Sienna Solar and Storage Project

Jurisdictional Waters and Wetlands Delineation Report

prepared for

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
Contact: Erec DeVost
Via email: edevost@8minutenergy.com

prepared by

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93001

March 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

Table of Contents

Tables

Appendices

Executive Summary

Rincon Consultants, Inc. (Rincon) conducted a jurisdictional delineation for the proposed Sienna Solar and Storage Project (Project) located approximately 3.5 miles north of the unincorporated community of Lucerne Valley in San Bernardino County, California. The delineation was conducted to determine the location and extent of resources potentially subject to the jurisdiction of the California Department of Fish and Wildlife (CDFW) and Regional Water Quality Control Board (RWQCB). Proposed impacts to potential CDFW and RWQCB jurisdictional features may be subject to the notification and permit requirements of the CDFW pursuant to Sections 1600 *et seq.* of the California Fish and Game Code (CFGC) and Porter-Cologne Act for the RWQCB.

Under Section 1602 of the CFGC, the CDFW regulates activities impacting the bed, bank or channel of any river, stream, or lake system that supports fish or wildlife. As part of Project scoping, planning, and design, this report was prepared to support CDFW consultation, notification, and permitting, as needed. The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State." The Porter-Cologne Act has become an important tool with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a dredge/fill application when there is no federal nexus, such as under Section 401 of the Clean Water Act (CWA).

The Project area drains to inland areas of California, specifically Lucerne Dry Lake, for which the U.S. Army Corps of Engineers (USACE) previously issued an Approved Jurisdictional Determination (AJD) stating that the tributaries and dry lake are not waters of the United States regulated under the CWA. Based on this determination, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries.

The majority of the Project area is situated within the historic bed of Lucerne Dry Lake. The lake is an area of low relief that is typically dry and only collects water in its lowest points during above average precipitation events. Based on review of current and historical aerial imagery and field observations, including recent Project-specific high-resolution aerial drone imagery, the dry lakebed is not ponded frequently, or for long durations. As noted above, the USACE assessed Lucerne Dry Lake in an AJD and found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for recreation or other purposes, including harvesting fish or shellfish. Due to major hydromodification in the watershed, primarily from road construction and maintenance, which completely block or severely restrict the flow of tributary ephemeral streams toward the lake, hydrologic inputs to the dry lake are very low. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall. Much of the dry lakebed is topographically planar and unvegetated and provides extremely limited value for wildlife. The dry lake does not support fish or other aquatic life.

The dry lakebed also contains numerous large polygonal cracks associated with geologic phenomena called desiccation polygons (fractures or fissures). These fissures commonly develop in clay playas/dry lakebeds in the arid west, including California and the Mojave Desert, and are attributed to water table retreat. These features have not been created by the flow of water, and do not exhibit characteristics typical of CDFW streams with typical bed and bank and channel

features or indicators of fluvial activity. The fissures typically retain water in the low elevations of the fracture channels during periods of above average precipitation.

Based on the factors presented above, three retention basins and one seep within the dry lakebed were delineated as CDFW and RWQCB jurisdictional resources. The retention basins are used for agricultural runoff and the seep is likely a result of a broken agricultural pipe. To the north and west of the dry lakebed, 33 ephemeral streams are potentially under jurisdiction of the CDFW and RWQCB.

A total 8.34 acres and 91,251 linear feet of ephemeral streams were delineated in the Project area. Four retention basins were mapped, with three collectively containing 0.26 acre wetland waters of the state and one containing 0.14 acre non-wetland waters of the state. A small (40 square feet) isolated wetland containing cattails (*Typha domingensis*) was observed on site, originating near an assumed agricultural pipe leak.

Introduction

This report details the findings of the jurisdictional delineation conducted by Rincon Consultants, Inc. (Rincon) for the 1,854-acre Sienna Solar and Storage Project (Project) located in the Lucerne Valley, San Bernardino County, California. The delineation was conducted on July 20-22, 2021, to determine the location and extent of waters and/or wetlands within the Project area that are potentially subject to the permit requirements of the U.S. Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act (CWA), Colorado River Regional Water Quality Control Board (RWQCB) under Section 401 of the CWA and Porter-Cologne Water Quality Act, and a Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) pursuant to Section 1600 et. seq. of the California Fish and Game Code (CFGC). Actual jurisdictional areas are confirmed by the state and federal authorities at the time that permits are requested.

Project Location

The 1,854-acre Project area is located in the southwestern portion of the Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 shows the regional location of the Project area. Figure 2 shows the 27 parcels that comprise the site, and Table 1 lists the parcels and the acreage of each. Figures are provided in Appendix D. The site is depicted on the *White Horse Mountain, California* and *Lucerne Valley, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Figure 3).

Table 1 Parcels Within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
45207120	40.201988	45211217	8.8374063
45207119	40.21116	45211317	151.40044
45207111	154.92994	45212112	80.724638
45207125	40.206093	45212142	70.847518
45207110	80.411658	45212138	5.0164927
45206223	80.447237	45212139	12.554045
45206221	40.207435	45212148	33.286326
45206222	76.437885	45212152	10.188996
45206224	84.470432	45237101	161.27385
45211220	70.208881	45236147	80.707295
45211224	89.9045	45236146	80.667639
45211225	103.44547	45239109	39.915267
45211219	73.471912	45239108	80.023993
45211218	64.725183		

Project Description

The proposed Sienna Solar and Storage Project is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this assessment, although not all routes will be developed.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Environmental Setting

The Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake. The area is in a rain shadow formed by the adjacent mountains and features alkaline soils. This high desert ecological subregion is characterized by arid scrub, creosote bush scrub, playas, and desert washes. The site is primarily located on the floor of the Lucerne Dry Lake, and along its eastern and northern margins. Topography is mostly flat to gently sloped along the dry lake

margins. The Granite Mountains and White Horse Mountain are west of the site, and Peterman Hill is within the gen-tie matrix, east of Barstow Road. Elevation at the site ranges between 2,850 and 2,910 feet above mean sea level.

The dry lakebed is heavily used for recreational activities, including off highway vehicle (OHV) travel (including racing) and assorted day use and camping activities. The Rocketry Organization of California (ROC) uses the dry lake as one of its designated launch sites, with scheduled launches occurring monthly throughout the year. Additionally, areas outside the dry lake within the Project area are also subject to various ongoing disturbances related to road maintenance, utility activities (electrical transmission towers and lines; underground gas pipeline), recreation, OHV travel, and illegal dumping.

Methodology

Federal Clean Water Act Jurisdiction

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands (Appendix B). Section 404 requires a permit before dredged or fill material may be discharged into WOUS, unless the activity is exempt from Section 404 regulation. The USACE, under provisions of Section 404 of the CWA and USACE implementing regulations, has jurisdiction over WOUS.

The USACE previously evaluated Lucerne Dry Lake as the lowest point in the Lucerne Valley watershed to determine if the dry lakebed and washes terminating there constitute WOUS that would be regulated under Section 404 of the CWA. The USACE considered Lucerne Dry Lake in an approved jurisdictional determination (AJD) dated November 16, 2010, for the Granite Mountain Wind Project (USACE File No. SPL-2010-00791-SLP, JD-2). In this determination, the USACE found that it is a dry lake, and surface flows that enter the dry lakebed percolate into the groundwater table. The determination concluded that Lucerne Dry Lake is not a Traditional Navigable Water (TNW) and is not an "other" water. It does not have use for surface water used for recreation or other purposes by foreign or interstate travelers, it does not support harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and it does not support surface water industrial usage by industries in interstate commerce. Additionally, the current definition of WOUS under the Navigable Water Protection Rule excludes dry lakebeds that do not contribute surface water flow to a TNW or territorial sea in a typical year. Therefore, the Lucerne Dry Lake would not be considered a WOUS under the Navigable Waters Protection Rule.

As part of a determination regarding ephemeral washes within the Lucerne Valley watershed, the USACE stated that the Lucerne Valley basin is a closed basin with no external surface water flows leaving the basin, with Lucerne Dry Lake as the low point. The USACE concluded that ephemeral washes flowing toward Lucerne Dry Lake are isolated and not under federal jurisdiction (Approved Jurisdictional Determination for Agincourt Solar Project, USACE File No. SPL-2012-00498 [JD-BEM], May 29, 2013).

Based on these determinations, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries. These features are hydrologically isolated from TNWs or interstate waters and do not have the potential to directly or indirectly affect interstate or foreign commerce (33 CFR 3.28.3(a)(3)). Therefore, federal CWA jurisdiction and USACE delineation methods are not considered further in this report.

Literature Review

Pre-field investigations generally consisted of reviewing existing background literature, data, and information to identify areas of potential CDFW and RWQCB jurisdiction and prepare for delineation field surveys. Rincon reviewed existing resource information related to the Project area and vicinity. Pertinent sources reviewed include the *General Biological Resources Assessment* (Rincon 2021); recent and historical aerial photography; *White Horse Mountain, California* and *Lucerne Valley, California* quads; *Soil Survey of San Bernardino County, California, Mojave River Area*; Web Soil Survey (U.S. Department of Agriculture Natural Resources Conservation Service

[USDA NRCS] 2021); San Bernardino County General Plan (SBC 2017); Lucerne Valley Community Plan (SBC 2018); and Desert Renewable Energy Conservation Plan (DRECP). The National Wetland Inventory (NWI) (USFWS 2021) and National Hydrography Dataset (NHD) (U.S. Geological Survey [USGS] 2021) were reviewed to determine if any wetland and/or other jurisdictional waters had been previously documented and mapped on or in the vicinity of the site. The *National Hydric Soils List* (USDA NRCS 2021b) was reviewed to determine if any soil map unit types mapped on or in the vicinity of the site were classified as hydric. Other data sources reviewed included geologic maps, climate and hydrology data, and previous studies for similar or nearby solar projects. Additionally, a detailed review of the Lucerne Dry Lake and its unique geomorphic characteristics was completed and is summarized above in Environmental Setting.

Field Survey

After completing the initial literature review, Rincon conducted a reconnaissance-level field survey on July 20-22, 2021, to determine the general presence and locations of ephemeral streams and isolated wetlands potentially under CDFW and RWQCB jurisdiction onsite. Current USACE delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the State potentially subject to RWQCB jurisdiction (Lichvar et al. 2016; USACE 1987, 2008a, 2008b). Likewise, current CDFW procedures and guidance were considered to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction (CFGC 2017, Brady and Vyverberg 2013, Vyverberg 2010). Wetland Determination Data Forms and Ordinary High Water Mark (OHWM) Data Forms for determining jurisdiction are presented in Appendix A.

Rincon imported the locations of potential jurisdictional features into a global positioning system (GPS)-enabled tablet displayed over high resolution aerial imagery to allow for evaluation of those features in the field. These features, and any other potential jurisdictional features that were encountered during the survey, were examined for the presence of defined channels with characteristic bed and bank features and indicators of water flow. Potential jurisdictional streams were mapped on recent aerial imagery. The landforms, vegetation, hydrology, and soil conditions were noted where these characteristics were relevant to identification of the feature. A handheld GPS unit with sub-meter horizontal accuracy was also used to record locations and collect general data, and to guide digitization of features with a geographic information system (GIS) software package. Representative photographs of potential jurisdictional features were recorded to document their physical characteristics in the context of the site (Appendix C).

Results

Vegetation

Vegetation types in the Mojave Desert are strongly influenced by arid climatic conditions and desert soils. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity and saline alkali soils. Vegetation structure is generally characterized by short-statured and widely-spaced shrubs, and arborescent shrubs resulting from a competition for soil water resources (Baldwin, et al. 2012). Three vegetation types contribute to 75 percent of the land cover in the Mojave Desert region: Mojave creosote bush (*Larrea tridentata*) scrub (16,398 square miles), Mojave mixed woody scrub (Joshua tree woodland; 3,646 square miles), and desert saltbush (*Atriplex* spp.) scrub (1,510 square miles) (Davis et al., 1998). Other common vegetation types occurring in the region include desert and valley sink scrub, Mojave Desert wash scrub, and Mojave mixed steppe (Holland 1986, CDFW 2010). The primary disturbed or nonnative vegetation/land cover types within the Mojave Desert include annual grasslands, agricultural lands, and developed areas.

Rincon prepared a Jurisdictional Delineation Report (Rincon 2017a) and Biological Resource Assessment (BRA) (Rincon 2017b) for an alternative alignment for the Project. Rincon had determined at the time that jurisdictional features were limited to ephemeral washes that drained into the dry lake. The alignment has since shifted, thereby requiring a new delineation to be conducted. In June 2017 for the BRA, Rincon conducted vegetation mapping consisting of a windshield survey and meandering pedestrian transects to generally characterize the distribution of natural vegetation communities, habitats, residential development, and other disturbed areas in the general area. Meandering pedestrian transects were conducted in areas containing natural habitat, which allowed for a more thorough assessment to distinguish vegetation communities and identify approximate community boundaries within natural areas. Natural vegetation communities identified in the BRA were generally classified based on the classification system presented in *A Manual of California Vegetation, Second Edition* (MCV) (Sawyer et al. 2009).

Three natural vegetation communities were mapped in the general setting: creosote bush scrub (*Larrea tridentata* Shrubland Alliance), allscale scrub (*Atriplex polycarpa* Shrubland Alliance, and fourwing saltbush scrub (*Atriplex canescens* Shrubland Alliance). Two additional land cover types that did not meet the membership rules for classification as one of the recognized vegetation types in the MCV were also identified and mapped at the site. These land cover types include rock outcrop and dry lakebed.

The majority of the general area consists of the dry lakebed, which is largely unvegetated. This is the dominant land cover type at the site; it exceeds all other land cover types and vegetation communities combined.

Hydrology

Hydrology of the site and vicinity was evaluated through review of topographic maps, aerial photos, the NHD (USGS 2021), and the NWI (USFWS 2021), in conjunction with field survey data.

The site is located within the central portion of the Lucerne Lake watershed, Hydrologic Unit Code [HUC] 181001000404. It is located within the Este hydrologic groundwater sub-basin, a hydrologic

subarea of the Mojave Groundwater Basin which contains two primary groundwater basins separated by a fault (Mojave Water Agency [MWA] 2005). The groundwater below the site is stored in an aquifer within the Lucerne Valley Groundwater Basin (LVGB). The northern portion of the site extends slightly outside of the LVGB. Water is provided to the residents of Lucerne Valley from groundwater pumping (MWA 2005).

The majority of the site is mostly level and slope gradients across the site are extremely low. Thirty-nine (39) small, shallow, ephemeral streams drain generally to the west and southwest in the direction of the dry lakebed. The streams convey water flows only during and immediately after high precipitation events. Hydromodification, primarily from roads, has fragmented stream flow in areas north and west of the dry lakebed. Road maintenance activities include clearing and blading, which create large soil berms on each side of the roads, blocking flow in most of the drainages at the road edge. Additionally, OHV tracks interrupt the flow of small shallow channels.

Climate data for the Lucerne Valley obtained from four sources, including the Western Regional Climate Center (WRCC 2021), WeatherBase (WeatherBase 2021), Climate-Data (Climate-Data 2021), and Intellicast (Intellicast 2021), indicate that average annual rainfall in the vicinity is approximately 6.04 inches.

Soils

The USDA NRCS (2021) has mapped and inventoried soils at both landscape (coarse) scales and detailed (fine) scales. These data are catalogued in previously published soil surveys, the Soil Survey Geographic Database, and the U.S. General Soil Map. These data were accessed through the Web Soil Survey Application (USDA NRCS 2021). This subsection summarizes soil resources as mapped by the NRCS that overlap the site at the landscape level.

The site is covered by the *Soil Survey of San Bernardino County, California, Mojave River Area*. The soil survey indicates that soils in the Lucerne Valley floor are primarily derived from alluvium parent materials from granitic sources and other mixed sources. Within the Project area, soils are associated with alluvial fans, toe slopes, playas, and other gently sloped landforms. Based on Web Soil Survey data, the site contains 19 soil map units, which are briefly described below. Soil map units across the site are shown on Figure 4 (Appendix D).

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that in their undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop anaerobic conditions that support the growth and regeneration of hydrophytic vegetation (59 Federal Register 16835). Soils that are sufficiently wet to support the growth and regeneration of hydrophytic vegetation due to artificial measures are included in the concept of hydric soils on the list “Hydric Soils of the United States” (National List) (USDA NRCS 2021b). Soils are identified for inclusion on the list based on specific criteria established by law (67 Federal Register 58756). The National List is “a compilation of all map units with either a major or minor component that is at least in part hydric. …Because the list includes both major and minor (small) percentages for map units, in some cases most of the map unit may not be hydric… Some components may be phases of soil series that have a range of characteristics… therefore, only a portion of that component’s concept (or range in characteristics) may in fact be hydric. The list is useful in identifying map units that may contain hydric soils.”

Of the soils mapped in the Project area, further discussed below, at least one minor component of the following soil map units have been identified as hydric when they occur in depressions or playas that are during the growing season:

- Bousic Clay; Cajon Sand
- Cave Loam, Dry, 0 to 2 Percent Slopes
- Lavic Loamy Fine Sand
- Peterman clay
- Playas

Of these units, only Playas has a major component identified as hydric on the National List. The majority of the dry lakebed is mapped as Playas. However, the dry lakebed is not frequently ponded for long or very long durations. During and immediately after infrequent heavy rainfall, low volumes of water appear to collect in the lowest elevations for brief durations. The dry lakebed contains a dense, hardpan layer of clay soil. The soils contain a high alkaline pH, and high levels of salts. These soils often do not form hydric soil indicators even when saturated for extended periods.

The following soil units identified in the Web Soil Survey (USDA NRCS 2021) are summarized below.

Bousic Clay

This soil map unit typically occurs on toeslopes of lake plains and talfs (geomorphic components of an essentially flat and broad area dominated by closed depressions) in low areas with very little slope. The dominant soil series, Bousic clay, is formed in alluvium from mixed sources. A typical soil profile consists of clay horizons to at least 60 inches of depth. This soil is well drained, alkaline, and strongly saline. Minor components within this map unit are Peterman soils. This soil map unit is considered hydric.

Bryman Loamy Fine Sand, 2 to 5 Percent Slopes

This granitic soil map unit usually occurs on terraces and older alluvial fans, at elevations from 2,800 to 3,800 feet. A typical soil profile consists of a pale topsoil layer that is loamy or sandy. The second horizon is usually pink to reddish brown and is generally sandy clay loam, loam or gravelly sandy loam. The third horizon is pale yellowish brown to strong brown, is usually alkaline, and may be loamy coarse sand to sand. This soil map unit is not considered hydric.

Cajon Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fans on gentle slopes. The dominant soil series, Cajon sand, is formed in alluvium from granitic sources. A typical soil profile consists of sandy topsoil, underlain by a second sand horizon to approximately 25 inches, with layers of gravelly sand, stratified sand and loamy fine sand below to at least 60 inches of depth. This soil is somewhat excessively drained. Minor components within this map unit are Manet, Kimberlina, and Helendale soils. This soil map unit is not considered hydric.

Cajon Sand, 2 to 9 Percent Slopes

This soil map unit is similar to the Cajon map unit except it occurs on slightly greater slopes (2 to 9 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Cajon Gravelly Sand, 2 to 15 Percent Slopes

This soil map unit is similar to the previous two Cajon map units except it occurs on slightly greater slopes (2 to 15 percent) and the topsoil and subsoil horizons have increased gravel content. This soil map unit is not considered hydric.

Cave Loam, Dry, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Cave loam, is formed in alluvium from granitic sources. A typical soil profile consists of loam topsoil, underlain by stratified sandy loam to loam subsoil between 21 and at least 66 inches of depth. This soil is well drained, and very slightly to slightly saline. Minor components within this map unit are a Cave soil with clayey subsoil, Kimberlina, and Lavic soils. This soil map unit is considered hydric.

Dune Sand

This soil map unit consists of unstable hills and ridges of loose, wind-deposited sand that is excessively drained and barren. Dunes are typically less than 15 feet high and slopes are between 5 to 15 percent. Minor components within this map unit are Cajon sand, Riverwash and Villa loamy sand along the Mojave River, and Halloran soils. This soil map unit is not considered hydric.

Glendale Variant Silt Loam, Saline-Alkali

This soil map unit occurs on basin rims and lower margins of narrow alluvial fans with slopes ranging from 0 to 2 percent with vegetation consisting of salt-tolerant shrubs, grasses, and forbs. Soil profiles are very pale brown silt loam down to 11 inches with underlying material consisting of light yellowish brown and pale brown silty clay loam. Surface layer and underlying layers are moderately or strongly alkaline. Minor components within this map unit are small areas of Lavic soils. This soil is suited for irrigated crops in areas where they are reclaimed. This soil map unit is not considered hydric.

Helendale Loamy Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Helendale loamy sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy sand topsoil topsoil, underlain by sandy loam subsoil between 4 and at least 66 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Helendale Loamy Sand, 2 to 5 Percent Slopes

This soil map unit occurs on alluvial fans and terraces and is derived primarily from granitic material. Slopes are broad and nearly level with many areas dissected by shallow intermittent drainageways. Vegetation is primarily yucca, desert shrubs, grasses, and forbs. The surface layer is

very pale brown loamy sand about 4 inches thick with subsoil and the upper part of the substratum are brown, yellowish brown, and light yellowish brown sandy loam about 62 inches thick. Clay content decreases below a depth of 30 inches. Minor components include Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Joshua Loam, 2 to 5 Percent Slopes

This soil map unit occurs on old stable terraces that have desert pavement. It formed in alluvium derived from mixed sources with broad, slightly convex slopes. Most areas are dissected by moderately deep intermittent drainageways. Typically, 70-90 percent of the surface layer is covered by desert pavement with a light yellowish-brown loam about 3 inches thick. Subsoils are brown and reddish brown gravelly sandy clay loam around 17 inches thick. These soils are often strongly alkali. Minor components within this map unit are Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Kimberlina loamy fine sand, is formed in alluvium from mixed sources. A typical soil profile consists of loamy fine sand topsoil, underlain by sandy loam, fine sandy loam, and loam subsoil between 7 and at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Helendale and Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 2 to 5 Percent Slopes

This soil map unit is similar to the Kimberlina map unit except it occurs on slightly greater slopes (2 to 5 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Lavic Loamy Fine Sand

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Lavic loamy fine sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy fine sand topsoil, underlain by multiple layers of sandy loam, loamy fine sand, loamy sand and loam subsoil between 10 and at least 49 inches of depth. This soil is well drained, and slightly to moderately saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Peterman Clay

This soil map unit typically occurs on skirts of alluvial fans on gentle slopes. The dominant soil series, Peterman clay, is formed in fine-textured alluvium from mixed sources. A typical soil profile consists of clay topsoil, underlain by clay and gravelly clay subsoil to at least 60 inches of depth. This soil is moderately well drained, alkaline, and strongly saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Playas

This soil map unit consists of playa areas consisting of lacustrine deposits derived from mixed sources. Minor components within this map unit are Bousic, Norob, and Halloran soils. This soil map unit is considered hydric.

Rock Outcrop – Lithic Torriorthents Complex, 15 to 50 Percent Slopes

This soil map unit typically occurs on summits, backslopes and flanks of mountains on moderate to steep slopes. This map unit does not contain named soils. Rock outcrops, typically granitic, are interspersed with minimally developed soil underlain by bedrock within 8 to 20 inches of the soil surface. Minor components within this map unit are Sparkhule, and Trigger soils. This soil map unit is not considered hydric.

Wasco Sandy Loam, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on aprons of alluvial fans on gentle slopes. The dominant soil series, Wasco sandy loam, is formed in alluvium derived from granite. A typical soil profile consists of sandy loam topsoil, underlain by additional sandy loam horizons to at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Cajon, Lucerne and Bryman soils. This soil map unit is not considered hydric.

Sample Points

Based on soil pit data from the field survey, hydric soils occur in at least one retention basin and potentially two others that were inaccessible at the time of the survey. All three wetland parameters were observed at a location where an irrigation pipe likely has a leak. These all occur within the dry lake portion of the Project, and hydric soils were not observed outside of the dry lake. Therefore, hydric soils are considered present within retention basins in the Project area. Please refer to Table 2 below for a summary of data collected at the soil pits, Appendix A for completed datasheets, and Appendix D Figures 5a-d for soil pit locations. Vegetation at retention basins primarily consisted of alfalfa (*Medicago sativa*), common purslane (*Portulaca oleracea*), narrowleaf plantain (*Plantago lanceolata*), knotgrass (*Paspalum distichum*), and salt heliotrope (*Heliotropium curassavicum*) (Appendix A).

Table 2 Summary of Hydrophytic Vegetation, Hydric Soils, and Wetlands Hydrology Wetlands Indicator Status by Soil Test Pit Location

Sampling Point	Plant Species Scientific Name	Plant Species Common Name	Absolute Percent Cover	Wetland Indicator Status[1]	Passed Dominance Test	Passed Prevalence Index	Meets Hydrophytic Vegetation Criterion	Meets Hydric Soils Criterion	Meets Wetlands Hydrology Criterion
1	*N/A*	N/A	N/A	N/A	N/A	N/A	Yes	No	Yes
2	*Bromus catharticus*	rescuegrass	30	UPL	No	No	No	No	Yes
	Plantago lanceolata	ribwort plantain	20	FAC					
	Medicago sativa	alfalfa	48	UPL					
3	*Ulmus pumila*	Siberian elm	20	UPL	Yes	Yes	Yes	Yes	Yes
	Paspalum distichum	knotgrass	60	FACW					
4	*Medicago sativa*	Alfalfa	100	UPL	No	No	No	No	No
5	*Panicum miliaceum*	proto millet	60	UPL	No	No	No	No	Yes
	Portulaca oleracea	common purslane	10	FAC					
	Cynodon dactylon	Bermuda grass	5	FACU					
6	*Suaeda nigra*	bush seepweed	15	OBL	No	No	No	No	Yes
	Atriplex confertifolia	shadscale	5	UPL					
	Atriplex canscens	fourwing saltbush	5	UPL					
7	*Typha domingensis*	southern cattail	40	OBL	Yes	Yes	Yes	Yes	Yes
	Kali tragus ssp. *Tragus*	tumbleweed	5	UPL					
8	*Kali tragus* ssp. *Tragus*	tumbleweed	40	UPL	No	No	No	No	No

[1] OBL=obligate wetland species; FACW=facultative wetland species; FAC=facultative species; FACU=facultative upland species; UPL=obligate upland species (See Appendix A for full data detailed in datasheets).

Lucerne Dry Lake

The majority of the Project area consists of Lucerne Dry Lake. Southeastern California deserts, including the Mojave Desert where the Project area is located, contain a number of lakebeds that were filled with water during the Pleistocene Epoch (approximately 2,600,000 to 11,700 years ago) under a cooler and wetter climate regime than currently exists. The regional climate has since changed, and the extremely arid climate and low precipitation (less than 8 inches) conditions of the Mojave Desert have replaced the Pleistocene lakes with dry beds and native desert vegetation (Vyverberg 2010). They are characterized by accumulations of stratified fine textured soil materials and a number of evaporite minerals, and large polygonal desiccation fractures.

The Lucerne Dry Lake is a large Pleistocene lakebed, approximately 3 km by 7 km in size (El-Maarry 2015). It is now typically dry in most years and only collects water in its lowest points during extreme precipitation events (MWA 2005, Stoffer 2004).

Visual evidence of previous inundation and/or saturation (e.g., cracked soils, salt crusts) was observed in the dry lakebed during the field surveys. However, these features are not indicative of the lake's present hydrology. Indicators such as cracked soils can occur readily as the result of repeated intervals of short-term wetting and drying of areas dominated almost entirely by clay soils. Salt crusts often form on the surface in dry desert conditions where salts are abundant in the soils and precipitate out onto the soil surface when sporadic rainfall quickly evaporates.

In the vicinity of the site, no large tributaries directly enter the dry lake from adjacent areas. Small, shallow ephemeral streams originate in the Granite Mountains, Whitehorse Mountain, and near Peterman Hill to the northwest and north of the site, but due to significant hydromodification, primarily from road construction and maintenance, the infrequent, low-volume, short-duration surface flow in these features does not reach the dry lakebed. A main utility access road and other minor roads are present along the north and west sides of the dry lakebed. During regular road maintenance, large berms of dirt up to 3 feet high are formed on each side of the roads as a result of clearing and blading. Overall, these berms completely block or severely restrict ephemeral stream flows south and east of the roads toward the lake. Some streams do flow across the roads and continue toward the lake. As the slope gradient nears zero in areas adjacent to the dry lakebed, any infrequent, low-volume, short-duration water flows in these very small and shallow streams disperse, dissipate, and percolate into the mostly level ground before reaching the dry lake. They lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall, since outside hydrologic inputs have been significantly decreased by the presence of the roads.

As noted in the Methodology Section, in 2010, the USACE considered Lucerne Dry Lake in an AJD for the Granite Mountain Wind Project. The USACE found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for harvesting fish or shellfish.

CFGC Sections 1600 *et seq.* were enacted to conserve wildlife associated with lake and stream ecosystems. The vast majority of the dry lakebed is topographically planar and unvegetated and provides extremely limited, low-quality value for wildlife. Soils are highly alkaline and lack nutrients due to repeated inundation and evaporation events, and high and low temperatures are extreme. What little vegetation is present is primarily concentrated within larger fractures at the edges of the dry lakebed. Riparian habitat is limited to retention basins and sporadic pipeline leakages, and the dry lake does not support fish or other aquatic life.

The dry lakebed contains numerous large polygonal cracks, oriented in every direction. Based on background research and field observations, these fractures are not formed by fluvial processes typical to streams regulated by CDFW and RWQCB but are in fact geologic phenomena called desiccation polygons (fractures or fissures) which are associated with the clayey soils comprised largely of smectites or vermiculites sedimentary deposits (El-Maarry, et al. 2015, USDA NRCS 2021). Published studies, as recent as December 2015 (El-Maarry, et al. 2015), show that these fissures commonly develop in clay playas/dry lakebeds in the arid west including California and Mojave Desert, and are attributed to desiccation phenomena and water table retreat. The fractures are generally created by smectites that undergo a reversible expansion on absorbing water and are found at the lower elevations of the lakebed. The large desiccation polygons occur through lowering of the water table rather than surface evaporation (El-Maarry, et al. 2012). As dehydration proceeds from the surface downward and penetrates the capillary fringe above the water table, shrinkage occurs, which ultimately results in rupture at depth that extends upward to the surface. The mineral constituents of sediments in both the fissured and nonfissured areas are predominantly clay minerals, carbonates, salines, and analcite, with fine grains of quartz, feldspar, and ferro-magnesian silicates. Fissured lakebeds possess significantly greater quantities of clay and carbonate minerals as compared to nonfissured playas. The clay minerals, carbonates, and analcite are primarily present in <2 micron size fraction. This colloidal aggregate is believed to exert a major influence on the physical behavior of the sediments which contain the large polygons. In particular, the dehydration to an almost dry condition of a clay mass, in which the water content may exceed the mineral content, results in a major loss of volume. The shrinkage leads to rupture with the formation of fissures. The fissures form orthogonal polygons characteristic of volume change in a largely uniform horizontal mass with one surface exposed (Neal, et al. 1968). In summary, the polygonal cracks on the surface of Lucerne Dry Lake are the result of geologic processes and were not carved by the flow of water.

The conclusion that Lucerne Lake's polygonal fractures are not streambeds is supported by the fact that these features do not exhibit typical characteristics of streambeds such as bed, bank, and channel features and indicators of fluvial activity. The lakebed is generally very flat, with elevation change in the lower levels near zero. The fractures do not convey water flow from higher elevations to lower elevations as in a typical stream and lack an origin and terminus or a discernable direction of flow. They appear to simply retain water in the low elevations of the fracture channels during periods of extreme precipitation, which appears to primarily originate from onsite direct rainfall, as discussed above. Most of the fractures are devoid of vegetation. Some of the fractures are vegetated with upland species that are also present outside of the lakebed, primarily allscale. The vegetation appears to occur in older fractures near the dry lakebed edges where enough time has passed for seeds to disperse into the fractures and vegetation to colonize and persist. This vegetation consists almost exclusively of upland species, primarily allscale.

Based on the factors presented above, only the retention basins and leaked pipe within the dry lakebed were delineated as CDFW/RWQCB-jurisdictional features. All other features under the jurisdiction of CDFW/RWQCB are the 33 ephemeral streams outside of the lakebed.

Fish and Wildlife Resources

Rincon conducted biological surveys across the site in July 2021 and documented onsite biological resources and the site's potential to support special status species. The BRA (Rincon 2021) assesses potential Project impacts to biological resources at the site. The majority of the site is located in the dry lakebed, which provides extremely limited value for wildlife. No substantial aquatic or riparian

habitat is present, and the site does not support fish or other aquatic life. Project impacts in the dry lakebed would not be expected to adversely affect fish and wildlife resources.

The ephemeral streams present at the site outside of the dry lakebed are small and water flows are low in volume and short in duration. The streams do not contain habitat characteristics that differentiate them from the surrounding landscape, including riparian or other vegetation that is distinct from adjacent areas or known to support special status species. Common and special status wildlife species expected to utilize the site are wide-ranging and are not specifically dependent on these streams; in other words, the streams don't provide any additional resources that may benefit wildlife that are not present in the adjacent areas.

Assessment of Jurisdictional Waters and Wetlands

Delineation of Potential CDFW and RWQCB Jurisdiction

This section presents the results of the delineation of ephemeral streams and retention basins/leaked pipes that are potentially under the jurisdiction of the CDFW and RWQCB at the 1,854-acre Project area. A total 8.34 acres/91,251 linear feet of retention basins, leaked pipeline, and ephemeral streams were delineated onsite. Riparian habitat is limited to the small (less than 0.01 acres), isolated wetland at what is likely a leaked pipeline.

Figure 5a through Figure 5d depict the location and extent of delineated stream segments and retention basins. Table 3 lists the delineated segment ID, type, hydroperiod, average top of bank width (in feet), and potential CDFW and RWQCB jurisdiction in linear feet and acreage. A discussion of delineated streams and retention basins is provided below.

Indicators of fluvial activity, such as sediment transport and deposition, shelving, and the presence of litter and debris, were observed in the ephemeral streams. Soils in these channels include smaller particle sizes such as silt and clay. Indicators of fluvial activity were often absent or severely obscured where a stream is present on roads. Stream segments were only delineated where at least faint evidence of flow was present.

As noted before, the slope gradient nears zero in areas adjacent to the dry lakebed, and any infrequent, low-volume, short-duration water flows in the shallow delineated streams disperse, dissipate, and percolate into the mostly-level ground before reaching the dry lake. The streams lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed, and there is no discernible distinction with adjacent uplands.

Table 3 Summary of Delineated Features Onsite

				RWQCB/CDFW Jurisdiction		
Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	Non-wetland Waters of the State/ Streambed (linear feet)	Non-wetland Waters of the State/ Streambed (acres)	Wetland Waters of the State/ Streambed (acres)
1	Stream	Ephemeral	4	967.35	0.0858	–
2	Stream	Ephemeral	4	1,360.57	0.1161	–
3	Stream	Ephemeral	4	647.26	0.0597	–
4	Stream	Ephemeral	4	726.08	0.0669	–
5	Stream	Ephemeral	4	2,354.16	0.2143	–
6	Stream	Ephemeral	4	1,940.81	0.1780	–
7	Stream	Ephemeral	4	2,962.53	0.2719	–
8	Stream	Ephemeral	4	1,418.10	0.1304	–
9	Stream	Ephemeral	4	3,211.51	0.2934	–
10	Stream	Ephemeral	4	1,967.58	0.1809	–

Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	RWQCB/CDFW Jurisdiction		
				Non-wetland Waters of the State/ Streambed (linear feet)	Non-wetland Waters of the State/ Streambed (acres)	Wetland Waters of the State/ Streambed (acres)
11	Stream	Ephemeral	4	3,206.66	0.2943	–
12	Stream	Ephemeral	4	1,226.67	0.1130	–
13	Stream	Ephemeral	4	6,039.18	0.5529	–
14	Stream	Ephemeral	4	6,956.78	0.6377	–
15	Stream	Ephemeral	4	1,931.45	0.1778	–
16	Stream	Ephemeral	4	2,432.64	0.2235	–
17	Stream	Ephemeral	4	3,130.30	0.2876	–
18	Stream	Ephemeral	4	3,591.80	0.3297	–
19	Stream	Ephemeral	4	8,533.16	0.7778	–
20	Stream	Ephemeral	4	6,689.50	0.6117	–
21	Stream	Ephemeral	4	2,225.19	0.2044	–
22	Stream	Ephemeral	4	411.54	0.0373	–
23	Stream	Ephemeral	4	1,506.97	0.1385	–
24	Stream	Ephemeral	4	3,434.12	0.3125	–
25	Stream	Ephemeral	4	2,251.03	0.2058	–
26	Stream	Ephemeral	4	6,254.48	0.5696	–
27	Stream	Ephemeral	4	1,287.97	0.1170	–
28	Stream	Ephemeral	4	3,128.29	0.2870	–
29	Stream	Ephemeral	4	2,878.73	0.2644	–
30	Stream	Ephemeral	4	2,217.85	0.2036	–
31	Stream	Ephemeral	4	3,438.34	0.3149	–
32	Stream	Ephemeral	4	921.60	0.0839	–
33	Stream	Ephemeral	4	0.91	0.0002	–
34	Retention Basin	N/A	N/A	N/A	–	0.10
35	Retention Basin	N/A	N/A	N/A	–	0.14
36	Retention Basin	N/A	N/A	N/A	–	0.12
37	Retention Basin	N/A	N/A	N/A	–	0.04
38	Isolated Wetland	N/A	N/A	N/A	–	0.001
Total				**101,985.00**	**9.29**	**0.401**

A total of 33 stream segments, four (4) retention basins, and one (1) isolated wetland were delineated at the Project area. Stream widths (from top of banks) ranged from 2 to 8 feet, and the average width was 4 feet. These streams convey flows only during and immediately after high precipitation events. Evidence of fluvial activity in the majority of the streams is faint, and primarily consists of weakly defined multiple-thread channels with very low banks, minor changes in soil character, and marginally decreased vegetative cover. The delineated streams were distinct and separated by local topography and elevations of land that confine them to a definite course when waters rise to their highest level. Vegetation species composition in the streams and stream margins

does not differ from the surrounding areas, while vegetation density is generally slightly lower. Soils consist primarily of unconsolidated small particles including sand and gravel. No evidence of higher concentrations of suspended sediment or greater transport rates of bedload sediment was observed in these features. Infiltration rates are high. Overall, the movement of sediment, organic debris, and nutrients is extremely limited.

Based on a review of historical aerial photographs, it is likely that these streams conveyed higher volume flows and were more clearly defined prior to the construction of roads and increased human use and manipulation of the site. In their current condition, most streams have been fragmented or isolated by formal and informal roads and OHV tracks, which have greatly reduced fluvial activity. Many of these may be partially abandoned channels, based on the isolation from their source and very low fluvial activity.

A number of ephemeral streams surrounding the dry lakebed are mapped in the NWI. They are classified as riverine, intermittently flooded streambeds (Cowardin code R4SBJ). In these areas, most of the streambeds are depicted as connecting to the dry lakebed. However, as discussed above, field observations indicate that the streams onsite lack a clear surface connection via defined channels with bed and bank to the dry lakebed and flows dissipate to sheet flow before entering the lake. The NHD mapping data is similar to the NWI. Streambed features are depicted in approximately the same locations but fewer features are depicted. Similarly, some features are depicted connecting to the dry lakebed, and others are not.

The four retention basins on the Project area are man-made and associated with agricultural uses from surrounding farmlands. Of the four basins, one was determined to consist of wetland waters based on a sampling point examined in the bed (see Soils section above and Figure 5d in Appendix D). Two basins could not be accessed and were conservatively assumed to consist of wetland waters for the purposes of this report. The other basin did not contain hydric soils and is therefore not a wetland. According to the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2019), artificially constructed lakes and ponds created in dry land such as settling basins are excluded from the definition of Waters of the State. Therefore, the four detention basins are not under jurisdiction of the RWQCB.

One isolated wetland was observed in the western portion of the Project area in a small puddle dominated by cattails. Ponding and a hydrogen sulfide odor were observed at the time of the survey.

Conclusion

It is anticipated that the proposed Project may proceed under the authorization of a Waste Discharge Requirements permit from the RWQCB and a Lake or Streambed Alteration Agreement from CDFW. A notice of intent to RWQCB and 1602 notification to CDFW would be required. A permit from USACE would not be required. However, the final design of the proposed Project is still in preparation. It is recommended that the final Project design implement avoidance of jurisdictional aquatic features to the maximum extent feasible to support the permit application process with RWQCB and CDFW.

References

Baldwin B. G., Goldman, D. H., Keil D. J., Patterson R., Rosatti T. J. (editors). 2012. *The Jepson Manual: Vascular Plants of California, Second Edition, Thoroughly Revised and Expanded*. University of California Press. Berkeley, California.

California, State of. 2017. *California Fish and Game Code (CFGC)*. Available at: http://www.leginfo.ca.gov/.html/fgc_table_of_contents.html

California Department of Fish and Game (CDFG). 1990. *Jurisdictional Issues in the Application of Fish and Game Code Sections 1601 and 1603.* Memorandum from Eugene Toffoli, CDFG Legal Advisor, to Interested Parties dated July 2, 1990.

California Department of Fish and Wildlife (CDFW). 2010. List of Vegetation Alliances and Associations. Vegetation Classification and Mapping Program, CDFW. Sacramento, CA. September. Available at: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_communities.asp

Climate-Data. 2021. Available at: https://en.climate-data.org/location/125313/

Davis, F. W., D. M. Stoms, A. D. Hollander, K. A. Thomas, P. A. Stine, D. Odion, M. I. Borchert, J. H. Thorne, M. V. Gray, R. E. Walker, K. Warner, and J. Graae. 1998. The California Gap Analysis Project--Final Report. University of California, Santa Barbara, CA. Available at: http://www.biogeog.ucsb.edu/projects/gap/report/moj_rep.html

El-Maarry, M. R.W. A. Watters, Z. Yoldi, A. Pommerol, D. Fischer, U. Eggenberger, and N. Thomas (2015), Field investigation of dried lakes in western United States as an analogue to desiccation fractures on Mars, J. Geophys. Res. Planets, 120,2241–2257, doi:10.1002/2015JE004895.

Flener, Claude, M. Vaaja, A. Jaakkola, A. Krooks, H. Kaartinen. 2013. Seamless Mapping of River Channels at High Resolution Using Mobile LiDar and UAV-Photography. Remote Sensing Journal. Available at: www.mdpi.com/journal/remotesensing.

Intellicast. 2021. Available at: http://www.intellicast.com/Local/History.aspx?location=USCA0650

Gomi, T., R.C. Sidle and J.S. Richardson. 2002. Understanding processes and downstream linkages of headwater systems: Bioscience. 52(10):905-916.

Google Earth. 2021. Available at: http://earth.google.com/

Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Wildlife, Nongame Heritage Program. 156 pgs.

Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D.P. Guertin, M. Tluczek, and W. Kepner. 2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. U.S. Environmental Protection Agency and USDA/ARS Southwest Watershed Research Center. EPA/600/R-08/134, ARS/233046. 116 p.

Li, Na, Demin Zhou, Fuzhou Duan, Shumin Wang and Yingying Cui. 2010. Application of Unmanned Airship Image System and Processing Techniques for Identifying of Fresh Water Wetlands at a Community Scale. 2010 18th International Conference on Geoinformatics. Available at: http://ieeexplore.ieee.org/document/5567533/.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30:1–17.

Mojave Water Agency (MWA). 2005. Este Hydrologic Atlas. Available at: https://www.mojavewater.org/files/EsteHydrologicAtlasComplete.pdf

Neal, James T., et al. 1968. Giant Desiccation Polygons of Great Basin Playas. GSA Bulletin (1968) 79 (1): 69-90. Available at: https://doi.org/10.1130/0016-7606(1968)79[69:GDPOGB]2.0.CO;2

Renewable Energy Action Team (REAT). 2015. Desert Renewable Energy Conservation Plan. Available at: http://www.drecp.org/draftdrecp/.

Rincon Consultants, Inc. (Rincon). 2017a. *Sienna Solar Project General Biological Resources Assessment*. Prepared for 99MT 8ME LLC.

_____. 2017b. *Sienna Solar Project Jurisdictional Delineation Report.* Prepared for 99MT 8ME LLC.

_____. 2021. *Sienna Solar Project General Biological Resources Assessment*. Prepared for 8Minuteenergy.

Roland, H. Brady III. and Kris Vyverberg. 2014. California Energy Commission, Energy Research and Development Division. *Methods to Describe and Delineate Ephemeral Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants with MESA Field Guide*. Available at: https://www.energy.ca.gov/2014publications/CEC-500-2014-013/CEC-500-2014-013.pdf

San Bernardino, County of (SBC). 2017. San Bernardino County General Plan. Available at: http://cms.sbcounty.gov/lus/planning/generalplan.aspx

_____. 2017. Lucerne Valley Community Plan. Available at: http://www.sbcounty.gov/uploads/lus/communityplans/lucernevalleycp.pdf

Sawyer, J. O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition (MCV2). California Native Plant Society, Sacramento, California.

Shaw, J.R. and D.J. Cooper. 2007. Linkages among watersheds, stream reaches, and riparian vegetation in dryland ephemeral stream networks. Journal of Hydrology. 350:68-82.

State Water Resources Control Board (SWRCB). 2019. State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. Adopted April 2, 2019.

Stoffer, Philip. 2004. Changing Climates and Ancient Lakes. In Desert Landforms and Surface Processes in the Mojave National Preserve and Vicinity. USGS Open-File Report 2004-1007.

United States Army Corps of Engineers (USACE). 2021. National Wetland Plant List. Available at: https://cwbi-app.sec.usace.army.mil/nwpl_static/v34/home/home.html

_____. 2013. Jurisdictional Determination for Agincourt Solar Project. USACE File No. SPL-2012-00498 (JD-BEM).

_____. 2010. Jurisdictional Determination for Granite Mountain Wind Project. USACE File No. SPL-2010-00791-SLP (JD-2).

_____. 2008a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR 08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

_____. 2008b. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the United States, ed. R.W. Lichvar and S. M. McColley. ERDC/CRREL TR-08-12. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center.

_____. 1987. Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Waterways Experiment Station.

United States Department of Agriculture (USDA), National Resources Conservation Service (NRCS). 2021. Web Soil Survey. Soil Survey Area: Antelope Valley, Ca. Soil Survey Data: Version 8, July 14, 2021. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

_____. NRCS. 2021b. National Hydric Soils List. *National Cooperative Soil Survey, U.S. Department of Agriculture*. Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/

United States Geological Survey (USGS). 2021. The National Hydrography Dataset (NHD). Available at: https://viewer.nationalmap.gov/advanced-viewer/

United States Fish and Wildlife Service (USFWS). 2021. *National Wetlands Inventory (NWI)*. Available at: http://wetlands.fws.gov

Vyverberg, Kris. 2010. California Department of Fish and Game. A Review of Stream Processes and Forms in Dryland Watersheds.

WeatherBase. 2021. Available at: http://www.weatherbase.com/weather/weather-summary.php3?s=281540&cityname=Lucerne+Valley%2C+California%2C+United+States+of+America&units=

Western Regional Climate Center (WRCC). 2021. Available at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5182

List of Preparers

Rincon Consultants, Inc.

Field Survey

Malek Al-Marayati, Associate Biologist/Project Manager

Christian Nordal, Associate Biologist

Primary Author

Christian Nordal, Associate Biologist

Technical Review

Thea Benson, Senior Biologist/Project Manager

Chris Julian, Principal Regulatory Specialist

Graphics

Tracy Popiel, GIS Analyst

This page intentionally left blank.

Appendix A

Wetland Determination Data Forms

Appendix B

Regulatory Overview and Definitions

USACE Jurisdiction

The USACE, under provisions of Section 404 of the Clean Water Act and USACE implementing regulations, has jurisdiction over the "waters of the United States." "Waters" include all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, seasonal drainage channels, etc.), all impoundments of waters otherwise defined as waters of the U.S., tributaries of waters otherwise defined as waters of the U.S., territorial seas, and wetlands adjacent to waters of the U.S. USACE jurisdictional limits are typically identified by the presence of an Ordinary High Water Mark (OHWM). The OHWM is the line on the shore or banks of a water course established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology.

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds excavated on dry land used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (51 Fed. Reg. 41, 217 1986). In addition, a Supreme Court ruling (Solid Waste Agency of Northern Cook Counties [SWANCC] vs. USACE, January 9, 2001) determined that the USACE exceeded its statutory authority by asserting Clean Water Act jurisdiction over "an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds." Based solely on the use of such waters by migratory birds, the Supreme Court's holding was strictly limited to waters that are "non-navigable, isolated, and intrastate."

The Supreme Court further addressed the extent of the USACE jurisdiction in Rapanos v. U.S. (June 19, 2006). There, a sharply divided Court issued multiple opinions, none of which garnered the support of a majority of Justices. This created substantial uncertainty as to which jurisdictional test should be used. The Ninth Circuit Court of Appeal, which encompasses California, answered this in Northern California River Watch v. City of Healdsburg (August 11, 2006). There, the Court held that Justice Kennedy's opinion in Rapanos provides the controlling rule of law. Under that rule, wetlands or other waters which are not navigable in fact are subject to USACE jurisdiction if they have a "significant nexus" to a navigable-in-fact waterway. As Justice Kennedy explained, whether a significant nexus exists in any given situation will have to be decided on a case-by-case basis, depending on site-specific circumstances.

USACE Headquarters in Washington, D.C. issued substantive guidance on June 5, 2007, to its District Offices as to how to apply these rulings. Based on this guidance, additional quantitative, qualitative, and other physical data is required for the USACE to make a determination of jurisdictional authority. This determination is reviewed by the United States Environmental Protection Agency (USEPA).

In accordance with the Rapanos guidance, the USACE will assert jurisdiction over traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are relatively permanent waters (RPWs), and wetlands that directly abut such tributaries. TNWs include all of the "navigable waters of the U.S.," defined in 33 CFR Part 329 and by pertinent federal court decisions. RPWs convey water flow seasonally, typically for at least 3 months. In addition, non-navigable tributaries that are

not relatively permanent (non-RPWs), wetlands adjacent to non-RPWs, and wetlands adjacent to but that do not directly abut a TNW will be found jurisdictional based on a fact-specific analysis that they have a significant nexus with a TNW. The significant nexus evaluation considers the volume, duration, and frequency of water flow in the tributary and the proximity of the tributary to a TNW, as well as the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

RWQCB Jurisdiction

The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to "isolated" waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the USACE to be Outside of Federal Jurisdiction). The local RWQCB enforces actions under this general order, and is also responsible for Clean Water Act Section 401 certification determinations over USACE defined jurisdictional waters.

The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a "Report of Waste Discharge" (ROWD) when there is no federal nexus, such as under Section 401of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

It should be noted that the RWQCB shares USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands methodology pursuant to the 1987 Wetlands Manual. The CDFW's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake or other impoundment, whichever is greater.

CDFW Jurisdiction

The CDFW has regulatory authority over any work within rivers, streams, and lakes of the State of California (California Fish and Game Code Section 1600 et. seq.) on public, private, and agricultural lands. Water features that are regulated by CDFW include all rivers, streams, or lakes, including man-made watercourses with or without wetlands, if they contain a definable bed and bank and support a fish or wildlife resource.

Wetlands

The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. The following is a discussion of each of these parameters.

Hydrophytic Vegetation

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USFWS published the National List of Plant Species That Occur In Wetlands (Lichvar, 2013), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- **Obligate Wetland (OBL).** Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- **Facultative Wetland (FACW).** Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
- **Facultative (FAC).** Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- **Facultative Upland (FACU).** Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- **Obligate Upland (UPL).** May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

The ACOE considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the USFWS list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying, which indicates reducing conditions by a blue-grey color, or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

Wetland Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Appendix C

Site Photographs

Appendix D

Figures