# SOIL AND SURFACE WATER

## GENERAL COMMENTS

1. Applicant submitted a preliminary construction Stormwater Pollution Prevention Plan (SWPPP) and Drainage Erosion and Sediment Control Plan (DESCP) as part of Data Response Set 1A, Attachments DR 80-1 and 80-2 that identified practices that would be used on the project site to manage storm water erosion and sedimentation. This should be referenced and included in the PSA. In addition, Applicant has recently completed a revision to the SWPPP and DESCP to reflect the two-unit project described in Applicant's Environmental Enhancement Proposal. The revised documents are attached to these comments.

2. Applicant is submitting a Revised Preliminary Jurisdictional Delineation for Waters of the United States as Appendix Soil and Surface Water 2.

## FINDINGS OF FACT

No findings of fact are included in the PSA.

## PROPOSED CONDITIONS OF CERTIFICATION

1. **Page 4.10-32, DRAINAGE EROSION AND SEDMENTATION CONTROL PLAN:** Please revise Condition of Certification Soil & Surface Water-1 as follows:

   **Soil & Surface Water-1:** Prior to site mobilization, the project owner shall obtain the compliance project manager's (CPM) approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities.

   **Verification:** The project owner shall complete all engineering plans, reports, and documents necessary for the CPM to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and shall contain the following elements:

- **Vicinity Map:** A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.

- **Site Delineation:** The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale.

- **Drainage:** The DESCP shall include the following elements:

  a. Topography. Topography for off-site areas is required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.
  b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of on-site ephemeral washes, drainage ditches, and tie-ins to the existing topography. A clear indication of on-site storm water ~~containment~~ features (berm, etc.) should also be delineated.
  c. Hydrology. Existing and proposed hydrologic calculations for on-site areas and off-site areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.
  d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the on-site drainage network, diversion facilities and BMPs.
  ~~e. Containment. Description of on-site storm water containment features. Indicate how the project will maintain a "no discharge" status.~~

- **Watercourses and Critical Areas:** The DESCP shall show the location of all on-site and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.

- **Clearing and Grading:** The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

- **Soil Wind and Water Erosion Control:** The plan shall describe soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by the CPM prior to use.

- **Project Schedule:** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final grading/stabilization). BMP implementation schedules shall be provided for each project element for each phase of construction.

- **Best Management Practices:** The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.

- **Erosion Control Drawings:** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

- **Agency Comments:** The DESCP shall include copies of recommendations from the Riverside County and CRB RWQCB.

- **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the on-site containment berms, drainage ditches, and storm water diversions.

~~**Verification:**~~ The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall be submitted to the Chief Building Official (CBO) for review and approval. The DESCP may be combined with the construction SWPPP. In addition, the project owner shall do all of the following:

1. No later than sixty (60) days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Riverside County and the CRB RWQCB for review and comment and to the CPM for review and approval. The CPM shall consider comments received from Riverside County and CRB RWQCB and approve the DESCP based on comments as appropriate.

2. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion, and sediment control measures and the results of monitoring and maintenance activities.

3. Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities. ~~The project owner shall also indicate what maintenance activities were completed~~ Provide the CPM with two (2) copies each of all monitoring or compliance reports.

2. **Page 4.10-35, CONSTRUCTION – NPDES GENERAL PERMIT (SOLAR PLANT I & II):** Please revise the verification language of SOIL & SURFACE WATER-2 as follows:

   **Verification:** Thirty (30) days prior to site mobilization, the project owner shall submit the construction SWPPP to the CBO and CPM for approval. A copy of the approved construction SWPPP shall be kept accessible onsite at all times. The DESCP may be combined with the construction SWPPP.

3. **Page 4.10-35, STORM WATER DAMAGE MONITORING AND RESPONSE PLAN:** Please revise Soil & Surface Water-4 as follows:

   **Soil & Surface Water-4:** The project owner shall ensure that the heliostats are designed and installed to withstand storm water scour that may occur as a result of a 100-year storm event. The analysis of the storm event and resulting heliostat stability will be provided within a Pylon Insertion Depth and Heliostat Stability Report to be completed by the applicant. This analysis will incorporate results from site-specific geotechnical stability testing, as well as hydrologic and hydraulic storm water modeling performed by the applicant. The modeling will be completed using methodology and assumptions approved by the CPM.

   The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including heliostats that fail due to storm water flow or otherwise break and scatter mirror debris on to the ground surface.

   The basis for determination of pylon embedment depths shall employ a step-by-step process as identified below and approved by the CPM:

   A. Determination of peak storm water flow within each sub-watershed from a 100-year event:

      - Use of Riverside County Hydrology Manual to specify hydrologic parameters to use in calculations; and
      - HEC -1 and Flo-2D models shall be developed to calculate storm flows from the ~~mountain~~ watersheds upstream of the project site, and flood flows at the project site, based upon hydrologic parameters from Riverside County.

   B. Determination of potential total pylon scour depth:

      - Potential channel erosion depths shall be determined using the calculated design flows, as determined in A above, combined with the ~~methodology~~

~~presented in "FAN, An Alluvial Fan Flooding Computer Program, FEMA, 1990."~~Flo-2D model results.

- Potential local scour shall be determined using the calculated design flows, as determined in A above, combined with the Federal Highway Administration (FHWA) equation for local bridge pier scour from the FHWA 2001 report, "Evaluating Scour at Bridges."

C. The results of the scour depth calculations and pylon stability testing shall be used to determine the minimum necessary pylon embedment depth within the active channels. In the inactive portions of the alluvial fans that are not subject to channel erosion and local scour, the minimum pylon embedment depths will be based on the results of the pylon stability testing.

D. The results of the calculated peak storm water flows and channel erosion and heliostat scour analysis together with the recommended heliostat installation depths shall be submitted to the CPM for review and approval sixty (60) days before the start of heliostat installation.

The Storm Water Damage Monitoring and Response Plan shall be submitted to the CPM for review and approval and shall include the following:

- Detailed maps showing the installed location of all heliostats within each project phase;
- Description of the method of removing all soil spoils should any be generated;
- Each heliostat shall be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground;
- Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water and debris loading effects;
- Above and below ground construction details of a typical installed heliostat;
- BMPs to be employed to minimize the potential impact of broken mirrors to soil resources;
- Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments; and
- ~~Monitoring, documenting, and restoring the downstream playa surface when impacted by sedimentation or broken mirror shards.~~

A plan to monitor and inspect periodically, before first seasonal and after every storm event resulting in rainfall of 10mm or more within a 24-hour period as measured at or within 1 mile of the Project site:

- Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris

- Heliostats within drainages or subject to drainage overflow: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
- Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken glass.
- Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.
- ~~Downstream Playa Surface: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.~~

Short-Term Incident-Based Response:

- Security and Tortoise Exclusion Fence: repair damage, and remove built-up sediment and debris.
- Heliostats: Remove broken glass, damaged structure, and wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the mirrors to avoid exposure for broken glass.
- Drainage Channels: no short-term response necessary unless changes indicate risk to facility structures.
- Constructed Diversion Channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

- Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.
- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.
- Inspection, short-term incident response, and long-term design based response may include activities both inside and outside of the project boundaries. For activities outside of the project boundaries the owner shall ensure all appropriate environmental review and approval has been completed before field activities begin.

**Verification:** At least sixty (60) days prior to ~~construction~~ installation of the pylons, the project owner shall submit to the CPM a copy of the Pylon Insertion Depth and Heliostat Stability Report for review and approval. At least sixty (60) days prior to commercial operation, the project owner shall submit to the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval. The project owner shall retain a copy of this plan onsite at the power plant at all times. ~~The project owner shall~~

~~prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.~~

Appendix Soil and Surface Water 1

Provided on CD

Appendix Soil and Surface Water 2

BrightSource

October 8, 2012

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U.S. Army Corps of Engineers
Los Angeles District
U.S. Army Corps of Engineers
Riverside Regulatory Field Office
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Subject: Revised Rio Mesa SEGF Preliminary Jurisdictional Determination Report

Mr. Mace,

BrightSource Energy is pleased to submit the enclosed Rio Mesa Solar Electric Generating Facility Preliminary Jurisdictional Determination Report. The report provides documentation of field investigations that were performed subsequent to the prior studies that utilized remote testing techniques.

We look forward to cooperating with the Army Corps of Engineers on this project. If you have questions or require further information please do not hesitate to contact me at (510)-410-3211.

Regards,

Marc Sydnor
Director – Environmental Affairs
BrightSource Energy, Inc.

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# Revised Preliminary Jurisdictional Determination Report

## Rio Mesa Solar Power Generating Facility
## Riverside County, California

**Prepared For:**

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**Date:**

October 5, 2012

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# 1.0 INTRODUCTION AND PURPOSE

On behalf of BrightSource Energy Inc. (BrightSource), WRA, Inc. (WRA) has prepared this report containing additional information on the United States Army Corps of Engineers (Corps) preliminary jurisdictional determination (PJD; Corps File #SPL-2011-0972-JEM) of wetlands and Waters of the U.S. (WoUS) found within the Rio Mesa Solar Electric Generating Facility Project (Project Area). The original wetland delineation for the Project Area was performed by URS Americas, Inc. (URS). URS performed the initial delineation from the desktop using aerial photography interpretation with limited field verification (URS 2012; URS Personal Comm. 2012). Additionally, no on-site data were collected for WoUS using ordinary high water mark (OHWM) methods outlined by the Corps nor were detailed site investigations conducted using the Corps Arid West Regional Supplement (Corps 2008) for wetlands.

WRA submits this additional delineation information to inform a refined PJD process which will accurately capture the location and extent of WoUS in the Project Area.

A field analysis was conducted from September 24 to 28, 2012. This survey was conducted during a normal rainfall year. A significant storm event occurred on August 16, 2012.

## 1.1 Purpose of providing additional information

This additional information is being submitted to refine the previously mapped WoUS in the Project Area, as the previous desktop analysis was conducted using aerial imagery without field confirmation of the presence of indicators of OHWM nor detailed field investigation on the extent of any wetlands.

### *1.1.1 Following guidance issued by the Corps on wetland determinations*

The additional information provided herein for wetlands follows the methods outlined in *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (Corps 2008). Data was recorded on standard Corps delineation data forms which are provided in Appendix B.

### *1.1.2 Using guidance on determination of OHWM in the arid west*

Dry and ephemeral washes throughout the Project Area were examined using the methods outlined in the *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region* (Lichvar and McColley 2008) and *Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Curtis and Lichvar 2010). Data was recorded on standard Corps OHWM forms which are provided in Appendix B.

## 1.2 Previous Corps Submittal

Original delineation information for the Project Area was submitted to the Corps in a January 2012 letter report from URS (URS 2012). This letter report described URS delineation

methodology and presented their findings on total acreages of wetlands and WoUS in the Project Area with an associated map depicting the location and extent of wetlands and waters features.

URS identified a total of 1,178.78 acres of potentially jurisdictional wetlands and WoUS in the Project Area. An additional 254.82 acres of potentially jurisdictional wetlands and WoUS was mapped outside of the Project Area in an associated Biological Study Area (BSA) that was examined as part of their delineation. See URS letter report (provided in Appendix C), containing tables of potentially jurisdictional acreages and associated maps, for additional information on their delineation methods and results.

# 2.0 EXISTING CONDITIONS

## 2.1 Location and Setting

The Project Area is located on the Palo Verde Mesa, primarily on land owned by the Metropolitan Water District of Southern California (MWD). A portion of the Project Area is located on lands administered by the Bureau of Land Management (BLM), all within Riverside County. The Project Area is approximately two miles west of the town of Palo Verde, California and State Route 78 (Figures 1, 2). The Project Area is located on the Thumb Peak U.S. Geologic Survey (USGS) 7.5-minute quadrangle map (USGS 1983, Figure 3). The Project Area is currently undeveloped and surrounded by undeveloped land to the north, south, and west with agricultural lands located to the east. The site is comprised primarily of creosote desert scrub with areas of desert wash scrub within the onsite washes. Portions of the site are disturbed due to existing infrastructure (transmission lines, pipelines, past military training activities, etc.).

The Project Fenceline describes the area of project activities including solar generating towers, heliostats and heliostat accessways, roads, substation, and other related development.

## 2.2 Soils

The United States Department of Agriculture (USDA) Soil Survey of the Palo Verde Area, California (USDA 1974) indicates that six native soil map units are present in the eastern portion of the Project Area in the vicinity of the mapped wetlands: Badlands, Carrizo gravelly sand, Duneland, Gilman fine sandy loam, Orita gravelly fine sandy loam and Rositas fine sand, 0 to 2 percent slopes. None of these soil types are considered hydric by federal, state, or local hydric soils lists (USDA 2012). These soil types are described in more detail below. Soils in the western portion of the Project Area have not been described by a USDA soil survey. Soils within the eastern portion of the Project Area are shown on Figure 4.

**Badland.** Badland slopes range from 9 to 75 percent. Vegetation is sparse or lacking except for short periods after rains. Runoff is rapid, and the hazard for erosion is high.

**Carrizo gravelly sand.** The Carrizo series consists of very deep, excessively drained soils formed in mixed igneous alluvium. Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent. The soil surface is covered by approximately 70 percent gravel. A representative profile for Carrizo gravelly sand is 0-2 inches; pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; 2-60 inches; pale brown (10YR 6/3) stratified extremely gravelly and very gravelly coarse sand, brown (10YR 4/3) moist. Available water capacity is between 2.5 and 3.5 inches and permeability is rapid. This soil unit is slightly saline with limited potential for erosion.

**Duneland.** The Duneland series consists of fine sand hills that have a slope of 9 to 20 percent, where dunes have recently stabilized or are being slowly drifted by wind.

**Gilman fine sandy loam.** The Gilman series consists of very deep, well drained soils that formed in stratified stream alluvium. Gilman soils are on flood plains and alluvial fans and have slopes of 0 to 3 percent. A representative profile for Gilman fine sandy loam is 0-3 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; 13-28 inches; 13 to 28 inches; pale brown (10YR 6/3) stratified very fine sandy loam, brown (10YR 4/3) moist; 28-60 inches; brown (10YR 5/3) stratified very fine sandy loam, brown (10YR 4/3) moist. The available water capacity is between 5 and 6 inches and permeability is moderately rapid to rapid. Runoff is slight with little to no potential for erosion. This soil unit is nonsaline.

**Orita gravelly fine sandy loam.** The Orita series consist of very deep, well drained soils that formed in alluvium from mixed sources. Orita soils are on fan remnants and terraces. Slopes are 0 to 2 percent. The soil surface is covered with a continuous pavement of fine gravel of leuco-granite and some schist and quartz; some gravel are weakly varnished by dark coatings, some by calcium carbonate. A representative profile is 0 to 4 inches; light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 4/4) moist; 4 to 10 inches; light brown (7.5YR 6/4) gravelly sand, brown (7.5YR 5/4) moist; 10 to 22 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; 22 to 42 inches; reddish yellow (5YR 6/6) gravelly clay loam, yellowish red (5YR 4/6) moist; 42 to 60 inches; light reddish brown (5YR 6/4) gravelly clay loam, reddish brown (5YR 4/4) moist; 60 to 68 inches; reddish yellow (5YR 7/6) gravelly clay loam, yellowish red (5YR 4/6) moist; 68 to 80 inches; light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 5/4) moist.

**Rositas fine sand, 0 to 2 percent slopes.** The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent with hummocky or dune micro relief. A representative profile for Rositas fine sand is 0 to 9 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; 9 to 60 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist. Available water capacity is 3.5 to 4.5 inches and permeability is rapid. The potential for erosion is slight to moderate, and this unit is slightly saline to nonsaline.

## 2.3 Hydrology and Precipitation

*Local and Regional Flow Patterns*

The eastern portion of the Project Area, east of the Rio Mesa, was historically situated within the floodplain of the Colorado River. The primary hydrological sources in this area include surface runoff from adjacent mesa lands to the west during precipitation events, and to a lesser extent, direct precipitation. Flows from the mesa lands to the west collect in a large, dry wash feature ("Wash 25B" [VTN 2011]), within the central portion of the Project Area. This wash transport flows east and down gradient towards the historic floodplain of the Colorado River in the far eastern portion of the Project Area.

*Hydrologic/hydraulic Analysis*

A hydrologic and hydraulic analysis has been performed within the Project Area (VTN 2011). The large dry wash feature referenced above ("Wash 25B") is the third largest wash system present in the Project Area, with a contributing basin size of approximately 2.6 square miles within the Project Area. Two- and five-year event flows within this wash are 25 and 89 cubic feet per second (cfs), respectively. This wash system flows into the eastern portion of the Project Area, eventually discharging into the vicinity of the mapped wetlands described in this section.

*Precipitation Analysis*

Annual rainfall amounts in the Colorado River Hydrologic Region range from less than 3 to approximately 6 inches. Most of the precipitation for the region occurs in the winter and spring. However, monsoonal thunderstorms, created by the movement of subtropical air from the south, do occur in the summer and have generated significant rainfall in some years. Table 1 compares the total monthly precipitation received in Blythe (Blythe Northeast Station) with long-term (30-year record) monthly averages for this region (USDA 1995). These weather stations are located approximately 11-15 miles northeast of the center of the Project Area. Table 1 also shows total monthly precipitation received at the Palo Verde II Station, which is located approximately three miles southeast of the center of the Project Area. No long term data is available for the Palo Verde II station, though precipitation recorded at this station may more closely correlate to precipitation received within the Project Area due to local relief and rain shadowing effects.

Total recorded precipitation for the 2012 water year (October 2011 through October 2012) was 2.72 at the Blythe NE station and 2.63 inches at the Palo Verde II station (UCANR 2012). These values are below the long-term yearly average of 3.91 inches at the Blythe Airport station; however, both values fall within the long term normal range of 2.55 to 4.48 inches (USDA 1995). A recent significant precipitation event occurred in the Project Area vicinity on August 16, 2012, when 0.5 inches of rainfall were recorded at Blythe NE station and 0.39 inches were recorded at Palo Verde II station.

Table 1. Regional Precipitation Compared to Monthly and Annual Averages

| Month (Year) | Monthly Totals: Palo Verde II Station (in) | Monthly Totals: Blythe NE Station (in) | Long-term Averages (Blythe Airport Station) | | |
|---|---|---|---|---|---|
| | | | Average (in) | 30 Percent Chance of: | |
| | | | | less than (in) | more than (in) |
| October 2011 | 0 | 0.01 | 0.27 | 0.0 | 0.27 |
| November 2011 | 0.15 | 0.59 | 0.23 | 0.0 | 0.22 |
| December 2011 | 0.18 | 0.4 | 0.51 | 0.0 | 0.51 |
| January 2012 | 0 | 0 | 0.50 | 0.09 | 0.59 |
| February 2012 | 0 | 0 | 0.53 | 0.0 | 0.60 |
| March 2012 | 0.32 | 0.33 | 0.28 | 0.2 | 0.35 |
| April 2012 | 0.09 | 0.15 | 0.11 | 0.0 | 0.0 |
| May 2012 | 0 | 0 | 0.05 | 0.0 | 0.0 |
| June 2012 | 0 | 0 | 0.04 | 0.0 | 0.0 |
| July 2012 | 1.35 | 0.3 | 0.19 | 0.0 | 0.21 |
| August 2012 | 0.45 | 0.89 | 0.65 | 0.03 | 0.67 |
| September 2012 | 0.09 | 0.05 | 0.55 | 0.0 | 0.62 |
| **Total** | **2.63** | **2.72** | **3.91** | **2.55** | **4.48** |

## 2.4 Vegetation

Vegetation communities within the Project Area are described based on vegetation alliance descriptions in the Manual of California Vegetation, Second Edition (Sawyer et al. 2009) and vegetation community classifications given in the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986). Vegetation communities were identified by URS as part of previous Project Area biological investigations (URS 2011) and are included in this section for reference. Plant names given within this report follow Baldwin et al. (2012), with those from Hickman (1993) noted in brackets if applicable. Wetland indicator status follows the Corps 2012 Arid West Draft Final Ratings (USACE 2012).

**Blue Palo Verde – Ironwood Woodland Alliance.** Blue palo verde – ironwood woodland occurs on the margins of desert arroyos, seasonal watercourses and washes, bottomlands, middle and upper bajadas and alluvial fans. Soils are often sandy and well-drained, and derived from alluvium or colluvium. Blue palo verde – ironwood woodland occurs throughout the Colorado Desert (Sawyer et al. 2009). In the Project Area this woodland community is generally restricted to washes, where it grows at the edge of the active floodplain. Blue palo verde (*Parkinsonia florida* [*Cercidium floridum*], FAC) and ironwood (*Olneya tesota*, NL) are the dominant trees. Associated species include creosote bush (*Larrea tridentata,* NL), white bursage (*Ambrosia dumosa*, NL), indigobush (*Psorothamnus arborescens*, FACU), cheesebush (*Ambrosia* [*Hymenoclea*] *salsola*, NL), spiderling (*Boerhavia* sp., FACU-NL), chinchweed (*Pectis papposa*, NL), big galleta grass (*Hilaria* [*Pleuraphis*] *rigida*, NL) and sixweeks gramma (*Bouteloua barbata*, NL).

**Mesquite Bosque Woodland Alliance.** Mesquite bosque occurs on the fringes of playa lakes, river terraces, stream banks, floodplains, rarely-flooded margins of arroyos and washes, and sand dunes. Mesquite bosque occurs throughout California's southeastern deserts and in the southern San Joaquin Valley (Sawyer et al. 2009). This community does not occur in and around large perennial streams with high hydrologic input, but rather in drier areas with substantial near-surface groundwater supplies. Honey mesquite (*Prosopis glandulosa*, NL) dominated mesquite bosque in the Project Area, and common associated taxa include white bursage, bush seepweed (*Suaeda nigra* [*S. moquinii*], allscale (*Atriplex polycarpa*, FACU) and spiderling.

**Creosote Bush Scrub Shrubland Alliance.** Creosote bush scrub occurs in alluvial fans, bajadas, upland slopes, minor intermittent washes, and on desert pavement across California's southeastern deserts (Sawyer et al. 2009). Creosote bush scrub typically occurs on well-drained secondary soils rather than thin, residual upland soils or areas with high salinity. In the Sonoran Desert, creosote bush scrub is common on desert pavement. This community is dominated by creosote bush, but other common associates include ocotillo (*Fouquieria splendens*, NL), white bursage, brittlebush (*Encelia farinosa*, NL), *Cylindropuntia* [*Opuntia*] *ramosissima*, NL).

**Bush Seepweed Scrub Shrubland Alliance.** Bush seepweed scrub occurs on flat to gently sloping valley bottoms, playas, toe slopes adjacent to alluvial fans, and in bajadas, where soils are deep, saline or alkaline. Bush seepweed scrub occurs across California's southeastern deserts, and in the Central Coast Ranges, the Southern Mountains and Valleys, the San Joaquin Valley, and in the Northwestern Basin and Range. However, the alliance is restricted primarily to alkaline substrates in desert and semi-desert habitats (Sawyer et al. 2009). Stands were generally monotypic in the Project Area, though associated taxa at the edge of stands included allscale, honey mesquite and spidering.

**Desert Saltbush Scrub (*Atriplex polycarpa*) Shrubland Alliance.** Desert saltbush scrub occurs in washes, playa lake beds and shores, and other areas with poorly drained, finely textured alkaline soils, throughout the Colorado, Mojave and Great Basin deserts. This community is composed of low, grayish microphyllous shrubs, generally dominated by one species of *Atriplex* (Sawyer et al. 2009, Holland 1986). Total cover is often low with much bare

ground between widely spaces shrubs. Allscale is the dominant species within saltbush scrub in the Project Area. Other species observed in this community include bush seepweed and honey mesquite.

# 3.0 WETLANDS

This section describes the basis for the original determination on potential jurisdictional wetland areas within the Project Area contained in the original URS delineation (URS 2012). This section also contains background information that WRA considered preparing this updated delineation report, including existing soils, hydrology and vegetation conditions.

## 3.1 Basis for Original Determination

*Presence of NWI Polygon in the Project Area*

A query of the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map (USFWS 2010) shows that one wetland feature is located within the Project Area (Figure 5). This feature is a freshwater, intermittently flooded, palustrine wetland dominated by broad-leaved, deciduous scrub (NWI Code PSS1J).

## 3.2 Background Information

### *3.2.1 Wetland delineation methodology*

<u>Previous delineation report</u>

The original letter report used remote sensing techniques to map the extent of the wetland feature indicated on the NWI map, relying primarily aerial photograph interpretation. The extent of the wetland was based on an assumption that the feature on the NWI map was applicable throughout the entire eastern face of the mesa lands within the Project Area. Prior to the fieldwork described in this report, no verification of the aerial imagery used to map the wetland was completed in this area. Additionally, no data describing wetland or surrounding upland conditions in this area were collected on standard Corps Arid West data forms.

<u>WRA delineation report</u>

WRA followed guidance in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (Corps 2008) to delineate wetlands within the Project Area. Data was recorded on standard Corps delineation data forms which are provided in Appendix B.

## 3.3 Results

Potentially jurisdictional Section 404 wetlands are summarized in Table 2 and depicted in Figure

6. Standard Corps Arid West wetland delineation data forms are included in Appendix B. Photographs of representative portions of the Project Area are presented in Appendix D.

### *3.3.1 Potential Section 404 Waters of the U.S.*

No wetlands are located within the Project Fenceline. Approximately 2.36 acres of bush seepweed seasonal wetland was mapped in the eastern portion of the Project Area, outside of the Project Fenceline (Figure 6), in topographically low areas that collect runoff from the adjacent mesa lands to the west.

Vegetation in these wetlands was comprised entirely of bush seepweed (*Suaeda nigra* [*S. moquinii*], OBL). Notably, approximately 40-60 percent of bush seepweed appeared dead or dying, possibly indicating drying conditions within the wetlands. Upland areas lacked indicators of wetland hydrology and were not dominated by bush seepweed, but were dominated by allscale (*Atriplex polycarpa*, FACU). Because soils in the wetland lacked hydric soil indicators (see discussion below), areas dominated by bush seepweed but without wetland hydrology indicators were determined to be uplands, and the boundary of the wetland was thusly delineated.

Multiple primary indicators of wetland hydrology were observed in the mapped wetland, including surface soil cracks, salt crusts, and sediment deposits. The wetland appears to receive and collect flows from the large dry wash to the west (Wash 25B).

Hydric soil indicators were not observed in the mapped wetland areas. However, due to the presence of dominant hydrophytic vegetation, and multiple primary indicators of wetland hydrology, soils in these areas were determined to be problematic and considered hydric. Detailed rationale for this is described in the following section.

### *3.3.2 Difficult situations in the Arid West (problematic areas)*

The Arid West Supplement (Corps 2008) includes procedures for identifying wetlands that may lack indicators due to natural processes. These “problem area” wetlands are defined as naturally occurring wetland types that periodically lack indicators of hydrophytic vegetation, hydric soil, or wetland hydrology due to normal seasonal or annual variability. Some problem area wetlands may permanently lack certain indicators due to the nature of the soils or plant species on the site. WRA interpreted the gathered data using best professional judgment and our knowledge of the ecology of the wetlands in the region to make the decisions presented in this section.

<u>Problematic hydric soils</u>

Indicators of hydric soils were not apparent within the mapped wetlands. At two sampled locations, faint or indistinct redoximorphic concentrations were observed within the soil matrix, but not of enough to be considered indicators of hydric soils. Soils were typically layered and may indicate that large amounts of sediment are transported into this area during significant precipitation events. The rate of soil deposition in this area may prevent development of

redoximorphic features in the soil profile. However, because the area was dominated by OBL-classified vegetation, and displayed multiple primary indicators of wetland hydrology, soils were assumed to be hydric.

Problematic vegetation

Bush seepweed is listed as an obligate wetland plant in the new 2012 National Wetland Plat List (Lichvar and Kartesz 2009). Obligate species occur in wetland areas greater than 99 percent of the time and are almost always considered hydrophytes. However, seepweed was also observed growing on upland soils with no apparent indicators of wetland hydrology.

Bush seepweed can occur in non-wetland areas in desert habitats, and its presence may be dictated by other habitat characteristics. The Flora of North America describes that:

> *Suaeda nigra exhibits much phenotypic plasticity, as well as genetic variability, and is wide-ranging. This combination has resulted in the naming of many variants that often reflect a response to localized or regional habitat conditions such as degree of wetness, salinity, or freezing temperatures (Hopkins and Blackwell 1977) (FNA 1993)*

The Flora of North America additionally describes bush seepweed habitat as "Alkaline, saline, and gypseous places of the interior, mostly in deserts, occasionally coastal, rarely estuarine" (FNA 1993). From these descriptions and in-the-field observations, it is clear that bush seepweed is able to occupy a variety of habitats and its presence may be determined by other factors than moisture availability. The Manual of California Vegetation notes that bush seepweed "appears opportunistic in occupying roadsides and other recently disturbed areas" (Sawyer et al. 2009).

For these reasons, WRA considers bush seepweed-dominated communities which do not have additional indicators of wetland hydrology or hydric soils to be upland areas

# 4.0 "WATERS OF THE U.S.": LARGE DRY WASHES

## 4.1 Description of Large Dry Washes

Four large dry wash systems traverse the Project Area from a west-to-east direction. The four large washes are described in detail in the project hydrologic analysis (VTN 2011), and summarized here:

- "Wash 45" – This is the largest of the washes and is located along the Project Area's southern boundary.
- "Wash 30" – This wash is located approximately 0.75 mile north of Wash 45.
- "Wash 25B" – Located approximately 2.4 miles north of Wash 30.

- “Wash 0” – This wash traverses the Project Area’s northern boundary, and is located approximately 1.1 mile north of Wash 25B.

The large dry washes on the Project Area are compound channels as described in Lichvar and McColley (2008), where a complex mosaic of terraces are located within an active floodplain with frequently shifting low-flow channels. We used OHWM indicators as outlined in Corps guidance (Lichvar and McColley 2008) to delineate the ordinary high water mark of individual channels. Most often, these included mudcracks, crested ripples, benches, drift deposits, change in particle size distribution, and surface relief. The Corps guidance on ordinary high water mark in the arid west provides for separation of these systems into separate “waters” and terraces. WRA interpreted these systems based on hydrologic modeling, knowledge of recent storm events and rain gauge data, and experience working in similar dry wash systems in the Arid West.

## 4.2 Background Information

### *4.2.1 Large dry wash delineation methodology*

Previous delineation report

The original delineation used remote sensing techniques exclusively to map these large dry wash systems, and not published guidance from the Corps (Lichvar and McColley 2008) for mapping the OHWM in dry wash systems in the Arid West. In doing so, the boundaries between active floodplain and terraces were not delineated. Instead, the wash boundaries were mapped as extending broadly across the entire system, overstating potential jurisdiction.

WRA delineation report

The methods used by WRA in this study to delineate the OHWM in large dry washes in the Project Area followed guidance described in the publication *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (“Updated Datasheet”, Curtis and Lichvar 2010). At least one Updated Datasheet was completed for each large wash system in the Project Area. Data collected on the Corps Updated Datasheet are presented in Appendix B.

Refinement of the previous delineation map began with a review of background resources. An office review of available resources including the previous delineation map (URS 2011), USGS 7.5-minute topographic maps (USGS 1983), soils maps (USDA 1974) and high-quality aerial imagery was conducted to determine the probable locations of WoUS within the Project Area. Recent rainfall data (UCANR 2012) as well as long-term climatic data (USDA 1995) were reviewed to determine if any significant rainfall events had occurred in the months preceding the field assessment. No stream gauge data is available for watercourses within the Project Area. Using GIS, potential areas of terrace floodplain within the large washes were digitized and loaded onto Trimble GeoXH handheld GPS units with submeter accuracy.

Fieldwork to verify OHWM extent followed the office remote assessment. Areas identified as potential terrace floodplain within the large washes were inspected to determine potential jurisdictional status. Transitional areas between the low-flow channels, active floodplains and terrace floodplains were determined, and OHWM indicators associated with the system were noted as per the procedures in Lichvar and McColley (2008). Once the boundaries between low-flow channels, active floodplains and terrace floodplains were identified, transects were conducted perpendicular to direction of flow at intervals in the large wash systems. Using GPS, the OHWM locations (i.e. between the active floodplain and terrace floodplain) were mapped in the field to help inform further digitization of the large wash systems using GIS.

At six locations throughout the Project Area, updated OHWM datasheets (Curtis and Lichvar 2010) were used to describe the wash system in detail.

Lichvar and McColley (2008) describe that low to moderate rainfall events in the 5- to 10-year recurrence size range may be necessary to engage the active floodplain in wash systems in the Arid West, and that the shifts in vegetative and textural signatures brought on by events of this size are generally used to identify the limits of the OHWM. Therefore, WRA examined hydrologic models (FLO-2D and HEC-RAS) prepared for the Project Area (VTN 2011). Models depicting the extent of 5- and 10-year recurrence events were examined and considered in making potential jurisdiction determinations.

### 4.3 Results

The large dry washes in the Project Area can be described as compound channels as described in Lichvar and McColley (2008), where a complex mosaic of terraces are located within an active floodplain with frequently shifting low-flow channels. Low-flow channels and active floodplains contained substrates of sand or gravel, and were generally devoid of vegetation. Terrace floodplains, located within the large wash systems but outside of potential jurisdiction, sometimes contained high-flow channels, which only receive and transport flows during extremely large precipitation events. Large wash systems are shown in Figure 6. The locations of the updated datasheet transects are shown on Figure 7.

Numerous geomorphic and vegetative indicators of OHWM described in Lichvar and McColley (2008) were observed in the large wash systems. These included, but are not limited to, mudcracks, low-flow channel dunes, gravel sheets and sediment sorting, cobble bars, benches, drift, and vegetation shifts. See Appendix D for photographs of indicators of OHWM observed in the Project Area.

Vegetation within large washs typically varied by geomorphic position within the system. Low-flow channels and active floodplains were often devoid of vegetation or contained only scattered annual herbs and young shrubs. On terraces, vegetation was more developed, and some terraces within large wash systems supported mature trees and shrubs including blue palo verde, ironwood, smoke tree (*Psorothamnus spinosus*, NL) water jacket (*Lycium andersonii*, NL), cheesebush, indigo bush, creosote bush, big galleta grass, trailing windmills (*Allionia incarnata*,NL), spiderling and chinchweed. Low terraces adjacent to the large wash systems

typically supported creosote bush shrubland, with associated species as described in Section 2 of this report.

# 5.0 "WATERS OF THE U.S.": SMALL DRY WASHES

## 5.1 Description of Small Dry Washes

Aside from the four large wash systems, smaller, ephemeral dry washes traverse the Project Area, generally from west to east. Most of these washes are tributary to the larger systems described above.

## 5.2 Background Information

### *5.2.1 Small dry wash delineation methodology*

Previous delineation

The original delineation used remote sensing techniques including aerial photo interpretation in mapping these small dry washes, and not published guidance from the Corps (Lichvar and McColley 2008) for mapping the OHWM in dry wash systems in the Arid West. In digitizing each individual small wash, the previous delineator assigned a width class to describe the width of the wash. For instance, any wash estimated to be between zero and three feet wide was assigned a width of three feet. Any wash estimated to be between three and six feet wide was assigned a width of six feet, and so on.

The previous delineation considered many relict or swale features to be potentially jurisdictional. Since these features do not have an ordinary high water mark, these features were removed from the updated delineation map, as described below.

WRA delineation

In order to accurately characterize the extent and width of ephemeral washes within the Project Area, the previous delineation data was loaded onto handheld Trimble GeoXH receivers with sub-meter accuracy. Linear transects perpendicular to the ephemeral drainages were established at intervals as shown on Figure 7. Transects were traversed on foot. Where a wash with an ordinary high water mark crossed the transect, data describing the actual wash width and characteristic vegetation present were recorded. Where a relict or swale feature was encountered, GPS data indicating lack of jurisdiction were recorded. Transect data were then exported into GIS, and data collected in the field were used to inform further mapping refinement in the office.

The previous delineation considered many relict or swale features to be potentially jurisdictional. Due to the shifting nature of these ephemeral systems, channels that previously carried ordinary flows can be completely abandoned. Indicators that may have been present from these historic flows can remain intact for many years in these relict features. Alternatively, swales are

features that may carry flows during high-flow (25-year or greater events), but normally do not transport flows during low to moderate (up to 10-year) events. The OHWM is generally poorly defined in these features due to the lack of regular flows. When relict features or swales were encountered during transects, the location was noted with GPS and the feature subsequently removed from the delineation map. In other cases, features were delineated based on aerial imagery that did not exist and were subsequently removed from the delineation.

### 5.3 Results

Aside from the four large wash systems, numerous smaller, ephemeral dry washes traverse the Project Area, generally from west to east (Figure 6). These washes range from small (one-half to one foot wide) to relatively broad (over 10 feet wide). These smaller washes are generally less complex than the larger systems, and usually lack compound channels containing active and terrace floodplains present in the large washes. Substrates of active channels range from sandy to gravelly. Larger cobbles and small boulders that are present in the larger systems are generally absent from these smaller features.

Vegetation within smaller washes typically varies by size of the wash and location within the active floodplain. Active low-flow channels were typically devoid of vegetation. Vegetation was generally concentrated outside of the active channel. Most small washes were located within creosote bush scrub. Typical vegetation included creosote bush, big galleta grass, trailing windmills, spiderling, and chinchweed,

*Small wash widths*

Because the previous delineation had used size classes to describe the width of small washes within the Project Area, all washes below a certain width threshold were automatically rounded up when potential jurisdiction was reported. WRA found that many of these widths were overstated. By reporting the actual average width of small washes the total acreage of small washes within the Project Area was reduced from what was reported in the previous delineation.

Due to size classes used in previous delineation many small wash widths were overstated. WRA subsequently narrowed many washes in the transect areas.

*Small wash 'headwaters' areas*

Wash 'headwaters' are located at the upper extent of OHWM in small washes, where flows are less and indicators of OHWM become less apparent. WRA found that indicators of OHWM in many wash headwaters areas were insufficient to define the area as a WoUS. The uppermost portions of such washes were determined to be non-jurisdictional and were removed from the delineation map.

# 6.0 SUMMARY OF RESULTS

The conclusions of this report are based on conditions observed at the time of the delineation conducted between September 20 and 24, 2012.

## 6.1 Summary of Potential Jurisdictional Areas

Based on the findings of the wetland delineation, the Project Area contains approximately 2.36 acres of potentially jurisdictional wetlands and 367.97 acres of potentially jurisdictional dry washes (Table 2), for a total of 370.33 acres of potential jurisdictional Waters of the U.S.

The Project Fenceline contains no potentially jurisdictional wetland areas and 144.66 acres of potentially jurisdictional dry washes (Table 2), for a total of 144.66 acres of potential jurisdictional Waters of the U.S.

Table 2. Summary of Potential Jurisdictional Areas within the Project Area and Project Fenceline

| Potentially Jurisdictional Waters of the U.S. | Within the Project Area (acres) | Within the Project Fenceline (acres) |
|---|---|---|
| Wetlands | 2.36 acres | 0.00 acres |
| Dry Washes | 367.97 acres | 144.66 acres |
| **Total** | **370.33 acres** | **144.66 acres** |

# 7.0 REFERENCES


Curtis, Katherine E. and Robert W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL Publication TN-01-1.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi 39180-0631.

Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford.

Hickman, J.C., ed. 1993. The Jepson Manual of Higher Plants of California. University of California Press. Berkeley and Los Angeles, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. State of California, The Resources Agency, Nongame Heritage Program, Department of Fish and Game, Sacramento, CA.

Hopkins, C.O. and W.H. Blackwell. 1977. Synopsis of *Suaeda* (Chenopodiaceae) in North America. Sida 7:147-173.

Lichvar, R.W. and J.T. Kartesz. 2009. North American Digital Flora: National Wetland Plant List, version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC.

Lichvar, R.W. and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL Publication TR-08-12.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society in collaboration with California Department of Fish and Game. Sacramento, CA.

URS, Inc. (URS). 2012. BrightSource Energy Rio Mesa Solar Project, Blythe,CA Methods for ACOE Proposed Preliminary Jurisdictional Waters Delineation URS Project No. 27651003. Submitted January.

URS. 2011. Biological Resources Technical Report for the Rio Mesa Solar Power Generating Facility, Riverside County, California. Prepared for BrightSource Energy, Inc. Submitted October.

U.S. Army Corps of Engineers (USACE). 2012. Arid West Final Draft Ratings. USACE, Cold Regions Research and Engineering Laboratory (CRREL)

USACE. 2011. Preliminary Jurisdictional Determination (File/ORM# SPL-2011-00972-JEM)

USACE. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). Vicksburg, MS.

University of California Agriculture and Natural Resources (UCANR). 2012. Statewide Integrated Pest Manangement Program, California Weather Data. http://www.ipm.ucdavis.edu/calludt.cgi/WXPCLISTSTNS?MAP=++&PATH=CNTY&COUNTY=IM. Accessed October 4, 2012.

U.S. Department of Agriculture (USDA). 2012. Official National List of Hydric Soils. Online at: http://soils.usda.gov/use/hydric/. Accessed: October 2012.

USDA. 1995. Natural Resources Conservation Service (NRCS) National Water and Climate Center. WETS Tables for Riverside County, California.

USDA. 1974. Soil Survey of Palo Verde Area. In cooperation with the University of California Agricultural Experiment Station.

U.S. Fish and Wildlife Service (USFWS). 2010. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/. Accessed October 2, 2012.

U.S. Geologic Survey (USGS). 1983. 7.5-minute Quadrangle Map. Thumb Peak Provisional Map.

VTN Consulting. 2011. Rio Mesa Solar Overall Existing Condition Hydrologic & Hydraulic Analysis. Prepared for BrightSource. July 6.

## APPENDIX A

## PROJECT FIGURES

Figure 1. Project Area Vicinity Map

Figure 2. Project Area Detail Map

Figure 3. USGS Map with Project Area

Figure 4. Project Area Soils Map

Figure 5. NWI Features within the Project Area

Figure 6. Potentially Jurisdictional Wetlands and “Waters of the U.S.” within the Project Area

Figure 7. Transect Locations: OHWM Datasheet Locations and Wash Transects

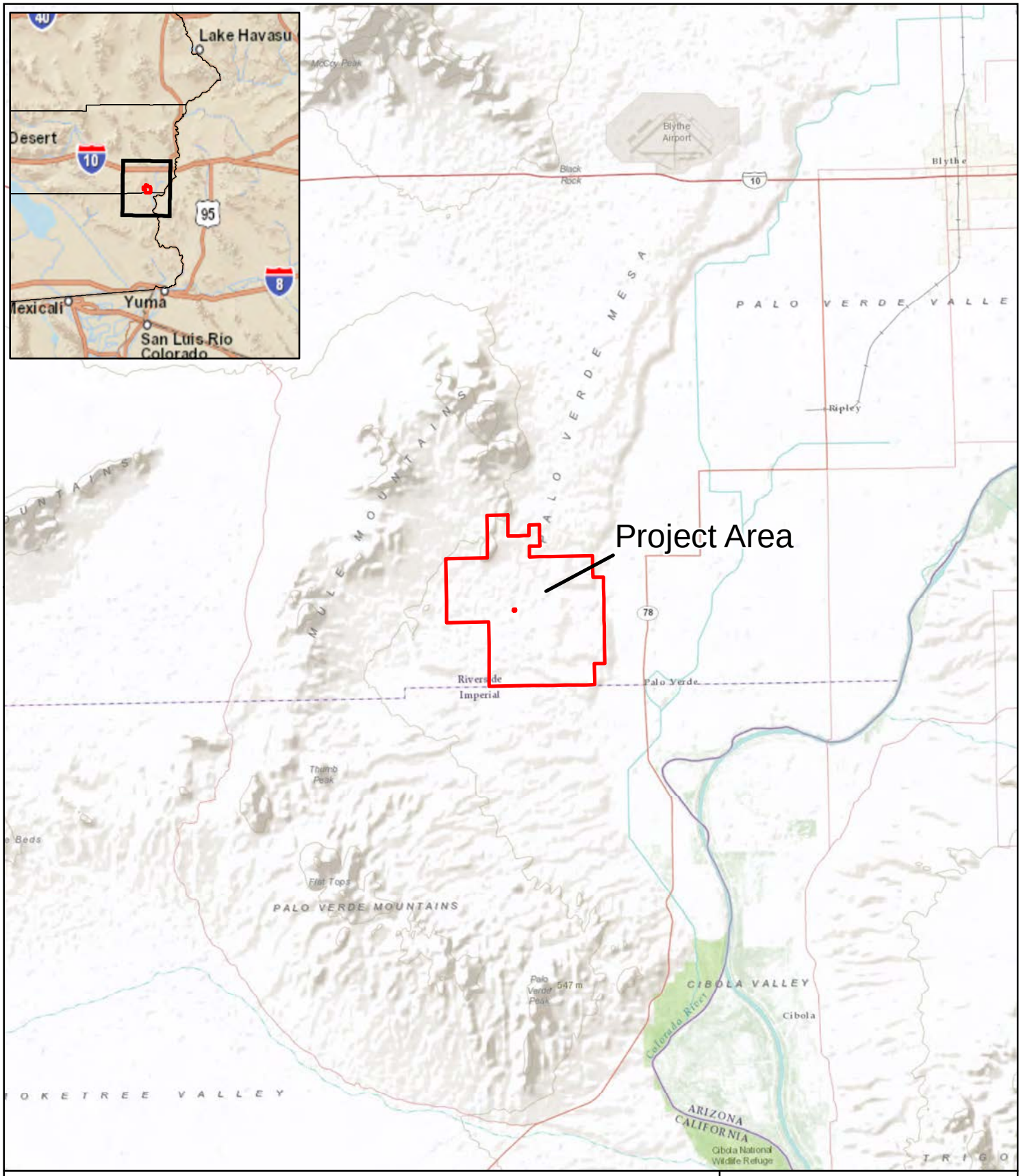


Figure 1. Project Area Vicinity Map

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Miles

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ENVIRONMENTAL CONSULTANTS

BrightSource Rio Mesa Site
Blythe, California

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Topo

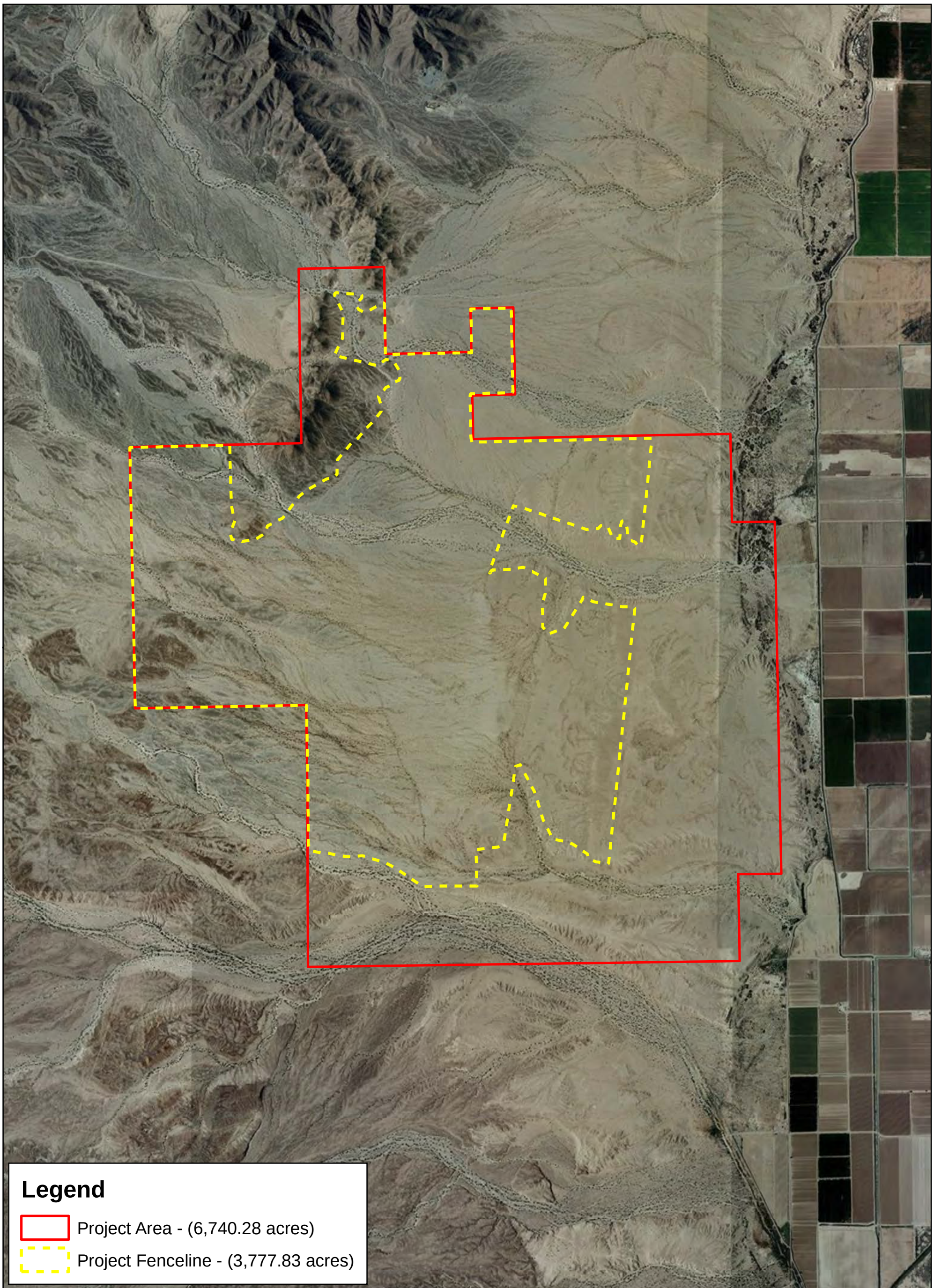


Figure 2. Aerial Site Map

BrightSource Rio Mesa Site
Blythe, California

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

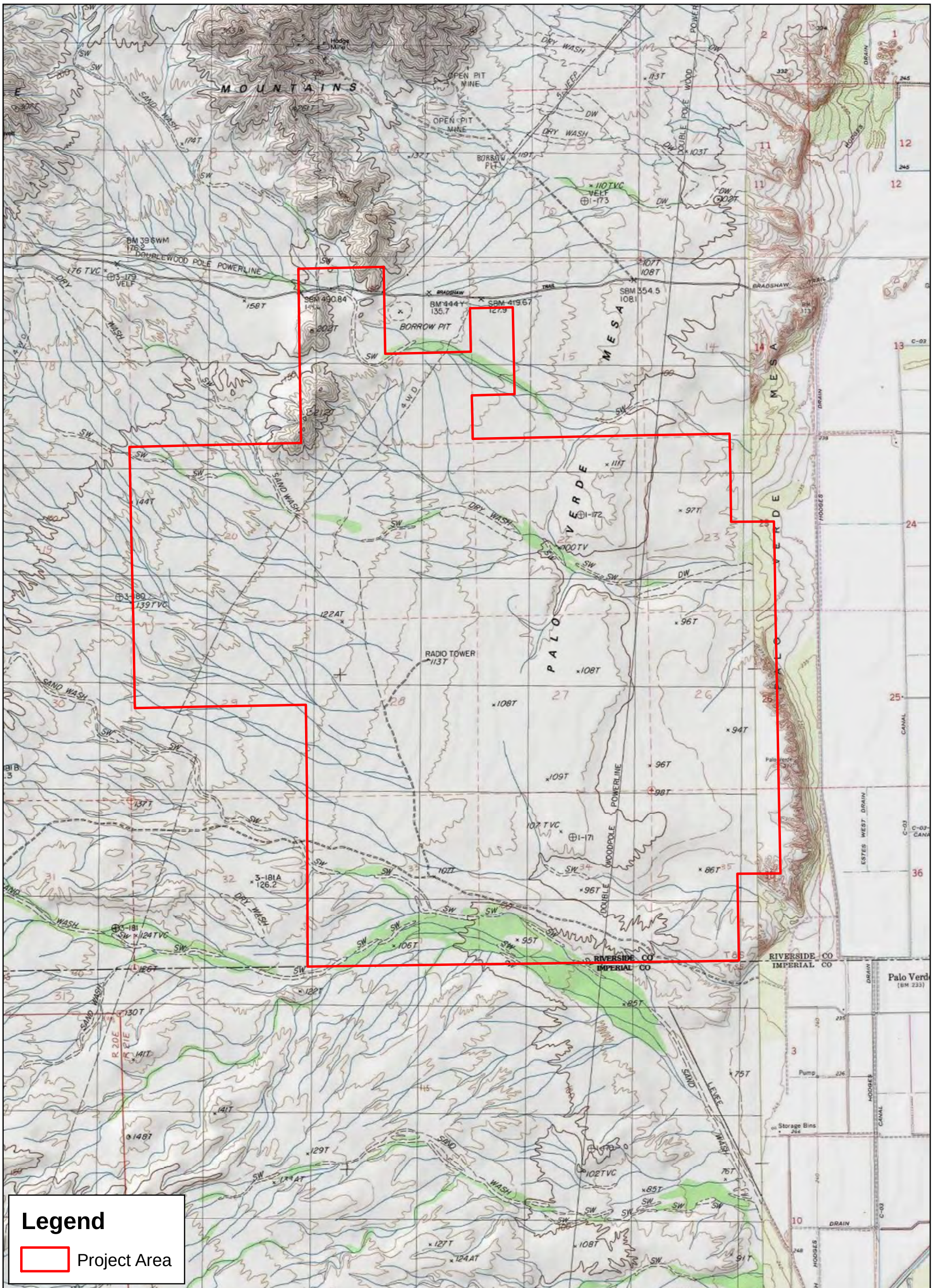


Figure 3. USGS 7.5' Topographic Quadrangle Map with Project Area

BrightSource Rio Mesa Site
Blythe, California

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

Figure 4. Soils in Vicinity of Mapped Wetlands

BrightSource Rio Mesa Site
Blythe, California

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

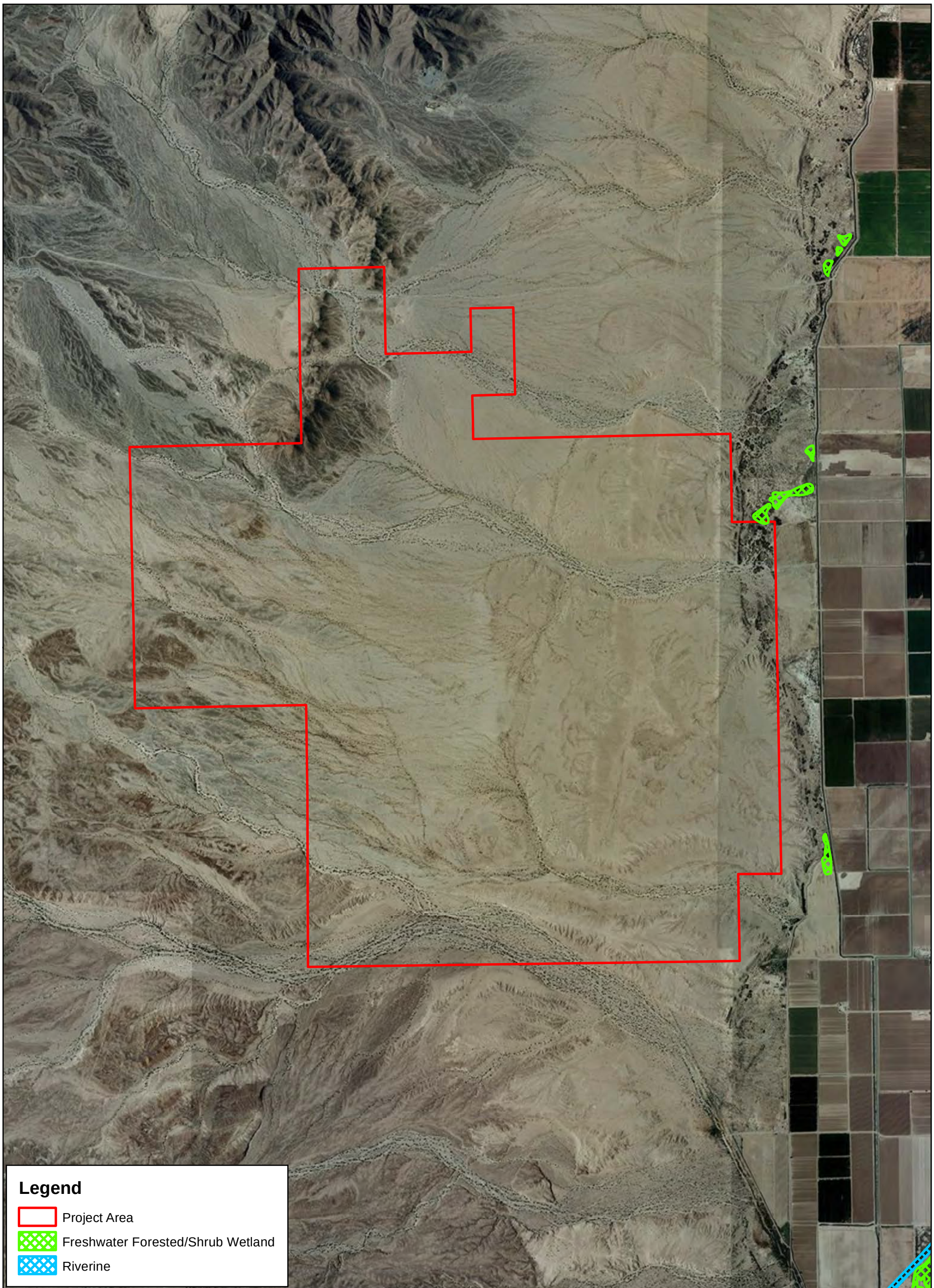


Figure 5. National Wetlands Inventory Features in the Project Area Vicinity

BrightSource Rio Mesa Site
Blythe, California

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

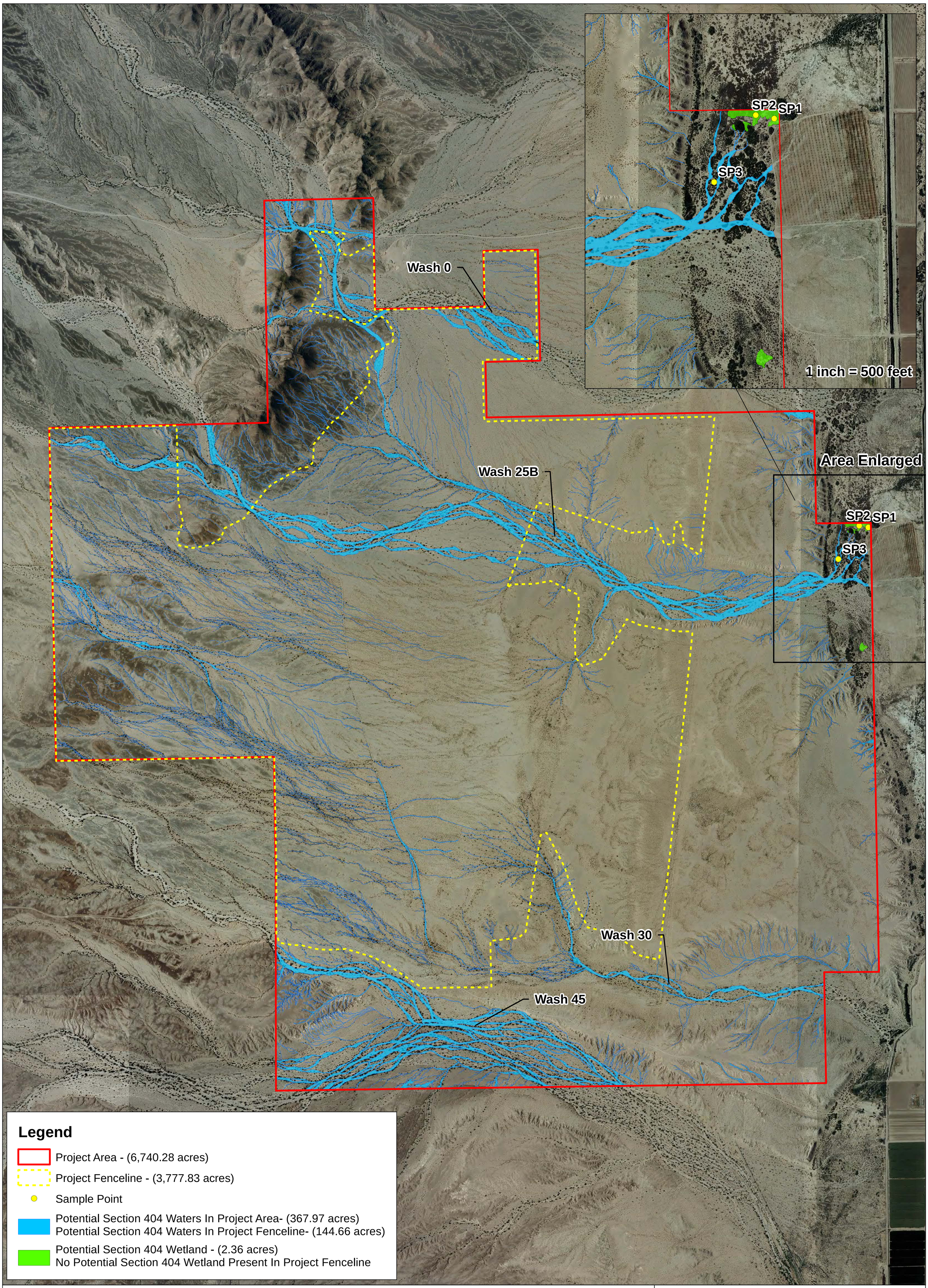


Figure 6. Potential Section 404 Waters and Wetlands of the U.S.

BrightSource Rio Mesa Site
Blythe, California

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Feet
1 inch = 1,000 feet

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

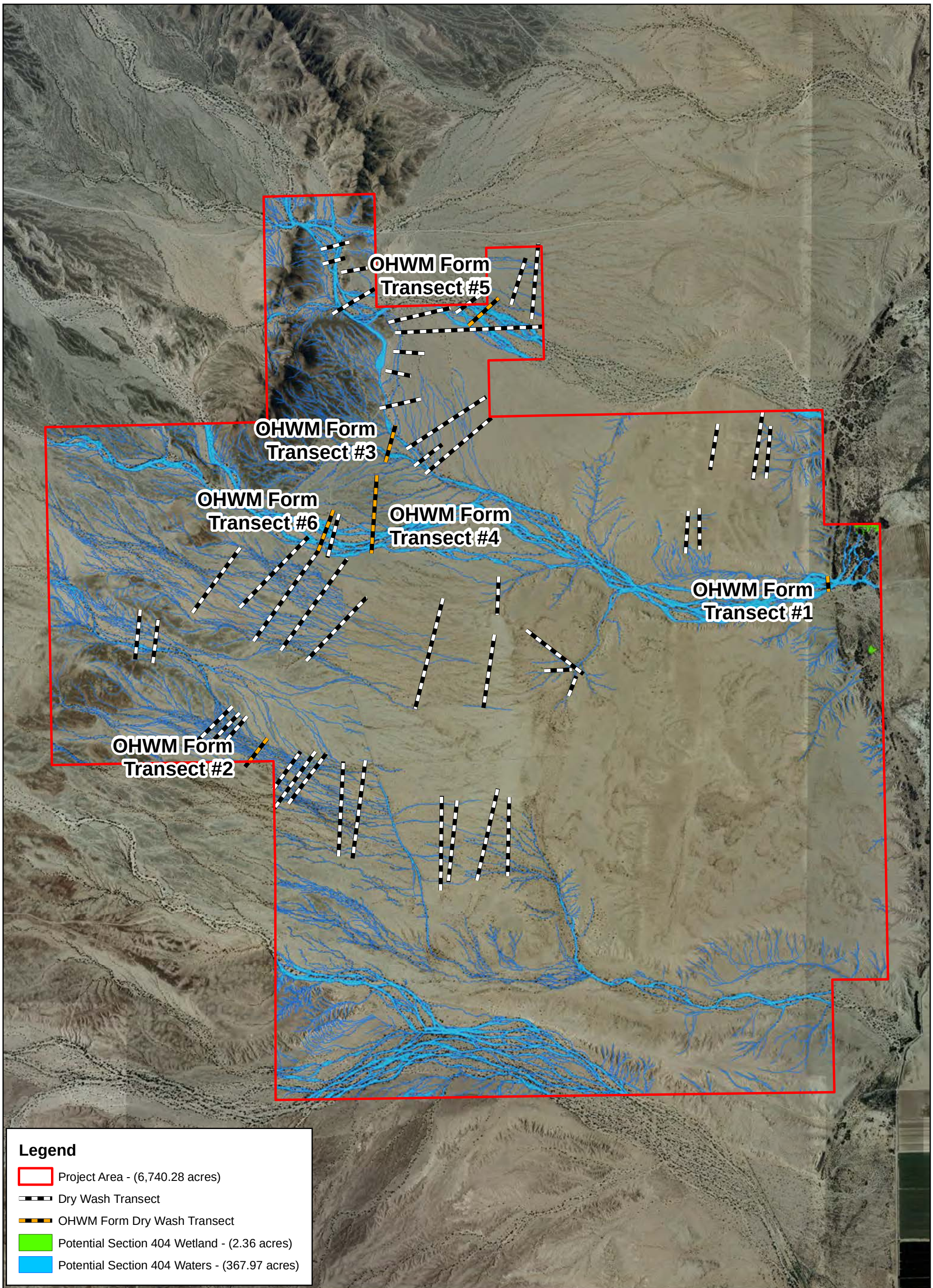


Figure 7. Transect Locations

BrightSource Rio Mesa Site
Blythe, California

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ENVIRONMENTAL CONSULTANTS

Date: October 2012
Map By: Sundaran Gillespie
Basemap: ESRI World Imagery

# APPENDIX B

# CORPS ARID WEST AND OHWM DATA FORMS

# Wetland Determination Data Form - Arid West Region

Project/Site: Rio mesa City: Pelo Verde County: Riverside Sampling Date: 9/24/12

Applicant/Owner: BSE State: CA Sampling Point: SP1

Investigator(s): MT, TH, AM, RB, JK Section, Township, Range: S23 T6S R21E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): none Slope(%): 0

Subregion(LRR): D Lat: 33° 24' 13.72" N Long: 114° 44' 55.46" Datum: NAD 83

Soil Map Unit Name: Gilman fine sandy loam NWI classification: None

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☐ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☒ Soil ☐ Hydrology (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.**

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | ☒ Yes ☐ No | **Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No** |
| Hydric Soil Present? | ☐ Yes ☐ No | |
| Wetland Hydrology Present? | ☒ Yes ☐ No | |

**Remarks:** Wetland near project boundary at low point in terrace adjacent to Hodges drain. Water from mesa appears to collect in this area. Problematic soils present. Sample point is in a wetland.

## VEGETATION (use scientific names)

| TREE STRATUM Plot Size: 50' R. | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Tamarix ramosissima | 5 | NO | UPL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Tree Stratum Total Cover: | | | |

| SAPLING/SHRUB STRATUM Plot Size: | | | |
|---|---|---|---|
| 1. Suaeda nigra | 60 | yes | OBL |
| 2. (live suaeda = 20%) | | | |
| 3. | | | |
| 4. | | | |
| Sapling/Shrub Stratum Total Cover: | | | |

| HERB STRATUM Plot Size: | | | |
|---|---|---|---|
| 1. Allionia incarnata | 10 | NO | UPL |
| 2. Boerhavia coulteri | 15 | NO | UPL |
| 3. Pectis papposa | 3 | NO | UPL |
| 4. Bouteloua barbata | 2 | NO | UPL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Herb Stratum Total Cover: | | | |

| WOODY VINE STRATUM Plot Size: | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| Woody Vines Total Cover: | Ø | | |

% Bare ground in herb stratum _____ % cover of biotic crust _____

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC? 1 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

**Prevalence Index Worksheet**

| Total % cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x1 |
| FACW species | | x2 |
| FAC species | | x3 |
| FACU species | | x4 |
| UPL species | | x5 |
| Column Totals | (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators**

☒ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present ?** ☒ Yes ☐ No

**Remarks:** Suaeda nigra (OBL) is the only dominant vegetation

SP 1

## SOIL

**Sampling Point** SP 1

**Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[1] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-12 | 10YR 4/3 | 100 | 7.5YR 4/4 | 1 | C | M | Sandy silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)(LRR C)
- ☐ 1cm Muck (A9)(LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

[3]Indicators of hydric vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

**Type:** _____

**Depth (inches):** _____

**Hydric Soil Present ?** ☒ Yes ☐ No

**Remarks:** Soils are entisols, with no apparent hydric soil indicators. Buried organic matter, layering in soil profile. Some redox concentrations in matrix. Problematic hydric soils present.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1)(Nonriverine)
- ☒ Sediment Deposits (B2)(Nonriverine)
- ☐ Drift Deposits (B3)(Nonriverine)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in PLowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1)(Riverine)
- ☐ Sediment Deposits (B2)(Riverine)
- ☐ Drift Deposits (B3)(Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☐ Yes ☒ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (inches): _____

**Wetland Hydrology Present ?** ☒ Yes ☐ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Multiple primary wetland hydrology indicators observed.

# Wetland Determination Data Form - Arid West Region

Project/Site: Rio Mesa City: Palo Verde County: Riverside Sampling Date: 9/24/12

Applicant/Owner: BSE State: CA Sampling Point: SP2

Investigator(s): MT, JK, TH, AM, RB Section, Township, Range: S23 T8S R21E

Landform (hillslope, terrace, etc.): terrace Local Relief (concave, convex, none): None Slope(%): <1

Subregion(LRR): D Lat: 33° 28' 14.13"N Long: 114° 44' 58.04 W Datum: NAD 83

Soil Map Unit Name: Carrizo gravelly sand NWI classification: None

Are climatic/hydrologic conditions on-site typical for this time of year? ☐ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☒ Soil ☐ Hydrology (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.**

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | ☒ Yes ☐ No | **Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No** |
| Hydric Soil Present? | ☒ Yes ☐ No | |
| Wetland Hydrology Present? | ☒ Yes ☐ No | |

**Remarks:** Wetland is in lowest portion of terrace adjacent to Hodges Drain. Area appears to receive flow from mesa to west, and flows appear to collect in this area. Problematic hydric soils present. Sample point is in a wetland.

## VEGETATION (use scientific names)

| TREE STRATUM Plot Size: | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Tree Stratum Total Cover: | Ø | | |
| **SAPLING/SHRUB STRATUM Plot Size:** | | | |
| 1. Suaeda nigra | 80 | Yes | OBL |
| 2. (live suaeda = 30%) | | | |
| 3. | | | |
| 4. | | | |
| Sapling/Shrub Stratum Total Cover: | 80 | | |
| **HERB STRATUM Plot Size:** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Herb Stratum Total Cover: | Ø | | |
| **WOODY VINE STRATUM Plot Size:** | | | |
| 1. | | | |
| 2. | | | |
| Woody Vines Total Cover: | Ø | | |

% Bare ground in herb stratum: 100% % cover of biotic crust:

**Dominance Test Worksheet**

| | | |
|---|---|---|
| Number of Dominant Species that are OBL, FACW, or FAC? | 1 | (A) |
| Total number of dominant species across all strata? | 0 | (B) |
| % of dominant species that are OBL, FACW, or FAC? | 100 | (A/B) |

**Prevalence Index Worksheet**

| Total % cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 80 | x1 | 80 |
| FACW species | | x2 | |
| FAC species | | x3 | |
| FACU species | | x4 | |
| UPL species | | x5 | |
| Column Totals | 80 (A) | | 80 (B) |

Prevalence Index = B/A = 1

**Hydrophytic Vegetation Indicators**

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** ☒ Yes ☐ No

**Remarks:** Approx 50% of S. nigra is dead.

## SOIL

Sampling Point SP 2

**Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[1] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-12 | 10YR 4/3 | 100 | N/A | | | | Sandy Silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)(LRR C)
- ☐ 1cm Muck (A9)(LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

[3]Indicators of hydric vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

**Type:** _____

**Depth (inches):** _____

**Hydric Soil Present ?** ☒ Yes ☐ No

**Remarks:** Soils are entisols, with no apparent hydric soil indicators. Dominant hydrophytic vegetation and wetland hydrology present. Problematic hydric soils present. Layering of sediment present.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)(Nonriverine)
- ☒ Sediment Deposits (B2)(Nonriverine)
- ☐ Drift Deposits (B3)(Nonriverine)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in PLowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1)(Riverine)
- ☐ Sediment Deposits (B2)(Riverine)
- ☐ Drift Deposits (B3)(Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☐ Yes ☒ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (inches): _____

**Wetland Hydrology Present ?** ☒ Yes ☐ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Multiple primary wetland hydrology indicators observed.

# Wetland Determination Data Form - Arid West Region

9/24/12

Project/Site: Rio Mesa City: Palo Verde County: Riverside Sampling Date: Upland w/WZ

Applicant/Owner: BSE State: CA Sampling Point: SP 3

Investigator(s): MT, TH, AM, RB, JK Section, Township, Range: S23 T8S R21E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): none Slope(%): Ø

Subregion(LRR): D Lat: 33° 28' 6.248N Long: 114° 45' 4.078"W Datum: NAD 83

Soil Map Unit Name: Rositas fine sand + Dunelands NWI classification: _____

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☒ Soil ☐ Hydrology (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.**

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | ☐ Yes ☒ No | **Is the Sampled Area within a Wetland?** ☐ Yes ☒ No |
| Hydric Soil Present? | ☐ Yes ☒ No | |
| Wetland Hydrology Present? | ☐ Yes ☒ No | |

**Remarks:** Upland terrace within mesquite bosque near active channels

## VEGETATION (use scientific names)

| TREE STRATUM Plot Size: _____ | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Tree Stratum Total Cover: | | | |

| SAPLING/SHRUB STRATUM Plot Size: 5x5 | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Atriplex lentiformis | 10 | yes | upl |
| 2. Prosopis glandulosa | 30 | yes | upl |
| 3. | | | |
| 4. | | | |
| Sapling/Shrub Stratum Total Cover: | 40 | | |

| HERB STRATUM Plot Size: _____ | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Chamaesyce (Euphorbia) | 2 | yes | upl |
| 2. Allionia incarnata | <1 | no | upl |
| 3. Pectis papposa | 1 | yes | upl |
| 4. Tribulus | <1 | no | upl |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Herb Stratum Total Cover: | 3 | | |

| WOODY VINE STRATUM Plot Size: _____ | Absolute % cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| Woody Vines Total Cover: | | | |

% Bare ground in herb stratum: 100% % cover of biotic crust: 0%

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC? 0 (A)

Total number of dominant species across all strata? 4 (B)

% of dominant species that are OBL, FACW, or FAC? 0% (A/B)

**Prevalence Index Worksheet**

| Total % cover of: | | Multiply by: |
|---|---|---|
| OBL species | x1 | |
| FACW species | x2 | |
| FAC species | x3 | |
| FACU species | x4 | |
| UPL species | x5 | |
| Column Totals | (A) | (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators**

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** ☐ Yes ☒ No

**Remarks:** Upland vegetation within floodplain adjacent to historic Colorado River floodplain bluff.

## SOIL

Sampling Point SP3

**Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[1] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-12 | 7.5 YR 5/6 | 100 | NA | NA | NA | NA | Sandy loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)(LRR C)
- ☐ 1cm Muck (A9)(LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

[3]Indicators of hydric vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

**Type:** _____

**Depth (inches):** _____

**Hydric Soil Present ?** ☐ Yes ☒ No

**Remarks:** Soils entisols within active floodplain, NRCS has soils listed as Duneland (DuD). This appears inaccurate as soils more closely resemble nearby Rositas fine sand (RoA)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)(Nonriverine)
- ☐ Sediment Deposits (B2)(Nonriverine)
- ☐ Drift Deposits (B3)(Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in PLowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1)(Riverine)
- ☐ Sediment Deposits (B2)(Riverine)
- ☐ Drift Deposits (B3)(Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☐ Yes ☒ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (inches): _____

**Wetland Hydrology Present ?** ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: No indicators of wetland hydrology present

OHWM Form # 1

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa Solar Generating Facility
**Project Number:** 22208
**Stream:** Blue/G Wash
**Investigator(s):** AM, MT, JH, RB, JK

**Date:** 9/24/2012 **Time:** 11:00 AM
**Town:** Palo Verde **State:** CA
**Photo begin file#:** RB Camera **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

**Location Details:** large wash, NE of Project Area near mapped Suaeda nigra wetland

**Projection:** **Datum:**
**Coordinates:** 33.466°N 114.752°W WGS 1984

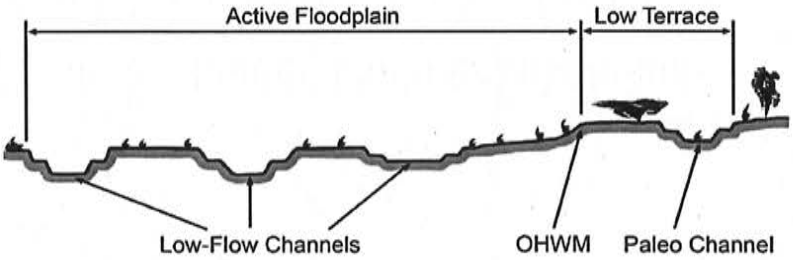
**Potential anthropogenic influences on the channel system:**
Vehicles, OHVs, hunting, historic debris within channel

**Brief site description:** large dry wash w/ many late successional vegetated islands

**Checklist of resources (if available):**

- [X] Aerial photography
  Dates:
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

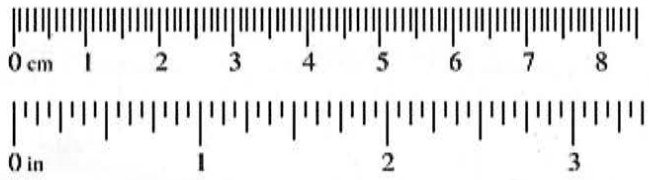



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] Digitized on computer
   - [X] GPS
   - [ ] Other:

## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| 10.08 | 256 | Boulder | |
| 2.56 | 64 | Cobble | Gravel |
| 0.157 | 4 | Pebble | |
| 0.079 | 2.00 | Granule | |
| 0.039 | 1.00 | Very coarse sand | |
| 0.020 | 0.50 | Coarse sand | |
| 1/2 0.0098 | 0.25 | Medium sand | Sand |
| 1/4 0.005 | 0.125 | Fine sand | |
| 1/8 0.0025 | 0.0625 | Very fine sand | |
| 1/16 0.0012 | 0.031 | Coarse silt | |
| 1/32 0.00061 | 0.0156 | Medium silt | Silt |
| 1/64 0.00031 | 0.0078 | Fine silt | |
| 1/128 0.00015 | 0.0039 | Very fine silt | |
| | | Clay | Mud |



Photos

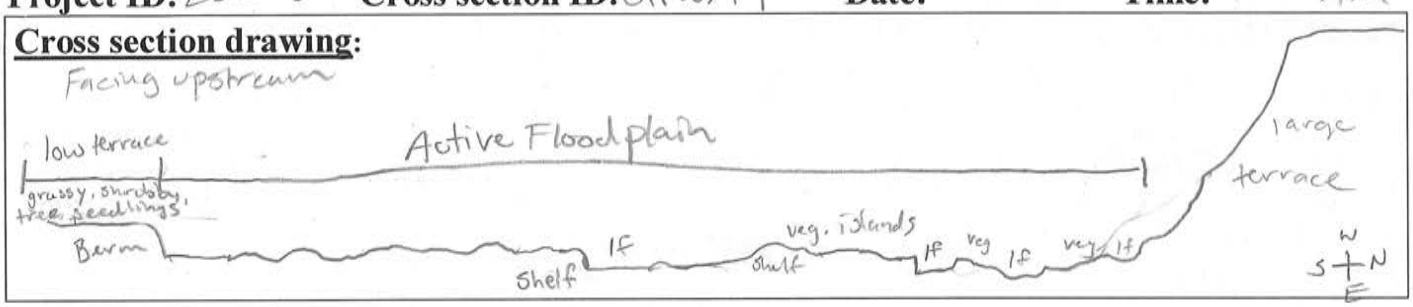
OHWM #1

Photo - JK 68662 - JKWash1 - Facing S
- JK 68663 - JKWash1 - facing N
- JK 68664 - 68665 - JKWash1 - braided channels

- JK 68666 - JKWash1 - overview from terrace

**Project ID:** 22208 **Cross section ID:** OHWM 1 **Date:** 9/24/12 **Time:** 11:00 AM

**Cross section drawing:**




## OHWM

**GPS point:** OHWM transect 1

**Indicators:**

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: See Comments
- [ ] Other:

**Comments:**

Shelving; wrack around Larrea tridentata, Prosopis glandulosa, sediment sorting

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** OHWM transect 1

**Characteristics of the floodplain unit:**

Average sediment texture: loamy sand

Total veg cover: 5 % Tree: Ø % Shrub: 4 % Herb: 1 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: sediment sorting
- [ ] Other:
- [ ] Other:

**Comments:**

Mudcracks, Drift and debris present, and Sediment sorting observed. Benches + bed and bank present.

OHWM Form #1

**Project ID:** 22208 **Cross section ID:** OHWM #1 **Date:** 9/24/12 **Time:** 11:00 AM

**Floodplain unit:** ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

**GPS point:** OHWM transect 1

**Characteristics of the floodplain unit:**

Average sediment texture: loamy sand

Total veg cover: 25 % Tree: 15 % Shrub: 8 % Herb: 2 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☒ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: Sediment sorting on islands
- ☐ Other:
- ☐ Other:

**Comments:**

old, large Palo verde/ ironwood woodland

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** OHWM transect 1

**Characteristics of the floodplain unit:**

Average sediment texture: Sandy loam w/gravel

Total veg cover: 30 % Tree: 5 % Shrub: 13 % Herb: 12 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

**Comments:**

grassy low terrace, old creosote and microphyll woodland

no indicators observed

OHWM Form #2

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa Solar EGF
**Project Number:** 22208
**Stream:** H2 Wash
**Investigator(s):** AM, JK, MT, TH, RB

**Date:** 9/26
**Town:** W. of Palo Verde
**Photo begin file#:** 1715

**Time:** 9:00 AM
**State:** CA
**Photo end file#:** 1719 (RB Camera)

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

**Location Details:** H2 Wash, South of North Tower site

**Projection:**
**Datum:** WGS 1984
**Coordinates:** 33°27'25.780" N, 114°47'48.485" W

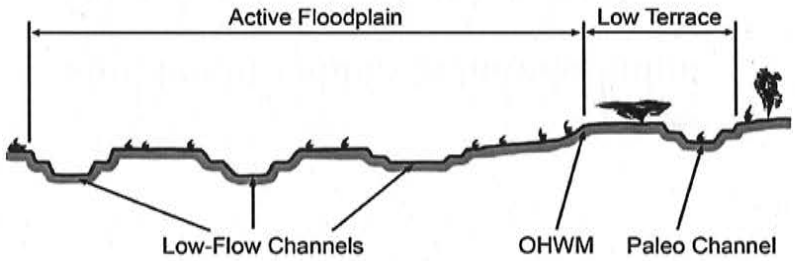
**Potential anthropogenic influences on the channel system:** Vehicles, OHVs, Hunting, Garbage Dumping

**Brief site description:** Broad floodplain wash w/ many low flow channels and higher elevation vegetated islands. Some overflow channels + historic/relict features, lots of overflow in select areas. Microphyll woodland across area

**Checklist of resources (if available):**

- [X] Aerial photography
  Dates:
- [ ] Topographic maps
- [ ] Geologic maps
- [X] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

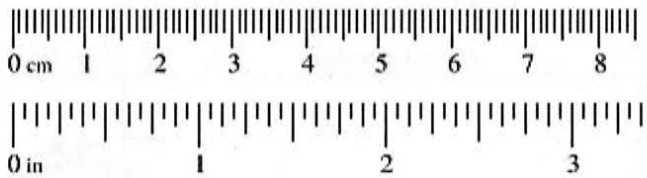



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] Digitized on computer
   - [X] GPS
   - [ ] Other:

## Wentworth Size Classes

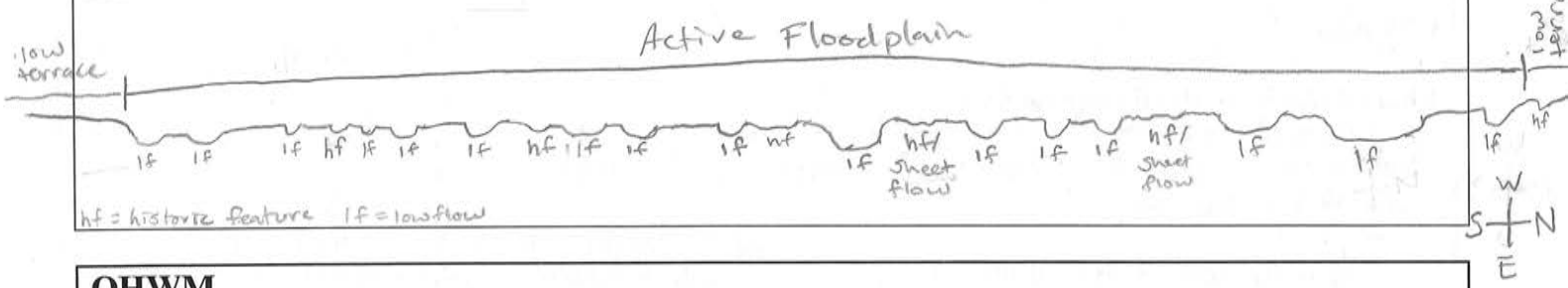
| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| 10.08 | 256 | Boulder | |
| 2.56 | 64 | Cobble | Gravel |
| 0.157 | 4 | Pebble | |
| 0.079 | 2.00 | Granule | |
| 0.039 | 1.00 | Very coarse sand | |
| 0.020 | 0.50 | Coarse sand | |
| 1/2 0.0098 | 0.25 | Medium sand | Sand |
| 1/4 0.005 | 0.125 | Fine sand | |
| 1/8 0.0025 | 0.0625 | Very fine sand | |
| 1/16 0.0012 | 0.031 | Coarse silt | |
| 1/32 0.00061 | 0.0156 | Medium silt | Silt |
| 1/64 0.00031 | 0.0078 | Fine silt | |
| 1/128 0.00015 | 0.0039 | Very fine silt | |
| | | Clay | Mud |



OHWM Form #2

**Project ID:** 22208 **Cross section ID:** OHWM 2 **Date:** 9/26/12 **Time:** 9:00 AM

**Cross section drawing:** Looking W up channel




## OHWM

**GPS point:** OHWM transect 2

**Indicators:**

- [x] Change in average sediment texture / sediment sorting
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

**Comments:** Defined shelf, Hilaria rigidor on edge of lf channel (but in active floodplain), then drops out into lf where there is no veg. except for a few seedlings / sparse herbs, mostly sand in lf channel

## Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

**GPS point:** OHWM transect 2

**Characteristics of the floodplain unit:**

Average sediment texture: Sandy loam w/ gravel

Total veg cover: 40 % Tree: 25 % Shrub: 50 % Herb: 25 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: wrack from historic large events
- [x] Other: Sediment sorting
- [ ] Other: _____

**Comments:** Microphyll woodland across floodplain

OHWM Form #2

**Project ID:** 22208 **Cross section ID:** OHWM 2 **Date:** 9/26/12 **Time:** 9:00 AM

**Floodplain unit:** ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** OHWM transect 2

**Characteristics of the floodplain unit:**
Average sediment texture: Sandy w/ low amount gravel
Total veg cover: ~1 % Tree: ____ % Shrub: ____ % Herb: ~1 %
Community successional stage:
- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☒ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: sediment sorting
- ☐ Other: ____
- ☐ Other: ____

**Comments:**
Mostly unvegetated from recent flow disturbance, very sandy soils, defined shelving

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** OHWM transect 2

**Characteristics of the floodplain unit:**
Average sediment texture: Sandy w/ lots of gravel + cobble
Total veg cover: 35 % Tree: ~1 % Shrub: 70 % Herb: 30 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

**Comments:**
Creosote bush scrub-dominated, microphyll woodland drops out, No indicators observed

OHWM Form #3

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa Brightsource delin.
**Project Number:** 22208
**Stream:** G/Blue Wash
**Investigator(s):** MT/TH

**Date:** 9/28/12
**Town:** Palo Verde
**Photo begin file#:** TH 2095 (Northend)

**Time:** 0720
**State:** CA
**Photo end file#:** TH 2101 (South end)

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

**Location Details:** North arm of 'blue wash' near western portion of heliostat array

**Projection:** (N. end) 33.4772126 N / 114.78620847 W
**Datum:** 33.47543040 N / 114.78692994 W (S. end)
**Coordinates:**

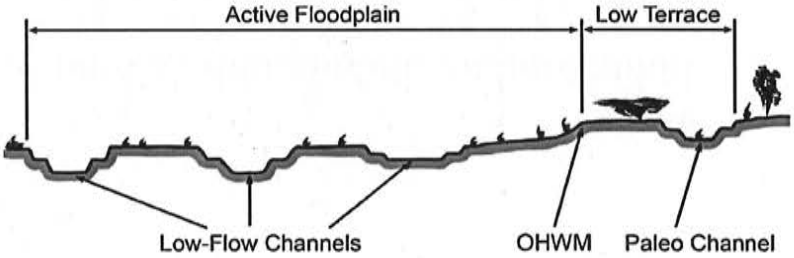
**Potential anthropogenic influences on the channel system:**
Limited road crossing grading upstream of transect, historic debris within wash.

**Brief site description:**
Braided, ephemeral wash system is tributary to one of the major drainage systems in the project area. Dense Microphyll woodland within active floodplain.

**Checklist of resources (if available):**

- [X] Aerial photography
  Dates:
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

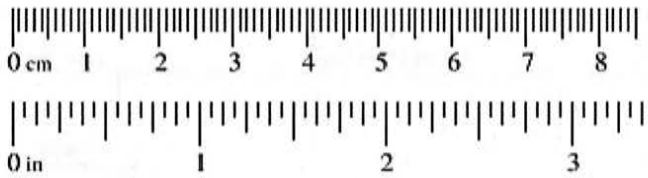



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| 10.08 | 256 | Boulder | Gravel |
| 2.56 | 64 | Cobble | |
| 0.157 | 4 | Pebble | |
| 0.079 | 2.00 | Granule | |
| 0.039 | 1.00 | Very coarse sand | Sand |
| 0.020 | 0.50 | Coarse sand | |
| 1/2 0.0098 | 0.25 | Medium sand | |
| 1/4 0.005 | 0.125 | Fine sand | |
| 1/8 0.0025 | 0.0625 | Very fine sand | |
| 1/16 0.0012 | 0.031 | Coarse silt | Silt |
| 1/32 0.00061 | 0.0156 | Medium silt | |
| 1/64 0.00031 | 0.0078 | Fine silt | |
| 1/128 0.00015 | 0.0039 | Very fine silt | |
| | | Clay | Mud |



OHWM Form #3

**Project ID:** 22208 **Cross section ID:** OWHM #3 **Date:** 9/28/12 **Time:** 0720

**Cross section drawing:**

**OHWM**

**GPS point:** OHWM Transect 3

**Indicators:**

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

**Comments:** Two moderate-sized washes with plain of desert asphalt in between. Microphyll woodland present in washes with distinct break to creosote shrub at low terrace.

**Floodplain unit:** [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

**GPS point:** OHWM transect 3

**Characteristics of the floodplain unit:**

Average sediment texture: Sand - with granule to pebble size gravel

Total veg cover: <1 % Tree: 0 % Shrub: 0 % Herb: <1 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [x] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: Sediment deposition
- [ ] Other: _____
- [ ] Other: _____

**Comments:**

**Project ID:** 22208 **Cross section ID:** OHWM #3 **Date:** 9/28/12 **Time:** 0720

**Floodplain unit:** ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

**GPS point:** OHWM transect 3

**Characteristics of the floodplain unit:**

Average sediment texture: Gravelly sand

Total veg cover: 60 % Tree: 30 % Shrub: 15 % Herb: 15 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Mature, dense microphyll woodland located within active floodplain, rooted above low-flow channels.

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** OHWM transect 3

**Characteristics of the floodplain unit:**

Average sediment texture: Gravel, sandy gravel

Total veg cover: 50 % Tree: <1 % Shrub: 25 % Herb: 25 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:** None

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:** No indicators observed

OHWM Form #4

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa Solar EGF
**Project Number:** 22208
**Stream:** Blue Wash (G Wash)
**Investigator(s):** JK, RB  RB - Camera

**Date:** 9/28/12
**Town:** SW of Blythe
**Photo begin file#:** 1911

**Time:** 0720
**State:** CA
**Photo end file#:** 1917

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

**Location Details:** Blue wash, Middle of Project site, E. of AM's first blue wash form from 9/25/12

**Projection:**
**Datum:** WGS 1984
**Coordinates:** 33°28'10.471"N 114°47'17.273"W

**Potential anthropogenic influences on the channel system:**
Roads, OHVs, Trash, Hunting

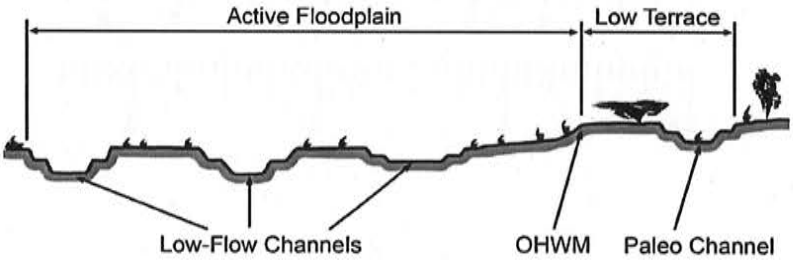
**Brief site description:** Large dry wash system with wide washes (ca. 5-80ft. in width), large vegetated islands also present, microphyll woodland present across site; creosote bush scrub also present, low herb cover

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units




**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
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   - ☒ GPS
   - ☐ Other:

## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
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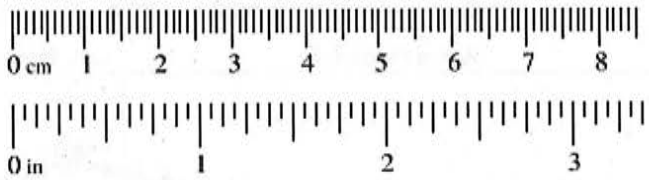
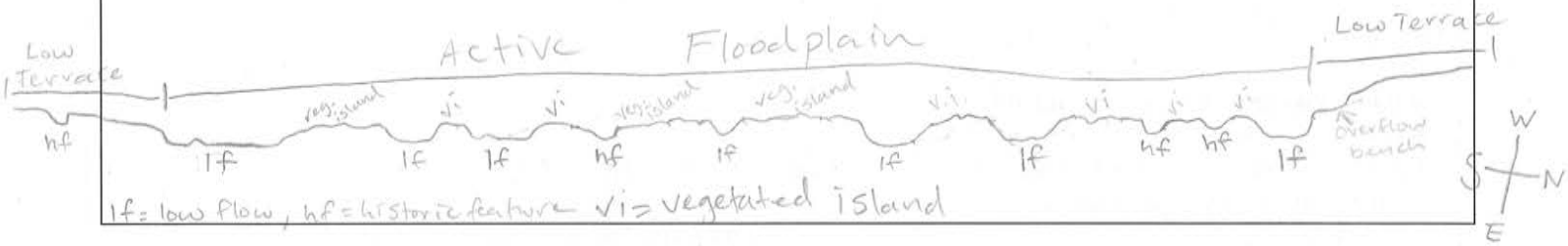
| 2.56 | 64 | Cobble | Gravel |
| 0.157 | 4 | Pebble | |
| 0.079 | 2.00 | Granule | |
| 0.039 | 1.00 | Very coarse sand | |
| 0.020 | 0.50 | Coarse sand | |
| 1/2 0.0098 | 0.25 | Medium sand | Sand |
| 1/4 0.005 | 0.125 | Fine sand | |
| 1/8 0.0025 | 0.0625 | Very fine sand | |
| 1/16 0.0012 | 0.031 | Coarse silt | |
| 1/32 0.00061 | 0.0156 | Medium silt | Silt |
| 1/64 0.00031 | 0.0078 | Fine silt | |
| 1/128 0.00015 | 0.0039 | Very fine silt | |
| | | Clay | Mud |



OHWM Form #4

**Project ID:** 22208 **Cross section ID:** OHWM 4 **Date:** 9/28/2012 **Time:** 0720

**Cross section drawing:** Looking West / N. West upstream




lf = low flow, hf = historic feature vi = vegetated island

## OHWM

**GPS point:** OHWM transect 4

**Indicators:**

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

**Comments:** large active floodplane and well defines shelf, Microfill woodland present.

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** OHWM transect 4

**Characteristics of the floodplain unit:**

Average sediment texture: Sand w/gravel, large cobble

Total veg cover: 5 % Tree: 4 % Shrub: ____ % Herb: <1 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings) to late, some large trees
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [x] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: sediment sorting
- [x] Other: wrack
- [ ] Other: _____

**Comments:** Scatterd large trees, but mostly a bare channel devoid of vegetation from recent flow events. Lots of sediment sorting

**Project ID:** 22208 **Cross section ID:** OHWM 4 **Date:** 9/28/2012 **Time:** 0720

**Floodplain unit:** ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

**GPS point:** OHWM transect 4

**Characteristics of the floodplain unit:**

Average sediment texture: Sand w/ more gravel + large cobbles

Total veg cover: 40 % Tree: 50 % Shrub: 35 % Herb: 15 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: wrack
- ☐ Other:
- ☐ Other:

**Comments:** Large trees, late successional microphyll woodland

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** 33° 28' 16.646" N, 114° 47' 16.649" W

**Characteristics of the floodplain unit:**

Average sediment texture: gravel desert pavement w/ cobbles, silt, and sand

Total veg cover: 25 % Tree: 12.5 % Shrub: 75 % Herb: 12.5 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

**Comments:** creosote bush-dominated scrub with microphyll woodland closer to active floodplain, fading towards upland. No indicators observed

OHWM Form #5

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa Solar EGF
**Project Number:** 22208
**Stream:** Green Wash / E Wash
**Investigator(s):** JK, MT, TH, RB

**Date:** 9/27/2012 **Time:** 0900
**Town:** SW of Blythe **State:** CA
**Photo begin file#:** R.B Camera 1749 **Photo end file#:** 1759

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

**Location Details:** Green Wash Close to N-S road crossing (road off Bradshaw Trail)

**Projection:** **Datum:** WGS 1984
**Coordinates:** 33° 29' 07.652" N 114° 46' 43.206" W

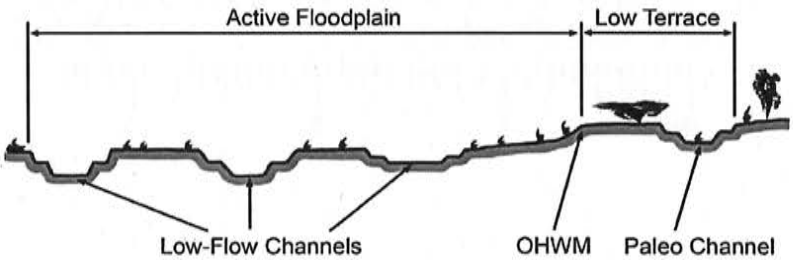
**Potential anthropogenic influences on the channel system:**
Roads, Vehicles, OHV, Hunting, Trash

**Brief site description:** Microphyll woodland/creosote bush scrub active floodplain system

**Checklist of resources (if available):**

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

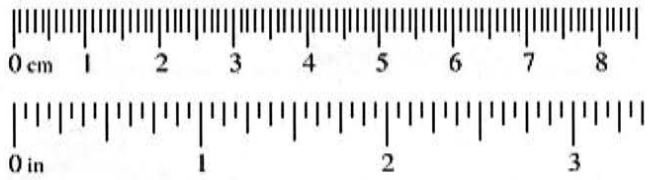



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] Digitized on computer
   - [X] GPS
   - [ ] Other:

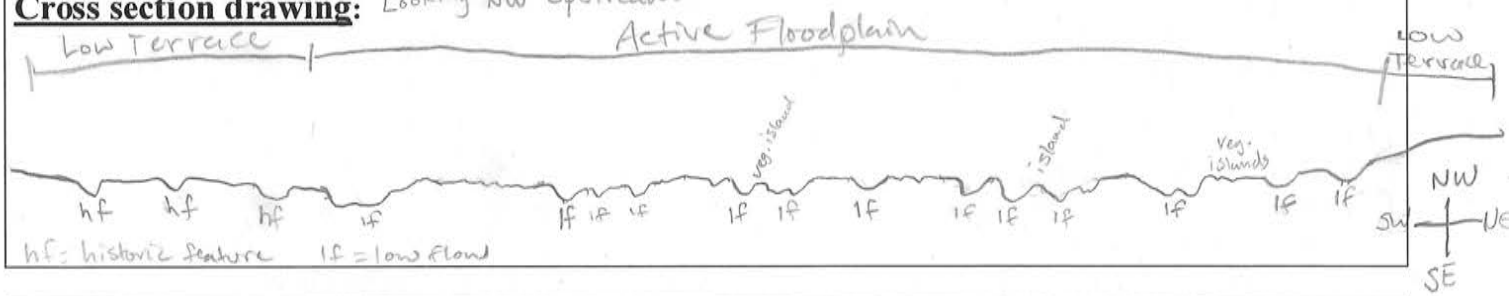
## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| 10.08 | 256 | Boulder | |
| 2.56 | 64 | Cobble | Gravel |
| 0.157 | 4 | Pebble | |
| 0.079 | 2.00 | Granule | |
| 0.039 | 1.00 | Very coarse sand | |
| 0.020 | 0.50 | Coarse sand | |
| 1/2 0.0098 | 0.25 | Medium sand | Sand |
| 1/4 0.005 | 0.125 | Fine sand | |
| 1/8 0.0025 | 0.0625 | Very fine sand | |
| 1/16 0.0012 | 0.031 | Coarse silt | |
| 1/32 0.00061 | 0.0156 | Medium silt | Silt |
| 1/64 0.00031 | 0.0078 | Fine silt | |
| 1/128 0.00015 | 0.0039 | Very fine silt | |
| | | Clay | Mud |



**Project ID:** 22208 **Cross section ID:** OHWM 5 **Date:** 9/27/12 **Time:** 0900

**Cross section drawing:** Looking NW upstream




## OHWM

**GPS point:** OHWM Transect 5

**Indicators:**

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

**Comments:**

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** OHWM Transect 5

**Characteristics of the floodplain unit:**

Average sediment texture: Sand

Total veg cover: 5 % Tree: 3 % Shrub: <1 % Herb: 2 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings) to late, some large, old trees
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [x] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: Sediment sorting
- [x] Other: wrack
- [x] Other: Scour

**Comments:** Newly active channel, but large old microphyll trees, wrack accumulated around trees

**Project ID:** 22208 **Cross section ID:** OHWM 5 **Date:** 9/27/12 **Time:** 0900

**Floodplain unit:** ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

**GPS point:** OHWM Transect 5

**Characteristics of the floodplain unit:**
Average sediment texture: Sand w/ gravel
Total veg cover: 60 % Tree: 25 % Shrub: 25 % Herb: 50 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: wrack
- ☒ Other: sediment sorting
- ☐ Other:

**Comments:** Microphyll woodland present across, creosote bush scrub, lots of herbaceous plants: Bouteloua barbata, other forbs + grasses

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** OHWM Transect 5

**Characteristics of the floodplain unit:**
Average sediment texture: Sand w/ gravel
Total veg cover: 60 % Tree: 5 % Shrub: 35 % Herb: 60 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

**Comments:** Creosote bush-dominated scrub w/ significant herbaceous cover. No indicators observed.

OHWM Form #6

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Rio Mesa - Brightsource Energy
**Project Number:** 22208
**Stream:** northern wash located in northern tower
**Investigator(s):** AM

**Date:** 9/25/12
**Town:** ~ Palo Verde
**Photo begin file#:** 1

**Time:** 8am
**State:** CA
**Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

**Location Details:** Wash located in northern portion of the northern tower impact (circle)

**Projection:** 33°28'17.238"N **Datum:**
**Coordinates:** 114° 47' 28.838" W

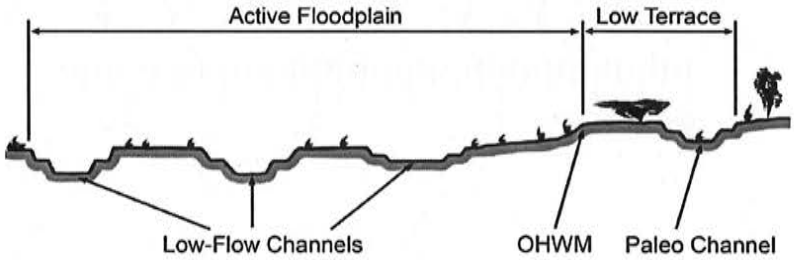
**Potential anthropogenic influences on the channel system:**
Earthen road located just south of wash system, but no anthropogenic influences noted. Some historic trash (i.e, tin cans) observed.

**Brief site description:** Large, braided wash system with many islands. Very good shelving and sediment sorting observed.

**Checklist of resources (if available):**

- [X] Aerial photography
  Dates:
- [ ] Topographic maps
- [ ] Geologic maps
- [X] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

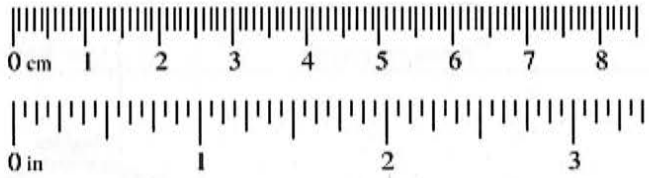



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

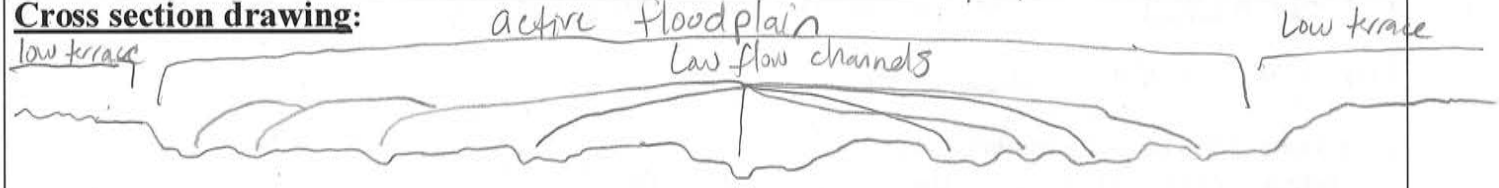
## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| 10.08 | 256 | Boulder | Gravel |
| 2.56 | 64 | Cobble | Gravel |
| 0.157 | 4 | Pebble | Gravel |
| 0.079 | 2.00 | Granule | Gravel |
| 0.039 | 1.00 | Very coarse sand | Sand |
| 0.020 | 0.50 | Coarse sand | Sand |
| 1/2 0.0098 | 0.25 | Medium sand | Sand |
| 1/4 0.005 | 0.125 | Fine sand | Sand |
| 1/8 0.0025 | 0.0625 | Very fine sand | Sand |
| 1/16 0.0012 | 0.031 | Coarse silt | Silt |
| 1/32 0.00061 | 0.0156 | Medium silt | Silt |
| 1/64 0.00031 | 0.0078 | Fine silt | Silt |
| 1/128 0.00015 | 0.0039 | Very fine silt | Silt |
| | | Clay | Mud |



**Project ID:** Rio Mesa 22208 **Cross section ID:** OHWM 6 **Date:** 9/25/12 **Time:** 8am

**Cross section drawing:**




## OHWM

**GPS point:** OMHW Transect 6

**Indicators:**

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

**Comments:** Large braided wash system approximately 700 feet wide (GPS'd both edges of system terrace)

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** OMHW Transect 6

**Characteristics of the floodplain unit:**

Average sediment texture: Sandy loam

Total veg cover: 0 % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- [x] NA (no vegetation)
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [x] Mudcracks
- [x] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: Sediment sorting
- [ ] Other: _____
- [ ] Other: _____

**Comments:** Low flow channels with the wash system are well defined by sediment sorting and topography / TOB. No vegetation with low-flow channel. Large rain event in August 2012 left clear indicators of OHWM.

**Project ID:** 22208 **Cross section ID:** OHWM 6 **Date:** 9/25/12 **Time:** 8am

**Floodplain unit:** ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

**GPS point:** OHW Transect 6

**Characteristics of the floodplain unit:**
Average sediment texture: Cobbly gravel
Total veg cover: 30 % Tree: 20 % Shrub: 10 % Herb: 2 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: Sediment sorting
- ☐ Other:
- ☐ Other:

**Comments:** within the larger floodplain, clear sediment sorting and indicators of OHWM (terracing/shelving) create upland islands

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** OHW Transect 6

**Characteristics of the floodplain unit:**
Average sediment texture: Sandy loam
Total veg cover: 30 % Tree: 0 % Shrub: 25 % Herb: 5 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

**Comments:** no indicators of OHWM in low terrace

# APPENDIX C

# URS (2012) DELINEATION

BrightSource

| DOCKET | |
|---|---|
| 11-AFC-4 | |
| DATE | FEB 09 2012 |
| RECD. | FEB 13 2012 |

February 9, 2012

Mr. Pierre Martinez, Project Manager for Rio Mesa Solar Project
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: BrightSource Energy, Inc. – Rio Mesa Solar Electric Generating Facility
Preliminary Jurisdictional Determination Acceptance

Dear Mr. Martinez:

BrightSource Energy, Inc. hereby submits the 2011 Preliminary Jurisdictional Determination Acceptance for the Rio Mesa Solar Electric Generating Facility.

If you have any questions, or need further clarification, please do not hesitate to call me at (510) 550-8908.

Sincerely,

Todd Stewart
Rio Mesa Solar Project Manager
BrightSource Energy, Inc.

**BrightSource Energy, Inc.**
1999 Harrison Street
Suite 2150
Oakland, CA 94612

www.BrightSourceEnergy.com

URS

October 7, 2011

James E. Mace, Senior Project Manager
U.S. Army Corps of Engineers, Riverside Regulatory Field Office
1451 Research Park Drive, Suite 100
Riverside, CA 92507-2154

Subject: BrightSource Energy Rio Mesa Solar Project: Methods for ACOE Proposed Jurisdictional Drainage Delineation
URS Project No. 27651003

Dear Mr. Mace:

On behalf of BrightSource Energy Inc., URS Corporation Americas (URS) would like to provide these revised materials and documents necessary to make a jurisdictional determination regarding waters found on the Rio Mesa Solar Project site. The revisions are and along the eastern edge of the Project site where it was determined that some areas previously mapped as non-wetland are likely wetlands. The vast majority of these wetland areas are not impacted by the Project as currently planned. There were also some small changes to the mapping along the gen-tie line and Bradshaw Trail/34th Ave. access corridor. The following materials have been attached to this letter:

1. Methods for ACOE Jurisdictional Drainage Delineation Memo
2. Table 1 – Revised - Detailed Potential Jurisdictional Waters of the United States
3. Table 2 – Revised - Summary of Potential Waters of the United States
4. Figure 1 – ACOE Informally Agreed Waters of the U.S.- Project Site
5. Figure 2 – ACOE Informally Agreed Waters of the U.S.- Generator Tie-Line Corridor and Access Corridors
6. Revised - Preliminary Jurisdictional Determination Form

Please contact Derek Langsford at (858) 812-9292 or derek.langsford@urs.com (note new email address), if you have any questions.

Sincerely,

URS CORPORATION

Angela Leiba
Vice President

Derek Langsford
Biology Group Team Manager

URS Corporation
4225 Executive Square, Suite 1600
La Jolla, CA 92037
Tel: 858.812.9292
Fax: 858.812.9293

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URS

January 12, 2012

James E. Mace, Senior Project Manager
U.S. Army Corps of Engineers, Riverside Regulatory Field Office
1451 Research Park Drive, Suite 100
Riverside, CA 92507-2154

Subject: BrightSource Energy Rio Mesa Solar Project, Blythe,CA
Methods for ACOE Proposed Preliminary Jurisdictional Waters Delineation
URS Project No. 27651003

Dear Mr Mace:

On behalf of BrightSource Energy Inc., URS Corporation Americas (URS) provides this letter to document the methods used to delineate the preliminary jurisdictional waters found within the Rio Mesa Solar Project Biological Survey Area (BSA).

Areas considered and assessed as potential jurisdictional Waters of the United States (WUS) were based on wetland delineation practices that are in compliance with Section 404 of the Clean Water Act (CWA), Sections 9 and 10 of the Rivers and Harbors Act of 1899 (RHA), and Regulatory Guidance Letter No. 08-02 dated 26 June 2008. For the purposes of this Preliminary Jurisdictional Determination (PJD) it is assumed that all waters and wetlands that would be affected in any way by the proposed activity on the site could be jurisdictional waters of the U.S. The methodology to determine what is proposed jurisdictional involved the following criterion:

**Ordinary High Water Mark (OWHM)**: Areas with higher density vegetation, but lacking any of the OHWM characteristics, were eliminated as proposed jurisdictional waters, whereas proposed jurisdictional waters exhibited conditions indicative of OHWMs being present.

Features were considered proposed jurisdictional regardless of connectivity to the Colorado River, the nearest traditional navigable water (TNW).

The preliminary data review and site reconnaissance survey (January, 2011) identified numerous west to east trending ephemeral washes throughout the project site, including five large ephemeral washes trending west to east and west to south. Given the size of the study area and the myriad of potential features present, the characterization and mapping of these drainages was accomplished by a combination of field surveys and desktop mapping using high resolution aerial photographs. Eleven drainage systems were pre-chosen, using the high resolution aerial photographs, as representatives of typical ephemeral washes found throughout the site. These 11 drainage systems were chosen based on size, flow direction, connectivity, flow patterns, vegetation composition, topography, and USGS `blue lines'.

URS Corporation
4225 Executive Square, Suite 1600
La Jolla, CA 92037
Tel: 858.812.9292
Fax: 858.812.9293

The reviewed areas are represented by Drainage Identification letters, labeled A through I, gen-tie line ROW corridor, and Bradshaw Trail and 34th Avenue Access, for simplicity, and presented in Figures 1 and 2, and summarized in Table 1. Potential WUS on the project site were identified by URS personnel through review of existing documentation and verified during the field investigation. During the field investigation, URS biologists gathered information on the physical parameters such as topographic demarcation, soil characteristics, vegetation cover, and connectivity of drainages to the Colorado River. Aerial photographs at a scale of one inch equals 200 feet (VTN 2011), USGS 7.5-Minute Quadrangle Maps including the Thumb Peak, Palo Verde, Ripley, and Roosevelt Mine, and the USFWS's Wetland Mapper (National Wetlands Inventory [NWI], 2011) were used to identify potential wetland and water resources in the project area. A data search for previously delineated and mapped wetland and non-wetland WUS was conducted using the NWI website. A total of 8.30 acres of Bush seepweed (*Suaeda moquinii*) scrub wetlands, mapped on the NWI, occur within the BSA (Figure 1& 2). Metadata for this wetland acreage were not found on the NWI website. An additional site visit was conducted to collect additional data, soil type, plant species, and hydrology on the quality of the 8.30 acres of wetlands. A wetland determination data form (Arid West Region) was completed during the field visit. Similarities in the vegetation and hydrology of the area around this NWI identified seepweed wetland point expanded the area of proposed jurisdiction to a total of 117.78 acres of wetland WUS. A summary of findings is currently being developed and will be presented in a separate memo.

A site reconnaissance survey and preliminary assessment of water features were conducted April 18 through April 22, 2011. The total area surveyed was approximately 11,381 acres. Pedestrian surveys were conducted along the 11 drainages and included points representing locations in the middle of the drainage channel, OHWMs, locations of low and high banks, and the outer extent of vegetation typically associated with each drainage. Data were recorded using a Trimble® Geo-XT GPS. General characteristics of the wash, including average channel width, evidence of flow, and general vegetation were noted. URS biologists reported no observable surface water in the BSA at the time of the investigation, but they documented evidence of past recent surface water flows, including visible shelves and edges in washes, OHWMs, litter and debris, and vegetation disturbance. Other evidence observed was the heavy braiding of washes throughout the project site. URS biologists determined that most surface waters flowed southeast to Hodges Drain, which connects to the Palo Verde Outfall. This outfall flows into the Colorado River, which is identified as a TNW.

Field data were incorporated into a GIS for subsequent analysis and mapping. Data points collected along transect lines were plotted on recent aerial photographs having one to two foot resolution, and drainage features within the survey area were manually digitized into the GIS using the nearest reference location data to aid in the mapping. The area extending one mile from the site boundaries was qualitatively evaluated for the presence of wetlands and other waters and for possible indirect effects to waters adjacent to the project site. When determining drainage acreages using desktop mapping, categories such as 1-3 feet wide, 3-6 feet wide, 6-9 feet wide, 9-12 feet wide, 12-15 feet wide, and greater than 15 feet wide, were used to quantify the acreage. Acreage calculations assumed that 1-3 feet was 3 feet and 3-6 feet was 6 feet, etc. Prior to field surveys, this proposed methodology was discussed with USACE regulatory staff from the Los Angeles District (Pers. Comm. Jim Mace, 2011).

Based on the field data and aerial photograph interpretation, these drainage systems were delineated based on connectivity of the smaller delineated ephemeral washes to the five largest ephemeral drainages and/or connection to Hodges Drain to the east of the project site boundary (Figure 1). Features for each drainage system include single, large channels with well-defined bed and banks, as well as broad, but sometimes weakly expressed, assemblages of shallow braided ephemeral channels. A total of no more than 1,178.78 acres of potentially jurisdictional WUS were identified and mapped in the project area, with an additional 254.82 acres in the BSA. Table 1 shows the breakdown of each drainage system's total acreage. The majority of WUS on the Project site are non-wetland, the numbers in brackets [xx] in Table 1 are the wetland acreages included in the totals. Table 2 shows a summary of wetland and non-wetland proposed jurisdictional WUS.

Sincerely,

URS CORPORATION

Heather Rothbard
Staff Botanist/Wetland Scientist

Derek H. Langsford, PhD
Biological Resources Team Manager

**Table 1**
**Potential Jurisdictional WUS**

| Drainage Systems[1] | Drainage Size within the Project Site (acres) | 500ft Buffer Area (acres) | Total Area (Project + Buffer) (acres) |
|---|---|---|---|
| A | 17.31 | 7.01 | 24.32 |
| B | 127.84 | 17.26 | 145.10 |
| C | 9.88 | 1.17 | 11.05 |
| D | 6.52 | 0.98 | 7.50 |
| E | 191.62 | 44.86 [4.11][2] | 236.48 [4.11] |
| F | 6.20 | 7.62 [6.09] | 13.82 [6.09] |
| G | 419.85 [58.85] | 75.69 [48.72] | 495.54 [107.57] |
| H | 141.53 | 50.05 | 191.58 |
| I | 238.28 | 50.20 | 288.48 |
| Gen-tie line and ROW | 9.05 | [3] | 9.05 |
| Bradshaw Trail & 34th Ave Access | 10.7 | [3] | 10.7 |
| Totals | 1,178.78 [58.85] | 254.84 [58.93] | 1433.62 [117.78] |

[1] Drainage Divisions A through I are shown on Figure 1

[2] Numbers in parentheses designates wetland acreage included in total WUS

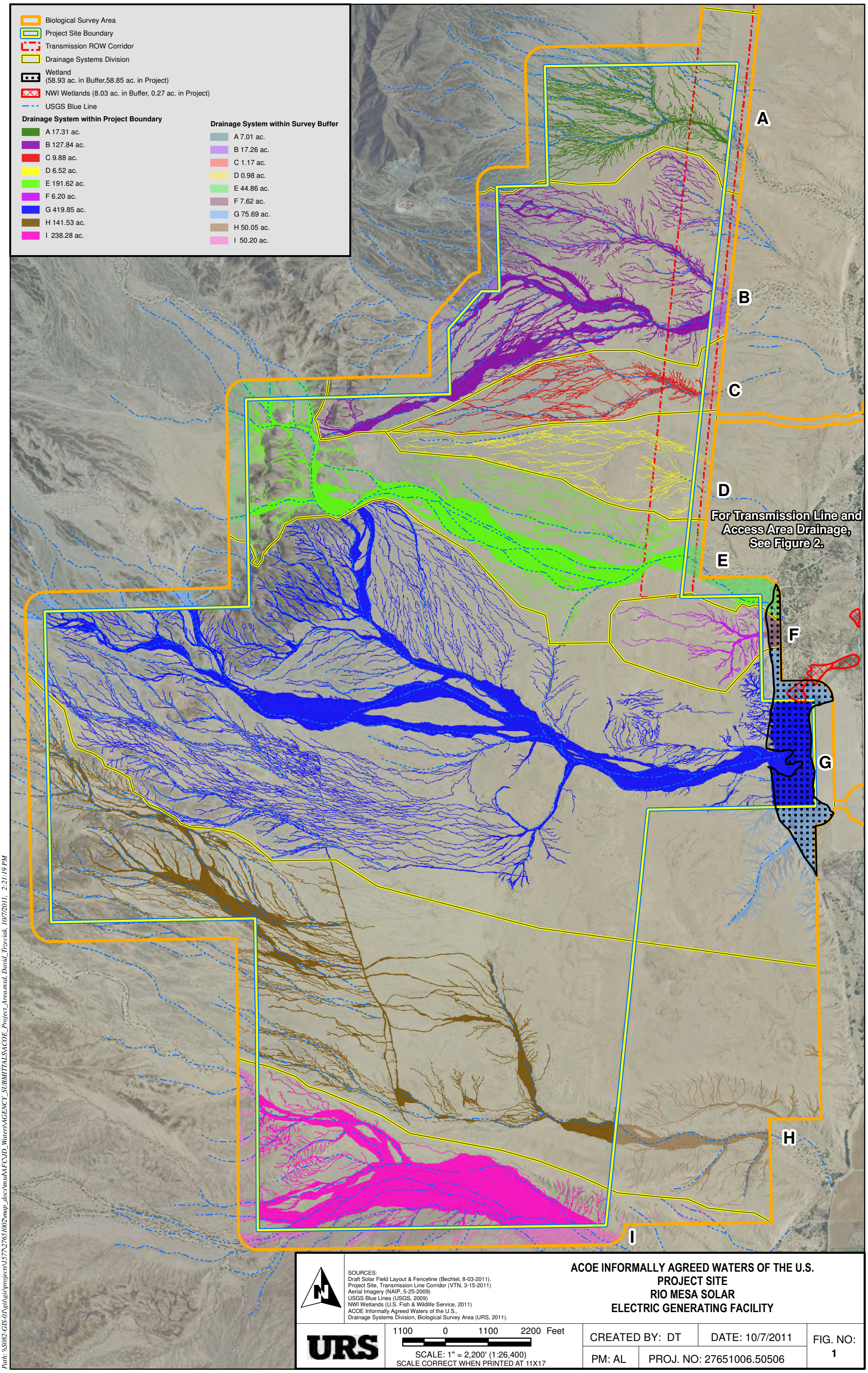
[3] Acreage included in Project Site

Gen-tie line = Generator tie line
ROW=Right-of-Way
WUS = Waters of the United States under Section 404 and 401 of the Clean Water Act. Defined in the study area by Ordinary High Water Mark

**Table 2**
**Summary of Potential Jurisdictional Wetland and Non-Wetland WUS in the BSA**

| Type | Existing within Project Site | Existing within Buffer Area | Existing Acres within BSA |
|---|---|---|---|
| Jurisdictional Waters of the United States (WUS) | | | |
| Wetland* | 58.85 | 58.93 | 117.78 |
| Non-wetland WUS | 1,119.93 | 196.39 | 1,326.32 |
| TOTAL United States Army Corps of Engineers (USACE) Jurisdiction | 1,178.78 | 254.84 | 1,433.62 |

BSA = Biological Survey Area
WUS = Waters of the United States
* Wetland present included bush seepweed scrub and bush seepweed scrub/ mesquite bosque vegetation communities.




SOURCES:
Draft Solar Field Layout & Fenceline (Bechtel, 8-03-2011).
Project Site, Transmission Line Corridor (VTN, 3-15-2011)
Aerial Imagery (NAIP, 5-25-2009)
USGS Blue Lines (USGS, 2009)
NWI Wetlands (U.S. Fish & Wildlife Service, 2011)
ACOE Informally Agreed Waters of the U.S.,
Drainage Systems Division, Biological Survey Area (URS, 2011).

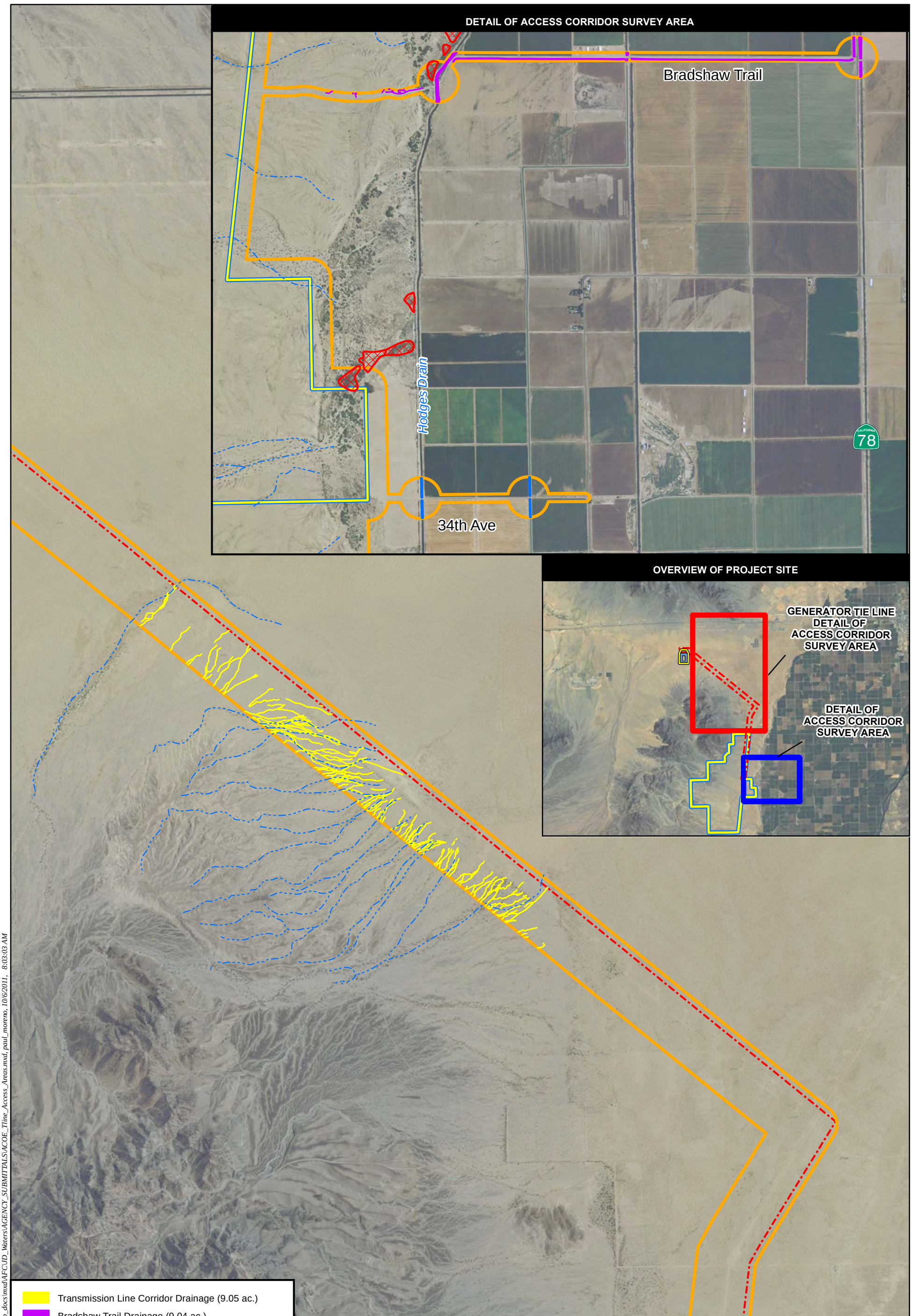
**ACOE INFORMALLY AGREED WATERS OF THE U.S.**
**PROJECT SITE**
**RIO MESA SOLAR**
**ELECTRIC GENERATING FACILITY**

URS

1100 0 1100 2200 Feet
SCALE: 1" = 2,200' (1:26,400)
SCALE CORRECT WHEN PRINTED AT 11X17

| CREATED BY: DT | DATE: 10/7/2011 | FIG. NO: 1 |
|---|---|---|
| PM: AL | PROJ. NO: 27651006.50506 | |

Path: \\S082-GIS-01\gis\gis\projects\577\27651002\map_docs\mxd\AFC\JD_Waters\AGENCY_SUBMITTALS\ACOE_Project_Area.mxd, David_Trzeciak, 10/7/2011, 2:21:19 PM




Transmission Line Corridor Drainage (9.05 ac.)
Bradshaw Trail Drainage (9.04 ac.)
34th Ave Access Drainage (1.66 ac.)
NWI Wetlands (8.03 ac. in Buffer, 0.27 ac. in Project)
Biological Survey Area
Transmission ROW Corridor
Project Site Boundary
USGS Blue Line

SOURCES: Project Site, Transmission Line Corridor (VTN, 3-15-2011)
Aerial Imagery (NAIP, 5-25-2009)
USGS Blue Lines (USGS, 2009)
ACOE Informally Agreed Waters of the U.S.,
Drainage Systems Division, Biological Survey Area (URS, 2011).
NWI Wetlands (U.S. Fish & Wildlife Service, 2011).

URS

1100 0 1100 2200 Feet
SCALE: 1" = 2,200' (1:26,400)
SCALE CORRECT WHEN PRINTED AT 11X17

ACOE INFORMALLY AGREED WATERS OF THE U.S.
GENERATOR TIE LINE CORRIDOR AND ACCESS CORRIDORS
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

| | | |
|---|---|---|
| CREATED BY: DT | DATE: 10/6/2011 | FIG. NO: 2 |
| PM: AL | PROJ. NO: 27651005.50506 | |

Path: G:\gis\projects\1577\27651002\map_docs\mxd\AFCUD_Waters\AGENCY_SUBMITTALS\ACOE_Tline_Access_Areas.mxd, paul_moreno, 10/6/2011, 8:03:03 AM

# *PRELIMINARY JURISDICTIONAL DETERMINATION FORM*

**This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:**

District Office: Los Angeles District | File/ORM #: SPL-2011-00972-SEM | PJD Date: Oct 7, 2011

State: CA | City/County: Palo Verde Mesa, Riversite County

Nearest Waterbody: Colorado River

Location: TRS, LatLong or UTM: San Bernardino Meridian: T8S R21E S1-3, 9-11,14-16, 20-23, 26-29, 33-35. T7S R21E S14-16, 23,26, 35

Name/ Address of Person Requesting PJD: Derek H. Langsford, PhD, CSE
Biological Resources Team Manager
URS Corporation
4225 Executive Square, Suite 1600
La Jolla, CA 92037
Phone: (858) 812-9292, ext. 1563

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 272530 linear ft | <5 width | 1315.85 acres | Stream Flow: Ephemeral

Wetlands: 117.78 acre(s) | Cowardin Class: Palustrine, scrub-shrub

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: N/A | Non-Tidal: N/A

☑ Office (Desk) Determination
☑ Field Determination: Date of Field Trip: Apr 20, 2011

**SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):**

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: URS Corporation
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: Palo Verde
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: websoilsurvey.nrcs.usda.gov Colorado Desert Are
- ☑ National wetlands inventory map(s). Cite name: fws.gov/wetlands/Data/Mapper.html
- ☑ State/Local wetland inventory map(s): californiawetlands.net/tracker/crb/map
- ☑ FEMA/FIRM maps: 06025C0275C
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☑ Aerial (Name & Date): VTN Consulting, 2011
  - ☐ Other (Name & Date):
- ☐ Previous determination(s). File no. and date of response letter:
- ☑ Other information (please specify): VTN Consulting, 2011. Draft Rio Mesa Overall E

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

2/8/12
Signature and Date of Regulatory Project Manager (REQUIRED)

2/7/12
Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

**EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:**

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

# *PRELIMINARY JURISDICTIONAL DETERMINATION FORM*

**This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:**

Appendix A - Sites

| | | | | | |
|---|---|---|---|---|---|
| District Office | Los Angeles District | File/ORM # | SPL-2011-0972-JEM | PJD Date: | Oct 7, 2011 |
| State | CA | City/County | Palo Verde/Riverside | Person Requestinq PJD | Derek Langsford |

| Site Number | Latitude | Longitude | Cowardin Class | Est. Amount of Aquatic Resource in Review Area | Class of Aquatic Resource |
|---|---|---|---|---|---|
| Wetlands | ***** | see Figure1 | Palustrine, scrub-shrub | 117.78 acres | Non-Section 10 wetland |
| A | ***** | see Figure 1 | Riverine | 24.32 acres | Non-Section 10 non-wetland |
| B | ***** | see Figure1 | Riverine | 145.10 acres | Non-Section 10 non-wetland |
| C | ***** | see Figure 1 | Riverine | 11.05 acres | Non-Section 10 non-wetland |
| D | ***** | see Figure 1 | Riverine | 7.48 acres | Non-Section 10 non-wetland |
| E | ***** | see Figure 1 | Riverine | 232.35 acres | Non-Section 10 non-wetland |

**Notes**:

*****Please see attached Figure number 11a and 11b, showing locations of Site Numbers labeled as Sections A thru I, Gen-tie and ROW corridors, and Bradshaw Trail and 34th Avenue Access.

Continued Sections from List above:

F: 7.73 acres, ***** see Figure 1, Riverine, Non-Section 10 non-wetland

G: 388.02 acres, ***** see Figure1, Riverine, Non-Section 10 non-wetland

H: 191.58 acres, ***** see Figure 1 Riverine, Non-Section 10 non-wetland

I: 288.48 acres, ***** see Figure 1, Riverine, Non-Section 10 non-wetland

Gen-tie/ROW corridor: 9.05 acres, ***** see Figure 2, Riverine, Non-Section 10 non-wetland

Bradshaw Trail/34th Ave Access: 10.70 acres, ***** see Figure 2, Riverine, Non-Section 10 non-wetland

**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA**
**1516 NINTH STREET, SACRAMENTO, CA 95814**
**1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION**
**FOR THE *RIO MESA SOLAR ELECTRIC GENERATING FACILITY***

DOCKET NO. 11-AFC-04
PROOF OF SERVICE
(Revised 1/23/12)

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publicadviser@energy.state.ca.us

*indicates change

## DECLARATION OF SERVICE

I, Michelle L. Farley, declare that on, February 9, 2012 I served and filed copies of the attached Preliminary Jurisdictional Determination Acceptance for the Rio Mesa Solar Electric Generating Facility , dated February 8, 2012. These documents are accompanied by the most recent Proof of Service list, located on the web page for this project at:

[http://www.energy.ca.gov/sitingcases/riomesa/index.html].

These documents have been sent to the other parties in this proceeding (as shown on the attached Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

_X_ Served electronically to all e-mail addresses on the Proof of Service list;

___ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "e-mail preferred."

*AND*

For filing with the Docket Unit at the Energy Commission:

___ by sending electronic copies to the e-mail address below (preferred method); *OR*

_X_ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-4
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

*OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:*

___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Michelle L. Farley _____
BrightSource Energy, Inc.

# APPENDIX D

# REPRESENTATIVE PHOTOS

*Appendix D. Representative Photographs – Typical Observed Indicators of OHWM*
Top: Mudcracks
Bottom: Benches

Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs – Typical Observed Indicators of OHWM*
Top: Drift and wrack deposition
Bottom: Mudcracks

Photographs taken September 20-24, 2012

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ENVIRONMENTAL CONSULTANTS

*Appendix D. Representative Photographs – Typical Observed Indicators of OHWM*
Top: Benches, wrack deposition, exposed roots below soil layer
Bottom: Wrack deposition
Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs – Typical Observed Indicators of OHWM*
Top: Benching
Bottom: Crested ripples

Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs – Typical Observed Indicators of OHWM*
Top: Crested ripples, change in particle distribution
Bottom: Change in particle size distribution

Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs - Wetlands*
Top: Sediment layering visible in soil profile at SP1.
Bottom: Faint and indistinct redox concentrations observed at SP1.
Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs - Wetlands*
Top: Vegetation dominated by bush seepweed.
Bottom: Wetland/upland edge. Wetland is dominated by bush seepweed.
Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs - Wetlands*
Top: Typical wetland hydrology indicators observed in the wetlands: surface soil cracking.
Bottom: Drift and debris south of the wetland shows flows from Wash 25B entering wetland.
Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs – Potentially Jurisdictional Dry Washes*
Top: Blue palo verde – ironwood woodland
Bottom: Terrace floodplain surrounded by active floodplain in a large wash system
Photos taken September 20-24, 2012

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*Appendix D. Representative Photographs – Potentially Jurisdictional Dry Washes*
Top: Shelving, sediment sorting and wrack present in a large wash.
Bottom: Sediment sorting and crested ripples present in the low flow channel.
Photos taken September 20-24, 2012

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*Appendix D. Representative Photographs - Features Lacking OHWM*
Top and Bottom: Relict channel, no evidence of recent flow, No OHWM.

Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs - Features Lacking OHWM*
Top: Relict channel, no evidence of recent flow, No OHWM.
Bottom: Surface sheet flow. No OHWM.
Photographs taken September 20-24, 2012

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*Appendix D. Representative Photographs - Features Lacking OHWM*
Top and Bottom: Relict channel, no evidence of recent flow, No OHWM.

Photographs taken September 20-24, 2012

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ENVIRONMENTAL CONSULTANTS

*Appendix D. Representative Photographs - Features Lacking OHWM*
Top: Surface sheet flow, no OHWM.
Bottom: Relict channel, no evidence of recent flow, No OHWM.
Photographs taken September 20-24, 2012

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