Estimates (2)
	100-Year	100-Year
B	21,500	21,200
C+D	12,800	12,500

(1) Williamson and Schmid, 1988, 100-Year Hydrologic Analysis Harper Lake Power Plant San Bernardino County, California.

(2) CEC staff independent analysis using San Bernardino County Hydrology Manual, Unit Hydrograph Method.

Water Supply

o Luz proposes to supply the SEGS IX and X facilities from pumped groundwater. Of the two sites on which Luz proposes to construct these facilities, 700 acres were formerly used for irrigated alfalfa production as late as 1984 (Most, 1988). For comparative purposes staff estimates the consumptive use of water for alfalfa production on both sites as follows:

- Area irrigated = 700 acres
- Applied water = 5 acre feet (AF) acre/year
- Annual water demand (700 acres) x (5 AF/acre/year) = 3500 acre feet/year (AFY)
- Water returned to groundwater through deep percolation equal to 40% of the total required = (3500 AFY) x (.4) or 1400 AFY
- Net water use equals total annual water demand less deep percolation = 3500 AFY - 1400 AFY 2100 AFY/year

Luz estimates that each project will require approximately 820 AF of water per year (Luz 1989d). The preceding calculations show that these sites, in the past, have used up to 2100 AFY with no adverse effect on the groundwater supply. Inspection of the hydrograph of state well No. T11N/R4W-19H01 on Figure 4 shows that during the period 1977 through 1984 when the SEGS IX and X sites were under irrigation, the trend in the water level was stable. This stable trend under an estimated irrigation draft of 2100 AF indicates that the extraction of 1640 (2 x 820 AFY per facility) AFY will have minimal effect on the local groundwater supplies. Therefore, Staff concludes that development of the sites for solar generating facilities will actually reduce the prior use by an estimated 460 AFY and have less effect on the groundwater than the previous irrigation use.

Staff estimated that water use for dust control during construction requires 0.5 inches of water per day for 90 days over an area of 1,140 acres (Luz 1989a, App. 5.3.1, p. 5.3.1-4). This equates to about 4,300 AF of water use for dust control during the construction period. Based on the previous agricultural draft on the basin Staff concluded that this one time use will have no measurable impact on the groundwater supplies.

Water Quality

Water for the SEGS facilities will be supplied by groundwater. Groundwater will be utilized for cooling without prior treatment. The balance of water used in the facilities will receive various levels of treatment depending on the end use. Lime softening, reverse osmosis, and resin bed demineralization will be used to provide proper quality for boiler makeup and solar collector mirror washing. Fire protection and miscellaneous use water will be treated with lime softening only. All of these processes produce minerally concentrated waste streams which will be discharged, along with cooling tower blow-down water, to ponds and evaporated.

The evaporation ponds are sized to dispose all wastewater generated.

There is no direct discharge of liquid other than to the evaporation ponds. However, there may be, due to construction activities, small amounts of accidental spills of fuels, lubricants and solvents. These are of a temporary nature and should not significantly affect groundwater quality.

CUMULATIVE IMPACTS

Luz proposes to build a total of five solar generating facilities in the Harper Lake area over the next 5-10 years. Each of these units will modify the surface drainage of the area and concentrate this drainage into defined channels and diversions. Luz has prepared a master drainage and flood control plan to protect the proposed facilities and provide for the diversion and control of flows until they reach the Harper Dry Lake area.

Water use of each facility will either replace water used at existing or formerly irrigated agricultural areas or be balanced by the removal of presently irrigated areas from production. As the total annual water use of these facilities is less than what has been used annually on irrigated cropland, the draft on the groundwater basin may decrease as the result of present and future project construction.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Luz will be in compliance with all LORS regulating and protecting water resources of the Harper Valley basin during project construction and operation.

Flood Hazards

Luz is required to design, construct, operate and maintain the evaporation ponds "to prevent inundation or washout due to floods with a 100-year return period" (CCR Title 23 Sec 2532 c).

Water Supply

Luz proposes to use groundwater underlying the project and since the groundwater is brackish this use is consistent with referenced State Water Code sections 100 and 461 previously cited. Luz must also file a Notice of Extraction and Diversion of Water with the State Water Resources Control Board for all groundwater extractions in excess of 25 acre-feet per year (Water Code Sections 4,999 through 5,008).

Luz will comply with State Water Resources Control Board Resolution 75-58 in that the groundwater proposed to be used is classified as brackish and is the highest priority of cooling water available at the site (Luz 1988d p. 6.8) (see Table 3 of this testimony).

Water Quality

Luz SEGS Units IX & X facilities will discharge all waste waters to evaporation ponds. The LRWQCB must approve and issue discharge requirements for these wastes.

MITIGATION

APPLICANTS PROPOSED MITIGATION

Luz has proposed the following mitigation measures:

Flood Hazard

- o Design and construct all permanent flood diversion and control structures to withstand the effects of runoff generated from a 1 in 100-year recurrence interval storm (Luz 1989c, App. A).
- o Protect SEGS Units IX & X sites from flooding and erosion by constructing permanent dikes along the north and west sides of the SEGS X site to divert flows from subareas B, C, and D (See Figures 2 and 5).

Water Supply

- o Space wells to minimize water level drawdown and mutual interference. (Fox 1989, P. 3-5)
- o Monitor groundwater levels and use this data to identify long term groundwater trends (Ibid).

Water Quality

- o Store acid and caustic solutions in lined steel or fiberglass tanks, surrounded by impervious cast concrete containment basins. Size containment basins to hold in excess of 100% of tank contents (Luz 1989a, p. 5-30).
- o Design and construct holding and evaporation ponds to meet all federal, state and local LORS. Operate ponds to prevent non-permitted discharges from reaching local surface and groundwater resources (Luz 1989a, p. 4-109).

- Monitor groundwater quality from wells used to supply the project (Luz 1989a, p. 5-30).

Staff analyzed in detail all mitigation measures proposed by Luz and concluded that water supply mitigation will reduce all environmental impacts to insignificant levels. Additional flood hazard and water quality mitigation are detailed in the following section.

ADDITIONAL OR ALTERNATIVE MITIGATION

The surface water diversion facilities may cause flows to encroach on private property in the southern part of Section 7 (T11N/R4W SBBM) due to the concentration of surface flows from the major portions of the watershed tributary to the sites.

Staff believed that the dike along the southern section line of adjacent Section 12 should be extended along the south section line of Section 7 a distance sufficient to eliminate overland flow onto Section 7 prior to entry onto the dry lakebed. An alternative to extending this dike is for Luz to purchase sufficient property in Section 7 to allow possible overland flow through the purchased property into the Harper Lakebed (see Figure 5).

A limitation on the amount of ground water to be used at each unit was being proposed by staff in response to Intervenor James LaMont's concern for the amount of ground water to be used by each unit. Staff proposed a limitation of 950 acre feet per year of ground water for the operation of each unit. This does not include the use of 75 acre feet per year of ground water for Northern Marsh restoration.

Following the testimony by Intervenor LaMont, the Committee proposed additional mitigation in the Proposed Decision to address LaMont's concerns about the adequacy of groundwater supplies as a result of the Luz operations in the Harper Lake aquifer. LaMont was offered the option of either having Luz drill a well within the next five years to establish his water rights or having Luz supply water to him in the event he cannot reasonably obtain water by his own drilling efforts.

At the Committee hearing on the Proposed Decision, LaMont indicated that neither of these options addressed his particular interests. Thus, the Commission will prohibit Luz from operating its facilities in a way which would prevent LaMont from obtaining groundwater from his property and will retain jurisdiciton over this issue.

CONCLUSIONS

The proposed SEGS Units IX & X facilities are subject to significant impact from surface flows generated by runoff from upstream tributary areas. However, the flood hazard mitigation proposed by Luz combined with that required for the SEGS VIII project is adequate to provide required flood protection and reduce this impact to an insignificant level.

All significant impacts on the water supply or water quality of the area will be successfully mitigated. Luz will comply with all federal, state and local laws, ordinances, regulations and standards governing flood hazard, water supply, and water quality.

CONDITIONS OF CERTIFICATION SEGS UNIT IX & X

WATER SUPPLY

Requirements

1. For each well that Luz drills, develops or uses for extracting water from the Harper Valley Basin, Luz shall place in the project files the following:

   - o driller's well log, if available.
   - o drawdown-discharge curve and recovery test.
   - o a map depicting the location of the well.

   Verification: Luz shall notify the CEC CPM, via the weekly Compliance Activity Report, of the initiation of well drilling and via the Monthly Compliance Report of the completion of well drilling. Within 60 days after completion or initiation of use of a well intended to supply SEGS Unit IX or X, Luz shall maintain at the site the required information and notify the CPM that the records are available for inspection.

2. For each Luz well extracting groundwater from the Harper Valley Basin for operation of SEGS Unit IX or X, Luz shall provide in each annual Compliance Report the following:

   - o pre-and-post pumping standing water levels,
   - o pumping rates in gallons per minute, and
   - o total annual extractions in acre-feet.

   Verification: Luz shall forward via the Annual Compliance Report a copy of the records specified above to the CEC CPM.

3. Luz shall install in-line flow meters on all water wells supplying SEGS Unit IX. Prior to commencement of commercial operation, Luz shall make available at the site for CEC inspection, as-built drawings depicting installation of in-line meters for SEGS Unit IX supply well. The drawings shall

be approved by a civil engineer registered in the state of California. CEC personnel shall be provided access to the facility during normal business hours to inspect the as-built drawings and actual installations.

Verification: Luz shall notify CEC CPM, via the Monthly Compliance Report after each meter installation.

4. Luz shall limit extractions from the Harper Valley groundwater basin to 950 AFY for the operation of each of SEGS Unit IX and X.

   Verification: In each Annual Compliance Report Luz shall provide groundwater pumping records for each project which shall indicate compliance with these limits.

5. Luz shall not oerate its facilities in a manner that will prevent Intervenor James LaMont from obtaining adequate groundwater supplies for his property from the Harper Lake aquifer.

   Verification: Mr. LaMont may direct Luz to drill one test well on his property for the purpose of monitoring compliance with this condition. Mr. LaMont will be responsible for maintenance and operation of this well. The Commission will retain jurisdiction to impose appropriate mitigation measures if Mr. LaMont can establish that Luz has, in fact, violated this condition.

WATER QUALITY

Requirements

6. Luz shall apply for and obtain waste discharge requirements for the condensate/feedwater system waste from the LRWQCB. Luz shall maintain the waste discharge requirements for the life of the plant in its project compliance file.

   Verification: In the next Monthly Compliance Report following receipt of the waste discharge requirements from the LRWQCB, Luz shall provide written notification to the CEC CPM that waste discharge requirements have been issued and that they are available for inspection.

7. Luz shall apply for and obtain waste discharge requirements from the LRWQCB for cooling tower blowdown wastes discharged from the SEGS Unit IX and X. Luz shall maintain the waste discharges requirements in the project compliance file.

   Verification: Prior to beginning commercial operation of SEGS Unit IX or X, respectively, Luz shall provide written notification to the CEC CPM in the Monthly Compliance Report that said discharge requirements have been issued and that they are available for inspection.

8. For liquid wastes discharged from SEGS Unit IX and X, Luz shall notify the CEC CPM of any change in the waste discharge requirements issued by the LRWQCB.

   Verification: In its annual compliance report to the CEC CPM, Luz shall indicate the status of the current waste discharge requirements and attach the quarterly reports required by the LRWQCB for SEGS Unit IX and X.

FLOOD HAZARD

Requirements

9. To protect private property from inundation, erosion, or sheet flow in Section 12 (T11 N/R 5 W SBBM) from diverted flood water, Luz shall design, construct and maintain a dike along the north section line of Section 13 capable of withstanding and diverting combined flows from tributary areas B, C, and D shown in Figure 3, generated from a storm having a 1 in 100-year recurrence interval. These drawings and calculations shall be approved by a civil engineer registered in the state of California and kept in the Project Compliance File.

   Verification: Prior to commencement of commercial operation at the SEGS Unit IX facility, Luz shall prepare and have available at the site to CEC personnel, complete as-constructed drawings and water surface profile calculations of the diversion areas and structures.

10. Prior to start of any construction Luz shall purchase in fee or obtain a right-of-way or flow easement over any and all land not owned by Luz north of the north section line of section 18, T11N, R4W, SBBM which are subject to the overflow, erosion, or meander of surface flows generated by a 1 in 100-year storm. Prior to the start of any construction, Luz shall record with the San Bernardino County Recorder documents showing title to or flow easements over all properties north of Section 18 subject to the overflow or meander of surface flows generated by a 1 in 100-year recurrence interval storm. As an alternative, Luz may demonstrate that all the abovementioned land will be protected from flooding.

    Verification: Luz shall maintain these records at the site and make them available to CEC personnel during normal business hours.

CONDITIONS OF CERTIFICATION SEGS UNIT X (Only)

WATER SUPPLY

Requirements

11. To protect SEGS Unit X site from flood flows along its western and northern boundaries Luz shall design, construct and maintain the following facilities:

    - o A dike capable of withstanding and diverting combined flows from tributary areas B, C and D, shown in the attached Figure 1, generated by a storm with a 1 in 100-year recurrence interval.

APPENDIX B – Correspondence Between Michael Baker International and Mojave Water Agency, SUB: 2020 Urban Water Management Plan – Project Water Demands, 10 August 2021

EXTERNAL: RE: --EXTERNAL-- 2020 Urban Water Management Plan - Project Water Demands

NS Nicholas Schneider <nschneider@MojaveWater.org>

Reply | Reply All | Forward | ...

To Conarro, Charlie

Cc Negus, Damie; Bowdan III, Joel E; Adnan Anabtawi; Jeff Ruesch; Emmett Campbell

Wed 8/11/2021 12:57 PM

Charlie

To answer your question. We don't include specific projects by name but we do include projects like this in our future growth estimates. Additionally, due to the fact that you have water rights allows us to account for it in our water demand numbers.

Please let us know if you have any additional questions or concerns.

Nicholas Schneider
Senior Legislation and Conservation Manager

From: Conarro, Charlie <Charlie.Conarro@mbakerintl.com>
Sent: Tuesday, August 10, 2021 9:05 AM
To: Nicholas Schneider <nschneider@MojaveWater.org>
Cc: Negus, Damie <Damie.Negus@mbakerintl.com>; Bowdan III, Joel E <JBOWDAN@mbakerintl.com>
Subject: --EXTERNAL-- 2020 Urban Water Management Plan - Project Water Demands

[EXTERNAL EMAIL]
Hi Nick,

I left you a voicemail earlier this morning to ask if a specific project was accounted for in Mojave Water Agency's 2020 Urban Water Management Plan. As a little background, we are completing a Water Supply Assessment for a proposed solar project (Lockhart Solar II). The Project will replace a previously approved solar project, in which water rights were obtained but the project was never constructed due to funding. For purposes of our assessment, we would like to know whether the previously approved project water demands were accounted for in the latest (2020) Urban Water Management Plan.

The project name is "Solar Electric Generating System (SEGS) X" and the applicant is LUZ Solar Partners Ltd.

Thank you in advance for any help you can provide!

Charlie Conarro, E.I.T. | Civil Associate II - Water
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