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**WILLOW ROCK ENERGY STORAGE CENTER PROJECT
DESERT TORTOISE SURVEY**



UNINCORPORATED COMMUNITY OF ANSEL, KERN COUNTY, CALIFORNIA

Prepared for:

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January 2024

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1.0 INTRODUCTION

WSP USA Environment & Infrastructure Inc. (WSP) was contracted by GEM A-CAES LLC (GEM), a subsidiary of Hydrostor Inc. (Hydrostor), to conduct a focused survey for the desert tortoise (*Gopherus agassizii*) at the site of a proposed Willow Rock Energy Storage Center (project) in the unincorporated community of Ansel, Kern County, California. This report provides methods, results, and discussion of the survey. All figures referenced in this report are provided in Appendix A; photographs may be provided upon request.

1.1 Project Description

The proposed project includes the development of an energy storage facility (approximately 88 acres) and approximately 19 miles (287 acres) of electrical transmission right-of-way lines connecting to the existing Southern California Edison Whirlwind Substation. The total area, including the energy storage facility, transmission lines and their corridor (125-foot buffer), is approximately 375 acres and will be herein collectively referred to as the “WRESC or Action Area” unless otherwise specified. In general, GEM A-CAES LLC GEM proposes to construct and operate a 500-megawatt (MW) advanced compressed air energy storage (A-CAES) facility deploying Hydrostor proprietary A-CAES technology. The site will be designed to store 500 MW for up to 14 hours and deliver up to 4,000 megawatt hours (MWh) over an 8-hour period when discharging.

1.2 Project Location and Topography

The energy storage facility is located on private property in and around the rural community of Ansel, just north of State Route (SR) 138, south of SR 58, east of Highway 14, and west of Edwards Air Force Base (Figure 1, Regional Location). The transmission line alignment connects the energy storage facility to the Whirlwind Substation along existing road rights-of-way including Dawn Road, Mojave Tropico Road, Felsite Avenue, W 65th Street, and Rosamond Boulevard. Also included were several variances to the transmission line alignment in the eastern portion of the Action Area.

The energy storage facility is located on the 7.5-minute Soledad Mountain, California, U.S. Geological Survey (USGS) topographic quadrangle (topo quad). The transmission line route and variances are on the Soledad Mountain, Rosamond, Fairmont Butte, and Little Buttes topo quads. The project site is located within portions of Sections 31, 32, and 33 of Township 10 North and Range 12 West; portions of Sections 36 of Township 10 North and Range 13 West; portions of Sections 1, 2, 11, 14, 15, 16, 17, and 18 of Township 9 North and Range 13 West; portions of Sections 13, 14, 15, 16, 17, and 18 of Township 9 North and Range 14 West; and portions of Sections 13, 14, and 23 of Township 9 North and Range 15 West (Figure 2, Historic USGS Topographic Map).

2.0 TOPOGRAPHY IN THE PROJECT SITE SLOPES FROM NORTHWEST TO SOUTHEAST WITH FLAT AREAS IN THE SOUTHERN PORTIONS AND GENTLY ROLLING HILLS IN THE CENTRAL

**PORTION OF THE PROJECT SITE. ELEVATIONS RANGE FROM APPROXIMATELY 2,400 FEET (732 METERS) IN THE SOUTHEAST CORNER OF THE TRANSMISSION LINE AT THE CORNER OF ROSAMOND BOULEVARD AND 65TH STREET W TO 2,720 FEET (830 METERS) ALONG DAWN ROAD, JUST SOUTH OF AN EXISTING WATER TANK FACILITY (FIGURE 3, LOCAL VICINITY).
BACKGROUND ON THE DESERT TORTOISE**

The desert tortoise is a long-lived, terrestrial turtle with a domed carapace (upper shell) and rounded, stumpy elephantine hind limbs. The front limbs are flattened and heavily scaled for digging and without webbed toes. The carapace is oblong with rounded sides due to the joining of the carapace to the plastron (lower shell). The scutes are often yellowish in the middle and have grooved, parallel, concentric growth rings that form outward with age toward the scute margins. The plastron is typically yellowish, becoming brown around the scute margins. The head is relatively small and rounded in front with reddish-tan coloring, and the iris is greenish-yellow. The front and hind feet are about equal in size, and the tail is short.

Desert tortoises in the Mojave and Colorado deserts west and north of the Colorado River were listed by the U.S. Fish and Wildlife Service (USFWS) as threatened on April 2, 1990 (USFWS 1990). They are also listed as threatened by the State of California. Proposed actions within the range of the Mojave Desert tortoise fall under purview of the federal Endangered Species Act 1973, as amended (ESA), in addition to state regulations. These tortoises have since been named as a full species, still *G. agassizii*, no longer conspecific with tortoises south and east of the Colorado River that were reclassified as *G. morafkai* (Murphy et al. 2011).. For purposes of the ESA, desert tortoise habitat is defined as 1) areas with presence of desert tortoises or desert tortoise sign, 2) dispersal areas (i.e., habitat corridors), or 3) areas suitable for desert tortoises as identified by the USFWS or in the most recent approved recovery plan for the Mojave population of the desert tortoise (USFWS 2011).

The desert tortoise is most common in desert scrub, desert wash, and western Joshua tree (*Yucca brevifolia*) habitats in a variety of terrain types, including alluvial fans, valleys, rocky hillsides, and washes. They require friable soil for burrow and nest construction. Burrows are typically found at the base of shrubs, in the spaces between shrubs, and occasionally in caliche soil bank areas or underneath boulders/rocks. They are herbivores and feed on a variety of plants, including annual herbs and perennial grasses.

Tortoise activity is greatest during the spring and early summer, and to a lesser extent during the fall; however, tortoises can be active at any time of the year during appropriate weather conditions. Although tortoises hibernate during the winter and typically emerge in late February or early March, hatchlings and juveniles can be active during the winter months. Adults will also emerge from their burrows to drink if water resources have been limited during the previous activity season and/or winter precipitation has provided standing water. Their activity is usually much reduced during hot summer months, but they may be active following summer rains or if temperatures are moderate (Boarman 2003). They retreat into their horizontal burrow to avoid surface temperature extremes and to escape from predators. Desert tortoises

are known to utilize an average of 7 to 12 burrows at any given time. Multiple tortoises are also known to occasionally share a single burrow (BLM 2006).

Threats to desert tortoises include loss or degradation of habitat, vandalism, poaching, intentional killing, predation on young tortoises by the common raven (*Corvus corax*) and other predators (e.g. kit fox [*Vulpes macrotis*], snakes, etc.), and disease (e.g., Mycoplasmosis). Off-road vehicles, military training maneuvers, mining, and livestock grazing also affect tortoise habitat by collapsing burrows, eroding soils, reducing availability of food plants, and eliminating shrubs that would provide shade for tortoises and support for their burrows. These activities ultimately result in surface disturbance that promotes conditions more conducive to invasion by exotic plant species, which provide less nutritional value to tortoises than the native species that were replaced. Human activities, including garbage dumping, landfills, roads, increased nesting opportunities, irrigation, and increased vehicle use have also led to increased numbers of common ravens in California deserts. Ultimately, the increased predation on young tortoises by common ravens reduces recruitment into breeding populations (Boarman 2003).

Desert tortoises are most often detected by scat, sign, and burrows/pallets. Tortoises themselves can sometimes be detected aboveground foraging or moving about or in burrows by shining a light into the burrow. Tortoise sign includes burrows, scat, tracks, eggshell fragments, courtship rings, drinking depressions, carcasses, or fragments thereof. Presence of sign is an indication that tortoises either occur, or have recently occurred, at a particular location that is likely to be part or all of a lifetime home range. Sign can be detected at any time of the year and always indicates suitable habitat, if not occupied habitat.

3.0 METHODS

3.1 Literature Review and Records Search

A literature review and record search were conducted to identify occurrences of desert tortoise, designated critical habitat for desert tortoise, or any desert tortoise management areas within the project site. The review included, but was not limited to:

- A report from the California Department of Fish and Wildlife's California Natural Diversity Data Base (CNDDB) for a 5-mile radius of the project site (CDFW 2023a)
- The USFWS (2023) Environmental Conservation Online System (ECOS), including critical habitat mapping and an Information for Planning and Consultation (IPaC) report
- Aerial photographs
- Pertinent documents from the WSP USA library and project files (e.g., other biological surveys from the general vicinity)

3.2 Focused Survey

Surveys were conducted following the protocol set forth by the USFWS in the General Ecology and Survey Protocol for Determining Presence/Absence and Abundance for the Desert Tortoise - Mojave Population Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (*Gopherus*

agassizii) (USFWS 2019). The desert tortoise surveys were conducted within the project site, including a 500-foot survey buffer, herein referred to as the desert tortoise “study area”.

Desert tortoise surveys are typically conducted individually, but due to the low potential for this species to occur and the modified survey pace, these surveys were conducted in concert with sensitive plant and burrowing owl surveys, since all require 10-meter transects, are terrestrial based, . Instead of walking the standard two mph pace, surveys were conducted at a 0.5 mph pace to account for mapping of sensitive biological resources, such as burrows and other desert tortoise sign. All surveys included 100 percent visual coverage of the study area, plus an additional 500-foot buffer. Although this buffer is not required for the desert tortoise standard protocol, the additional area was covered to meet the minimum survey requirements for burrowing owl. Desert tortoise surveys were overseen by senior desert tortoise biologist Nathan Moorhatch (a desert tortoise handler) with over 30 years of desert tortoise experience. Also included on the team of desert tortoise biologists included John Green and Scott Crawford (also with 30-years of desert tortoise experience). Additional field biologists were utilized and walked between the senior biologists to ensure that junior biologists had a least on senior level person next to them during surveys. Above average rainfall occurred during the 2022/2023 rain season, which resulted in a super bloom flowering season. These conditions were considered suitable for desert tortoise and if present within the project site, would have been observed. Per the USFWS (2019) protocol, WSP biologists documented and classified any observed burrows, dens, scats, and shell remains associated with desert tortoise, if present. Table 1, below, presents the desert tortoise survey dates and personnel.

Table 1. Desert Tortoise Survey Dates and Personnel

Survey Date	Survey Personnel
April 18, 2023	Scott Crawford, Melanie Bukovac
April 25, 2023	Nathan Moorhatch, Scott Crawford, Liz Diaz, Kyralai Duppel
April 26, 2023	Nathan Moorhatch, Scott Crawford, Liz Diaz, Kyralai Duppel, Alexa Kerr, Melanie Bukovac
April 27, 2023	Nathan Moorhatch, Scott Crawford, Liz Diaz, Kyralai Duppel, Alexa Kerr, Melanie Bukovac
May 9, 2023	Nathan Moorhatch
May 10, 2023	Melanie Bukovac, Scott Crawford, Nathan Moorhatch, Ciara Shirey, Phil Clevinger
May 11, 2023	Melanie Bukovac, Scott Crawford, Nathan Moorhatch, Ciara Shirey
May 12, 2023	Nathan Moorhatch
May 23, 2023	Melanie Bukovac, Nathan Moorhatch
June 20, 2023	Nathan Moorhatch
June 21, 2023	Nathan Moorhatch, John Green
June 22, 2023	Nathan Moorhatch, John Green, Melanie Bukovac, Scott Crawford
June 23, 2023	Nathan Moorhatch, John Green, Melanie Bukovac, Scott Crawford
June 27, 2023	Nathan Moorhatch

Developed areas within the study area were excluded from the survey as unsuitable habitat. For habitat that biologists could not safely survey or gain permission to access, such as private property, surveys were conducted by meticulously scanning the study area using binoculars. All desert tortoise relevant data and wildlife species were recorded in field notes, and potentially suitable burrow locations were recorded using the Esri ArcGIS Collector application.

4.0 RESULTS

4.1 Literature Review

The study area is located within the Western Mojave Desert Tortoise Recovery Unit (USFWS 1994). The CNDDDB search identified three records of desert tortoise observations within 5 miles of the study area (all from 2004). Further, habitat, topography, and soils within the majority of the study area are suitable for desert tortoise. Designated critical habitat is not present within the study area; however, designated critical habitat is located approximately 14 miles (22.5 kilometers) to the northeast (USFWS 1994) (Figure 4, Desert Tortoise Critical Habitat).

4.2 Focused Survey

The surveys resulted in no detection of burrows or any suitable burrows for mature or juvenile desert tortoises within the study area. Further, no live tortoises, or any sign thereof, were present in the surveyed areas (Figure 5, Study Area). A full list of plant and vertebrate wildlife species detected onsite is included in the Biological Resources Assessment report (WSP USA 2023). No survey data forms are included in this report since no desert tortoise, or their sign, was detected in the study area.

5.0 DISCUSSION

Although suitable habitat (e.g., creosote brush scrub) is present throughout the study area, no live tortoises, or sign thereof, were detected within study area. For these reasons, desert tortoise is considered to be absent from the project site.

6.0 REFERENCES

Boarman, W. 2003. Desert tortoise species account. *In* Final Environmental Impact Report and Statement for the West Mojave Plan. Bureau of Land Management, California Desert Conservation Area District Office, Riverside, California.

Bureau of Land Management (BLM). 2006. West Mojave Plan.

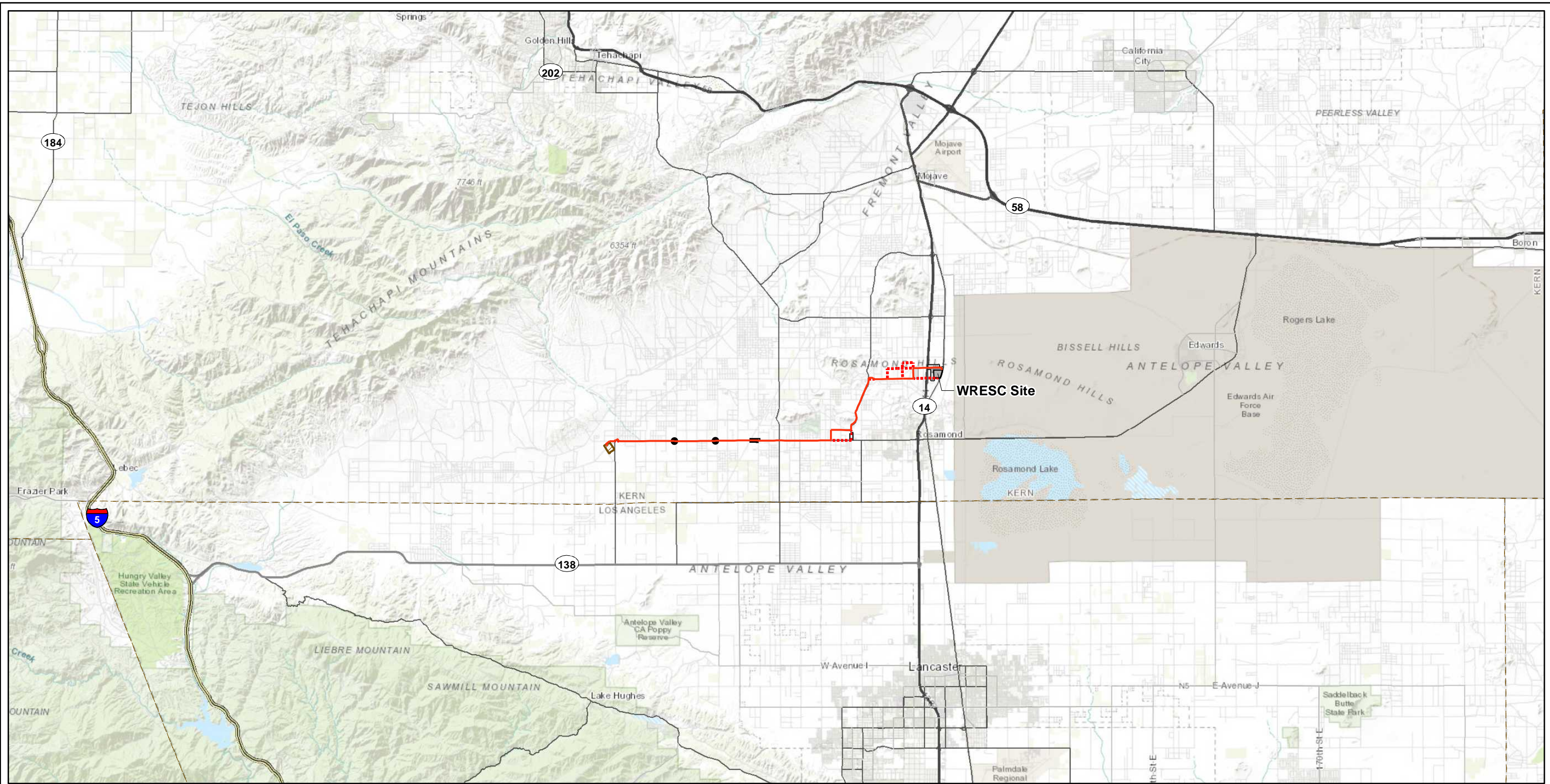
California Department of Fish and Wildlife (CDFW). 2023a. California Natural Diversity Database (CNDDDB) RareFind 5 records of sensitive elements.

Jepson Herbarium. 2023. *Jepson eFlora*. University of California, Berkeley.
<http://ucjeps.berkeley.edu/IJM.html>

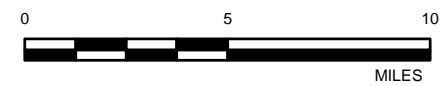
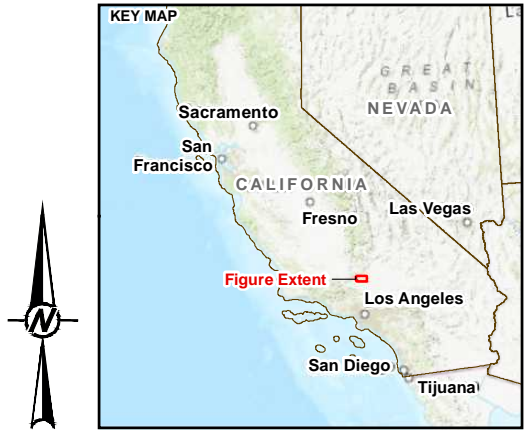
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- U.S. Fish and Wildlife Service (USFWS). 2023. Environmental Conservation Online System (ECOS) <https://ecos.fws.gov/ecp/>
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Appendix A Figures

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- LEGEND**
- Freeway
 - Major Road
 - Secondary Road
 - Local Connecting Road
 - Important Local Road
 - Proposed Transmission Line**
 - Preferred Route, Aboveground
 - Preferred Route, Underground
 - Route Options 1-6, Aboveground
 - Route Options 1-6, Underground
- Project Components**
- WRESC Site
 - Other Project Parcels
 - Project Boundary
 - SCE Whirlwind Substation



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GEM A-CAES LLC



CONSULTANT	YYYY-MM-DD	2024-02-29
	DESIGNED	MK
	PREPARED	MK
	REVIEWED	SC
	APPROVED	VG/LL

REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET
2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

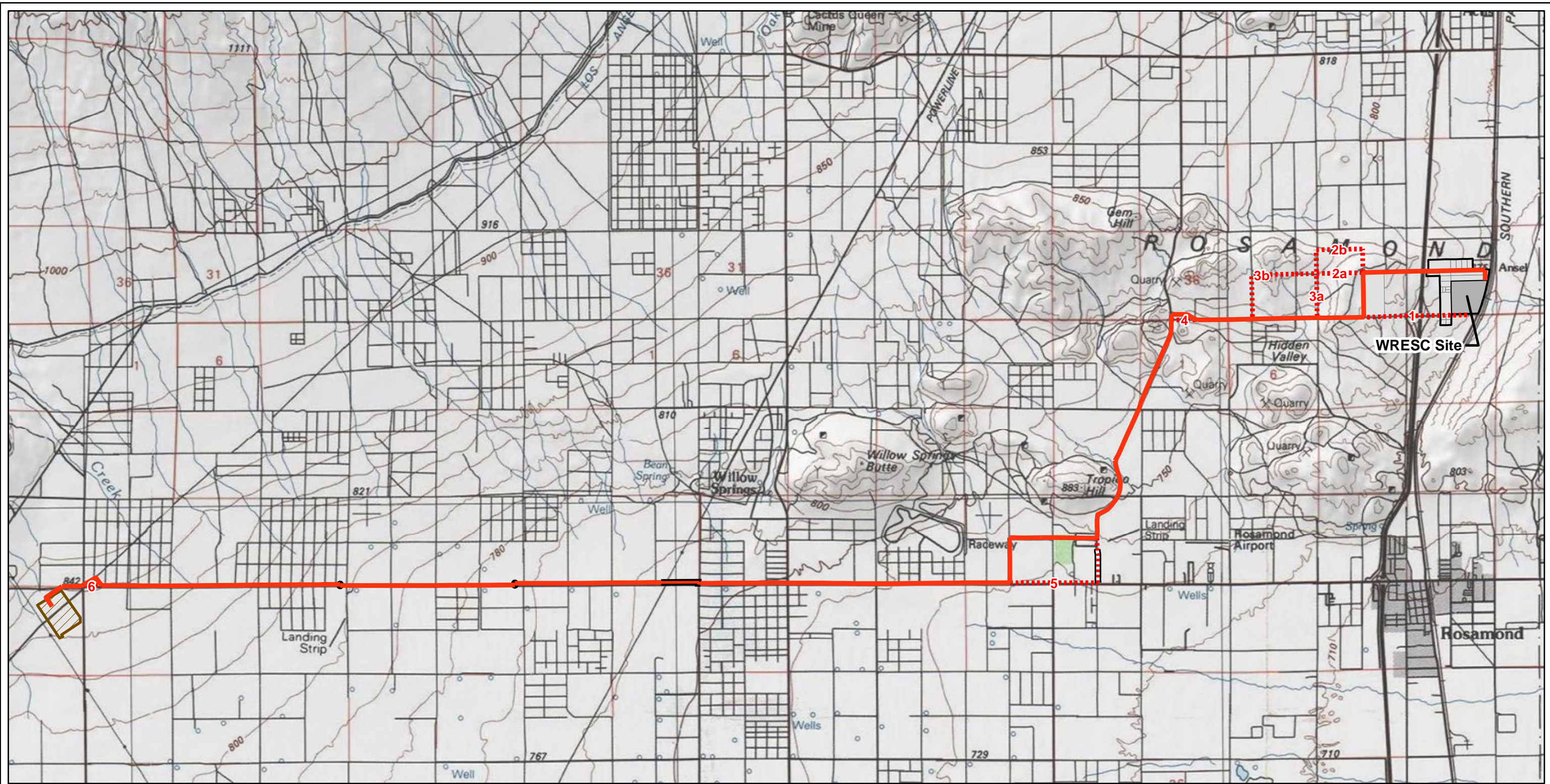
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WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT
DESERT TORTOISE FOCUS SURVEY

TITLE
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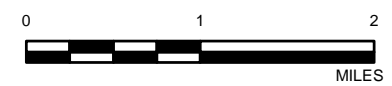
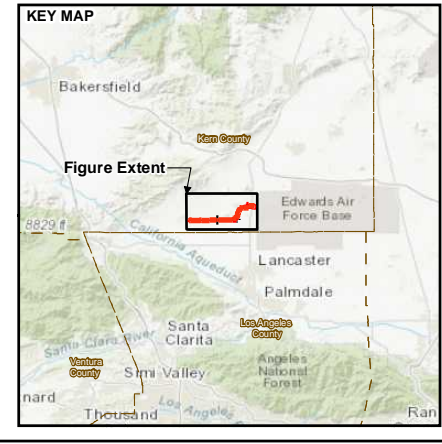
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- LEGEND**
- Proposed Transmission Line**
- Preferred Route, Aboveground
 - Preferred Route, Underground
 - - - Route Options 1-6, Aboveground
 - - - Route Options 1-6, Underground
- Project Components**
- WRESC Site
 - Other Project Parcels
 - Project Boundary
 - SCE Whirlwind Substation



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CONSULTANT	YYYY-MM-DD	2024-02-29
	DESIGNED	MK
	PREPARED	MK
	REVIEWED	SC
	APPROVED	VG/LL

REFERENCE(S)

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2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

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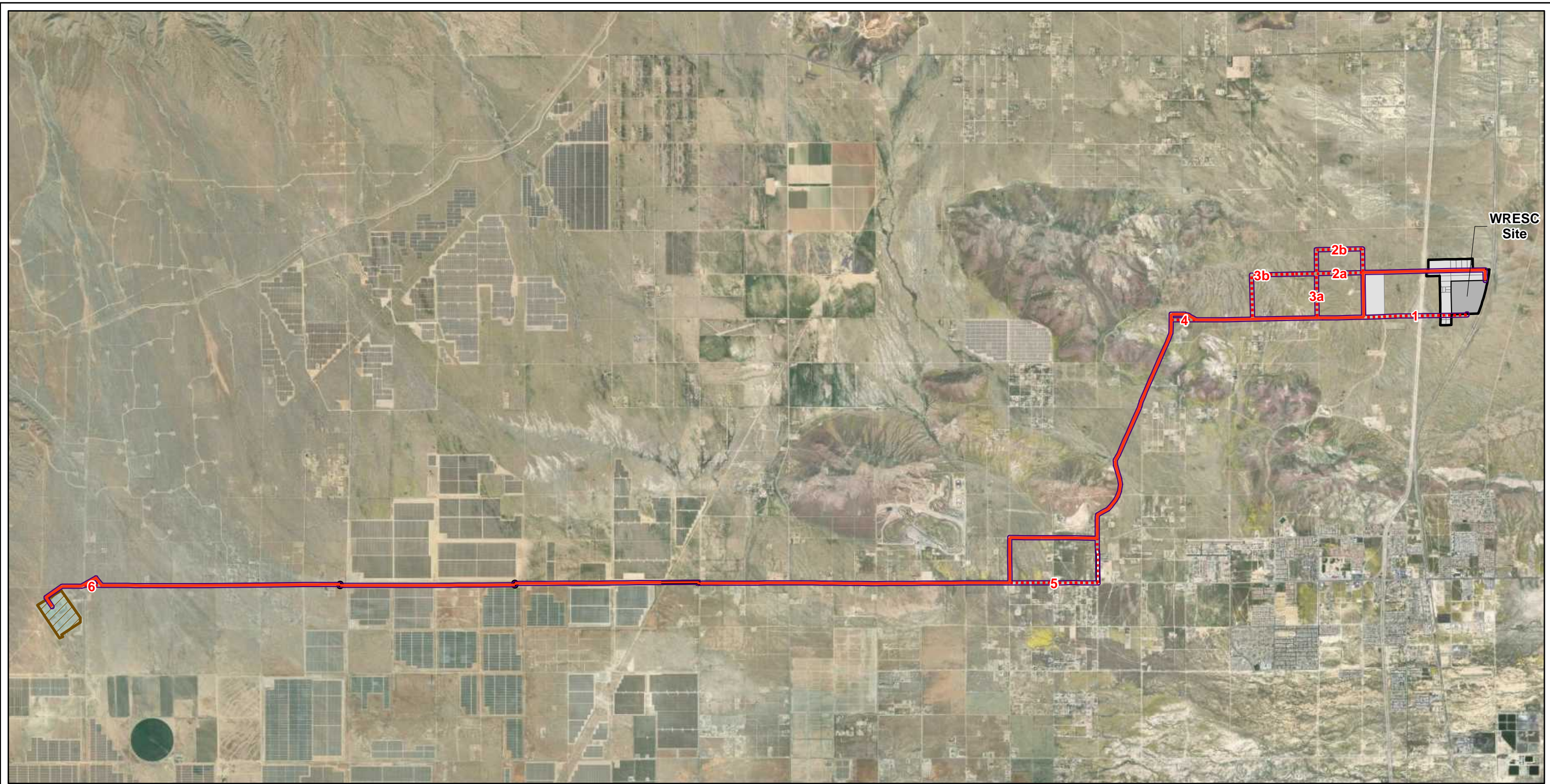
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WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT
DESERT TORTOISE FOCUS SURVEY

TITLE
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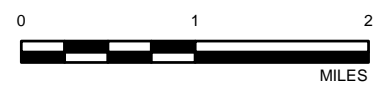
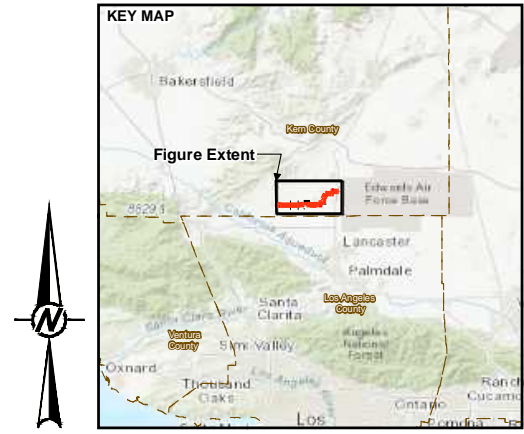
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- LEGEND**
- Proposed Transmission Line
 - Preferred Route, Aboveground
 - - - Preferred Route, Underground
 - · - · - Route Options 1-6, Aboveground
 - · - · - Route Options 1-6, Underground
 - 125 ft Buffer Around Transmission Line
- Project Components**
- WRESC Site
 - Other Project Parcels
 - Project Boundary
 - SCE Whirlwind Substation



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CONSULTANT	YYYY-MM-DD	2024-02-29
DESIGNED	MK	
PREPARED	MK	
REVIEWED	SC	
APPROVED	VG/LL	

NOTE(S)
1. PROJECT BOUNDARY IS CALCULATED BASED ON A 125 FT BUFFER AROUND TRANSMISSION LINES AND PROJECT PARCELS.

REFERENCE(S)
1. COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET
2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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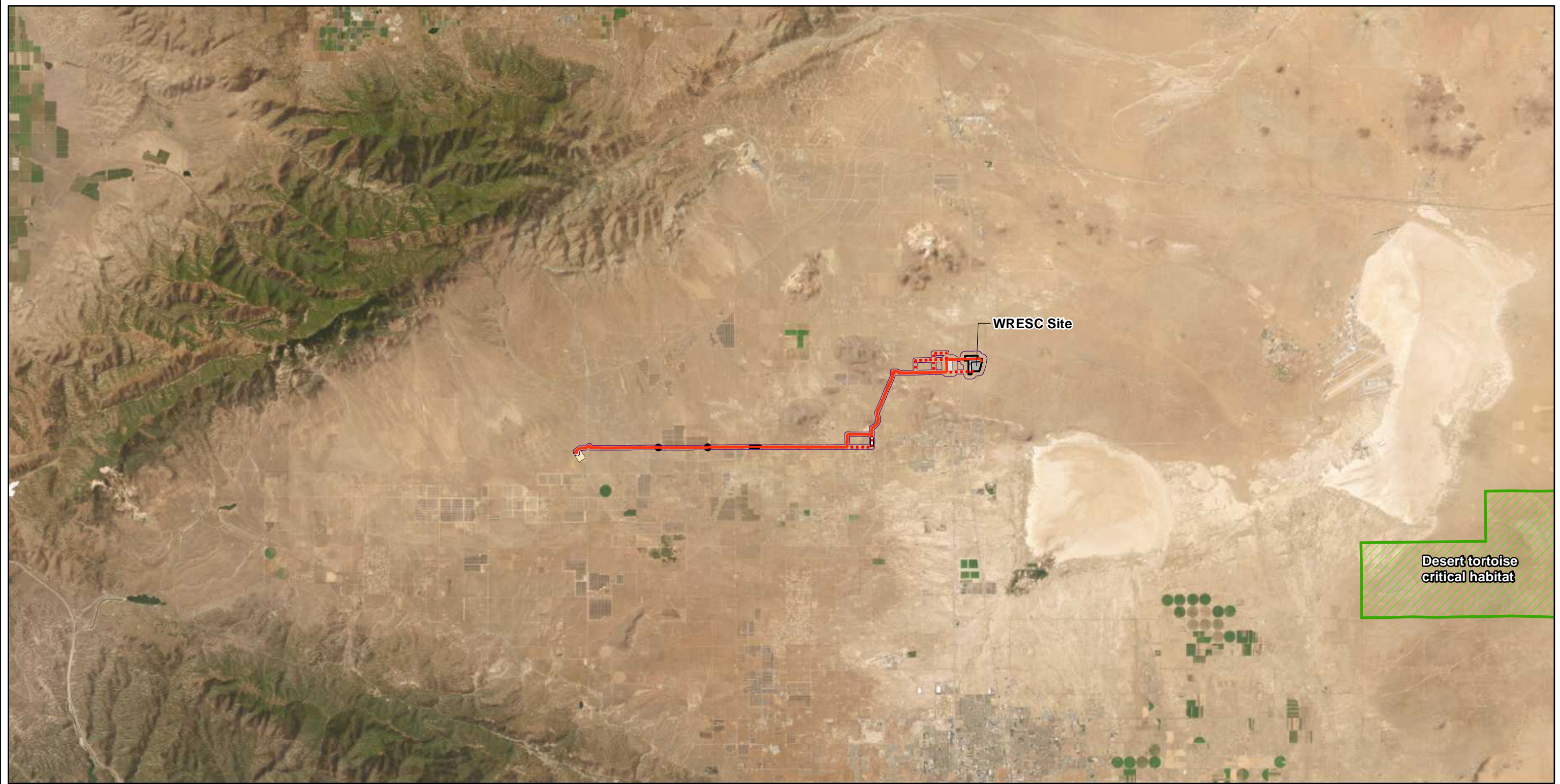
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WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT
DESERT TORTOISE FOCUS SURVEY

TITLE
LOCAL VICINITY MAP

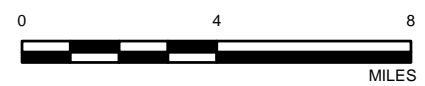
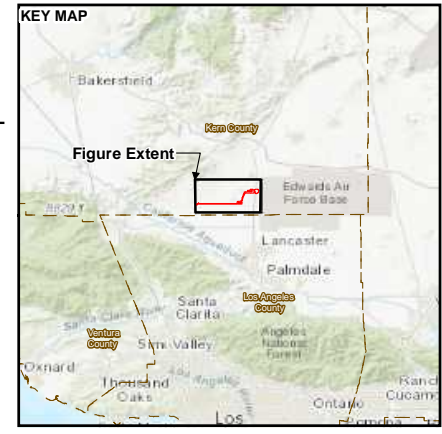
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- LEGEND**
- Desert Tortoise Critical Habitat (USFWS, 2023)
 - SCE Whirlwind Substation
 - Proposed Transmission Line**
 - Preferred Route, Aboveground
 - Preferred Route, Underground
 - Route Options 1-6, Aboveground
 - Route Options 1-6, Underground
 - Project Components**
 - WRESC Site
 - Other Project Parcels
 - Project Boundary
 - Project Survey Area



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	DESIGNED	MK
	PREPARED	MK
	REVIEWED	SC
	APPROVED	VG/LL

NOTE(S)
1. PROJECT STUDY AREA IS CALCULATED BASED ON A 500 FT BUFFER AROUND TRANSMISSION LINES AND 1000 FT BUFFER AROUND PROJECT PARCELS.

REFERENCE(S)
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2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT
DESERT TORTOISE FOCUS SURVEY

TITLE
DESERT TORTOISE CRITICAL HABITAT

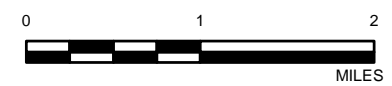
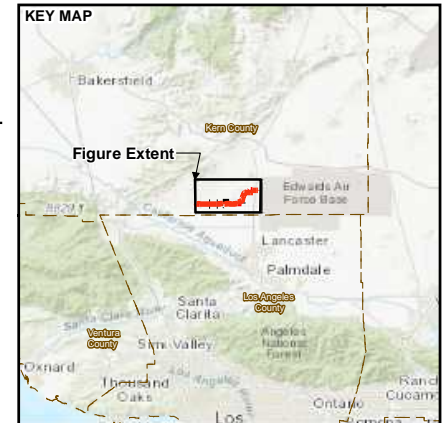
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- LEGEND**
- Proposed Transmission Line
 - Preferred Route, Aboveground
 - - - Preferred Route, Underground
 - · - · - Route Options 1-6, Aboveground
 - · - · - Route Options 1-6, Underground
 - SCE Whirlwind Substation
 - Project Survey Area
- Project Components**
- WRESC Site
 - Other Project Parcels
 - Project Boundary



CLIENT
GEM A-CAES LLC



CONSULTANT	YYYY-MM-DD	2024-02-29
	DESIGNED	MK
	PREPARED	MK
	REVIEWED	SC
	APPROVED	VG/LL

NOTE(S)
1. PROJECT BOUNDARY IS CALCULATED BASED ON A 500 FT BUFFER AROUND TRANSMISSION LINES AND 1000 FT BUFFER AROUND PROJECT PARCELS.

REFERENCE(S)
1. COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET
2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT
DESERT TORTOISE FOCUS SURVEY

TITLE
STUDY AREA

PROJECT NO.	PHASE	REV.	FIGURE
31406639.000	01.LBR	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B