

**DOCKET****08-AFC-13**DATE SEP 17 2010RECD. SEP 17 2010

## STATE OF CALIFORNIA

Energy Resources Conservation  
and Development Commission

In the Matter of:

The Application for Certification for the  
Calico Solar Project

Docket No. 08-AFC-13

**INTERVENOR DEFENDERS OF WILDLIFE****ADDITIONAL WRITTEN TESTIMONY ON APPLICANT'S PROPOSED  
PROJECT BOUNDARY MODIFICATIONS**

September 17, 2010

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STATE OF CALIFORNIA

Energy Resources Conservation  
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In the Matter of:

Docket No. 08-AFC-13

The Application for Certification for the  
Calico Solar Project

Pursuant to the Committee's scheduling order dated September 10, 2010, Defenders of Wildlife provides the following written testimony for the proposed Calico Solar Project evidentiary hearings scheduled for September 20, 2010. The foregoing testimony concerns the Biological Resources topic area.

Defenders of Wildlife reserves the right to supplement or revise its testimony at any time up to and including the close of the evidentiary hearings.

**TESTIMONY OF JEFF AARDAHL**

To the best of my knowledge, all of the facts contained in this testimony (including all referenced documents) are true and correct. I am personally familiar with the facts and conclusions described within this testimony and if called as a witness, I could testify competently thereto.

**Qualifications**

I have an Associate degree in Forestry from Pasadena City College and a Bachelor of Science degree in Wildlife Management from Humboldt State University, California. From approximately 1974 through 2005 I was employed by the Bureau of Land Management and held several positions including wildlife management biologist, environmental coordinator, and supervisory resources management specialist. During the period from 1989 through 1995, I was the Resources Management Division Chief in Death Valley National Park; and from 1997 through 2000, I was a wildlife biologist in the Washington, D.C. headquarters of the Bureau of Land Management. I retired from the Bureau of Land Management in 2005, and have been employed by Defenders of Wildlife as a California Representative since 2009.

During my career with the Bureau of Land Management (BLM) I was involved in the following activities involving the Desert Tortoise:

- Conducted several dozen relative density survey transects throughout the western and eastern Mojave Desert.
- Assisted in preparing the wildlife element of the California Desert Conservation Area Plan of 1980 (CDCA Plan).
- Prepared and implemented the management plan for the Desert Tortoise Natural Area located in the western Mojave Desert near the Rand Mountains and Fremont Valley.
- Analyzed several hundred multiple land use project proposals and prepared environmental impact assessments and recommended mitigation measures.
- Analyzed proposed amendments to the CDCA Plan and prepared environmental impact assessments and recommended mitigation measures.

I have visited the site of the proposed Calico Solar Project several times during 2009 and 2010 for the purpose of examining the quality of the habitat, searching for Desert Tortoises and their burrow and shelter sites, Bighorn Sheep and their sign, and assessing potential habitat connectivity and wildlife movement patterns.

### **Statement**

I have reviewed all of the biological resources related documents for the proposed Calico Solar Project posted on the California Energy website that pertain to the purpose of this hearing, which is to provide the Committee with evidence and hear additional argument regarding the Reduced Project Boundary Scenarios submitted by the applicant on September 8, 2010 and as further modified and filed on Friday, September 10, 2010.

Based on my review of the documents noted above, I have the following concerns about the proposed project:

#### **1. The applicant's alternatives for revised project boundaries do not reduce or eliminate potential impacts to Desert Tortoise movements in a north-south orientation.**

The applicant has proposed six alternative project boundaries for the purpose of reducing impacts to Desert Tortoises and their habitat, which they do to varying degrees. Staff has yet to provide an analysis of the effects of the proposed alternatives. Even the most beneficial alternative, Number 6, does not alleviate impacts to wildlife movements in a north-south orientation.

Wildlife movements in the project area are constrained by the presence of both the Burlington-Northern Railroad and I-40, such movements are not precluded due to the presence of numerous drainage passages, as indicated in the Biological Assessment submitted to the U.S. Fish and Wildlife Service for the purpose of initiating consultation under the requirements of the Endangered Species Act. The following paragraph from the Biological Assessment describes wildlife movement pathways associated with the railroad and I-40:

“Generally, the project site and surrounding vicinity is unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with uniform habitat composition throughout the area. Movement in the east-west direction is currently unconstrained. The primary constraints to wildlife movement are in the north-south direction. The existing BNSF railroad and I-40 run east-west across the lower one-third of the bajada that contains the Project site. I-40 adjacent to the Project site is fenced; however, tortoise exclusion fencing is not used, allowing animals to potentially move across the freeway. The BNSF railroad is not fenced, although the railroad is elevated several feet above surrounding grade, creating constraints to wildlife movement, especially for smaller terrestrial species such as reptiles and small mammals. Although animals can choose to cross over these features at any point, the only safe locations for general wildlife movement across both these features are through existing culverts and railroad trestles (Figure 10). The majority of these features are large enough for large animals to pass through, with the exception of a series of small pipes that run under I-40 at the far southwestern corner of the Project site. Regardless of the few culverts and bridges, north-south wildlife movement is greatly restricted by these existing landscape features.” Biological Assessment, dated 4/1/2010, page 3-3.”

The Biological Assessment also addresses “Constriction of Movement Corridors” and describes such corridors: “Movement corridors are not necessarily areas where animals spend most of their time (preferred habitat), but are merely areas that they periodically used to move between areas of preferred habitat.” Biological Assessment, dated 4/1/2010, page 4-2.

The area located between the railroad and I-40 contains approximately 2,140 acres of habitat suitable for the Desert Tortoise, but it is generally occupied at very low density. Staff describes this area as follows: “The area between the BNSF railroad and I-40 is isolated by the highway and railroad and portions of the site have been subject to repeated disturbance from pipeline development. Nonetheless, two tortoises were detected in this area and tortoise sign was observed in low density near the center of this area by staff and the applicant. While the railroad poses a substantial barrier to movement, access is available through the many railroad trestles that span the drainages that flow across the site.” Supplemental Staff Assessment, July 2010, page C.2-33. The area located between the railroad and I-40 contains 31 Desert Tortoise burrows; four in good condition but currently used, 23 in a deteriorated condition with no indication of current use, and four in deteriorated condition that may have been Desert Tortoise burrows. Supplemental Biological Assessment, dated July 19, 2010, page 4-3; Figure 8, Supplemental Biological Assessment, dated 7/19/2010.

Desert Tortoise barrier fencing is proposed for the three sides of the NAP 2 area, but staff concluded that habitat connectivity and movement pathways for Desert Tortoises would be provided by an adjacent and accessible culvert passing under I-40, provided the culvert area can be fenced to prevent animals from entering the highway. Supplemental Staff Assessment, page C.2-72. With this finding, staff concluded that Desert Tortoise movement under I-40 was probable and that it allowed for habitat connectivity to suitable habitat south of the highway. I photographed two culverts under I-40 during a visit to the project site and those photographs are included in this testimony (*See Exhibits 617 and 618*).



The issue of impacts to Desert Tortoise, habitat fragmentation and movements was addressed by the U.S. Fish and Wildlife Service (Service) for solar energy projects in the Harper Dry Lake area in a biological opinion issued in 1995. Due to concerns over habitat and population fragmentation that would result from Desert Tortoise barrier fencing along Harper Lake Road, the Service required that connectivity be maintained through culverts passing under the road. In December of 2003, a 36" diameter culvert was installed under Harper Lake Road to allow for Desert Tortoise movements. This culvert project was documented in the Spring 2004 edition of Tortoise Tracks, the newsletter of the Desert Tortoise Preserve Committee, Inc.

**2. Applicant's maps of the Reduced Project Boundary Scenarios do not reveal the actual number and location of the trestles under the railroad and the culverts and bridges under I-40.**

The applicant's proposed Reduced Project Boundary Scenarios are depicted on maps included in their proposal. Their maps indicate that three trestles occur under the railroad within the project area, whereas the Biological Assessment contains a map (Figure 10) that shows the location of seven trestles, all of which may provide opportunities for movement of Desert Tortoises in a north-south direction under the railroad. In addition to the trestles, the map also shows the location of three culverts under I-40 that would be isolated by the proposed alternatives, all of which could provide movements for wildlife, including the Desert Tortoise.

**3. Applicant's analysis of Reduced Project Boundary Scenarios does not accurately depict how many Desert Tortoises would be affected.**

The applicant's analysis of the number of Desert Tortoises affected by the various scenarios is based on the number observed during field surveys and does not account for the expected number based on application of the most recent population estimation formulas used by the U.S. Fish and Wildlife Service, Department of Fish and Game and Bureau of Land Management.

**4. A wildlife habitat connectivity and wildlife movements study needs to be conducted in order to adequately understand the potential impacts of the applicant's Reduced Project Boundary Scenarios on the Desert Tortoise and Desert Bighorn Sheep.**

The proposed project is located in a natural landscape area considered essential in maintaining habitat connectivity, as documented in the recent publication, "California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California" by Spencer, et al. 2010.<sup>1</sup> No habitat connectivity and wildlife movements study has been conducted during the environmental review of the proposed project. This is in contrast to the study performed for the proposed Palen solar project at the request of the Bureau of Land Management. The purpose of that study was to evaluate the potential effects of the proposed project on movement and habitat

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<sup>1</sup> Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

connectivity of large mammals, small mammals and reptiles, including the Desert Tortoise. The study was submitted to the California Energy Commission on 5/14/10 (*See exhibit 616*). For the Palen project study, the Bureau of Land Management requested that each of 24 crossings associated with I-10 from approximately Desert Center to Wiley Well, a distance of approximately 32 miles. A report of the survey findings was prepared and delivered to BLM on April 13, 2010.

The Calico project site has a greater diversity and abundance of Desert Tortoises and Desert Bighorn compared to the Palen site. Both sites are located near interstate highways containing bridges and culverts for drainage and vehicular access, and both are located in regions of the desert that contain large expanses of natural landscape that support wildlife populations and their natural movements. The proposed Calico project occurs in the center of a constricted habitat area that provides the only habitat linkage between the Bristol/Cady Mountains with those south of I-40 that include the Rodman, Newberry and Ord Mountains.

Given that a wildlife movement and habitat connectivity study was performed for the Palen project, a similar, if not more robust study, should be conducted as part of the analysis of the Calico project. Consistency in addressing biological resources issues associated with large-scale solar projects in the California Desert will facilitate better decisions through appropriate inventory, impact analysis, and the development of impact avoidance and minimization measures.

#### **5. Bighorn Sheep utilization of the proposed project areas and potential movements in a north-south orientation have not been adequately addressed as an issue.**

Desert Bighorn scat was detected in surveys by the applicant's consultant and documented in their field data sheets. The location was mapped by Mr. Cashen and submitted in his testimony for this hearing (*See Attachment A to Additional Rebuttal Testimony of Scott Cashen on Behalf of California Unions for Reliable Energy on the Applicant's Proposed Scenarios 5.5 and 6 for the Calico Solar Project*). The location of this scat, combined with that of a Desert Bighorn ram skeleton found during field surveys performed by the applicant's consultant (*See exhibit 619*), indicates that Desert Bighorn utilize the project area relatively farther south than the base of the Cady Mountains. Since Desert Bighorn rams are more likely than females to move between mountainous habitats, the presence of the ram skeleton and scat suggests the increased possibility that movements occur between the Cady Mountains and ranges to the south such as the Rodman, Newberry and Ord.

No studies of Desert Bighorn movements between the Cady, Rodman, Newberry and Ord Mountains have been conducted, and there are no radio-collared animals in these ranges that would facilitate such studies. The study conducted by Epps based on analysis of nuclear DNA obtained from scat was not suited to detecting low-level movements of Desert Bighorn between herds (John Wehausen, personal communication, 2010). Finally, without a study identifying each potential crossing under I-40, the CEC cannot make a conclusive determination about whether the proposed project will obstruct bighorn sheep movement corridors.

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In the Matter of:

Docket No. 08-AFC-13

The Application for Certification for the  
Calico Solar Project

INTERVENOR DEFENDERS OF WILDLIFE  
DECLARATION OF JEFF AARDAHL

I, Jeff Aardahl, declare as follows:

1. I hold the position of California Representative with Defenders of Wildlife.
2. I hold a Bachelor of Science degree in Biology. My relevant professional qualifications and experience are set forth in the attached testimony and are incorporated herein by reference.
3. I prepared the testimony attached hereto and incorporated herein by reference, relating to the biological resource impacts of the proposed Calico solar energy project.
4. It is my professional opinion that the attached testimony is true and accurate with respect to the issues that it addresses.
5. I am personally familiar with the facts and conclusions described within the attached testimony, and if called as a witness, I could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct and that this declaration was executed

At: Gualala, California

On: September 17, 2010

Signature:



### **DECLARATION OF SERVICE**

I, Joshua Basofin, declare that on September 17, 2010, I served and filed copies of the Attached Additional Written Testimony on Applicant's Proposed Project Boundary Modifications, updated exhibit list, and exhibits 616-619. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[www.energy.ca.gov/sitingcases/solarone]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

**(Check all that Apply)**

#### **FOR SERVICE TO ALL OTHER PARTIES:**

X sent electronically to all email addresses on the Proof of Service list;

\_\_\_ by personal delivery or by depositing in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

**AND**

X sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

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#### **CALIFORNIA ENERGY COMMISSION**

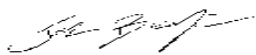
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I declare under penalty of perjury that the foregoing is true and correct.





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APPLICATION FOR CERTIFICATION

*For the CALICO SOLAR (Formerly SES Solar One)*

Docket No. 08-AFC-13

PROOF OF SERVICE  
(Revised 8/9/10)

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\*Indicates change

Exhibit	Brief Description	Offered	Admitted	CEC Use Only
600	Rebuttal Testimony of James M. Andre 7/29/2010			
601	Rebuttal Testimony of Jeff Aardahl 7/29/2010			
602	Revision of Disease Testing Requirements Based on Translocation Distance, Desert Tortoise Recovery Office 7/2010			
603	Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.			
604	Habitat Use and Food Preferences of the Desert Tortoise, <i>Gopherus agassizii</i> , in the Western Mojave Desert and Impacts of Off-Road Vehicles. Proceedings of the New York Turtle and Tortoise Society: Conservation, Restoration, and Management of Tortoises and turtles - An International Conference, pp. 42–45.			
605	Applicant's Responses to Defenders of Wildlife Data Requests Set 1. 12/4/2009			
606	Zitzer, S., King, J., and Etyemezian, V., 2008. <i>Unveiling the mysterious ecology of a rare relict Mojave Desert forb (Penstemon albomarginatus): Will ecological knowledge put a damper on exponential growth in Southern Nevada?</i> Report for 93 <sup>rd</sup> Ecological Society of American Annual Meeting.			
607	Mackay, P. White Paper on White-Margined Beardtongue, <i>Penstemon Albomarginatus</i>			
608	CPUC Phase I direct testimony of Dr. Barry Butler, CPUC Application 06-08-010 6/1/2007			
609	T. Mancini, P. Heller, B. Butler, B. Osborn, W. Schiel, V. Goldberg, R. Buck, R. Diver, C. Andracka, J. Moreno, <i>Dish-Stirling Systems: An Overview of Development and Status</i> ,			



	Journal of Solar Energy Engineering, Vol. 125, pp. 135-151, May 2003.			
610	Schwartz, O.A., V.C. Bleich, and S.A. Holl. 1986. Genetics and the conservation of mountain sheep <i>Ovis canadensis nelsoni</i> . Biol. Conserv. 37:179-190 .			
611	Epps, C. W., P. J. Palsbøll, J. D. Wehausen, G. K. Roderick, R. R. Ramey, D. R. McCullough, 2005. Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. Ecology Letters, (2005) 8: 1029–1038.			
612	Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon, pages 3-10.			
613	Abstracts, Thirty-fifth Annual Meeting and Symposium, The Desert Tortoise Council, February 25-28, 2010.			
614	Picture of Desert Tortoise observed on site by DOW staff.			
615	Bureau of Land Management, 2005. West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. California Desert District, Moreno Valley, CA. Page 2-116.			
616	Palen Connectivity Study for CEC			
617	Culvert Photograph #1			
618	Culvert Photograph #2			
619	Ram Skeleton Photograph			



# **Wildlife Movement and Desert Tortoise Habitat Connectivity**

**Palen Solar Power Project**

**Docket No. 09-AFC-7**

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May 14, 2010

Ms. Susan Sanders  
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**Subject: Wildlife Movement and Desert Tortoise Habitat Connectivity, Palen Solar Power Project (PSPP) Docket No. 09-AFC-7**

Dear Ms. Sanders:

The purpose of this letter is to present findings of surveys and analysis of wildlife movement along the Interstate 10 (I-10) corridor in the vicinity of the Palen Solar Power Project (PSPP or Project), and also to evaluate the potential effects of the PSPP on desert tortoise (*Gopherus agassizii*) movement and population connectivity. Mark Massar with the Bureau of Land Management (BLM) requested the wildlife movement analysis on March 25, 2010. Per the request of the BLM, AECOM, Inc. (AECOM) surveyed all potential wildlife underpasses on I-10 between the Desert Center exit to the west and the Wiley Wells Road exit to the east (32 miles). It was requested that each of these 24 crossings be evaluated in terms of suitability for use by different classes of wildlife (i.e., large mammal, small mammal, reptile). A memorandum summarizing the survey findings was prepared and delivered to BLM under separate cover on April 13, 2010. No comments have been received from BLM to date.

**Introduction**

The proposed PSPP is located approximately 10 miles east of Desert Center, and 0.5 mile north of the I-10 corridor in eastern Riverside County, California. The Project would be located within a 5,212-acre right-of-way (ROW) owned by the Federal government and administered by the BLM. Environmental analysis of the Project presented in the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) determined there would be adverse effects to wildlife movement and genetic connectivity, particularly to species with normal dispersal distances smaller than the area of the project, including desert tortoise.

**Methods**

Based on direction received from BLM, opportunities for wildlife species to cross under I-10 were inventoried along a 32-mile segment of the freeway running from Desert Center to Wiley Well (Figure 1). Underpasses were evaluated for potential wildlife use by AECOM wildlife biologists Dana Morin and Michael Anguiano on April 5, and April 6, 2010.

All potential underpasses were recorded using Geographical Positioning System (GPS) equipment. Each potential crossing was then accessed by hiking from truck trails south of I-10. The type of underpass (e.g., box culvert, bridge, etc.) was recorded and the four corners of each underpass structure were recorded with GPS. The length (distance from the southern approach to the northern approach) and width (distance between the walls of an

Ms. Susan Sanders  
May 14, 2010  
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underpass) were calculated using Geographical Information System (GIS) software. In addition, the minimum height of each underpass was measured. The minimum height was used because many crossings were over washes with a natural substrate bottom and height varied with erosion through the underpass. These measurements were used to calculate an openness ratio for each underpass ( $[\text{width} \times \text{height}] / \text{length}$ ). An openness ratio indicates the relative openness of a structure. Larger openness ratios are typically more conducive to wildlife use. Existing ROW fencing at each underpass was evaluated to determine if fencing along I-10 could prevent wildlife access to underpasses.

Photographs were taken at each underpass of the southern and northern approaches. All photographs taken are included in the attached CD. Any animal sign detected in the immediate vicinity of an approach or in an underpass was recorded and additional notes were taken if an approach would not be suitable for a specific wildlife species. Factors that may increase or restrict potential use of a wildlife underpass were also recorded. Examples of such factors would be presence of desert dandelion (*Malacothrix glabrata*), a known forage species for desert tortoise, or if there was evidence of human presence.

Vegetation cover was estimated for the southern approach, the middle of the crossing, and the northern approach. Surveys were conducted during spring when annual cover was high, but only perennial species were used to estimate cover. Cover was estimated visually using the following categories:

- Bare = 0%
- Sparse = 5% - 15%
- Moderate = 15% - 30%
- Medium = 30% - 60%
- Dense = 60% - 85%

Dominant perennial species were identified to genus and listed for the southern approach, middle of the crossing, and northern approach of each crossing.

## **Results**

The location of each underpass is shown in Figure 1. Variables for each underpass are listed in the GIS database included on the CD with this submittal. A total of 24 underpasses were surveyed over 30 miles along I-10. Twenty-one of the 24 underpasses are open span bridges with openings in the median and wash habitat throughout. Sizes of the open span bridges varied from 10.7 to 59.4 meters in width, 2.2 to 4.5 meters in height, and 56.7 to 97.8 meters in length. Openness ratio for the open span bridges varied from 0.5 to 3.4, all of which indicate potential use for all wildlife species in the area.

Overall, two types of fencing were present along the I-10 ROW: 5-strand barbed wire and fencing with square netting chicken wire (openings 6 inches by 6 inches) at the bottom and 2 to 3 strands of barbed wire from 1.5 meters to the top of the fence. Both fencing types were approximately 2 meters in height. At most underpasses fencing is either cut away for the

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width of the crossing or cut away for at least one 3-meter segment at each approach. In addition, the fencing is not suitable to prevent access to the roadway as wildlife can easily move over or under it and the fencing does not funnel wildlife to the underpass openings, but allows access to the roadway. In addition, fencing in the openings between spans is often missing or in disrepair and thus allows access to the median and roadway.

Wildlife species detected at the undercrossings included lizards, rodent (*Peromyscus* sp., *Dipodomys* sp., *Neotoma* sp.), rabbit (*Sylvilagus* sp.), roadrunner (*Geococcyx californianus*), ground squirrel (*Spermophilus* sp.), fox, and coyote (*Canis latrans*). Bobcat (*Lynx rufus*) and mule deer (*Odocoileus hemionus*) sign were detected to the south of several underpasses to the west of PSPP.

In general, the washes on the western side of the 32-mile survey segment have greater cover and diversity with more distinct hydrology than those to the east. The northern approaches to the east were often dominated by grasses and mustard species, providing little protection for wildlife. Dominant perennial plant species identified at underpasses includes cheesebush (*Hymenoclea salsola*), brickellbush (*Brickellia* sp.) scorpion weed (*Phacelia* sp.), *Psoralea* sp., cattle saltbush (*Atriplex polycarpa*), brittlebush (*Encelia farinosa*), white bursage (*Ambrosia dumosa*), creosote (*Larrea tridentata*), mesquite, ironwood (*Olneya tesota*), and palo verde.

Five underpasses (10, 11, 12, 13, and 14) were surveyed in the immediate vicinity of the PSPP (Figure 2). Figure 2 also includes the boundary of the proposed PSPP and the Reconfigured Alternative disturbance area and DT observations gathered during protocol surveys conducted by AECOM in 2009 and 2010. All five underpasses in the vicinity of the PSPP are open span bridges with openings in the median and wash habitat throughout.

Underpass 10 (Figure 1, Sheet 3) is located to the southwest of the PSPP. It is 3.0 meters in height, 30.1 meters wide, and 60.3 meters in length resulting in an openness ratio of 1.5, suitable for all wildlife species in the area. There is 5-strand barbed-wire fencing between spans on the median, but the fencing has been cut at either approach. In addition, the fencing is not suitable to prevent access to the roadway as wildlife can easily move over or under it. There is moderate vegetative cover in the wash to the south and between spans including *Psoralea* sp. and cheesebush (*Hymenoclea salsola*). Additionally, there is ironwood (*Olneya tesota*), mesquite (*Prosopis glandulosa*), and palo verde (*Cercidium floridum*) in the wash to the north. Coyote (*Canis latrans*) and rodent (*Peromyscus* sp.) tracks were found through the underpass.

Underpass 11 (Figure 1, Sheet 4) is located south of the PSPP. It is 3.3 meters in height, 24.3 meters wide, and 58.4 meters in length resulting in an openness ratio of 1.4, suitable for all wildlife species in the area. The 5-strand barbed-wire fencing has been cut at both approaches and is not suitable to prevent access to the roadway as wildlife can easily move over or under it. There is no ROW fence between spans, and the western side of the underpass between spans slopes gently up to the roadway, providing easy access to all wildlife species. The southern approach and area between the spans has dense vegetative

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cover including cheesebush, *Psoralea argemone* sp., creosote (*Larrea tridentata*), and palo verde. The northern approach to the wash has moderate vegetative cover including *Psoralea argemone* sp. cheesebush and ironwood. Coyote, rodent, rabbit (*Sylvilagus* sp.), lizard, and roadrunner (*Geococcyx californianus*) tracks were found through the underpass.

Underpass 12 (Figure 1, Sheet 4) is located to the south of the PSPP. It is 3.3 meters in height, 17.3 meters wide, and 57.8 meters in length resulting in an openness ratio of 1.0, suitable for all wildlife species in the area. The 5-strand barbed-wire fencing has been cut at either approach and is not suitable to prevent access to the roadway as wildlife can easily move over or under it. There is no ROW fence between spans. The southern approach contains moderate, diverse shrub cover including cheesebush, cattle saltbush (*Atriplex polycarpa*), and white bursage (*Ambrosia dumosa*). Between spans is sparsely vegetated with cheesebush and creosote and the northern approach has moderate cover including cheesebush and mesquite. Coyote, rodent, rabbit (*Sylvilagus* sp.), and lizard tracks were found through the underpass.

Underpass 13 (Figure 1, Sheet 5) is located to the southeast of the PSPP. It is 3.0 meters in height, 23.2 meters wide, and 56.9 meters in length resulting in an openness ratio of 1.2, suitable for all wildlife species in the area. The 5-strand barbed-wire fencing has been cut at either approach and is not suitable to prevent access to the roadway as wildlife can easily move over or under it. There is no ROW fence between spans. The southern approach contains moderate shrub cover including cheesebush, white bursage, and mesquite. There is sparse cover between spans including *Psoralea argemone* sp. and cheesebush. The northern approach is open with a few large *Psoralea argemone* sp. and mesquite. Coyote, rodent, rabbit, ground squirrel (*Ammospermophilus* sp.) and lizard tracks were found through the underpass.

Underpass 14 (Figure 1, Sheet 5) is located to the southeast of the PSPP beyond the eastern border of the Project footprint. The location of underpass 14 is in an area where the distance between the Palen Mountains and habitat to the south of I-10 is shortest, representing an area with a relatively high likelihood of movement between these areas. It is 4.5 meters in height, 10.7 meters wide, and 60.1 meters in length resulting in an openness ratio of 0.8, suitable for all wildlife species in the area. The 5-strand barbed-wire fencing extends across the southern approach but has been cut at the northern approach. The fencing is not suitable to prevent access to the roadway as wildlife can easily move over or under it. There is no ROW fence between spans. The southern approach contains moderate shrub cover including cheesebush and *Psoralea argemone* sp. The wash is bare and sandy between spans and the northern approach is open with a few large *Psoralea argemone* sp., palo verde and mesquite. Coyote, rodent, roadrunner, and lizard tracks were found through the underpass.

## **Conclusions**

While current underpasses are located at washes for hydrological reasons, all habitat to the north and south of I-10 is suitable for wildlife habitation and movement. Thus, these

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underpasses provide connectivity and safe movement corridors between the habitat to the north and south of the I-10 corridor. However, there is likely attempted movement in upland areas as well. Current fencing does not keep wildlife from accessing I-10 or funnel animals to the underpasses.

Implementation of the PSPP would not affect undercrossings in the project vicinity. All would remain open and DT could still cross under I-10. No evidence of DT use of the undercrossings was detected during the survey. There are 24 underpasses occurring along the existing washes in the 32-mile stretch between Wiley Wells Road and Desert Center that could facilitate movement of a migrating DT in a north-south direction (see Figure 1). Although DT are more likely to utilize movement corridors to the west and east of the PSPP (discussed in more detail below), the proposed DT-proof fencing along the perimeter of the solar fields, as required by conditions proposed in the SA/DEIS, could impede DT movement. The Applicant [therefore](#) proposes to install a large box culvert underneath the project access road to facilitate the movement of DT and other wildlife (see location on Figure 2). The culvert will connect the undercrossings south of the PSPP with open areas to the west.

The shortest distance between higher value habitat in the Palen and Chuckwalla Mountains is to the east of the Project disturbance area. Results of 2010 DT buffer surveys, which were conducted further east than in 2009 near the base of the Palen Mountains, suggest greater DT activity in this area as compared to the PSPP study area. Additionally, the shortest distance to higher value habitat likely near the Eagle and Coxcomb Mountains is west of the Project disturbance area. Underpasses to the west and east of the Project disturbance area would continue to facilitate movement to these areas despite project implementation (see Figure 1).

It was determined that there are many points along I-10 suitable for wildlife undercrossing, including by desert tortoise. The proposed PSPP would place a barrier a short distance north of two of these crossings. Examining these particular undercrossings in a regional context, however, suggests that they may be less important than other available undercrossings to the east and west of the PSPP. As was discussed in the draft SA/DEIS, the PSPP site is located on the margins of a sand transport zone. To the north of the site sand dunes occur with increasing frequency as a result of the northwest to southeast orientation of the sand transport system. Further north is the Palen Dry Lake which is inhospitable for tortoises. While desert tortoises will cross desert pavement and dunes, areas of heavy dune concentration and areas consisting purely of dunes offer little in the way of forage and make burrowing difficult. These areas are likely not a regular part of tortoises' home ranges.

The need to retain routes providing opportunities for movement of tortoises between populations south of I-10 and areas further north is understood. This movement, ultimately providing connection and exchange of genetic material between desert tortoise populations, would likely occur, assuming suitable climatic conditions, through the combination of juvenile dispersal and gradual northerly and/or southerly expansion of the home ranges of succeeding generations of tortoises. The placement of the PSPP does not block areas important for this home range expansion. Tortoises moving north from south of I-10 would

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confront an obstacle in the form of dunes and the Palen Dry Lake. The same features provide a barrier to tortoises moving south from northern portions of the Chuckwalla Valley. Tortoises seeking to establish new home ranges in this region would be forced into the bajada to the west of the proposed PSPP or to areas at the foot of the Palen Mountains to the east of the dunes. The placement of the PSPP, surrounded by tortoise fencing, simply places a more definitive barrier further south in an area that likely does not function as an effective desert tortoise movement corridor due to physiographic features. Additionally, the shortest distance between higher value habitat in the Palen and Chuckwalla Mountains is several miles to the east of the Project disturbance area. The shortest distance between the Chuckwalla Mountains to higher value habitat likely near the Eagle and Coxcomb Mountains is west of the Project disturbance area.

The placement of the PSPP north of I-10 will not significantly impact desert tortoise movement and population connectivity. Such movement, and the resultant connectivity, would occur via routes to the east and west of the PSPP due to the presence of extensive dune systems and Palen Dry Lake. Ample undercrossings (more than 20), completely unaffected by the proposed PSPP, exist to facilitate this movement across I-10. As an additional measure to facilitate desert tortoise movement, the applicant agrees to install a concrete box culvert under the access road leading to the site from the Corn Springs interchange (see Figure 2). This will prevent tortoises from becoming enclosed in an area bounded by the highway and the PSPP tortoise fence.

Sincerely,

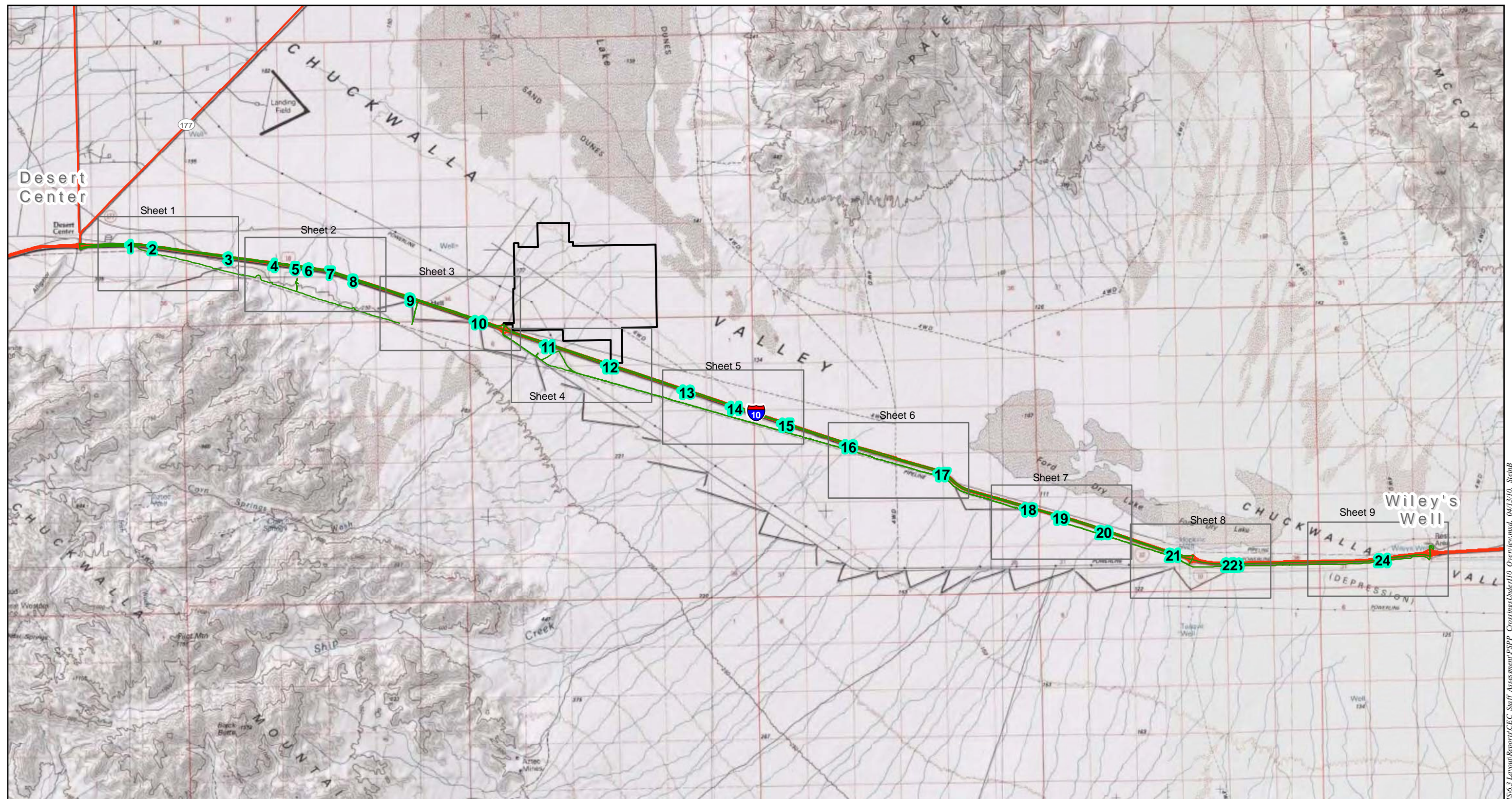


Mr. William Graham  
Principal  
AECOM

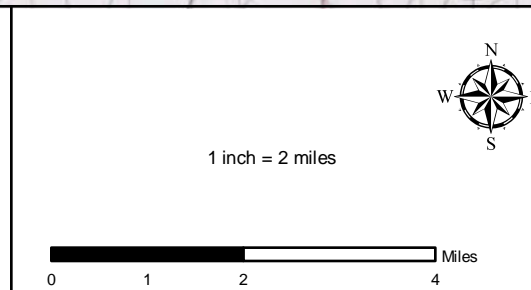
Enclosures: Figure 1. I-10 Wildlife Crossing Analysis in the Project Vicinity  
Figure 2. Desert Tortoise Observations and Wildlife Connectivity  
CD. Photos of underpasses, Shapefiles and Metadata

cc: Alan Solomon, CEC  
Larry LePre, Bureau of Land Management  
Alice Harron, Solar Millennium





- Legend**
- Project Disturbance Area
  - Access Routes
  - Crossings Under I-10
  - Map Extent
- Source: ESRI 2010; AECOM 2010



**Palen Solar Power Project**  
**Figure 1**  
**I-10 Wildlife Crossing Analysis**  
**in the Project Vicinity**

**AECOM**

Date: April 2010





Legend

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010

1 inch = 1,000 feet

Palen Solar Power Project  
Figure 1  
I-10 Wildlife Crossing Analysis  
in the Project Vicinity

Sheet 1

Date: April 2010

Path: P:\2009\09080081 Sol Mit Palen\6.0 GIS\6.3 Layout Reports\CEC\_Staff\_Assessment\PSP\_P\_CrossingsUnderI10\_Detail.mxd, 04/13/10, SteinB

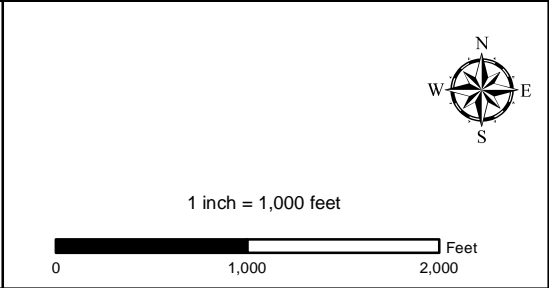




Legend

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010



**Palen Solar Power Project**  
**Figure 1**  
**I-10 Wildlife Crossing Analysis**  
**in the Project Vicinity**



Sheet 2

Date: April 2010





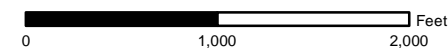
Legend
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-  Crossings Under I-10  
 Washes Within 500-feet of Crossing  
 Access Routes

Source: ESRI 2010; AECOM 2010



1 inch = 1,000 feet



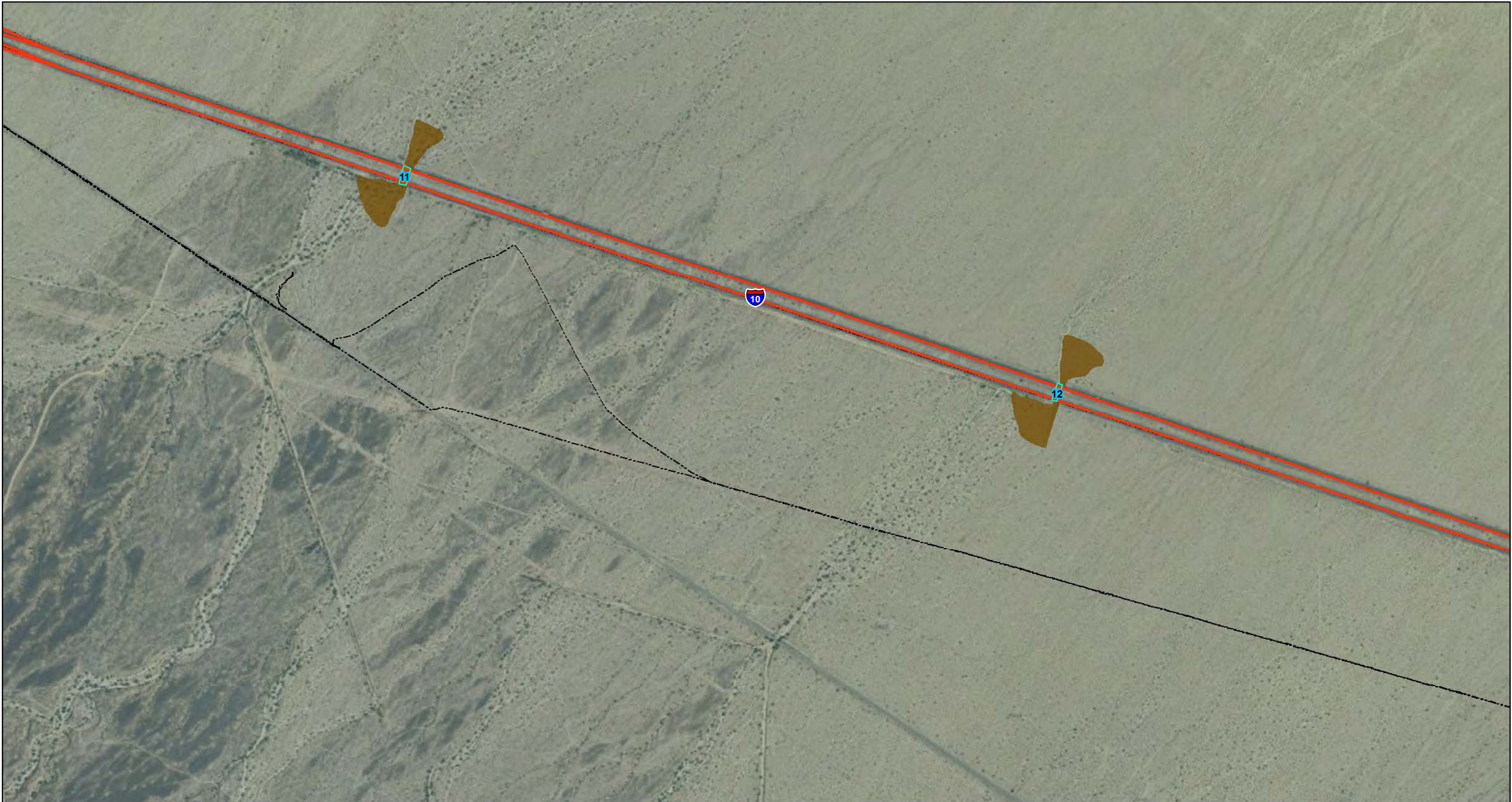
**Palen Solar Power Project  
Figure 1  
I-10 Wildlife Crossing Analysis  
in the Project Vicinity**

Sheet 3



Date: April 2010





**Legend**

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010

1 inch = 1,000 feet

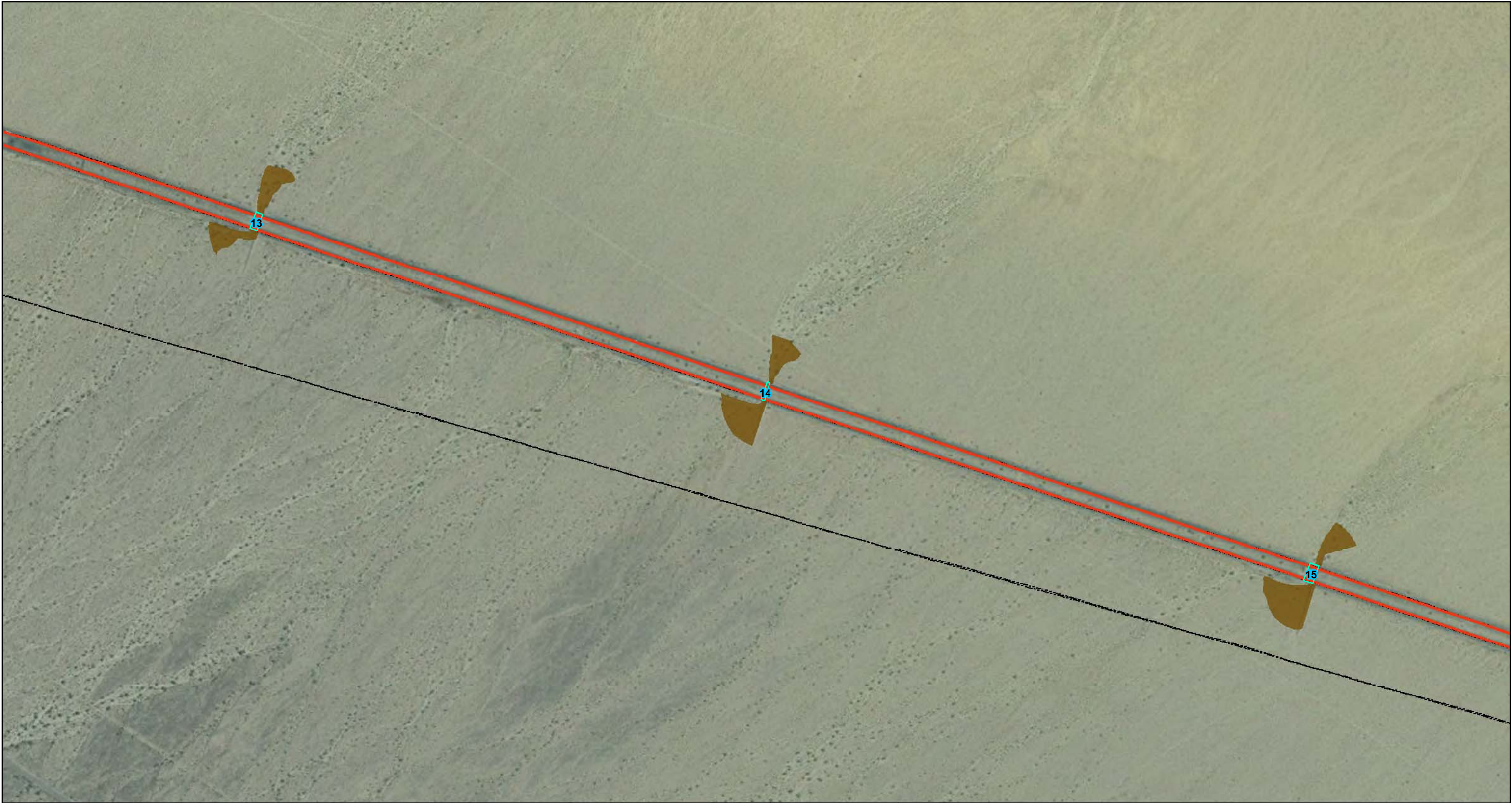
A scale bar showing distances in feet, with markings at 0, 1,000, and 2,000. Above the scale bar is a north arrow pointing towards the top of the page, with 'N' at the top, 'S' at the bottom, 'E' on the right, and 'W' on the left.

**Palen Solar Power Project**  
**Figure 1**  
**I-10 Wildlife Crossing Analysis**  
**in the Project Vicinity**

Sheet 4

Date: April 2010





**Legend**

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010

1 inch = 1,000 feet

0 1,000 2,000 Feet

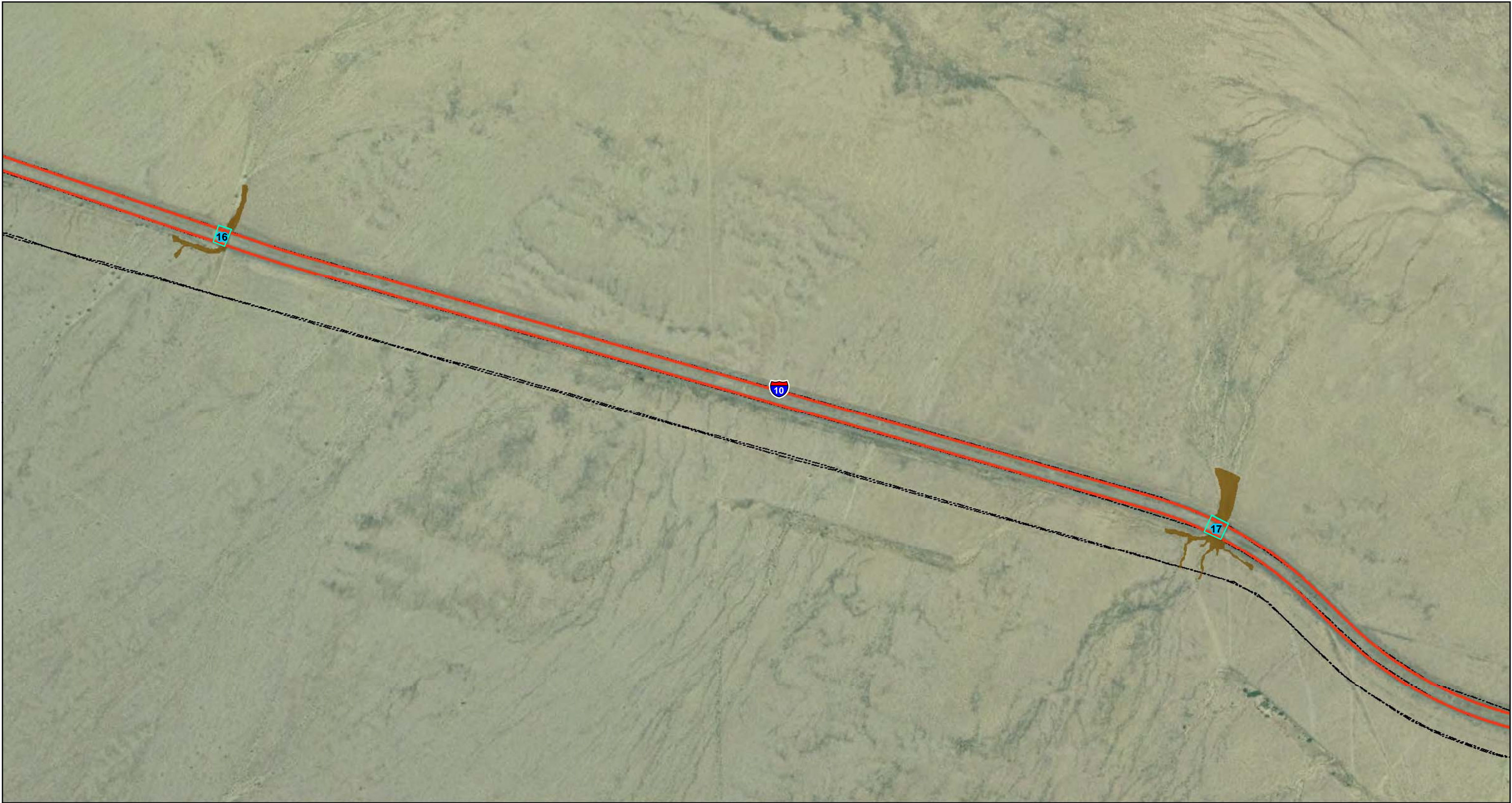
**Palen Solar Power Project**  
**Figure 1**  
**I-10 Wildlife Crossing Analysis**  
**in the Project Vicinity**

Sheet 5

**AECOM**

Date: April 2010

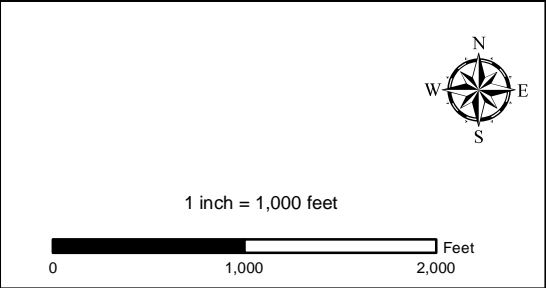




Legend

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010



Palen Solar Power Project  
Figure 1  
I-10 Wildlife Crossing Analysis  
in the Project Vicinity

Sheet 6

Date: April 2010





Legend

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010

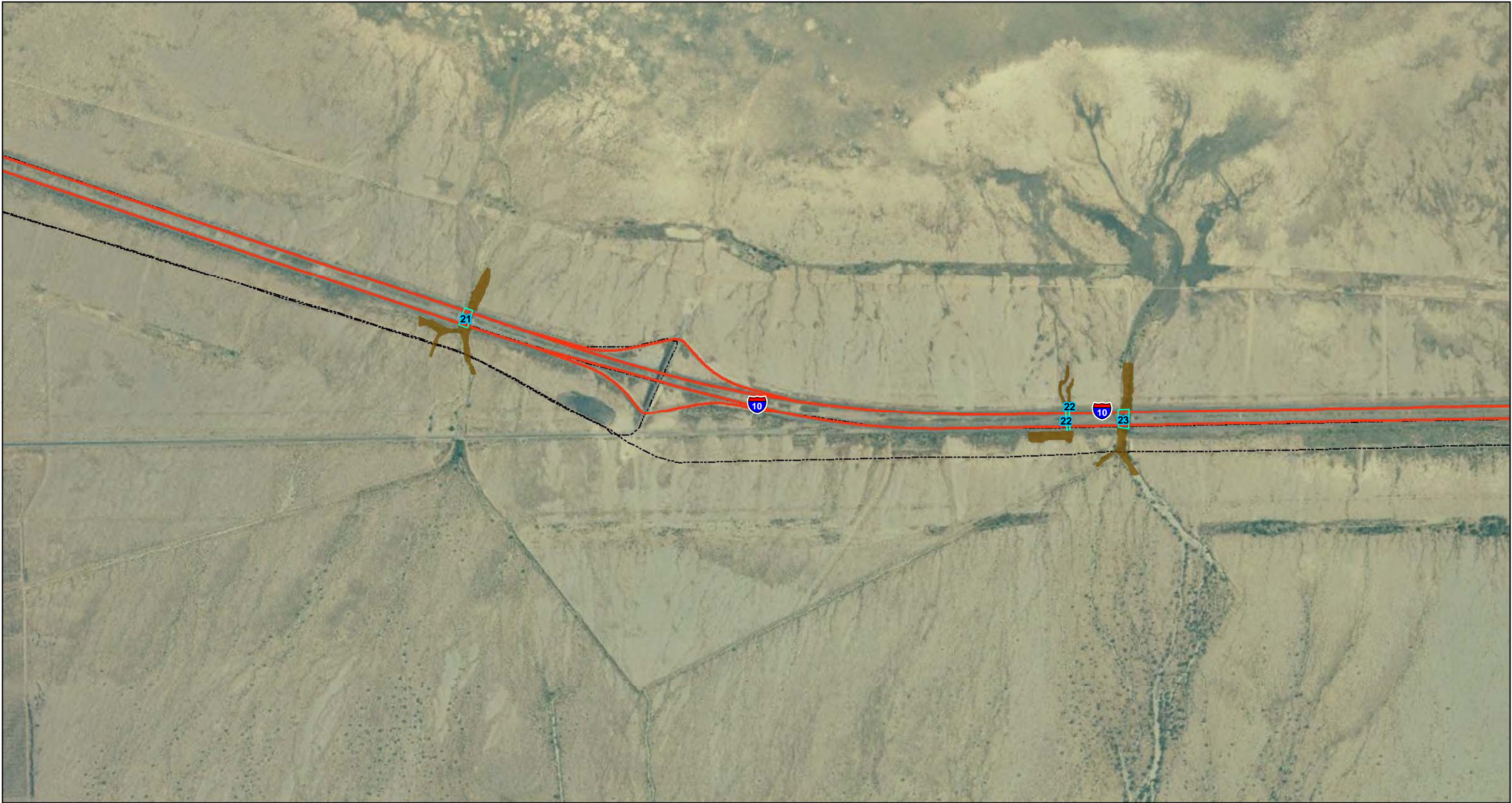
1 inch = 1,000 feet

Palen Solar Power Project  
Figure 1  
I-10 Wildlife Crossing Analysis  
in the Project Vicinity  
Sheet 7

**AECOM**

Date: April 2010

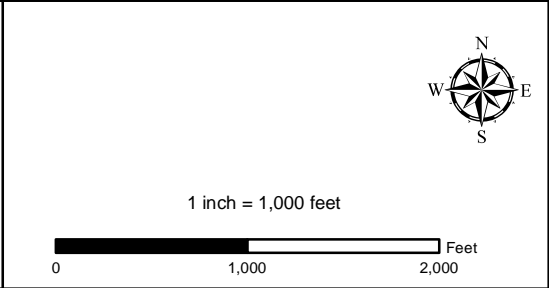




Legend

- Crossings Under I-10
- Washes Within 500-feet of Crossing
- Access Routes

Source: ESRI 2010; AECOM 2010



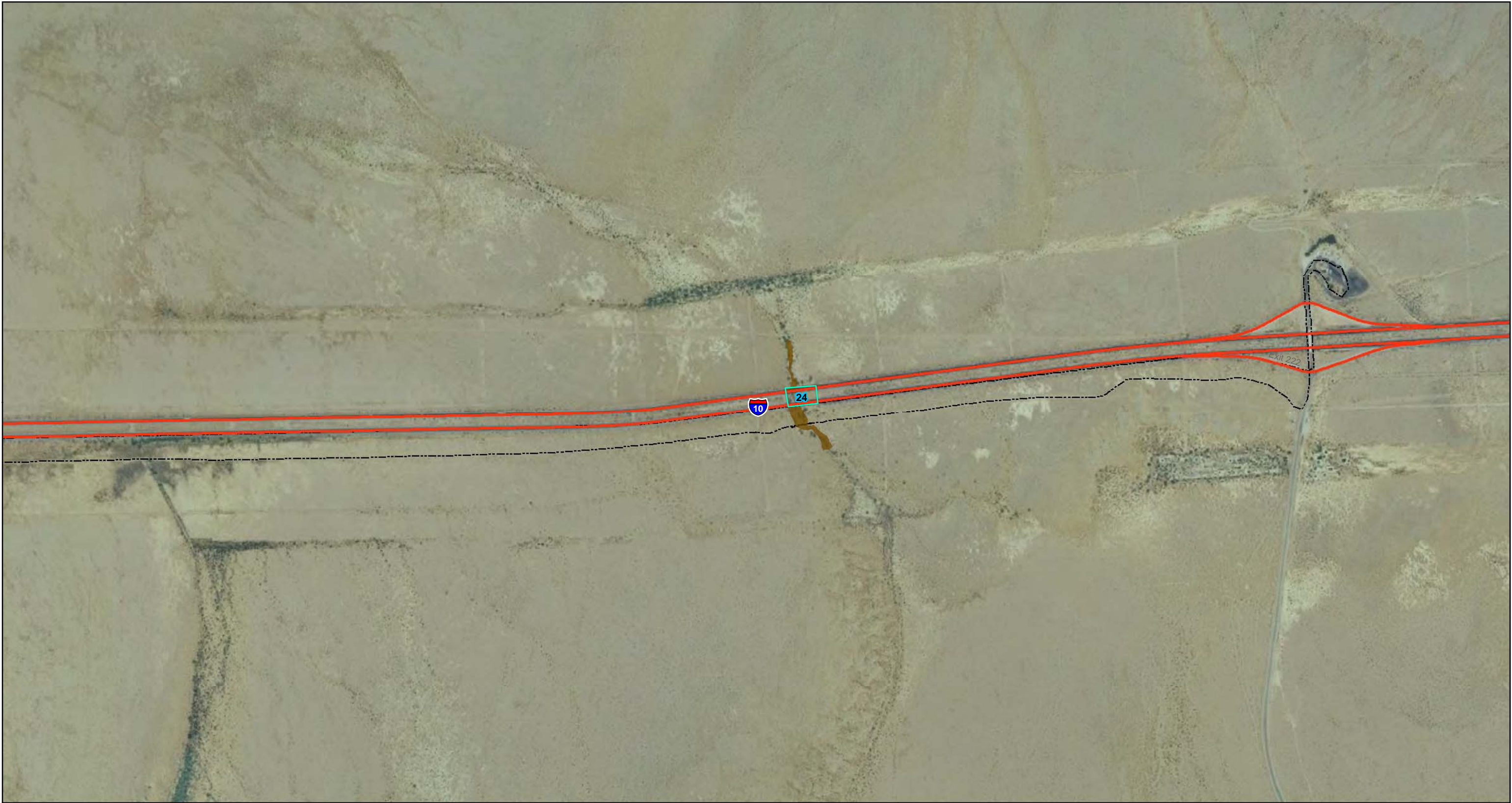
Palen Solar Power Project  
Figure 1  
I-10 Wildlife Crossing Analysis  
in the Project Vicinity

Sheet 8

**AECOM**

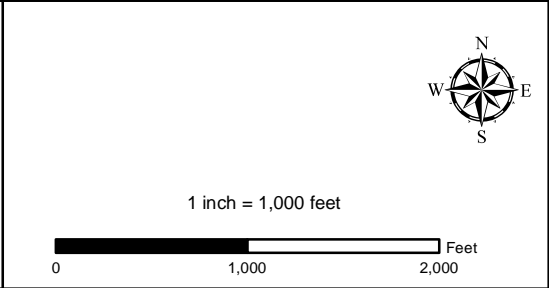
Date: April 2010





Legend	
	Crossings Under I-10
	Washes Within 500-feet of Crossing
	Access Routes

Source: ESRI 2010; AECOM 2010



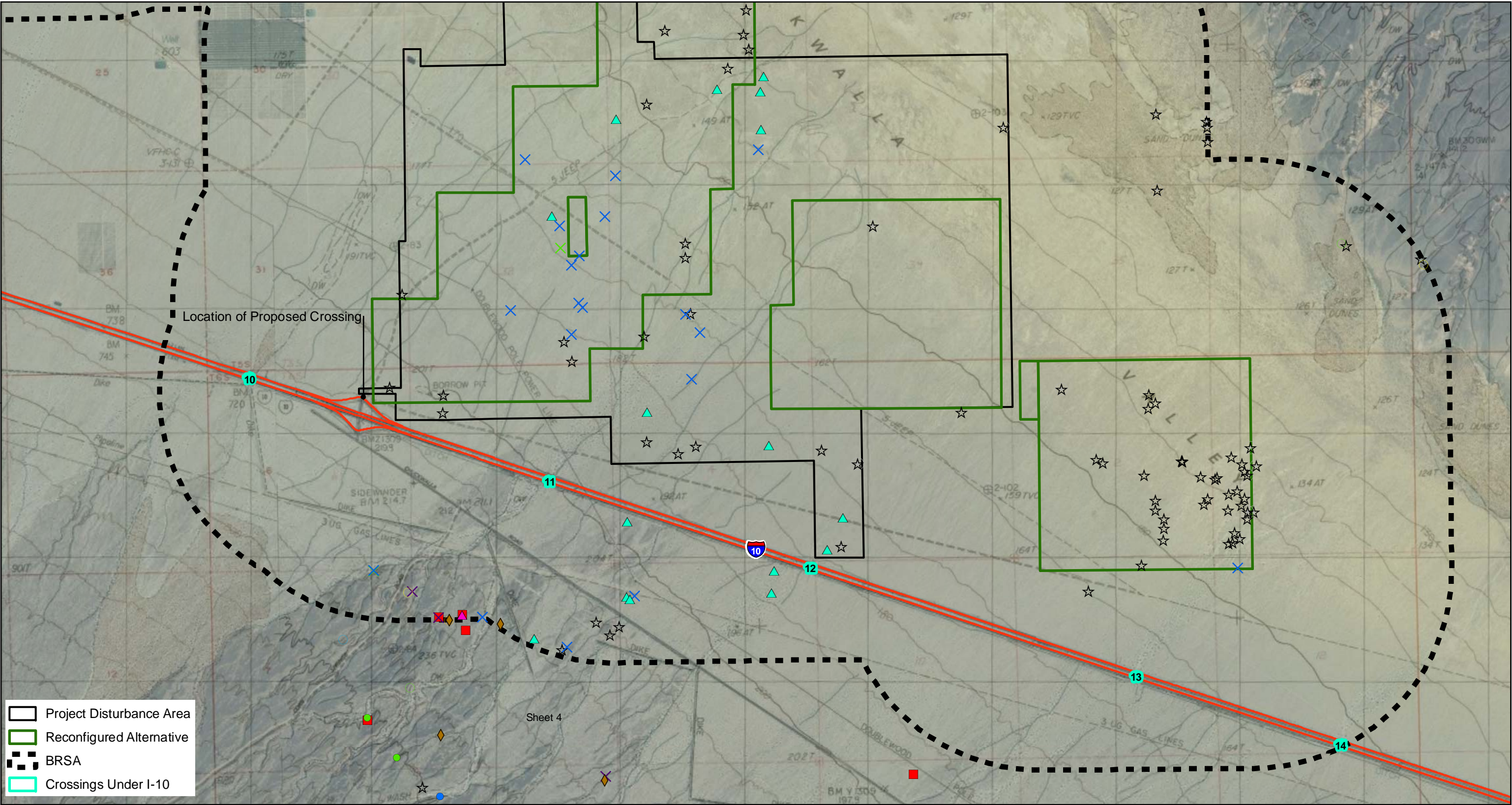
**Palen Solar Power Project**  
**Figure 1**  
**I-10 Wildlife Crossing Analysis**  
**in the Project Vicinity**

Sheet 9

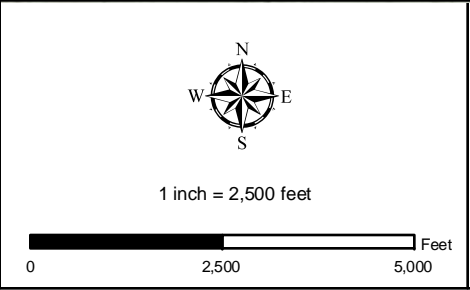
**AECOM**

Date: April 2010





Legend	
DETO Observations (as of May 11, 2010)	
■ Adult Tortoise	✕ Tortoise Burrow - Class 2
■ Juvenile Tortoise	✕ Tortoise Burrow - Class 3
✕ Tortoise Burrow (Active) - Class 1	✕ Tortoise Burrow - Class 4 or 5
	○ Tortoise Scat - Class 1
	○ Tortoise Scat - Class 2
	○ Tortoise Scat - Class 3
	○ Tortoise Scat - Class 4
	● Tortoise Carcass - Class 3
	● Tortoise Carcass - Class 4
	▲ Tortoise Pallet (Active) - Class 1
	▲ Tortoise Pallet - Class 4 or 5
	★ Tortoise Bone Fragment - Mineralized
	★ Tortoise Bone Fragment - Not Mineralized
	◆ Tortoise Tracks



**Palen Solar Power Project**

**Figure 2**

**Desert Tortoise Observations and Wildlife Connectivity**

**AECOM**

Date: May 2010









