Appendix E
Additional Biological Resources Reports

Desert Tortoise Survey
O-Farrell Biological Consulting Mojave Ground Squirrel Letter
CDFG Letter Response to O'Farrell Letter
Jurisdictional Delineation

Desert Tortoise Survey for Proposed Deep Creek Ranch Development in Apple Valley, California

Submitted to:

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August 29, 2010

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EXECUTIVE SUMMARY

No desert tortoise sign (live tortoises, scat, or burrows) was found within the boundaries of a 221-acre proposed single family residential housing development in Apple Valley, California or on additional transects conducted nominally at 200, 400, and 600 meters from the project boundary. Surveys were conducted between July 21 and 26, 2010. Protocols established by the U.S. Fish and Wildlife Service for desert tortoise surveys were followed except that the survey was conducted outside of the specified survey season. Approval was granted by the U.S. Fish and Wildlife Service for conducting this survey outside of the normal survey season. The lack of desert tortoise sign suggests that the site is not currently occupied by desert tortoise. Further, there are substantial obstacles to tortoise immigration to the site. Therefore, no measures are recommended to mitigate impacts to the species.

PROJECT DESCRIPTION

The project is a proposed residential housing development. The action area for the project, as the term is defined by the U.S. Fish and Wildlife Service (USFWS, 2010), included only the site itself as no offsite modifications were proposed.

SITE DESCRIPTION

The 221-acre project site is situated in southwestern San Bernardino County within the corporate boundary of Apple Valley (Figure 1). In a previous reports (Tom Dodson and Associates, 2009a, 2009b) the site has been referred to as 249 acres, however measurements confirm the 221-acre size. It is located on the Apple Valley South 7.5 minute topographic quadrangle in northwest ¼ of Section 20 and a portion of the southwest ¼ of Section 17, Township 4 North, Range 3 West. The site lies outside of habitat designated as critical for the recovery of the species (USFWS, 1994).

The site lies within the Mojave River flood plain and is composed of two flat terraces with a 60-foot high escarpment between the two terraces (Figure 2). This escarpment is subdivided into two slopes with about a 100 ft wide bench between them. A lightly used east-west road, Ocotillo Way traverses the northern ¼ of the site and is the only road on the site. Residual furrows indicate that the terraces have been used for agriculture in the past. The area south of Ocotillo Way was used as an enclosure for burros at the time of the survey and the area north of Ocotillo Way appears to have been left fallow longer than the remainder of the terraces. There is also a knoll in the southeastern-most corner where there is no evidence of agricultural utilization. Site elevations range from 2,870 feet in the northwest corner to 2,914 feet in the southeastern area. The area is primarily drained by sheet flow to the Mojave River less than a mile to the west.

A single private shop-type structure is located near the east-west center of the project just south of Ocotillo Way. The area surrounding the site includes a substantial array of dirt roads, a few paved roads, and a variety of land uses (Figure 2 - 4). To the north of the site lies a few horse farms and low density residential housing. Deep Creek Ranch Road, a two-lane paved road borders the western boundary of the site with residential housing and the Mojave River further to the west. Beyond the housing lies the Mojave River. A fallow field is located to the southwest of the site. A ranch with small cattle feed lots is situated south of the site with the BNSF Railroad and Rock Springs Road, a two-lane paved road further to the south. The BNSF Railroad forms the southern half of the eastern boundary while the northern half is bounded by residential housing.

The primary current human impact on the site is active grazing. The residual effects of cultivation are still visible on the ground.

The vast majority of the site (97%, 214 acres) is composed of fallow agricultural land dominated by ruderal vegetation. The perennial vegetation density in this area was very low and consisted primarily rubber rabbitbrush (*Chrysothamnus nauseosus*) and Russian thistle (*Salsola tragus*). A small portion of the site (3%, 7 acres) in the southeast corner of the site is a knoll dominated by Joshua Tree (*Yucca brevifolia*), creosote bush (*Larrea tridentata*), and buckhorn cholla (*Opuntia acanthocarpa*). A small sand dune of less than an acre in size is located at the extreme west end of this area.

To the east of the site soils are generally sandy loam. With the exception of the sand dune in the southeast area of the site soils become increasingly sandy from east to west to the Mojave River.

METHODS

Field Methods

U.S. Fish and Wildlife Service (Service) protocols (2010) specify a time period for which surveys can be conducted of April through May and September through October. However, provisions are made in the protocol for conducting surveys outside of these time frames if approved by the Service. A variance for the timing of the surveys for this project was sought and approved by Ray Bransfield with the Service.

Other than the timing, surveys were conducted according to U.S. Fish and Wildlife Service (2010) established protocols for desert tortoise surveys. For a small scale project such as this, these protocols recommend complete coverage of the action area utilizing pedestrian transects not to exceed 10 meters between transects. Further, if the site is less than 200 acres in size and no tortoise sign is found on the site, additional transects encircling the action area at distances of 200, 400, and 600 meters are recommended. Since this project was near the 200-acre limit, additional transects were walked at the 200, 400, and 600 meter distances.

The field survey was conducted between July 21 to July 26 by Erin Whitfield and Gilbert Goodlett. A total of 94 north-south transects (55.3 linear miles total) were walked at 10 meter intervals throughout the project site. The transect routes were calculated and downloaded to a handheld GPS unit that was used to accurately navigate the transects.

Because the site is surrounded by development at varying distances from the edge of the site, transects spaced at 200, 400, and 600 meters from border of the action area were routed to remain as close as possible to the specified distance from the action area but placed to avoid houses and yards, fenced areas, agricultural areas, grazing areas, and similar non-habitat areas (Figure 3). This resulted in transects that were unusually shaped and substantially longer than if they remained at the specified distance from the edge of the action area. These transects totaled 15.1 linear miles. In total 70.4 linear miles of transects were walked on the project and surrounding transects

Each transect was walked at a pace that allowed careful observations along the transect route and the vicinity. All plants, plant communities, wildlife and wildlife sign, human affects, and geomorphological characteristics were recorded. Particular attention was paid to potential desert tortoise sign including live tortoises, carcasses or parts thereof, burrows, scat, tracks, egg shell fragments, courtship rings, and drinking depressions.

Site photographs were taken during the field survey to catalog representative habitat. A sample of these photographs is included in the report (Photographs 1 to 8). The location and direction of each photograph is shown in Figures 2 and 3.

Identification Resources

Identification of plants followed The Jepson Manual: Higher Plants of California (Hickman, 1993) and plant communities followed A Manual of California Vegetation (Sawyer and Keeler-Wolf, 1995).

Bird identification resources included A Field Guide to Western Birds (Peterson, 1993), Field Guide to the Birds of North America (National Geographic Society, 1987), and Stokes Field Guide to Birds: Western Region (Stokes, 1996). Mammal identification resources included California Mammals (Jameson, 1988) and A Field Guide to the Mammals of North America North of Mexico (Burt and Grossenheider, 1980). Reptile identification resources included A Field Guide to Western Reptiles and Amphibians (Stebbins, 1985).

RESULTS

No evidence of desert tortoise was found on the site or on the additional transects surrounding the property. A similar survey was conducted in August and September of 2008 (Tom Dodson and Associates, 2009a) except that additional transects were not surveyed around the site. No desert tortoise sign was observed during that survey. Shaded air temperatures at 5 cm during the survey ranged between 75°F and 100 °F and never exceeded the maximum survey temperature specified in Service protocols of 104 °F.

CONCLUSIONS

Surveys from 2008 and this survey conducted in 2010 tend to support the conclusion that tortoise do not inhabit the site. Further, it appears unlikely that tortoise could reasonably move onto the site. To the west, the site is bounded by the Mojave River (Figure 4). At its narrowest point near the project site, the Mojave River is a 1,800 ft wide sandy area relatively devoid of vegetation and, during the survey, actively flowing near the project site. To the west of the Mojave River lies a narrow strip of unoccupied land with the town of Hesperia further to the west making this a very unlikely source of emigration for tortoises to the site.

Most of the area to the south of the project site is composed of heavily disturbed landscape of agricultural activities, ranches, cattle feed lots, and similar activities (Figure 4). The one exception is a 5 acre extension of the Joshua Tree Woodland found in the southeast corner of the size. South of both of these areas lies the BNSF Railroad, an obstacle likely to present a significant, though not impenetrable, barrier to the movement of tortoises. There are 3 bridges in the vicinity of the site that could potentially be used as an immigration route. One of these bridges is over the Mojave River and one is over Deep Creek road, both unlikely routes of travel. The third bridge is over a wash south of the central portion of the site. However, for a tortoise to arrive at this location from the south, it would be necessary to successfully negotiate crossing Rock Springs Road, moderately used paved road. It would seem unlikely that a tortoise could successfully travel to the site from the south.

The BNSF railroad forms the eastern boundary of the site in the southern half of the site. In the northern half, the BNSF railroad lies as far as 900 ft (274 m) with houses and private property between. There are no bridges to serve as travel conduits along the eastern area of the project.

It appears that the area to the north of the site would be the only feasible route of travel to the site. However, this route also appears to be an unlikely path of travel as there is a myriad of ranches, horse farms, houses, agricultural areas, and dirt roads with the urbanization density increasing as one traverses further north from the site.

RECOMMENDATIONS

No desert tortoise sign was detected on or near the project site during this survey or a similar survey in 2008. Further, it appears unlikely that tortoises would move onto the site from adjacent habitat areas. Therefore, no desert tortoise mitigation measures are recommended.

REFERENCES

Burt, William H. and Grossenheider, Richard P. 1980. A Field Guide to the Mammals of North America north of Mexico. Boston: Houghton Mifflin Company.

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Stokes, Donald and Lillian. 1996. Stokes Field Guide to Birds: Western Region. Boston and New York: Little, Brown and Company.

Tom Dodson & Associates. 2009a. Focused biological survey for a 249-acre parcel located in the town of Apple Valley. Prepared for RBF Consulting, Ontario, California.

Tom Dodson & Associates. 2009b. Botanical and habitat survey Deep Creek Ranch Project. Prepared for RBF Consulting, Ontario, California.

U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices.

U.S. Fish and Wildlife Service. 2010. Preparing for any action that may occur within the range of the Mojave Desert Tortoise (*Gopherus agassizii*). Undated memo.

FIGURES

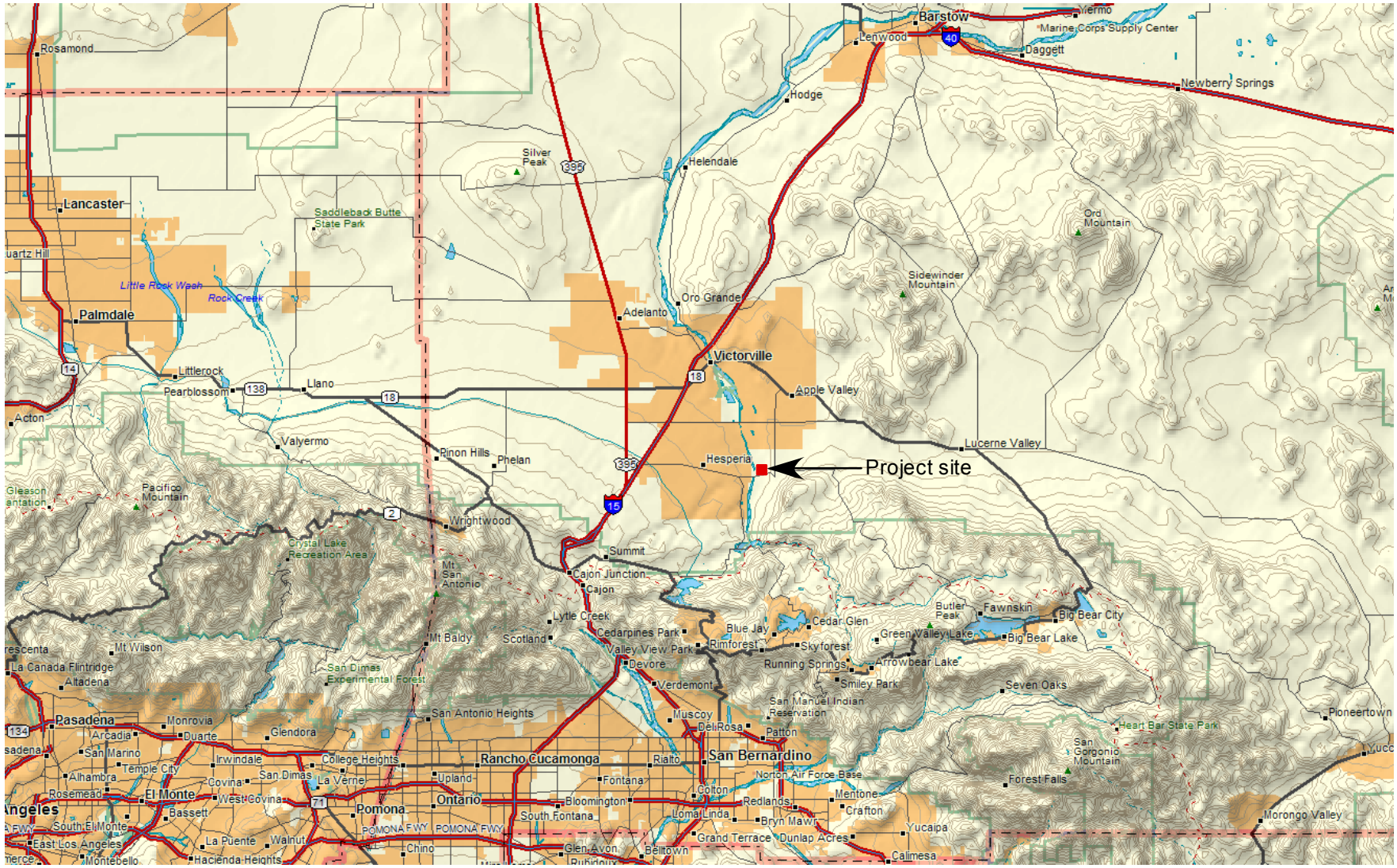
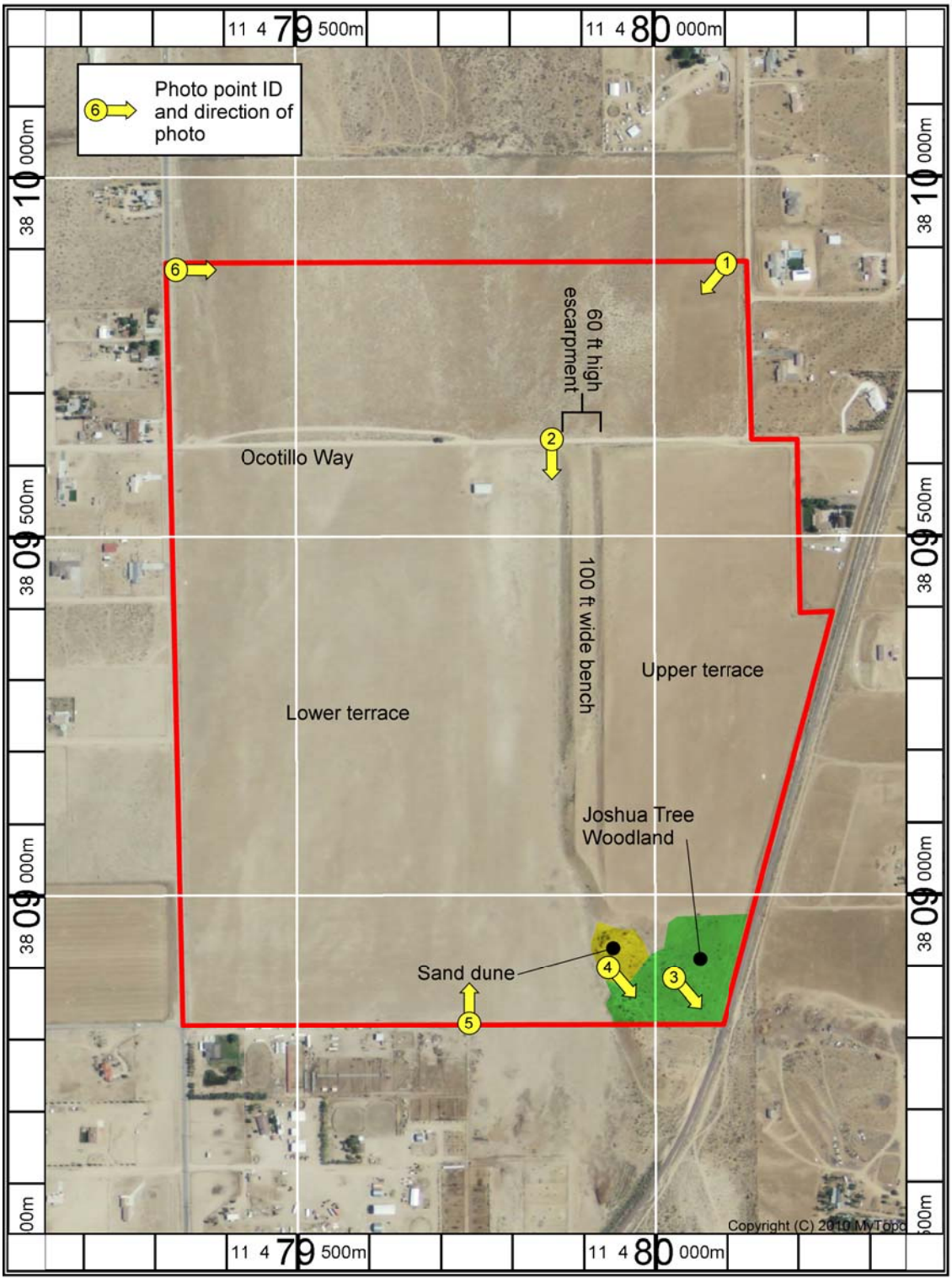


Figure 1. Deep Creek Ranch project vicinity map



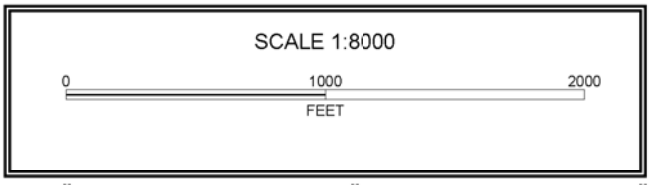


Figure 2. Deep Creek Ranch project site

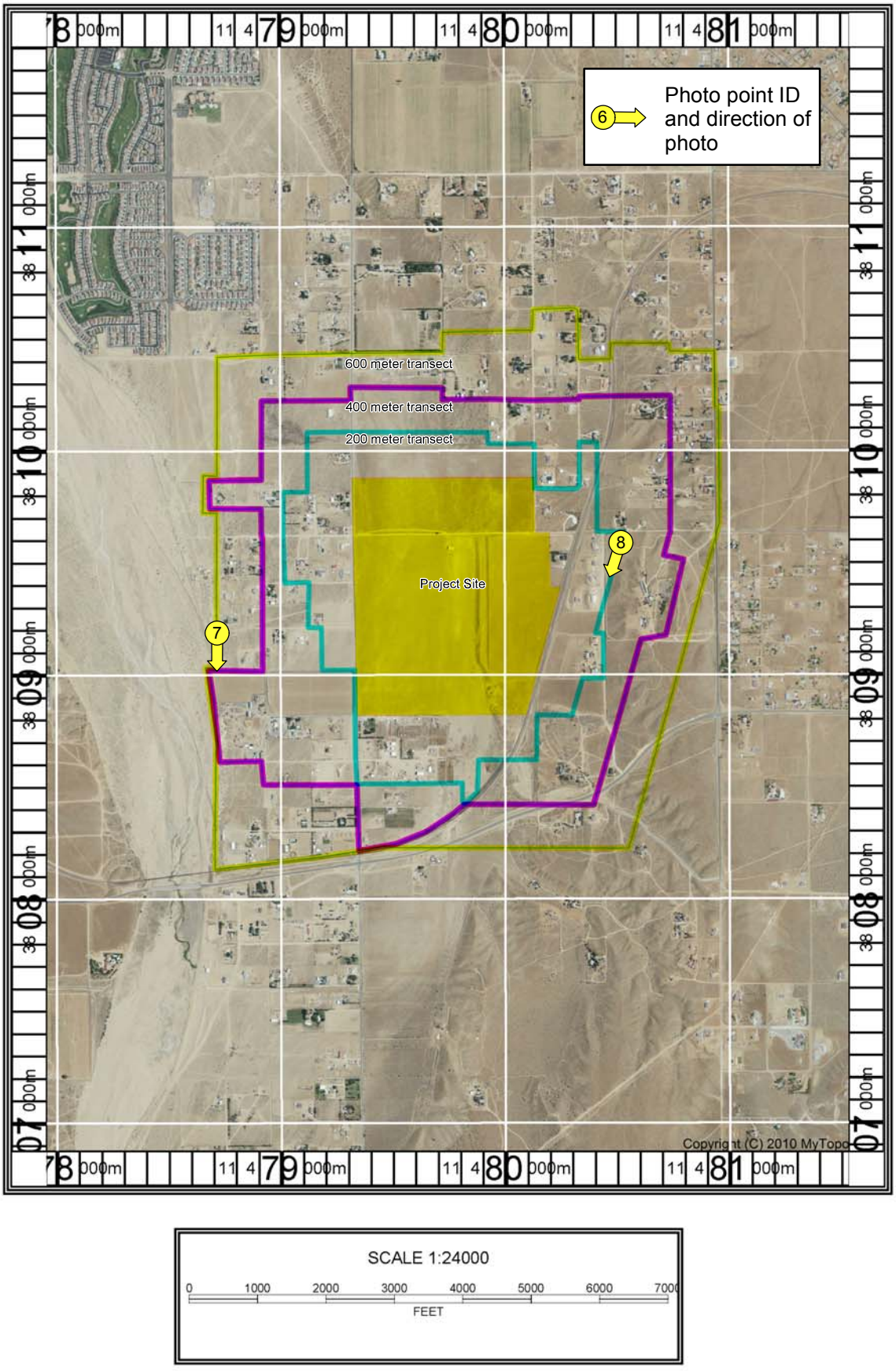


Figure 3. Deep Creek Ranch project site and surrounding transects

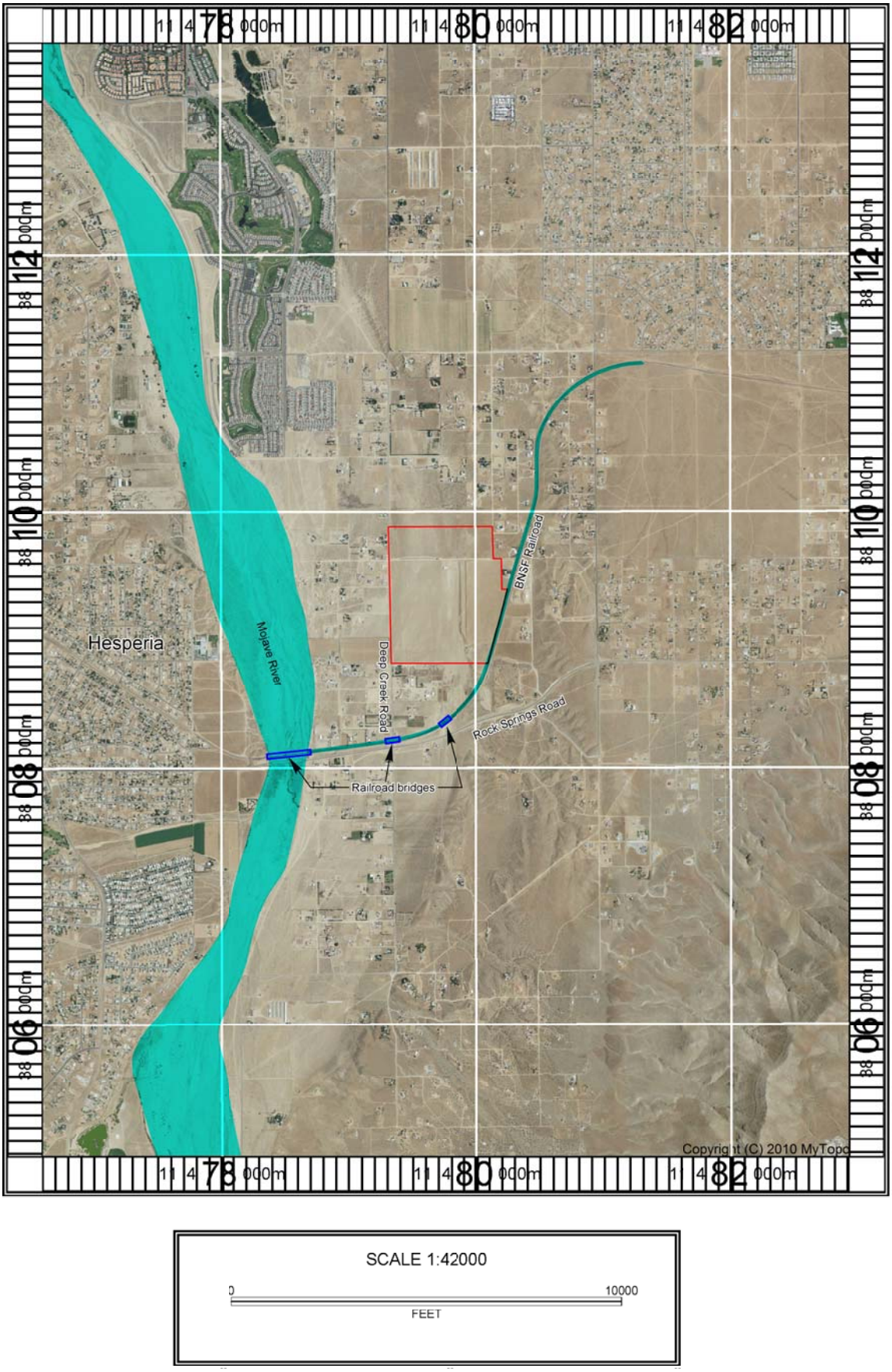


Figure 4. Deep Creek Ranch project site obstacles to immigration.

PHOTOGRAPHS

Photograph 1. Looking southwest from northeast corner of site.

Photograph 2. Looking south from Ocotillo Road at escarpment between two terraces.

Photograph 3. Looking southeast at Joshua Tree Woodland in southeast corner of site.

Photograph 4. Looking southeast with a portion of the sand dune area shown at right.

Photograph 5. Looking north from the southern central boundary of the site at heavily grazed area devoid of vegetation.

Photograph 6. Northwest corner of site looking east.

Photograph 7. Looking south along a portion of the 600 meter transect. Photo shows typical sandy soils and limited vegetative cover west of the project site near the Mojave River.

Photograph 8. Looking south-southwest along 200 meter transect. Photo shows more consolidated soils and higher vegetative cover than the area west of the project site. Project site is the flat area at right behind houses.

O'FARRELL BIOLOGICAL CONSULTING

28 April 2006

Tonya Moore
California Department of Fish and Game
407 West Line Street
Bishop, CA 93514

RE: Mojave Ground Squirrel Assessment for Deep Creek Ranch, Apple Valley

Dear Ms. Moore:

I am providing an assessment of Deep Creek Ranch, Apple Valley, San Bernardino County, California that we were requested to perform protocol trapping for Mojave ground squirrel (MGS), *Spermophilus mohavensis*. The property is 249 acres and lies between the A.T. & S.F. Rail Road and the Mojave River north of Rock Springs Road (see attached map). The property is bordered on the north by Breezy Road alignment, on the south by Round Up Way, on the west by Deep Creek Road, and on the east by the A.T. & S.F. Rail Road. Scattered rural housing occurs around the property. The entire site has been cleared. The larger portion south Ocotillo Way dirt road alignment is fenced and currently being used for cattle grazing. The smaller portion north of Ocotillo Way is unfenced and not in current use. The entire site is vegetated by low annual forbs and grasses. The only vegetative structure is in the small portion north of Ocotillo Way, which contains a few scattered Yellow Rabbitbrush shrubs.

The entire site was examined visually on 7 April 2006 and traversed by vehicle and on foot by two observers (M.J. O'Farrell and T.M. O'Farrell) to allow a complete visual assessment. Botta's pocket gopher (*Thomomys bottae*) was abundant throughout. California ground squirrel (*Spermophilus beecheyi*) was noted sparsely scattered on the property. Some Merriam's kangaroo rat (*Dipodomys merriami*) sign was evident near the periphery.

I am unaware of any site that has received the level of disturbance demonstrated on the project property and still remain suitable for MGS occupation. Similarly, the presence of established California ground squirrel and lack of white-tailed antelope ground squirrel (*Ammospermophilus leucurus*) suggests further that the site is not suitable for MGS. My professional opinion is that there is no likelihood of encountering MGS on the property. I do not believe that trapping is required on this property. I do not believe that development of the property will result in take of MGS. I request your concurrence on this evaluation.

7320 HEGGIE AVENUE. • LAS VEGAS, NV • 89131
PHONE: (702) 658-5222 • FAX: (702) 645-5688 E-MAIL: mike@mammalogist.org

Thank you for your assistance. If I may provide further information, please contact me.

Sincerely,

Michael J. O'Farrell

Michael J. O'Farrell, Ph.D.
Principal/Terrestrial Ecologist

cc: Steve Nelson, PCR Services

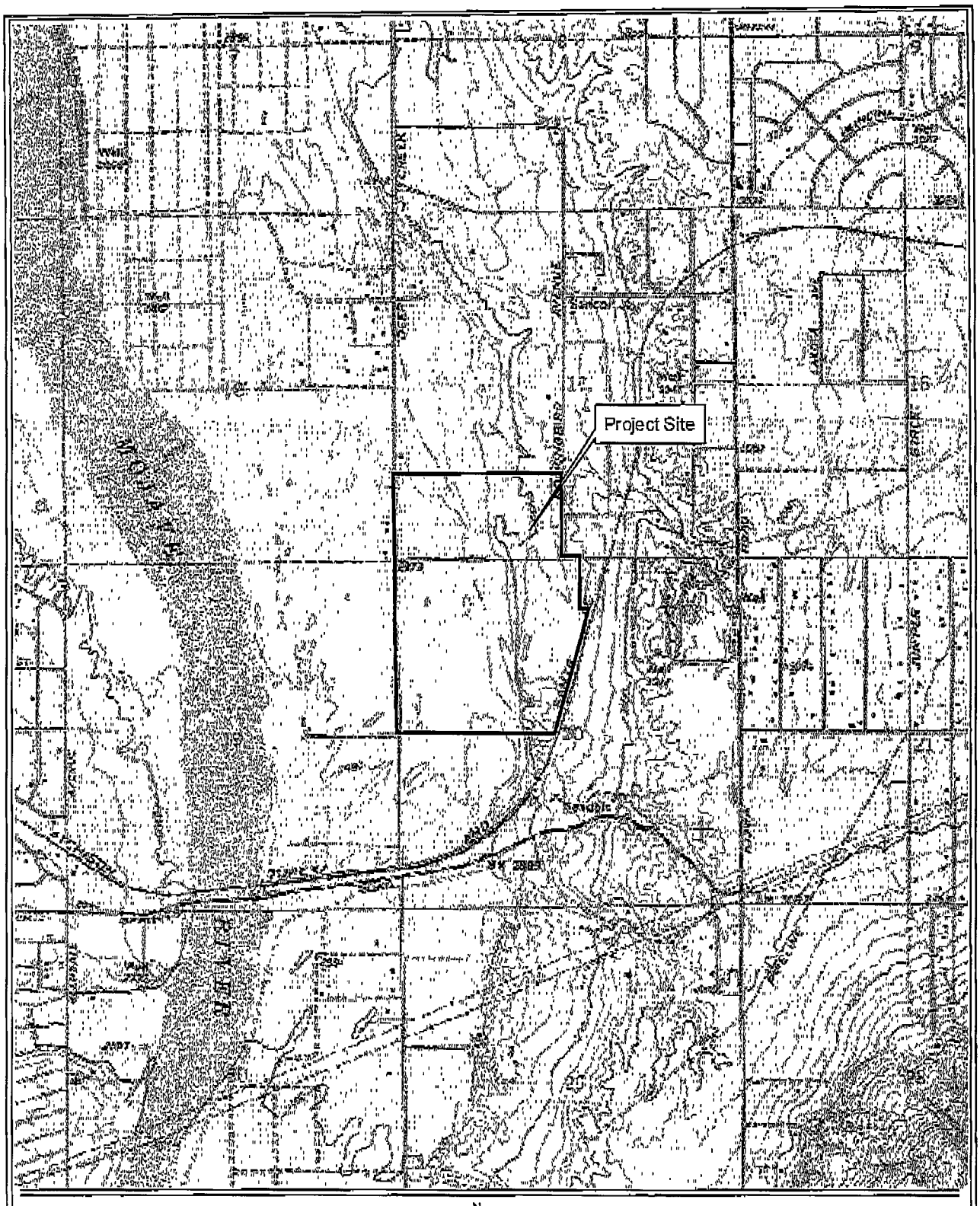


Figure 1
Deep Creek Ranch
Vicinity Map

State of California - The Resources Agency ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Eastern Sierra - Inland Deserts Region (ESIDR)
407 West Line Street
Bishop, CA 93514
(760) 872-1171

May 12, 2006

Mr. Michael O'Farrell, PhD
O'Farrell Biological Consulting
7320 Heggie Avenue
Las Vegas, NV 89131

Subject: Mohave Ground Squirrel Assessment for Deep Creek Ranch, Apple Valley, San Bernardino County

Dear Dr. O'Farrell:

The Department of Fish and Game (Department) has reviewed the information prepared by you regarding Deep Creek Ranch located between the AT&SF Rail Road and the Mojave River north of Rock Springs Road in the Town of Apple Valley. According to the information, the highly disturbed site does not constitute Mohave ground squirrel (MGS) habitat. After reviewing the information and other records, the Department concurs that this site is unlikely to provide viable MGS habitat. As such, no further action in regards to MGS is currently necessary for the project site. It should be noted that this determination does not completely preclude the possibility of a MGS occurring on the project site. If a MGS is found on the site before or during project implementation any work must stop and the Department contacted immediately.

In addition, the site may still provided habitat to other protected species such as burrowing owls. This letter does not constitute a release from the legal obligations associated with any protected species that may occur on the site.

Questions regarding this letter and further coordination on these issues should be directed to Ms. Tonya Moore, Environmental Scientist at (760) 955-8139.

Sincerely,

Tonya Moore

Tonya Moore
Environmental Scientist

cc: Denyse Racine, DFG Bishop

DEEP CREEK HOMES PROPERTY
SAN BERNARDINO COUNTY, CALIFORNIA

Delineation of
State and Federal Jurisdictional Waters

Prepared For:

County of San Bernardino, Land Use Services Department
385 North Arrowhead Ave.
San Bernardino, CA 92415-0182
Contact: Matthew Slowik
909/387-4372

Prepared By:

RBF Consulting
14725 Alton Parkway
Irvine, California 92618
Contact: Ms. Lauren See
949/330-4115

July 8, 2010

JN 65-100351

DEEP CREEK HOMES PROPERTY

SAN BERNARDINO COUNTY, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of a jurisdictional "waters of the U.S." (including wetlands) and "waters of the State" determination for the above-referenced project.

Lauren See
Regulatory Specialist
Environmental and Regulatory Services

Richard Beck, CEM, CPESC
Regulatory Manager
Environmental and Regulatory Services

July 8, 2010

Executive Summary

At the request of the County of San Bernardino, Land Use Services Department (County), RBF Consulting (RBF) has prepared this Delineation of Jurisdictional Waters for the Deep Creek Homes Property (herein referenced as the "project site"), located east of the City of Hesperia and south of the Town of Apple Valley, in an unincorporated area of San Bernardino County, California. Specifically, the project site is located north of Roundup Way and east of Deep Creek Road. The field work for this delineation was conducted on July 6, 2010. This delineation documents the regulatory authority of the U.S. Army Corps of Engineers (Corps), the Lahontan Regional Water Quality Control Board (Regional Board), and the California Department of Fish and Game (Fish & Game) pursuant to the Federal Clean Water Act (CWA), California Porter-Cologne Water Quality Control Act, and California Fish and Game Code.[1]

Based on a detailed review of current site conditions, our research has indicated that no Corps, Regional Board, or Fish & Game jurisdictional waters are located within the boundaries of the project site. Therefore, no regulatory approvals are required prior to construction.

This report presents RBF's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdiction.

[1] The project area was surveyed pursuant to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008); the Practices for Documenting Jurisdiction under Section 404 of the CWA Regional Guidance Letter (Corps 2007); Minimum Standards for Acceptance of Preliminary Wetland Delineations (Corps 2001); and the Field Guide to Lake and Streambed Alteration Agreements Section 1600-1607 (Fish & Game 1994).

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LIST OF TABLES

LIST OF EXHIBITS

Appendix

LIST OF ACRONYMS

CEQA	California Environmental Quality Act
CWA	Clean Water Act
DBH	Diameter at Breast Height
EPA	Environmental Protection Agency
FAC	Facultative Vegetation
FACU	Facultative Upland Vegetation
FACW	Facultative Wetland Vegetation
GPS	Ground Positioning System
IP	Individual Permit
MSL	Mean Sea Level
MS4	Municipal Separate Storm Sewer System
NWP	Nationwide Permit
OBL	Obligate Wetland Vegetation
OHWM	Ordinary High Water Mark
RBF	RBF Consulting
RPW	Relatively Permanent Waters
SAA	Streambed Alteration Agreement
SBBM	San Bernardino Base and Meridian
SWANCC	Solid Water Agency of Northern Cook County
TNW	Traditional Navigable Water
UPL	Obligate Upland Vegetation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WoUS	Waters of the United States

Section 1 Introduction and Purpose

This delineation has been prepared for the County of San Bernardino, Land Use Services Department (County) in order to delineate the U.S. Army Corps of Engineers' (Corps), Lahontan Regional Water Quality Control Board's (Regional Board), and California Department of Fish and Game's (Fish & Game) jurisdictional authority located within the Deep Creek Homes Property (herein referenced as the "project site"). The field work for this delineation was conducted on July 6, 2010.

The project site is located east of the City of Hesperia and south of the Town of Apple Valley, in an unincorporated portion of San Bernardino County, California. The project site is located in Township 4 north, Range 3 west, Sections 17 and 20, San Bernardino Base and Meridian (SBBM). Generally, the project site is located approximately 10 miles east-northeast of the interchange of Interstate 15 and State Route 395. Specifically, the project site is located north of Roundup Way and east of Deep Creek Road (refer to Exhibit 1, *Regional Vicinity*, and Exhibit 2, *Site Vicinity*).

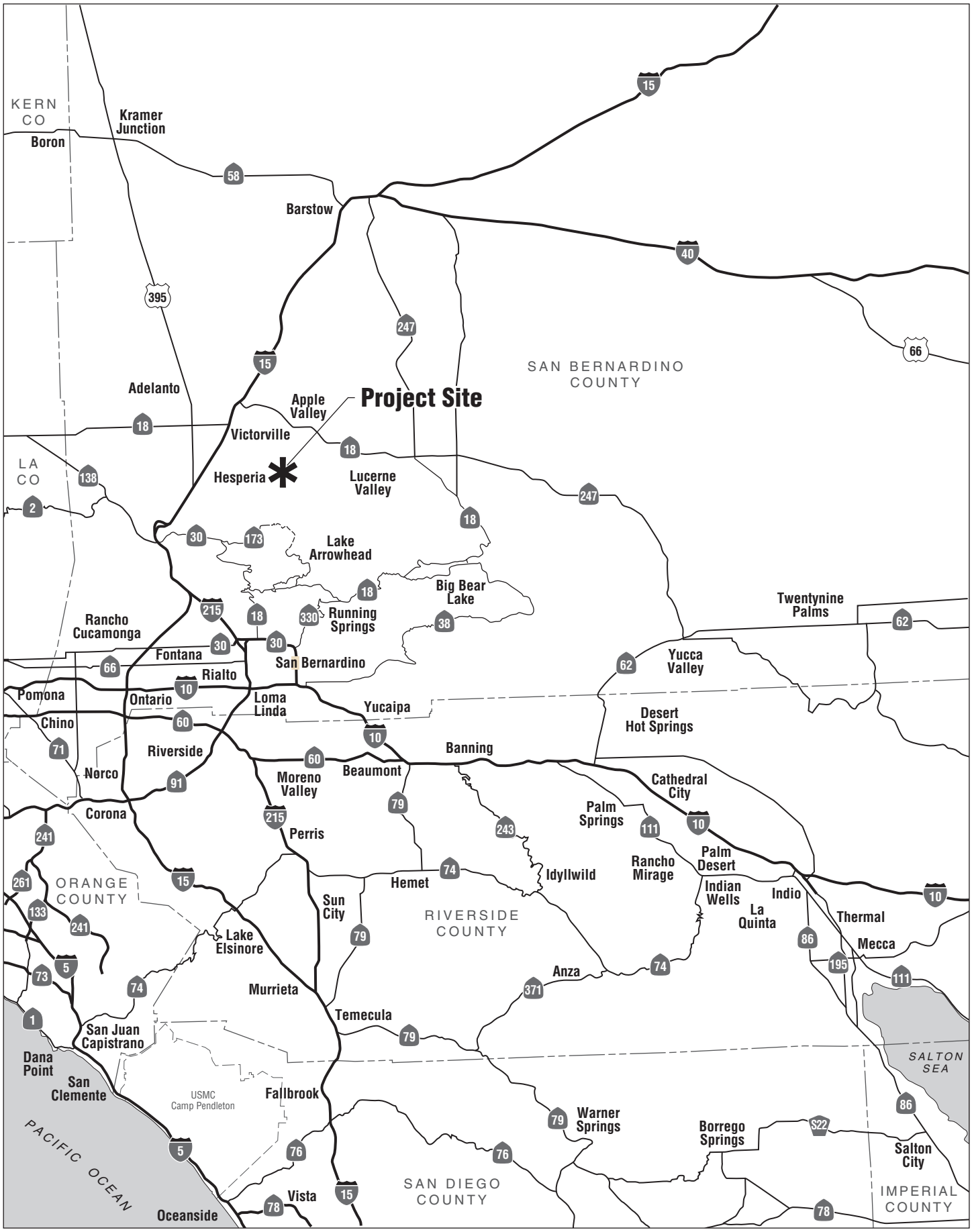
This delineation has been designed to document the authority of the regulatory agencies, explain the methodology undertaken by RBF Consulting (RBF) to document jurisdictional authority, and to support the findings made by RBF within the boundaries of the project site. This report presents our best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, only the regulatory agencies can make a final determination of jurisdictional boundaries.

1.1 PROJECT SITE BACKGROUND

The approximate 249-acre project site is currently vacant, with one (1) structure (refer to Exhibit 3, *Project Site*). The majority of the site has been highly disturbed by intensive grazing, grading, and weed abatement efforts. The project site sits on alluvium that has been terraced by mass grading and agricultural activities, altering the natural character of the project site. The Mojave River is located less than a half-mile to the west of the project site.

1.2 PROJECT DESCRIPTION

The proposed project consists of the development of a single-family residential community, which includes 202 residential lots and six lettered lots, construction of a drainage corridor, 25,300 linear feet of new streets, and a perimeter wall surrounding the project site.



RBF CONSULTING

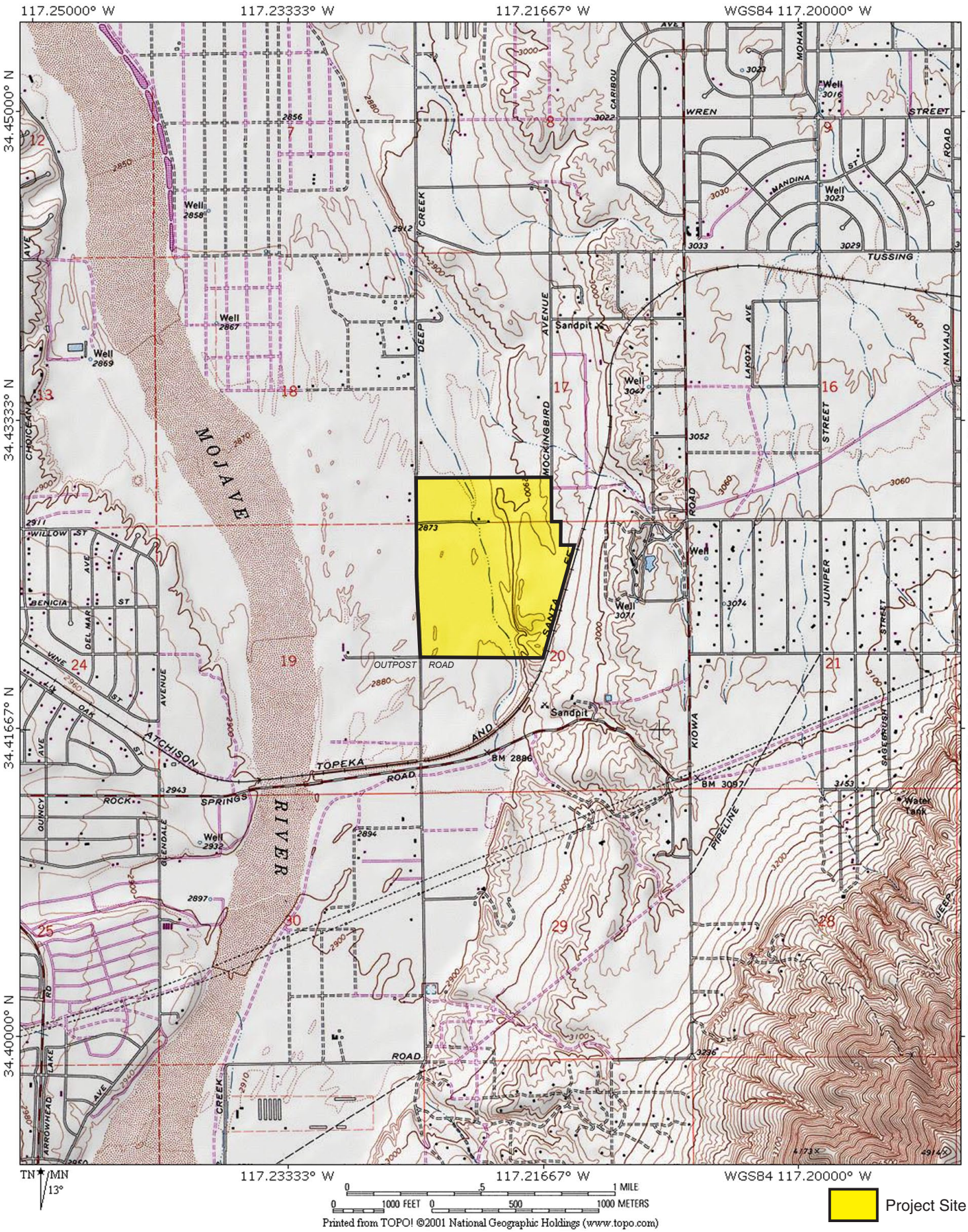
0 15 miles
APPROXIMATE

7/2/10 JN 65-100351-16857 MAS

DEEP CREEK HOMES PROJECT
JURISDICTIONAL DELINEATION

Regional Vicinity

Exhibit 1



Source: USGS Adelanto, CA, USGS Quad, 1993.

RBF CONSULTING

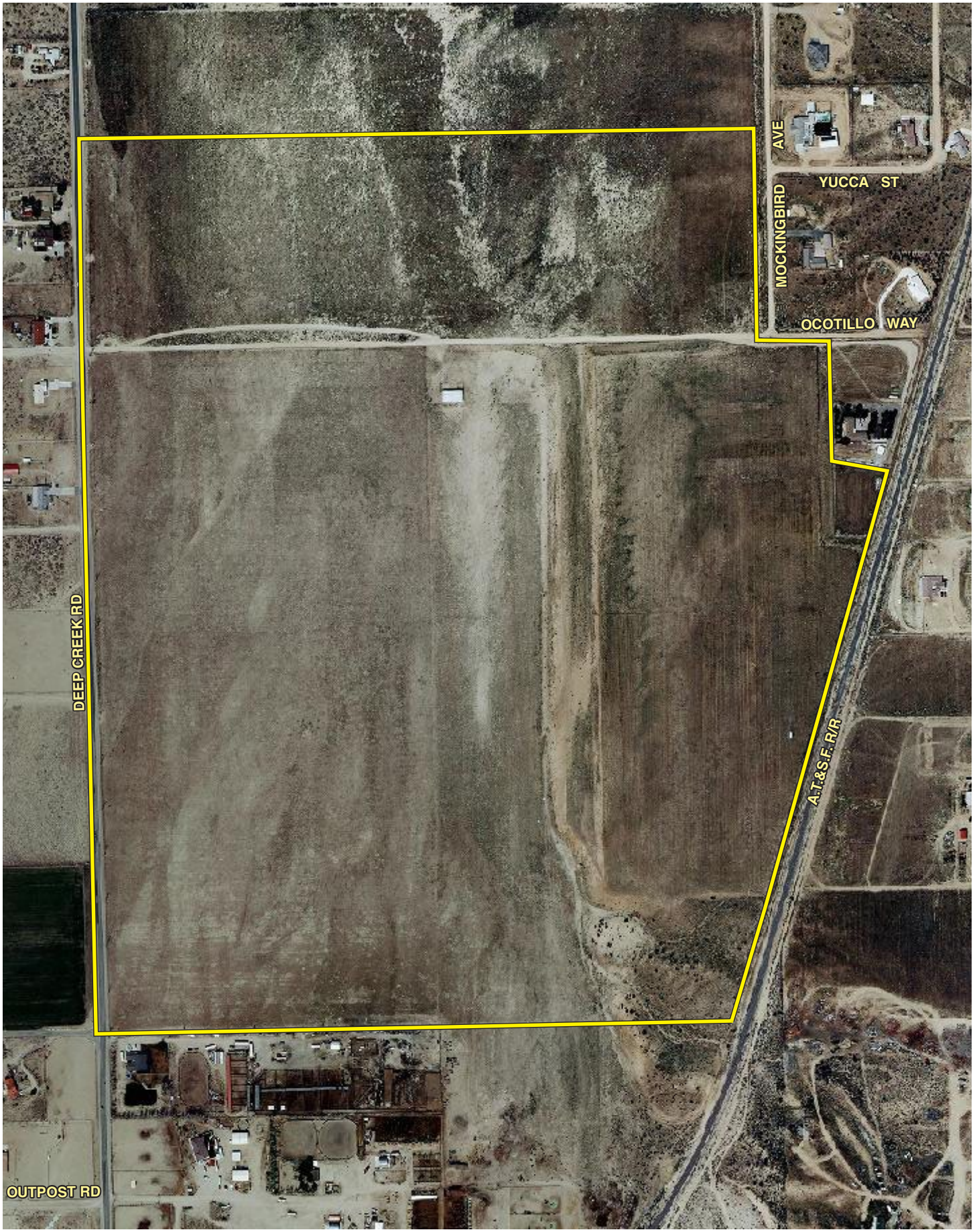
0 2500'
APPROXIMATE

7/7/10 JN 65-100351-16857 MAS

DEEP CREEK HOMES PROJECT
JURISDICTIONAL DELINEATION

Site Vicinity

Exhibit 2



RBF CONSULTING

0 500'
APPROXIMATE

7/7/10 JN 65-100351-16857 MAS

DEEP CREEK HOMES PROJECT
JURISDICTIONAL DELINEATION

Project Site

Exhibit 3

Section 2 Summary of Regulations

There are three (3) key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the Fish & Game regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

2.1 U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the filling of "waters of the U.S.", including wetlands, pursuant to Section 404 of the CWA. The Corps has regulatory authority over the discharge of dredged or fill material into the waters of the United States (WoUS) under Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States." The term WoUS is defined as follows[2]:

(1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) all interstate waters including interstate wetlands;

(3) all waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) which are used or could be used for industrial purpose by industries in interstate commerce;

(4) all impoundments of waters otherwise defined as WoUS under the definition;

(5) tributaries of waters identified in paragraphs (1)-(4) mentioned above;

[2] CWA regulations 33 CFR §328.3(a).

(6) the territorial seas; and,

(7) wetlands adjacent to the waters identified in paragraphs (1)-(6) mentioned above.

Wetlands, a subset of jurisdictional waters, are jointly defined by the Corps and EPA as "*those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.*"[3] Wetlands generally include swamps, marshes, bogs, and similar areas. The process in which jurisdictional areas (if any) are identified is further discussed in Section 3.0, *Methodology*.

The Corps' regulatory program continues to evolve due to court rulings associated with litigation. Sections 2.1.1 and 2.1.2, below, discuss court cases that have impacted the Corps' jurisdiction over the past decade.

2.1.1 Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers (Isolated Conditions)

On January 9, 2001, the US Supreme Court issued the decision on *Solid Waste Agency of Northern Cook County v. United States Corps of Engineers* (SWANCC). The CWA regulates "navigable waters," which is defined as "WoUS." This definition has been interpreted broadly by the Corps and EPA, to the extent that it reflected Congress' intention to regulate all waters that the Congress could constitutionally regulate under its commerce power (generally referred to as the Commerce Clause). Specifically, WoUS were regulated under Section 404 of the CWA if there was <u>any</u> possible connection to interstate commerce. The Corps stated that WoUS includes, among other things, *intrastate* waters:

(1) that are or would be used as habitat by birds protected by migratory bird treaties; or

(2) that are or would be used as habitat by other migratory birds that cross state lines; or

(3) that are or would be used as habitat for endangered species; or

(4) that are or would be used to irrigate crops sold in interstate commerce.

This approach was referred to as the Migratory Bird Rule. Although the SWANCC site was not a wetland, the Corps found that approximately 121 bird species dependent on aquatic environments were observed at the site; therefore, the site contained jurisdictional waters. The Corps denied the 404 permit since they found that the preferred project alternative was not the least damaging practicable alternative. The SWANCC sued to challenge the Corps' jurisdiction over the site, claiming that the Corps could not regulate non-navigable, isolated,

[3] CWA regulations 33 CFR §328.3(b).

intrastate waters based on the presence of migratory birds, and that Congress lacked authority under the Commerce Clause to grant the Corps such jurisdiction. Although the Corps prevailed in the lower courts, the US Supreme Court reversed the finding and invalidated the Migratory Bird Rule. It held that the rule is not a fairly supported interpretation of the term WoUS, and the Corps' use of the "migratory bird rule," adopted by the Corps and the EPA to interpret the reach of their Section 404 authority over discharges into "isolated waters" (including isolated wetlands), exceeded the authority granted by that section.

2.1.2 Rapanos v. United States (Significant Nexus Test)

On June 19, 2006, the U.S. Supreme Court decision on the *Rapanos v. United States* 547 U.S. 715 (2006) (Rapanos) case further limited the definition of "wetlands" and WoUS under the CWA. The Rapanos decision was a 4-1-4 plurality opinion since the majority of the Justices could not agree on a direction to give the lower court. More specifically, four Justices advocated a narrower interpretation of the CWA to hold that WoUS excludes intermittent or ephemeral streams and wetlands without a continuous surface connection to navigable waters (only permanent or continuous flowing bodies into navigable waters would be regulated). The other four Justices held to the prior interpretation that WoUS, including any waters that were tributary to and had a hydrologic connection with navigable waters, were regulated. Justice Kennedy, in his opinion, stated that WoUS should be determined on a case-by-case basis by the Corps, specifically based on whether a waterbody has a "significant nexus" to a navigable river. The lack of a majority decision and the undefined significant nexus test has lead to uncertainty in the Corps' CWA 404 regulation.

The Corps and EPA released a memorandum on June 5, 2007, with further clarification on December 2, 2008, in order to provide guidance in implementing the U.S. Supreme Court's decision. In accordance with the decision, the Corps will continue to assert jurisdiction over traditional navigable waters (TNWs) and all wetlands adjacent to TNWs, as well as non-navigable tributaries of TNWs that are relatively permanent waters (RPW) (i.e., the tributaries typically flow year-round or have a continuous flow at least seasonally) and wetlands with a continuous surface connection that directly abut such tributaries; however, the agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent (do not flow typically year-round or have a continuous flow at least seasonally).
- Wetlands adjacent to such tributaries.

- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

A case-by-case "significant nexus" analysis is conducted to determine whether the waters noted above and their adjacent wetlands are jurisdictional. A "significant nexus" may be found where waters, including adjacent wetlands, affect the chemical, physical, or biological integrity of downstream TNWs. The significant nexus analysis also includes consideration of hydrologic and ecologic factors relative to TNWs. RBF's methodology regarding significant nexus determinations is discussed in Section 3.0.

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Pursuant to federal law (Title 33, United States Code, Section 1341; Clean Water Act Section 401), applicants for a federal license or permit for activities which may discharge to waters of the United States must seek Water Quality Certification from the state or Indian tribe with jurisdiction. Such Certification is based on a finding that the discharge will meet water quality standards and other applicable requirements. In California, Regional Boards issue or deny Certification for discharges within their geographical jurisdiction. The State Water Resources Control Board has this responsibility for projects affecting waters within multiple Regional Boards. The Regional Board's jurisdiction extends to all waters of the State (includes SWANCC and Rapanos conditions) and to all WoUS, including wetlands.

Section 401 of the CWA gives the Regional Board the authority to regulate, through a Section 401 Certification process, any proposed federally-permitted activity undertaken in California that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the Corps pursuant to Section 404 of the CWA. Section 401 requires the Regional Board to provide "certification that there is reasonable assurance that an activity which may result in the discharge to waters of the United States will not violate water quality standards." Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which are defined as numeric and narrative objectives in each Regional Board's Basin Plan.

The California *Porter-Cologne Water Quality Control Act* gives the state very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

2.3 CALIFORNIA DEPARTMENT OF FISH AND GAME

California Fish and Game Code Sections 1600-1616 establish a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the Fish & Game before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;

(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or

(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

This notification process is referred to as a 1602 Streambed Alteration Agreement (SAA). *Fish and Game Code Section 1602* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. The jurisdictional limits of the Fish & Game are not as clearly defined by regulation as are those of the Corps. Though closely resembling the limits described by Corps regulations, the Fish and Game's regulatory authority extends to include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the Fish & Game takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation.

Any of the below criteria could be applicable in determining what constitutes a stream depending on the potential for the proposed activity to adversely affect fish and other stream-dependent wildlife resources.

(1) The term stream can include intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams based on United States Geological Survey (USGS) maps, and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife.

(2) Biological components of a stream may include aquatic and riparian vegetation, along with all aquatic animals including fish, amphibians, reptiles, invertebrates, and terrestrial species which derive benefits from the stream system.

(3) As a physical system, a stream not only includes water (at least on an intermittent or ephemeral basis), but also a bed or channel, a bank and/or levee, in-stream features such as logs or snags, and various flood plains depending on the return frequency of the flood event being considered (i.e., 10, 50, or 100 years, etc.).

(4) The lateral extent of a stream can be measured in several ways depending on a particular situation and the type of fish or wildlife resource at risk. The following criteria are presented in order from the most inclusive to the least inclusive:

(a) The flood plain of a stream can be the broadest measurement of a stream's lateral extent depending on the return frequency of the flood event used. For most flood control purposes, the 100-year flood plain exists for many streams. However, the 100-year flood plain may include significant amounts of upland or urban habitat and therefore may not be appropriate in many cases.

(b) The outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats and is therefore a reasonable and identifiable boundary for the lateral extent of a stream. In most cases, the use of this criterion should result in protecting the fish and wildlife resources at risk.

(c) Most streams have a natural bank which confines flows to the bed or channel except during flooding. In some instances, particularly on smaller streams or dry washes with little or no riparian habitat, the bank should be used to mark the lateral extent of a stream.

(d) A levee or other artificial stream bank would also be used to mark the lateral extent of a stream. However, in many instances, there can be extensive areas of valuable riparian habitat located behind a levee.

It should be noted that the State agencies (Regional Board and Fish & Game) do not have regulatory authority on Tribal Lands. Only the Corps regulates jurisdictional waters located on Tribal Lands.

Section 3 Methodology

The analysis presented in this document is supported by field surveys and verification of current conditions conducted on July 6, 2010. While in the field, jurisdictional areas are typically recorded onto a base map at a scale of 1" = 150' using the topographic contours and visible landmarks as guidelines. Data points are obtained with a Trimble Geo XT Ground Positioning System (GPS) with ESRI Arc Pad 6.0/7.0 in order to record and identify specific ordinary high water marks (OHWM), soil pits, picture locations, and drainage features. This data is transferred via USB port as a .shp file and added to the project's jurisdictional map (when necessary).

3.1 WATERS OF THE U.S. AND STATE WATERS

The limits of the Corps' jurisdiction in non-tidal waters extend to the OHWM, which is defined as " . . . *that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*"[4] An OHWM can be determined by the observation of a natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and/or change in plant community. The Regional Board shares Corps jurisdictional methodology, unless SWANCC or Rapanos conditions are present. In the latter case, the Regional Board considers such drainages to be jurisdictional. The Fish & Game's jurisdiction extends to the top of bank of the stream/channel or to the limit (outer dripline) of the adjacent riparian vegetation.

3.2 WETLANDS

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps, 2008). This document is one of a series of Regional Supplements to the 1987 Corps Wetland Delineation Manual (Corps Manual). According to the Corps Manual, identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three (3) parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. Both the Regional Board and the Fish & Game jurisdictional wetlands encompass those of the Corps. In the

[4] CWA regulations 33 CFR §328.3(e).

field, vegetation, soils, and evidence of hydrology have been examined using the methodology listed below and documented on Corps' wetland data sheets, when applicable.

3.2.1 Vegetation

Nearly 5,000 plant types in the United States may occur in wetlands. These plants, known as hydrophytic vegetation, are listed in regional publications of the U.S. Fish and Wildlife Service (USFWS). In general, hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during growing season. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Vegetation strata are sampled separately when evaluating indicators of hydrophytic vegetation. A stratum for sampling purposes is defined as having 5 percent or more total plant cover. The following vegetation strata are recommended for use across the Arid West:

- *Tree Stratum:* Consists of woody plants 3 inches or more in diameter at breast height (DBH);
- *Sapling/shrub stratum:* Consists of woody plants less than 3 inches in DBH, regardless of height;
- *Herb stratum:* Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size; and,
- *Woody vines:* Consists of all woody vines, regardless of size.

The following indicators are applied in the sequence presented. Hydrophytic vegetation is present if any of the indicators is satisfied.

Indicator 1 – Dominance Test

Cover of vegetation is estimated and is ranked according to their dominance. Species that contribute to a cumulative total of 50% of the total dominant coverage, plus any species that comprise at least 20% (also known as the "50/20 rule") of the total dominant coverage, are recorded on a wetland data sheet. Wetland indicator status is assigned to each species using *The List of Plant Species that Occur in Wetlands* (USFWS, 1988). If greater than 50% of the dominant species from all strata were Obligate, Facultative-wetland, or Facultative species, the criteria for wetland vegetation is considered to be met. Plant indicator status categories are described below:

- *Obligate Wetland (OBL):* Plants that occur almost always (estimated >99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated <1 percent) in non-wetlands (i.e., cattail or pickleweed);

- *Facultative Wetland (FACW):* Plants that occur usually (estimated >67 to 99 percent) in wetlands, but also occur (estimated 1 to 33 percent) in non-wetlands (i.e., mulefat or willow);

- *Facultative (FAC):* Plants with similar likelihood (estimated 33 to 67 percent) of occurring in both wetlands and non-wetlands;

- *Facultative Upland (FACU):* Plants that occur sometimes (estimated 1 to <33 percent) in wetlands, but occur more often (estimated >67 to 99 percent) in non-wetlands; and,

- *Obligate Upland (UPL):* Plants that occur rarely (estimated 1 percent) in wetlands, but occur almost always (estimated >99 percent) in non-wetlands under natural conditions.

Indicator 2 – Prevalence Index

The prevalence index is used to determine whether hydrophytic vegetation is present on sites where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test. The prevalence index takes in consideration all plant species in the community, not just a few dominants. The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot, where each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and weighing is abundance (percent cover). Hydrophytic vegetation is present if the prevalence index is 3.0 or less.

Indicator 3 – Plant Morphological Adaptations

Plant morphological adaptations can be used to distinguish certain wetland plant communities in the Arid West, when indicators of hydric soil and wetland hydrology are present. Some hydrophytes develop easily recognized physical characters, or morphological adaptations, when they occur in wetland areas. Common morphological adaptations include, but are not necessarily limited to, adventitious roots and shallow root systems developed on or near the soil surface. To apply this indicator, these morphological features must be observed on more than 50 percent of the individuals of a FACU species living in an area where indicators of hydric soil and wetland hydrology are present.

3.2.2 Hydrology

Wetland hydrology indicators are presented in four (4) groups, which include:

Group A – Observation of Surface Water or Saturated Soils

Group A is based on the direct observation of surface water or groundwater during the site visit.

Group B – Evidence of Recent Inundation

Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features.

Group C – Evidence of Recent Soil Saturation

Group C consists of indirect evidence that the soil was saturated recently. Some of these indicators, such as oxidized rhizopheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period.

Group D – Evidence from Other Site Conditions or Data

Group D consists of vegetation and soil features that indicate contemporary rather than historical wet conditions, and include shallow aquitard and the FAC-neutral test.

If wetland vegetation criteria is met, the presence of wetland hydrology is evaluated at each transect by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pits. The lateral extent of the hydrology indicators are used as a guide for locating soil pits for evaluation of hydric soils and jurisdictional areas. In portions of the stream where the flow is divided by multiple channels with intermediate sand bars, the entire area between the channels is considered within the OHWM and the wetland hydrology indicator is considered met for the entire area.

3.2.3 Soils

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper 16 inches.[5] The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently

[5] According to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008), growing season dates are determined through on-site observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature.

wet because of artificial measures are included in the concept of hydric soils. It should also be noted that the limits of wetland hydrology indicators are used as a guide for locating soil pits. If any hydric soil features are located, progressive pits are dug moving laterally away from the active channel until hydric features are no longer present within the top 16 inches of the soil profile.

Once in the field, soil characteristics are verified by digging soil pits along each transect to a depth of at least 16 inches; in areas of high sediment deposition, soil pit depth may be increased. Soil pit locations are usually placed within the drainage invert or within adjoining vegetation. At each soil pit, the soil texture and color are recorded by comparison with standard plates within a *Munsell Soil Chart* (1994). Munsell Soil Charts aid in designating color labels to soils, based by degrees of three simple variables – hue, value, and chroma. Any indicators of hydric soils, such as organic accumulation, iron reduction, translocation, and accumulation, and sulfate reduction, are also recorded.

Hydric soil indicators are present in three (3) groups, which include:

All Soils

"All soils" refers to soils with any United States Department of Agriculture (USDA) soil texture. Hydric soil indicators within this group include histosol, histic epipedon, black histic, hydrogen sulfide, stratified layers, 1 cm muck, depleted below dark surface, and thick dark surface.

Sandy Soils

"Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Hydric soil indicators within this group include sandy mucky mineral, sandy gleyed matrix, sandy redox, and stripped matrix.

Loamy and Clayey Soils

"Loamy and clayey soils" refers to soil materials with a USDA soil texture of loamy very fine sand and finer. Hydric soil indicators within this group include loamy mucky mineral, loamy gleyed matrix, depleted matrix, redox dark surface, depleted dark surface, redox depressions, and vernal pools.

3.3 SWANCC WATERS

The term "isolated waters" is generally applied to waters/wetlands that are not connected by surface water to a river, lake, ocean, or other body of water. In the presence of isolated conditions, the Regional Board and Fish & Game take jurisdiction through the application of the OHWM/streambed and/or the 3-parameter wetland methodology utilized by the Corps.

3.4 RAPANOS WATERS

The Corps will assert jurisdiction over non-navigable, not relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a significant nexus to a TNW. The flow characteristics and functions of the tributary itself, in combination with the functions performed by any wetlands adjacent to the tributary, determine if these waters/wetlands significantly affect the chemical, physical, and biological integrity of the TNWs. Factors considered in the significant nexus evaluation include:

(1) The consideration of hydrologic factors including, but not limited to, the following:

- volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary
- proximity to the TNW
- size of the watershed average annual rainfall
- average annual winter snow pack

(2) The consideration of ecologic factors including, but not limited to, the following:

- the ability for tributaries to carry pollutants and flood waters to TNWs
- the ability of a tributary to provide aquatic habitat that supports a TNW
- the ability of wetlands to trap and filter pollutants or store flood waters
- maintenance of water quality

Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) and ditches (including roadside ditches) excavated wholly in, and draining only, uplands and that do not carry a relatively permanent flow of water, are generally not considered jurisdictional waters.

In the presence of Rapanos drainage conditions, the Regional Board and Fish & Game take jurisdiction via the OHWM and/or the 3-parameter wetland methodology utilized by the Corps.

Section 4 Literature Review

Review of relevant literature and materials often aids in preliminarily identifying areas that may fall under an agency's jurisdiction. A summary of RBF's literature review is provided below (refer to Section 8.0 for a complete list of references used during the course of this delineation):

4.1 WATERSHED REVIEW

The project is located within the Mojave River watershed (HUC 18090208). The Mojave River Watershed encompasses approximately 4,500 square miles and is located entirely within San Bernardino County. The primary geographic and surface hydrologic feature of the watershed is the Mojave River. Elevations within the watershed range from 8,500 feet above sea level at Butler Peak in the San Bernardino Mountains to 1,400 feet above sea level at Afton Canyon near the terminus of the Mojave River. The annual rainfall in the region is about 3.9 inches and humidity is low throughout the year.

The headwaters of the Mojave River are in the San Bernardino Mountains, which annually receive greater than 40 inches of precipitation at the highest elevations. The Mojave River channel transects the watershed for approximately 120 miles until it reaches Silver Dry Lake near the community of Baker. Some reaches of the Mojave River flow underground in the confined riverbed channel. The Mojave River channel is typically dry downstream of the Mojave Forks Dam. Water quickly percolates into the porous sands of the Mojave River bed.

The Mojave River Watershed is divided into five sub-basins based on hydrologic features: (1) Headwaters – tributaries above the Mojave Forks Dam; (2) Upper Basin - Mojave Forks Dam to the Lower Narrows at Victorville; (3) Middle Basin - Lower Narrows to the Waterman Fault at Barstow; (4) Lower Basin - Waterman Fault to Afton Canyon; and (5) Tailwater - Afton Canyon to Silver Lake. The sub-basins include an aquifer system consisting of two interconnected aquifers – floodplain aquifer and regional aquifer. The floodplain aquifer is composed of sand and gravel, which is as much as 250 feet thick, and generally follows the surface expression of the Mojave River. The regional aquifer, which is composed of sand, silt and clay, generally underlies and surrounds the floodplain aquifer.

4.2 LOCAL CLIMATE

The local climatic conditions in the project site area are characterized by hot summers, mild winters, infrequent rainfall, and dry humidity. Rainfall in the project site area averages 5.5 inches per year. July is the warmest month, with daily average temperatures of 79 degrees Fahrenheit. January is the coolest month, with daily average temperatures of 44 degrees Fahrenheit (refer to Table 1, Climate Summary).

Table 1. Climate Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	58.7	62.1	67.0	74.1	82.5	91.6	98.3	97.1	91.1	80.2	67.4	59.4	**77.5**
Average Min. Temperature (F)	29.8	33.1	36.6	41.5	47.7	54.2	60.8	60.0	53.9	44.3	34.5	29.2	**43.8**
Average Total Precipitation (in.)	0.96	1.06	0.82	0.36	0.13	0.04	0.13	0.20	0.24	0.32	0.50	0.80	**5.56**
Average Total Snowfall (in.)	0.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	**1.4**

Source: *Western Regional Climate Center, Victorville, CA,* Period of Record: 1/1/1917 to 7/31/2009

4.3 USGS TOPOGRAPHIC QUADRANGLE

The USGS 7.5 Minute Series Topographic Quadrangle maps show geological formations and their characteristics, describing the physical setting of an area through contour lines and major surface features including lakes, rivers, streams, buildings, landmarks, and other factors that may fall under an agency's jurisdiction. Additionally, the maps depict topography through color and contour lines, which are helpful in determining elevations and latitude and longitude within a project site.

Most topographic maps are made from aerial photos and, due to errors in photo interpretation, some streams which should be shown as "blue-line" or "dashed blue-line" are not shown. Even the most detailed topographic maps (7.5 minute) do not show all streams. Drainages and wetlands do not need to be labeled on USGS maps in order to be jurisdictional.

The project site is located within Township 4 north, Range 3 west, Sections 17 and 20, SBBM of the USGS *Apple Valley South, California* quadrangle. On-site topography ranges from approximately 2,880 to 2,920 feet above mean sea level, and slopes to the northeast. The project site appears to be mainly vacant, with one (1) unimproved roadway and two (2) structures in the northern portion. One (1) blue line stream is noted traversing the center of the project site from south to north. The blue line stream appears to terminate off-site prior to entering any downstream tributaries. No additional on-site pits, ponds, or lagoons are noted on the topographic map.

4.4 AERIAL PHOTOGRAPH

Prior to the July 6, 2010 field visit, RBF reviewed an existing aerial photograph, provided by Eagle Aerial Imaging for the project site. Aerial photographs can be useful during the

delineation process, as the photographs often indicate drainages and vegetation (i.e., riparian vegetation) present within the boundaries of the project site (if any). According to the aerial photograph, the project site is primarily undeveloped and vacant. One (1) structure and an unimproved road are noted on-site in the northern portion. The majority of the southern portion of the project site appears to be unvegetated, with the exception of the southeastern corner, which appears to contain desert scrub and yucca. No drainage features are visible on the aerial photograph.

4.5 SOIL SURVEY

On-site and adjoining soils were researched prior to the field visits using the U.S. Department of Agriculture, Soil Conservation Service, Soil Survey, San Bernardino County, California, Mojave River Area. The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. Soil surveys furnish soil maps and interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research, and disseminating the results of the research. In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color).

According to the Soil Survey, the proposed project site is situated on the Bryman-Helendale association. The Bryman-Helendale association consists of very deep, nearly level to strongly sloping, well drained soils on alluvial fans and terraces. One (1) soil series, with multiple phases, and one (1) soil complex are present within the project site and are briefly described below:

Cajon sand, 0 to 2 percent slopes (112): This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic material. Slopes are broad, long, smooth, and nearly level. Most areas are dissected by long, shallow, intermittent drainageways. The natural vegetation is mainly yucca, desert shrubs, grasses, and forbs. Typically, the surface layer and upper part of the underlying material are very pale brown sand about 7 inches thick. The next 18 inches of the underlying material is very pale brown sand. Permeability of this Cajon soil is rapid, runoff is slow, and hazard of water erosion is slight. Available water capacity is low. The effective rooting depth is 60 inches or more.

Cajon sand, 2 to 9 percent slopes (113): This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic material. Slopes are broad, long, smooth, and gently sloping. Most areas are dissected by long, shallow, intermittent drainageways. The natural vegetation is mainly yucca, desert shrubs,

grasses, and forbs. Typically, the surface layer is very pale brown sand about 6 inches thick. The upper 19 inches of the underlying material is very pale brown sand. Permeability of this Cajon soil is rapid, runoff is slow, and hazard of water erosion is slight or moderate. Available water capacity is low. The effective rooting depth is 60 inches or more.

Cajon sand, 9 to 15 percent slopes (114): This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic material. Slopes are short, convex, and strongly sloping. Most areas are dissected by shallow intermittent drainageways. The natural vegetation is mainly yucca, desert shrubs, grasses, and forbs. Typically, the surface layer is very pale brown sand about 6 inches thick. The upper 36 inches of the underlying material is light yellowish brown sand. Permeability of this Cajon soil is rapid, runoff is slow, and hazard of water erosion is slight or moderate. Available water capacity is low. The effective rooting depth is 60 inches or more.

Cajon-Wasco, cool, complex, 2 to 9 percent slopes (119): This map unit is on alluvial fans. Most areas are dissected by moderately deep intermittent drainageways. The natural vegetation is mainly yucca, desert shrubs, grasses, and forbs. This unit is 65 percent Cajon sand and 30 percent Wasco sandy loam. Cajon and Wasco soils are on long and narrow alluvial fans. Slopes of the Cajon soil are convex and gently sloping or moderately sloping and range from 2 to 9 percent. Slopes of the Wasco soil are convex and gently sloping and range from 2 to 5 percent. Included in this unit are small areas of soils that have stones and boulders on the surface and are adjacent to intermittent drainageways.

According to the Soil Survey, the soil series present on the project site do not appear to have the potential to have hydric soil characteristics (refer to the Appendix for documentation).

4.6 HYDRIC SOILS LIST OF CALIFORNIA

RBF reviewed the Hydric Soils List of California, provided by the Natural Resources Conservation Service, in an effort to verify whether or not on-site soils are considered to be hydric. It should be noted that lists of hydric soils along with soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for on-site investigations. According to the list, none of the soil series on-site are considered hydric.

4.7 NATIONAL WETLANDS INVENTORY

RBF reviewed the U.S. Fish and Wildlife Service's National Wetland Inventory maps. No stream features or wetlands are noted on the project site (refer to the Appendix).

4.8 FLOOD ZONE

RBF searched the Federal Emergency Management Agency website for flood data for the project site. Based on the Flood Insurance Rate Map No. 06071C6515H, the project site is not located within the 100-year flood zone (refer to the Appendix).

Section 5 Site Conditions

RBF regulatory specialists Lauren See and Wesley Salter visited the project site from approximately 10:00 a.m. to 1:00 p.m. on July 6, 2010, to verify existing conditions and document potential jurisdictional areas. The temperature was approximately 91 degrees Fahrenheit. No rain events had occurred within seven (7) days of the site visit. RBF encountered no limitations during the site visit. Refer to Exhibit 4, *On-Site Photographs*, for representative photographs taken throughout the project site.

5.1 VEGETATION

The majority of the project site appears to have been cultivated in the past, with the exception of the southwest knoll which does not appear to have been tilled. The entire portion of the project site south of Ocotillo Way appears to have been recently grazed. Three plant communities are located on-site, which include Joshua Tree Woodland, Desert Dunes, and fallow Agricultural Land. No hydrophytic or riparian vegetation was noted on-site during the site visit.

5.2 HYDROLOGY

The project site is located less than a half-mile east of the Mojave River and drains to the northeast. While in the field, RBF staff identified culverts under the BNSF Railroad that provide drainage for the tracks. Although no water flow was observed during the site visit, it is assumed that water from the culverts drains through the southeast corner of the site and sheet flows across the fallow field. No evidence of an OHWM (i.e., drift/debris, erosional features, sediment deposits, etc.) was observed on-site.

5.3 SOILS

Due to the lack of hydrophytic vegetation and hydrology on-site, no soil pits were dug during the site visit. Soils on-site appeared to be very sandy and consistent with those mentioned in Section 4.5.

View looking north from Ocotillo Way at the northern portion of the project site.

View of the northeastern portion of the site looking south from Ocotillo Way.

View looking north from the southwest corner of the project site.

View of the southeastern portion of the project site.

Section 6 Findings

This delineation has been prepared for the County in order to delineate the Corps, Regional Board, and Fish & Game jurisdictional authority within the project site. This report presents RBF's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdictional boundaries within a project site/property.

6.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

6.1.1 Wetland Determination

As previously noted in Section 2.1, an area must exhibit all three (3) of the wetland parameters described in the Corps Regional Supplement to be considered a jurisdictional wetland. Based on the results of the field investigations, it was determined that no portion of the project site exhibited all three parameters; therefore, no Corps jurisdictional wetlands are located on-site.

6.1.2 Non-Wetland Determination

No evidence of an OHWM was noted within the boundaries of the project site; therefore, no Corps jurisdictional waters are located on-site.

6.2 REGIONAL WATER QUALITY CONTROL BOARD DETERMINATION

No isolated or Rapanos conditions were observed within the boundaries of the project site; therefore the Regional Board follows that of Corps jurisdiction.

6.3 CALIFORNIA DEPARTMENT OF FISH AND GAME DETERMINATION

No drainages/streambeds or riparian vegetation was noted within the boundaries of the project site; therefore, no Fish & Game jurisdictional streambeds are located on-site.

Section 7 Regulatory Approval Process

The following is a summary of the various permits, agreements, and certifications required before construction activities take place within the jurisdictional areas (if proposed).

7.1 U.S. ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into WoUS and wetlands pursuant to Section 404 of the CWA. Due to the lack of jurisdictional waters on-site, no Corps permit will be required prior to construction.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters under the Federal CWA and the California Porter-Cologne Water Quality Control Act. The Regional Board's jurisdiction extends to all waters of the State (including SWANCC and Rapanos conditions) and to all WoUS (including wetlands). Due to the lack of jurisdictional waters on-site, no Regional Board approval will be required prior to construction.

7.3 CALIFORNIA DEPARTMENT OF FISH AND GAME

The Fish & Game regulates impacts to rivers, streams, and lakes under the California Fish and Game Code. Due to the lack of jurisdictional streambeds or riparian vegetation on-site, a Fish & Game Agreement will not be required prior to construction.

7.4 GLOBAL RECOMMENDATIONS

It is highly recommended that the delineation be forwarded to each of the regulatory agencies for their concurrence. The concurrence/receipt would be valid up to five (5) years and would solidify findings noted within this report.

Section 8 References

The following resources were utilized during preparation of this Delineation of State and Federal Jurisdictional Waters:

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Western Regional Climate Center, Victorville, California (http://www.wrcc.dri.edu/summary/climsmla. html)

Appendix

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Bernardino County, California, Mojave River Area

Deep Creek Homes

July 7, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:7,210 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1,000 1,500

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:7,210 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 5, Sep 26, 2008

Date(s) aerial images were photographed: 6/18/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Bernardino County, California, Mojave River Area (CA671)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	12.7	5.5%
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	75.0	32.5%
114	CAJON SAND, 9 TO 15 PERCENT SLOPES	42.6	18.5%
119	CAJON-WASCO, COOL COMPLEX, 2 TO 9 PERCENT SLOPES*	100.5	43.5%
Totals for Area of Interest		**230.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino County, California, Mojave River Area

112—CAJON SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

Elevation: 1,800 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days

Map Unit Composition

Cajon and similar soils: 85 percent
Minor components: 15 percent

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R030XF012CA)

Typical profile

0 to 7 inches: Sand
7 to 25 inches: Sand
25 to 45 inches: Gravelly sand

Minor Components

Kimberlina

Percent of map unit: 5 percent

Helendale

Percent of map unit: 5 percent

Manet

Percent of map unit: 5 percent
Landform: Playas

113—CAJON SAND, 2 TO 9 PERCENT SLOPES

Map Unit Setting

Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 68 degrees F
Frost-free period: 180 to 290 days

Map Unit Composition

Cajon and similar soils: 85 percent
Minor components: 15 percent

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6e
Ecological site: Sandy (R030XF012CA)

Typical profile

0 to 6 inches: Sand
6 to 25 inches: Sand
25 to 60 inches: Stratified gravelly sand to sand, gravelly sand

Minor Components

Cajon, gravelly surface

Percent of map unit: 5 percent
Landform: Alluvial fans

Helendale
Percent of map unit: 5 percent
Landform: Alluvial fans

Kimberlina
Percent of map unit: 5 percent
Landform: Alluvial fans

114—CAJON SAND, 9 TO 15 PERCENT SLOPES

Map Unit Setting
Elevation: 1,800 to 4,000 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days

Map Unit Composition
Cajon, slope, and similar soils: 85 percent
Minor components: 15 percent

Description of Cajon, Slope

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Properties and qualities
Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.0 inches)

Interpretive groups
Land capability (nonirrigated): 7e
Ecological site: Sandy (R030XF012CA)

Typical profile
0 to 6 inches: Sand
6 to 42 inches: Sand
42 to 60 inches: Gravelly sand

Minor Components

Arizo
Percent of map unit: 5 percent

Cajon, gravelly surface
Percent of map unit: 5 percent

Cajon, steep
Percent of map unit: 5 percent

119—CAJON-WASCO, COOL COMPLEX, 2 TO 9 PERCENT SLOPES*

Map Unit Setting
Elevation: 2,300 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days

Map Unit Composition
Cajon and similar soils: 65 percent
Wasco, gravelly, and similar soils: 30 percent
Minor components: 5 percent

Description of Cajon

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Properties and qualities
Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R030XF012CA)

Typical profile

0 to 8 inches: Sand
8 to 60 inches: Sand

Description of Wasco, Gravelly

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: COARSE LOAMY (R030XF003CA)

Typical profile

0 to 7 inches: Sandy loam
7 to 60 inches: Sandy loam

Minor Components

Cajon, sloping

Percent of map unit: 2 percent

Wasco

Percent of map unit: 2 percent

Riverwash

Percent of map unit: 1 percent
Landform: Channels

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U.S. Fish and Wildlife Service
National Wetlands Inventory

Deep Creek Homes

Jul 8, 2010

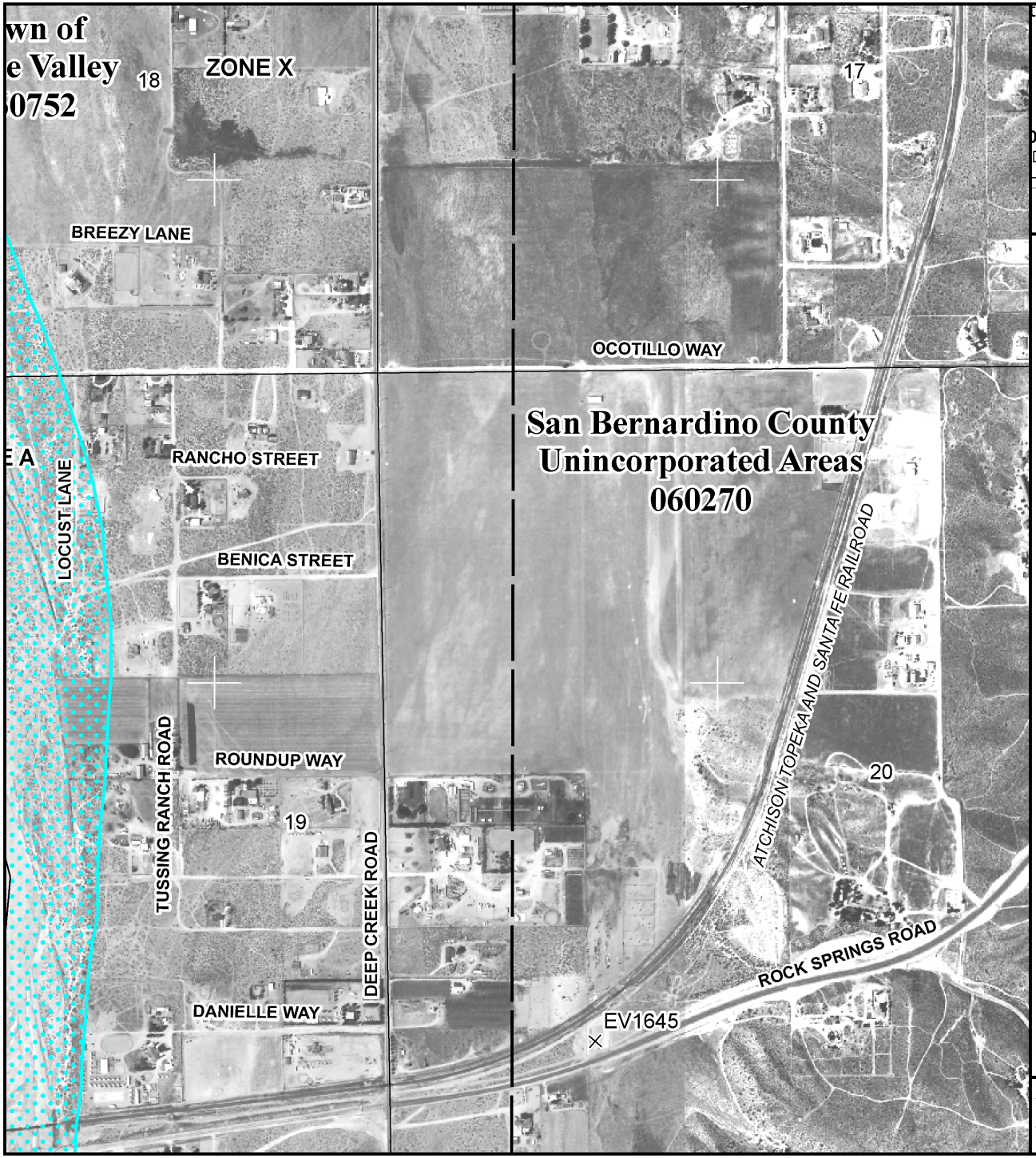
Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deetwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

User Remarks:



tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

00 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 6515H

FIRM

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 6515 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
APPLE VALLEY, TOWN OF	060752	6515	H
HESPERIA, CITY OF	060733	6515	H
SAN BERNARDINO COUNTY	060270	6515	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06071C6515H

MAP REVISED
AUGUST 28, 2008

Federal Emergency Management Agency