HABITAT CONSERVATION PLAN
For Valley Electric Association's
Community Solar Project
Approximately 80.65 Acres – Nye County, Nevada
T19S R53E Sections 24 and 25

Prepared for:

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Executive Summary

Valley Electric Association, Inc. (VEA, Proponent) is applying for an incidental take permit (permit) under Section 10(a)(1)(B) of the Endangered Species Act (ESA) as amended, for activities proposed in association with the development of approximately 80 acres of vacant land in Pahrump, Nevada, for construction of a Community Solar Project (Project). The proponent provides a Habitat Conservation Plan (HCP) in support of their permit application. The HCP describes activities associated with development of the solar field, the effects of those activities on the Mojave desert tortoise (*Gopherus agassizii*), a species that is listed as threatened under the ESA, and measures VEA will take to avoid, minimize, and mitigate the effects.

The development of the solar field is expected to take eight months and the in-service period is 30 years; therefore, VEA requests a permit period of 30 years, with option to extend. All construction, operation, and maintenance activities, as well as implementation of the conservation actions in the HCP, are expected to be completed within the 30-year term of the permit. Construction of the solar field and associated power line will result in the disturbance of 80.0 and 0.65 acres of desert tortoise habitat, respectively, within the town limits of Pahrump. The solar field parcel and the power line area are both zoned Village Residential (VR-20, medium density). In addition, the solar field parcel has a Nye County approved Special Project Overlay (SO) zone for a renewable energy project.

To minimize and mitigate the effects of disturbing 80.65 acres of desert tortoise habitat, VEA has incorporated several design features into the Project, as further described in Section 5 of this HCP: install temporary tortoise fencing and tortoise proof access gates around the 80-acre site to ensure tortoises do not gain access to the site following survey and removal; survey for and remove tortoises from the site prior to surface disturbing activities; install a permanent security fence with tortoise access points to allow tortoises to re-enter the site following disturbance; mow, crush, or trim vegetation within the majority of the site rather than blading or grading to provide future habitat; install PV panels at a greater height than industry standard; and increase spacing of the panels by six feet on the southern 40 acres of the site. Increasing the height and spacing of the panels is intended to allow vegetation growth in order to provide habitat for desert tortoise use following construction.

Finally, this HCP provides for addressing changed and unforeseen circumstances, describes funding to implement identified measures, discusses alternatives, identifies other measures required by the US Fish and Wildlife Service (USFWS), and lists the literature reviewed for the completion of this and related documents.

1.0 INTRODUCTION AND BACKGROUND

1.1 Overview / Background

VEA is a nonprofit electric utility headquartered in Pahrump, Nevada that was incorporated in 1965. Throughout its history, VEA has steadfastly adhered to the cooperative (co-op) principles of doing business. An electrical co-op is an organization formed by a group of people with the purpose of providing electric service in an area

that has not attracted an investor-owned utility. It's Charter and by-laws are drawn to provide for the common interest and benefit. The co-op is owned by those it serves and administered by Directors duly elected by the membership.

VEA's service area includes more than 6,800 square miles, located mainly along the Nevada-California border, with the majority lying within Nevada. In the south, the service area starts in Sandy Valley, southwest of Las Vegas, and extends for more than 250 miles to Fish Lake Valley and beyond in the north. At present, VEA provides electricity to over 17,000 members and a total of approximately 22,000 meters. Since its inception, VEA has been involved in the construction, operation, and maintenance of hundreds of miles of distribution and transmission lines.

The proposed Project will provide a local renewable generation source to VEA's members. Currently, VEA purchases all of their power from sources outside of their service area and has no local area generation and no renewable generation. A portion of the output of the planned Project will be made available for VEA members to purchase as part of a community solar project. This will allow VEA members to purchase solar generation without installing solar panels on their roof tops and make it more cost effective to purchase renewable energy. VEA's service territory is in one of the best solar resource locations in the country for photovoltaic (PV) systems and solar development is part of the Nye County master plan.

The purpose of developing this HCP is to document actions that will be taken by VEA to minimize and mitigate the effects of the solar field on desert tortoises and their habitat. The HCP will be submitted by VEA to support an application for a Section 10(a)(1)(B) incidental take permit for desert tortoise. VEA is applying for an incidental take permit because incidental take may be unavoidable due to activities on the Project site. Further, changes to habitat may alter essential behaviors such as breeding, feeding, or sheltering.

1.2 Permit Duration

This Agreement shall become effective on the date that USFWS issues the permit requested in the HCP and shall remain in full force and effect for the period of 30 years, with option to extend. It is anticipated that all land disturbance, construction activities, operation and maintenance, and implementation of the HCP will be accomplished during this period.

1.3 Regulatory / Legal Framework

<u>Sections 7, 9, and 10 of the Endangered Species Act</u>. Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species by annoying them to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited

to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Pursuant to section 11(a) and (b) of the ESA, any person who knowingly violates section 9 or any permit, certificate, or regulation related to section 9, may be subject to civil penalties of up to $25,000 for each violation or criminal penalties up to $50,000 and / or imprisonment of up to one year.

Individuals and State and local agencies proposing an action that is expected to result in the take of Federally listed species are encouraged to apply for an incidental take permit under section 10(a)(1)(B) of the ESA to be in compliance with the law. Such permits are issued by the USFWS when take is not the intention of and is incidental to otherwise legal activities. An application for an incidental take permit must be accompanied by a habitat conservation plan, commonly referred to as an HCP. The regulatory standard under section 10 of the ESA is that the effects of authorized incidental take must be minimized and mitigated to the maximum extent practicable. Under section 10, a proposed project also must not appreciably reduce the likelihood of the survival and recovery of the species in the wild, and adequate funding for a plan to minimize and mitigate impacts must be ensured.

Section 7 of the ESA requires Federal agencies to ensure that their actions, including issuing permits, do not jeopardize the continued existence of listed species or destroy or adversely modify listed species' critical habitat. "Jeopardize the continued existence of …" pursuant to 50 CFR 402.2, means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. Issuance of an incidental take permit under section 10(a)(1)(B) by the USFWS is a Federal action subject to section 7 of the ESA. As a Federal agency issuing a discretionary permit, the USFWS is required to consult with itself (i.e., conduct an internal consultation).

Delivery of the HCP and a section 10 permit application initiates the section 7 consultation process within the USFWS.

The requirements of section 7 and section 10 substantially overlap. Elements unique to section 7 include analyses of impacts on designated critical habitat, analyses of impacts on listed plant species, if any, and analyses of indirect and cumulative impacts on listed species. Cumulative effects are effects of future State, tribal, local or private actions that are reasonably certain to occur in the Action Area, pursuant to section 7(a)(2). The Action Area is defined by the influence of direct and indirect impacts of covered activities. The Action Area may or may not be solely contained within the HCP boundary. These additional analyses are included in this HCP to meet the requirements of section 7 and to assist the USFWS with its internal consultation.

<u>National Environmental Policy Act</u>. The purpose of the National Environmental Policy Act (NEPA) is two-fold: to ensure that Federal agencies examine environmental impacts of their actions (in this case deciding whether to issue an incidental take permit) and to utilize public participation. NEPA serves as an analytical tool on direct,

indirect, and cumulative impacts of the proposed project alternatives to help the USFWS decide whether to issue an incidental take permit or section 10(a)(1)(B) permit. NEPA analysis must be done by the USFWS for each HCP as part of the incidental take permit application process.

National Historic Preservation Act. All Federal agencies are required to examine the cultural impacts of their actions (e.g., issuance of a permit). This may require consultation with the State Historic Preservation Office (SHPO) and appropriate American Indian tribes. All incidental take permit applicants are requested to submit a Request for Cultural Resources Compliance form to the USFWS. To complete compliance, the applicants may be required to contract for cultural resource surveys and possibly mitigation.

Other relevant laws and regulations. Other relevant laws to the incidental take permit process include Migratory Bird Treaty Act, Clean Water Act, and other state and local legislation.

1.4 Covered Lands

The solar field will be constructed on 80 acres of vacant land within the town limits of Pahrump in T19S R53E Section 25. In addition, the associated power line will be constructed within a 2,640 foot x 20 foot (1.2 acres, actual disturbance is estimated at 0.6 acres) easement in T19S R53E Sections 24 and 25. These two areas make up the Project Area and are located approximately 1.4 miles east of Highway 160 and immediately south of Simkins Road. Project maps are provided in Appendix A.

1.5 Species to be Covered by the Permit

Mojave Desert Tortoise (*Gopherus agassizii*)

Federal Status: Listed as Threatened under the ESA (FR 12178, April 2, 1990); critical habitat designated (FR 5820, February 8, 1994)

State Status: Classified as Protected, Threatened by the State of Nevada (NAC 503.080)

2.0 ENVIRONMENTAL SETTING / BIOLOGICAL RESOURCES

2.1 Environmental Setting

2.1.1 Climate

Based on data from 1948-2006 (WRCC 2006), summer (June, July, and August) average temperatures range from 60.2 °F (June average minimum) to 101.2 °F (July average maximum), with average mean temperatures of 77.6, 84.2, and 82.7 °F for June, July, and August, respectively. Winter (December, January, and February) average temperatures range from 26.5 °F (December average minimum) to 62.4 °F (February average maximum), with average mean temperatures of 42.3, 42.6, and 47.4 °F for December, January, and February, respectively.

Annual precipitation based on data from 1948-2006 (WRCC 2006) is 4.83 inches, almost all of which falls as rain. Most of the precipitation comes from winter rains from November to March, with summer thunderstorms also common.

2.1.2 Topography / Geology

The Pahrump Valley is located in south-southwestern Nevada within the Great Basin section of the Basin and Range geomorphic province. The Valley, which trends northwest to southeast, resides in a geologic basin that was formed through regional tectonic extension (Henry and Mossa 1995). The Project Area has an elevation near 2,900 feet and is composed of Quaternary alluvium. The Valley is bounded by fault block mountain ranges that are comprised of Paleozoic and Late Proterozoic carbonate and clastic rocks (Darling 2012). The Spring Mountains are to the east and the Nopah Mountains are to the west. The highest point in the area is Mount Charleston (11,916 feet), which is located in the Spring Mountains to the east. The faulting that produced these fault block mountains began in the Tertiary and continues to this day (Henry and Mossa 1995).

In the Project Area, soil type includes the Commski-Lastchance Association. These soils are derived from limestone and dolomite and formed in a fan environment. They occur on slopes ranging from 2-8 percent, are well drained, and are medium to high in runoff. The depth to the water table is greater than 80 inches (USDA 2015).

2.1.3 Hydrology / Streams, Rivers, Drainages

The Project Area is within the Pahrump Valley Hydrographic Area (No. 162). There are no rivers or streams within the Project Area. Further, the Project Area is not within a flood zone or an alluvial fan.

2.1.4 Existing Land Use

The Project Area is located on vacant land within the town limits of Pahrump, with vegetation typical of the Mojave Desert. Being located near populated areas, the Project Area has been impacted from off road use, dumping, and target shooting. The land surrounding the Project Area is similar, i.e., undeveloped Mojave Desert that provides suitable tortoise habitat. Land use is also similar, being primarily off road use (there are multiple old roads in the area), with some dumping and target shooting. However, neither the Project Area nor the surrounding land has been heavily impacted by these activities.

2.2 Biological Resources

2.2.1 Covered Wildlife Species

<u>Desert Tortoise</u>

The desert tortoise is found throughout the Mojave, Sonoran, and Colorado deserts, with two distinct populations; the Sonoran population and the Mojave population. The Mojave desert tortoise populations north and west of the Colorado River in Arizona and Utah (excluding the Beaver Dam slope population in southwestern Utah) were listed as endangered under an emergency rule on August 4, 1989 (FR 54:42270). Subsequently, the entire Mojave population of the desert tortoise west of the Colorado River in

California and Nevada, and north of the river in Arizona and Utah, including the Beaver Dam slope, was listed as a threatened species on April 2, 1990 (FR 55:12178). Critical habitat was designated in 1994 (FR 59:5820, also see corrections at FR 59:9032). The Revised Desert Tortoise (Mojave Population) Recovery Plan (USFWS 2011) was signed on May 6, 2011. The Recovery Plan divided the Mojave desert tortoise population into five recovery units; the Pahrump Valley and the Project Area are within the Eastern Mojave Recovery Unit. However, the Project Area does not contain designated critical habitat.

The desert tortoise is an arid land reptile associated with desert scrub vegetation types; primarily creosote bush flats, washes, and hillside slopes or bajadas. A robust herbaceous component to the shrubs and cacti of the creosote bush vegetation type is an important component of suitable habitat. Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met: a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and over-wintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow. Further information on the range, biology, and ecology of the desert tortoise can be found in USFWS (2011). Desert tortoises are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Tortoises are most active from March to June and September to October. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert.

Desert tortoise home range sizes vary with respect to location and year. Young tortoises seldom move more than 150 feet from their burrow. However, older tortoises may move as far as 0.75-mile in a day and use multiple burrows (USFWS 2014). During droughts, tortoises forage over larger areas, increasing the likelihood of injury or mortality through encounters with humans and predators. Direct loss of tortoises has occurred from illegal collection by humans for pets or consumption, Upper Respiratory Tract Disease (URTD), predation on juvenile desert tortoises by common ravens (*Corvus corax*) and kit foxes (*Vulpes macrotis*), and collisions with vehicles on paved and unpaved roads. Other threats affecting the desert tortoise include loss of habitat from construction projects such as roads, housing, and energy developments, and conversion of native habitat to agriculture.

Live tortoises and tortoise sign (e.g., burrows, scat, carcasses, etc.) were found within the Project Area during a desert tortoise survey (Stantec 2015; Appendix B). The survey, conducted April 1-2, 2015, located two live tortoises, 47 burrows, 11 carcasses, and nine scat groupings. Of the burrows, seven had recent sign of tortoise use, 24 were in good condition but showed no sign of recent use, and 14 were classified as deteriorated tortoise burrows. The two remaining burrows were deteriorated and classified as being possible tortoise burrows (Table 2-1). There were 14 burrows where the back of the burrow was not visible, which could have contained live tortoises.

Table 2-1 List of desert tortoise burrows

Burrow #	Date	Class[1]	Other Sign	Cover	Width, Depth (inches)	Back Visible
1	04-01-15	2	Old scat	Open	13,0	No
2	04-01-15	5		Under Shrub	12,15	Yes
3	04-01-15	3		Under Shrub	10,10	Yes
4	04-01-15	3		Under Shrub	8,8	Yes
5	04-01-15	2		Open	15,18	No
6	04-01-15	2		Under Shrub	22,36	No
7	04-01-15	2		Under Shrub	12,24	No
8	04-01-15	2		Under Shrub	11,16	Yes
9	04-01-15	2		Under Shrub	14,24	No
10	04-01-15	2		Open	14,24	No
11	04-01-15	2	Scat inside	Under Shrub	14,36	Yes
12	04-01-15	3		Under Shrub	12,14	No
13	04-01-15	2		Wash Bank	14,14	Yes
14	04-01-15	3		Under Shrub	10,8	Yes
15	04-01-15	3		Under Shrub	12,15	Yes
16	04-01-15	2		Under Shrub	15,24	Yes
17	04-01-15	2	2 burrows together	Under Shrub	15,24	Yes
18	04-01-15	5		Under Shrub	12,4	Yes
19	04-01-15	2	Scat	Open	10,24	No
20	04-01-15	3		Open	8,12	Yes
21	04-01-15	3		Open	10,14	Yes
22	04-01-15	3		Under Shrub	13,19	Yes
23	04-01-15	2		Under Shrub	13,24	Yes
24	04-01-15	1	Tortoise near burrow	Open	11,24	Yes
25	04-01-15	3		Under Shrub	11,13	Yes
26	04-01-15	2		Open	14,60	No
27	04-01-15	1		Under Shrub	14,36	No
28	04-01-15	1	Tracks in burrow	Under Shrub	14,41	Yes
29	04-01-15	2		Open	14,38	Yes
30	04-02-15	3		Under Shrub	15,20	Yes
31	04-02-15	2		Under Shrub	17,26	Yes
32	04-02-15	3		Under Shrub	12,18	Yes
33	04-02-15	1	Scat at burrow	Under Shrub	6,40	No
34	04-02-15	2	Burrowing owl pellet at entrance, tortoise scat	Open	16,42	Yes
35	04-02-15	2		Under Shrub	12,15	Yes
36	04-02-15	1	Tracks in burrow	Under Shrub	13,15	Yes
37	04-02-15	3		Open	8,8	Yes
38	04-02-15	3		Under Shrub	8,9	Yes
39	04-02-15	1	Scat	Under Shrub	12,22	Yes
40	04-02-15	2		Wash Bank	14,17	Yes
41	04-02-15	3		Under Shrub	10,8	Yes
42	04-02-15	1	Tracks, tortoise near burrow	Under Shrub	12,14	Yes
43	04-02-15	2		Under Shrub	6,18	Yes
44	04-02-15	2		Under Shrub	14,28	No

Burrow #	Date	Class[1]	Other Sign	Cover	Width, Depth (inches)	Back Visible
45	04-02-15	2	Scat	Under Shrub	14,60	No
46	04-02-15	2		Wash Bank	13,12	No
47	04-02-15	2		Wash Bank	14,14	Yes

Source: Stantec 2015 – included as Appendix B

[1] Class 1 – Currently active, with desert tortoise or recent desert tortoise sign.
Class 2 – Good condition, definitely desert tortoise; no evidence of recent use.
Class 3 – Deteriorated condition; this includes collapsed burrows; definitely desert tortoise.
Class 4 – Good condition; possibly desert tortoise.
Class 5 – Deteriorated condition; this includes collapsed burrows; possibly desert tortoise (USFWS 2009).

3.0 PROJECT DESCRIPTION / ACTIVITIES COVERED BY PERMIT

3.1 Project Description

The Project consists of installing 54,864 fixed PV panels over an 80-acre site in the northern portion of Pahrump. The Project also consists of installing a 2,640-foot, 24.9kV power line to connect the solar field to an existing VEA power line near the Project Area. The total area disturbed will be approximately 80.65 acres as shown in Table 3-1 and described in Section 3.1.1 and 3.1.2 below.

Table 3-1 Summary of Project disturbance

Project Component		Disturbance (acres)
Solar Field	PV Panel Areas[1]	76.6
	Access Road	2.4
	Inverter Stations	0.1
	Switchyard Area	0.4
	Future Well Site	0.5
	Total	80.0
Power Line	Power Poles	0.04
	Access Road	0.61
	Total	0.65
Project Total		80.65

[1] PV panel areas will be accessible to desert tortoise following construction

In addition to the construction of the solar field and power line, the Project also includes research and monitoring studies. The duration of construction activities is expected to last approximately eight months and the Project is anticipated to be in service for 30 years. Construction will begin after receiving an incidental take permit. The output of the Project will be approximately 15 MW_{AC}.

3.1.1 Solar Field

Construction of the 80-acre solar field will include:

- First, prior to construction activities, temporary tortoise fencing and tortoise proof access gates will be installed around the 80-acre site to ensure that tortoises do not gain access to the site. This fence will be removed following construction.
- A 6-foot tall chain-link perimeter fence will be installed around the 80-acre site (within 10 feet of the temporary tortoise fence) along with secured access gates.

The fence will have barbed wire on top. In order to allow desert tortoise access and egress to the site (and the ability to occupy the site), the fence will have ground level holes measuring 10-inches wide by 7-inches tall (see Fence Detail drawing, Appendix A). There will be approximately five openings on the 1,320-foot sides and approximately 10 on the 2,642-foot sides (for an approximate total of 30, or one approximately every 260 feet along the entire perimeter). The holes will have a natural bottom.

- Rather than blading and grading the entire site and removing all existing vegetation, vegetation on the majority of the site (with the exception of the gravel access road, inverter stations, and switchyard area) will be mowed, clipped, or crushed.
- 30 degree fixed tilt, ground-mounted solar PV panels capable of producing 15 MWAC of power will be installed. The panels will be installed in twelve groupings each containing 4,572 315-watt panels (54,864 panels in total). Each panel will measure 39 inches x 79 inches, with the leading edge about 42 inches above the ground. This leading edge distance is about 18 inches above industry standard (see Elevation Details, Appendix A). The panels will be blue-black in color and will be composed of the least reflective glass available.
- A 40-foot wide (including shoulders) by 2,642-foot long (2.4 acres) gravel access road will be constructed down the east-west center of the site (see Site Plan, Appendix A). The road will have a posted speed limit of 15 MPH, with lightweight utility terrain vehicles (UTVs) the type of vehicle most likely to be used along the route after construction is completed.
- 10 inverter stations (12 feet x 40 feet and 7.1-feet tall) will be installed adjacent to the access road.
- A 233-foot by 73-foot (0.4 acres) switchyard area will be created in the northeast corner of the site. This area will be graded and leveled and all vegetation will be removed. Tortoise proof fencing will be installed around the switchyard area.
- A switchgear cabinet (200 feet x 40 feet and 11.7-feet tall) containing system equipment, metering, telecommunications equipment, and switches will be mounted on a concrete pad in the switchyard area.
- Conduit and wire will be buried (approximately 4-feet deep) between the panels and inverter station and switchgear.
- An approximately 500 square foot prefabricated building for housing system monitoring equipment and for use as a visitor center will also be installed within the switchyard area.
- A 0.5-acre area in the northwest corner of the site will be graded, leveled and all vegetation will be removed. This area will be tortoise fenced and will be used as a future well site.
- Rip-rap and culverts may be installed within the larger wash located in the southern portion of the site.
- All staging and temporary work areas will be contained within the 80-acre site.

- It is not anticipated that VEA will need to further develop any roads on the site. However, to accommodate any future public roads, approximately 30 feet on the northern and southern edges of the property will be set aside for possible future roads. It would be the responsibility of Nye County to obtain any necessary permits for future road construction.

Regarding site layout, two solar panel spacing configurations will be used (see Site Layout, Appendix A):

1. Industry Standard: The northern 40 acres will have an inner row spacing (i.e., the distance between the leading edge of one panel and the trailing edge of the panel behind it) of 14 feet (see Elevation Details, Appendix A).
2. Modified Configuration: In order to allow more light to reach the ground (for vegetation growth) and to break up the pattern of the solar panels (to minimize avian mortality), the southern 40 acres will have an inner row spacing of 20 feet (see Elevation Details, Appendix A).

Water

The Project will use between 500,000 and 600,000 gallons of water during construction. The water will be obtained off-site from an existing local area water utility and trucked to the Project Area. After construction, it is not anticipated that the panels will need to be washed. However, should washing become necessary, water would be trucked in to the Project Area. Any water used for washing would be contained within the Project Area (i.e., no run-off). Also, the prefabricated building will ultimately have water supplied by a small well and a sewer system. VEA owns a half acre of water rights to use for the building. All water from the future well will be used for the prefabricated building only and not within the solar array or other facilities.

Noxious Weeds

VEA will manage and control noxious weeds and invasive plant species consistent with applicable regulations and agency policies. The introduction of noxious weeds and invasive plants will be addressed through the use of certified weed-free seed and mulching; cleaning of vehicles to avoid introducing invasive weeds; and education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. Regarding the cleaning of vehicles, a controlled inspection and cleaning area will be established to visually inspect construction equipment arriving at the Project Area and to remove and collect seeds that may be adhering to tires and other equipment surfaces. Equipment will also be cleaned any time thereafter if the equipment leaves the Project Area, is used on another project, and reenters the Project Area.

Further, to prevent the spread of invasive species, project developers will determine whether a pre-activity survey is warranted and, if so, to conduct the survey. Were noxious weeds or invasive plants to be introduced to the Project Area as a result of the Project, VEA will use principles of integrated pest management, including biological controls, to prevent the spread of invasive species. If necessary, only herbicides with low toxicity to wildlife and non-target native plant species will be used, as determined in consultation with the USFWS. The typical herbicide application rate rather than the

maximum application rate will be used where this rate is effective. All results from periodic monitoring for noxious weeds or invasive plants, and any adaptive management triggered by monitoring, will be included in the annual report.

3.1.2 Power Line

The Project includes the construction of an approximately 2,640-foot, 24.9kV power line connecting to an existing power line (Appendix A). The new overhead line will also have fiber optics installed on the same poles. The new power line will consist of approximately eight single wooden power poles measuring approximately 40-feet tall. Disturbance associated with the power poles is estimated at 0.04 acres in total (15 feet x 15 feet at each pole). No grading, scraping, or placement of gravel will be required within the 15 x 15 foot area, and permanent disturbance will consist of the actual location of each pole. Adequate spacing (60 inches or greater) between conductors will be implemented for this power line per Avian Power Line Committee (APLIC) recommendations. In addition, a new 10-foot wide power line access road (2,640 feet by 10 feet = 0.61 acres) will be constructed. The poles will be installed immediately adjacent to the new road. A tortoise survey will be conducted prior to any construction. Noxious weeds and invasive species will be controlled as described for the solar field.

3.1.3 Research and Monitoring Studies

VEA will, through qualified third-parties (e.g., University of Nevada, Las Vegas), facilitate research and monitoring studies to evaluate the impact of the different PV panel configurations on vegetation growth and avian mortality. VEA will fund these studies for a period of 3 years. The studies will be designed to answer the following general questions:

1. The Project is designed using both industry standard spacing between solar panels and a modified configuration to allow more light to reach the ground; how does the vegetation respond to these two treatments?
2. The Project is designed using both industry standard spacing between solar panels and a modified configuration to break up the panel appearance from the air (i.e., make it look less like a body of water) and minimize avian mortality. How do changes in panel configuration affect avian species?
3. Can seeding the area under the panels with *Plantago ovata* stabilize soil and provide forage for desert tortoise? Can beavertail cactus plants (*Opuntia basilaris*) or cuttings/pads in the solar field persist to supplement existing desert tortoise forage species?
4. How do soil conditions (e.g., soil temperature, soil water balance, microbial community, and biotic soil crust) underneath solar panels change following construction of a solar field when vegetation is left in place?

Regarding vegetation, it is anticipated that data on, for example, vegetation composition, density, and cover will be collected from sample points located within each configuration area and compared using statistical analyses. Regarding avian species, it is anticipated that mortality surveys, likely using trained dogs, will be

conducted on a regular schedule within each configuration area and the results (including by species or species group) documented. Further, VEA, in coordination with the USFWS, will prepare an Avian Protection and Monitoring Plan (APMP). Designs and methodologies will be incorporated into the APMP to minimize and monitor potential impacts to avian species from the solar facility and results from the monitoring will be used to determine if bird deterrent methods may be needed. The exact experimental designs and methodologies will be determined later in coordination with VEA, third-party contractors, and USFWS.

3.1.4 Desert Tortoise Translocation

Following construction of the temporary tortoise fence, qualified biologists will conduct a protocol clearance survey. Any tortoises found will be moved to a tortoise-fenced enclosure located on lands owned by VEA approximately 2,000 feet east of the site. Tortoises will be captured and moved between September 1 and October 15 (this window may be extended based on temperatures). The fenced enclosure will measure 5 acres and will contain suitable tortoise habitat similar to that at the site. The translocated tortoises will remain in the enclosure until the first active season (March to June or September to October) following construction. At that time, any translocated tortoises will be re-captured, marked or tagged to facilitate monitoring, and returned to the fenced Project Area. Once released into the Project Area, the tortoises will be allowed to move at their free will. For this task, all applicable protocols and approved methodologies (e.g., Desert Tortoise Field Manual 2009) will be followed and all work will be done in coordination with USFWS.

3.2 Activities Covered by Permit

Activities to be covered by the Section 10(a)(1)(B) permit include all activities associated with construction of the solar field and associated utilities and infrastructure including construction of a new power line outside of the 80-acre solar field area.

Construction activities will include:

Activity 1: Installation of temporary tortoise fencing and tortoise proof access gates.

Activity 2: Surveys for and translocation of desert tortoise from the site.

Activity 3: Installation of the chain-link perimeter fence with tortoise access areas.

Activity 4: Mowing or crushing of vegetation on the approximately 76.6 acres to be used for installation of the PV panels.

Activity 5: Removal of vegetation and grading and leveling of soil on approximately 2.4 acres for the access road, 0.1 acres for the inverter stations, 0.4 acres for the switchyard, and 0.5 acres for the future well site.

Activity 6: Installation of the PV panels; burial of conduit and wire; installation of the inverter stations, switchgear cabinet, and all system equipment; and installation of the prefabricated building.

Activity 7: Installation of permanent tortoise fencing surrounding the switchyard area and future well site.

Activity 8: Installation of rip-rap and culverts in the larger wash in the southern portion of the Project Area.

Activity 9: Pre-construction tortoise surveys along the power line.

Activity 10: Construction of the power line, including access road.

Activity 11: Operation, maintenance, and decommissioning of the solar field.

Activity 12: Operation, maintenance, and decommissioning of the power line.

It is expected that construction of the temporary tortoise fence and the survey for and translocation of tortoises will be completed between September 1 and October 15. Tortoise fence will be constructed according to the protocols and designs for desert tortoise exclusion fence as provided in Chapter 8 of the Desert Tortoise Field Manual (USFWS 2009). In general, the designs call for fences to be constructed with durable materials (i.e., 16 gauge or heavier) consisting of 1-inch horizontal by 2-inch vertical, galvanized welded wire, 36 inches in width; 5-6 foot steel T-posts are used to anchor the fence and the fence is buried a minimum of 12 inches below the ground.

Once tortoise fencing and translocation are complete, fencing and construction of the solar field site can occur. In general, construction activities will include surveying, clearing, digging, trenching, grading, berming, watering for dust control, etc. However, vegetation clearing and grading will be limited to the access road, inverter stations, switchyard, and well site. The remainder of the area used for the PV panels will not be graded, but will either be mowed or trimmed before construction, or will be constructed using drive and crush avoidance construction practices. During construction, additional activities will include storing, transporting, and use of equipment and materials and workers arriving and departing from parking areas by car. Heavy equipment used during construction will include tractors, graders, water trucks, concrete trucks, cranes, jackhammers, compactors, delivery trucks, etc. Construction is expected to take eight months and may occur at any time of the year.

The proposed power line will be constructed following a pre-construction tortoise survey. It will involve clearing and grading a new 10-foot wide access road and disturbing an area approximately 15 feet x 15 feet for each of the eight poles. Heavy equipment used during construction will include tractors, graders, water trucks, cranes, compactors, delivery trucks, etc. It is anticipated that construction will take three weeks.

Operation and maintenance of the solar field will primarily occur along the center access road, which will be accessed mostly using lightweight off-highway vehicles (OHVs). Work will include visual inspections and electrical verification testing at the combiner panels and inverter power stations on each side of the access road. Preventative maintenance will also be performed at each of the inverter power stations and switchgear, to include but not be limited to: visual inspections, cleaning of the front screens and rear louvers, cleaning of the air intake filter, verification of electrical connections, and verification of signal connections. Within the PV array, operation and maintenance activities will primarily include visual inspections of the PV modules, racking system, electrical wiring, weather stations, and the perimeter fence. Cleaning or washing of PV modules is not expected, but if needed, will be performed with warm

water and an environmentally friendly soap that will not harm exiting wildlife or vegetation. Although the equipment is expected to last 25 years or longer, replacement of PV modules, wiring, combiner boxes, racking, or inverters may be necessary. These activities will be performed on foot whenever possible. Ground guides (i.e., a person walking in front of the vehicle looking for and ensuring that no tortoises are in harm's way) will be used anytime a lightweight vehicle is required within the array. Further, vehicles larger than a UTV may be required to replace inverters, but would be limited to the center access road and would also use ground guides.

Upon retirement of the facility, it is anticipated that all equipment will be removed, including fencing, and disturbance reclaimed (holes filled in with soil gathered in the immediate vicinity) and raked to match the surrounding topography. The area will then be allowed to recover naturally. Given the term of the permit (30 years), future conditions in the surrounding area may be different upon retirement of the facility (i.e., residential and/or commercial development of adjacent land). As a result, the site may also be repurposed for another use, or could be upgraded to new technology. If either of these were to occur, a new permit would be requested. Currently there are no plans other than the removal of equipment and natural recovery of the site as described above.

Although it is not anticipated that the new power line will experience frequent failures, some routine inspection, maintenance, and service will be required to replace components due to age or damage. Types of maintenance activities that could occur over the life of the line include pole, conductor, and insulator replacement. Access for routine inspection, maintenance, and unexpected service failures will be limited to the approved access road and disturbed areas around each pole. Upon retirement of the line, conductors, conduit, and associated hardware will be totally removed. All disturbance (i.e., access road, pole locations) will be reclaimed, with holes at each pole location filled with soil gathered from the immediate vicinity and the area raked to match the surrounding topography.

Section 5 identifies numerous measures that will be implemented by VEA to minimize impacts during construction.

4.0 POTENTIAL BIOLOGICAL IMPACTS / TAKE ASSESSMENT

4.1 Direct and Indirect Impacts

On a regional scale, direct impacts from the Project are considered minimal to desert tortoise conservation and recovery. The subject property is not found within regional conservation areas that have been identified as essential to the survival of the species.
On a local scale, the Project is within the town limits of Pahrump and has been impacted by local use, which may limit recruitment. However, the habitat in the general Project Area is still relatively good, with tortoises and tortoise sign present. Direct and indirect impacts are described separately below for the solar field and power line.

4.1.1 Solar Field

Construction of the solar field will result in the temporary displacement of any tortoises found within the Project Area. However, as a clearance survey will occur prior to disturbance, with tortoises relocated to temporary habitat (see Section 3.1.4); the potential for the Project to injure or kill any tortoises during construction is greatly reduced. However, eggs of hatchlings that are difficult to detect could be harmed if not cleared during the clearance survey. As a result, although relocation is unlikely to result in injury or mortality, the possibility cannot be eliminated. Once relocated, desert tortoises could be more susceptible to URTD due to stress. However, visual health assessments will be conducted prior to translocation and tortoises cared for according to the San Diego Zoo guidelines for temporary care of captive wild tortoises (Appendix C). This is expected to reduce potential impacts from URTD or other potential health problems to a discountable level. Relocation may result in effects other than illness, such as behavioral effects like altered behavior, reduced feeding, and reduced growth rates. Any behavioral effects are expected to be temporary as tortoises adjust to their new environment, but could continue throughout the relocation process and influence overall health, longevity, and behavior once relocated to the Project Area.

Construction of the solar field will also result in the direct permanent loss of 3.4 acres of desert tortoise habitat for the access road, inverter stations, switchyard area, and future well site. There will also be temporary disturbance of 76.4 acres due to mowing, clipping, or crushing of the vegetation for installation of the PV panels. However, once construction is complete, it is anticipated that some vegetation within the 76.4 acres will recover, and owing to Project design (e.g., increased height of the solar panels, increased spacing on a portion of the site), recover adequately to provide habitat for desert tortoise. If vegetation growth is less than expected, desert tortoise may not find adequate forage and essential behaviors such as breeding, feeding, or sheltering could be impacted in the solar field; however, undisturbed, suitable, and similar habitat is available in the immediate, surrounding area. As a result, if vegetation growth is less than expected, it is not expected to result in tortoise mortality, but could result in displacement to adjacent habitat. During operation, there is the potential for any tortoises using the site to be killed or injured due to collisions with equipment. The minimization measures described in Section 5 (e.g., use of UTVs, 15 mph speed limits, use of ground monitors) are expected to reduce the potential for injury or mortality, but cannot eliminate it. As a result, mortality or injury is possible during the life of the Project.

4.1.2 Power Line

Tortoise surveys would be conducted prior to construction, with any occupied burrows avoided or tortoises moved to a safe location. The Project is thus unlikely to injure or kill any tortoises. There will be a small direct loss of 0.65 acres of desert tortoise habitat due to construction of the access road and placement of the power poles. During routine maintenance and repair, it is possible that tortoises could be killed or injured due to collisions with equipment. Given the low density of the tortoise population and the short length of the power line, it is unlikely that tortoises will be present on any of the roads during Project activities. However, the potential for mortality or injury due to power line maintenance or repair cannot be eliminated.

4.1.3 Anticipated Take-Wildlife Species

Due to the minimization measures in place, take is expected to be minimized to primarily harassment and habitat disturbance. However, the potential for mortality or injury, particularly during operation, exists. A summary of impacts and potential take is contained below in Table 4-1.

Table 4-1 Summary of impacts to desert tortoise by covered activities

Covered Activity	Type of Impact (Take[1] or Impact)	Quantity Take or Impact
Activity 1	Harassment of any tortoises present during installation of temporary tortoise fencing	1-2 individuals
Activity 2	Harassment due to relocation	Up to 10 individuals
Activity 3	Possible mortality or injury	Mortality/Injury: Unknown # of hatchlings & eggs
Activity 4	Temporary habitat disturbance / possible mortality or injury	Temporary disturbance: 76.6 acres Mortality/Injury: Unknown # of hatchlings & eggs
Activity 5	Permanent habitat disturbance / possible mortality or injury	Permanent disturbance 3.4 acres Mortality/Injury: Unknown # of hatchlings & eggs
Activities 6, 7, & 8	Temporary and permanent disturbance as described for Activities 4 &5 / possible mortality or injury	Temporary – 76.6 acres Permanent – 3.4 acres Mortality/Injury: Unknown # of hatchlings & eggs
Activity 9	No impact	Flagging of burrows only
Activity 10	Habitat disturbance	0.65 acres
Activity 11	Harassment of any tortoises present during activities / possible mortality or injury	Harassment: 1-2 individuals/year Mortality/Injury: Unknown # of hatchlings & eggs, < 5 adults/30 years
Activity 12	Harassment of any tortoises present during activities / possible mortality or injury	Harassment: < 1 individual/year Mortality/Injury: Unknown # of hatchlings & eggs, < 5 adults/30 years

[1] Take as defined by the ESA (e.g. harassment, harm, injury, mortality, etc.).

4.1.4 Effects on Designated Critical Habitat

The proposed Project is not in an area of Designated Critical Habitat and will have no effect on Designated Critical Habitat elsewhere.

4.2 Cumulative Impacts

Impacts in the area include other development and associated habitat loss due to development in and around Pahrump. Due to the Project design, which minimizes permanent disturbance, and the small amount of total disturbance when added to already existing and future disturbance, the cumulative impact of the Project is expected to be insignificant.

4.3 Anticipated Impact of the Taking

As described in Section 4.4, take may include harassment during relocation and operation, a small amount of permanent disturbance, and the possibility of mortality or injury. However, the impact of the taking is not considered significant when compared

to the status of desert tortoise in the Eastern Mojave Recovery unit and the Project is not expected to result in jeopardy of the species. For example, the loss of 4.05 acres of desert tortoise habitat and the temporary disturbance of 76.6 acres will not significantly affect the overall extent of suitable habitat throughout the recovery unit. Further, the number of tortoises that may be incidentally killed or injured during the 30-year term of the permit is expected to be small (i.e., unknown number of hatchlings and eggs, and less than 5 adults) and possibly similar to the existing, background rate of injury and mortality in the surrounding area, which is impacted by off-road use, shooting, etc. Also, research associated with the Project has the potential to improve the design of other solar facilities within the recovery unit and the species overall range. This could result in decreased disturbance associated with these types of projects and be a benefit to the species.

5.0 CONSERVATION PROGRAM / MEASURES TO MINIMIZE AND MITIGATE FOR IMPACTS

Section 10(a)(2)(A) of the ESA requires that an HCP specify the measures that the permittee will take to minimize and mitigate to the maximum extent practicable the impacts of the taking of any federally listed animal species as a result of activities addressed by the plan.

5.1 Biological Goals

As part of the "Five Point" Policy adopted by the Services in 2000, HCPs must establish biological goals and objectives (65 Federal Register 35242, June 1, 2000). The purpose of the biological goals is to ensure that the operating conservation program in the HCP is consistent with the conservation and recovery goals established for the species. The goals are also intended to provide to the applicant an understanding of why these actions are necessary. These goals are developed based upon the species' biology, threats to the species, the potential effects of the covered activities, and the scope of the HCP.

The goals of this HCP are to:

1. Minimize take of desert tortoise in the form of mortality and injury resulting from the construction and operation of the solar field and associated power line, and minimize take in the form of harassment and habitat loss.
2. Allow for continued use by desert tortoise of habitat within the Project Area.
3. Study design features that may minimize impacts to desert tortoise.

5.2 Biological Objectives

The objectives of this HCP are to:

1. Move all tortoises out of harm's way prior to commencement of construction activities and minimize the potential for take during operation and maintenance.
2. Minimize disturbance to the site and modify portions of the PV array to allow vegetation growth necessary for desert tortoise habitat.
3. Maintain a population of resident desert tortoises within the PV array.

4. Conduct research and monitoring studies to assess the effectiveness of not grading the site and modifying the PV array on objectives #2 and #3.

5.3 Measures to Avoid and Minimize Impacts

VEA is committed to developing, constructing, operating, and maintaining a solar project with the least possible impact to desert tortoise and desert tortoise habitat. In order to avoid and minimize impacts, VEA proposes the measures described below for both the solar field and the power line.

5.3.1 Solar Field

- Immediately prior to tortoise surveys and removal, the 80-acre site will be secured with tortoise proof fencing per specifications outlined in USFWS (2009). A qualified desert tortoise biologist authorized by the USFWS will be onsite and will survey for desert tortoise and their burrows along the proposed fence line. During surveys, any occupied desert tortoise burrows within areas to be disturbed would be excavated using hand tools under the supervision of an authorized biologist. Tortoises discovered in burrows would be moved to a safe distance outside the temporary tortoise fence.
- Once the tortoise proof fencing is in place, qualified desert tortoise biologists will survey for desert tortoises and their burrows using techniques providing 100-percent coverage of the Project Area. All potential burrows will be examined to determine occupancy. Tortoises detected during the surveys will be marked and relocated following USFWS handling protocols (USFWS 2009) to temporary habitat located on VEA owned land located approximately 2,000 feet east of the Project Area.
- The permanent security fence will have tortoise access points constructed to allow tortoises to enter and use the site.
- Vegetation will be mowed, clipped, or crushed (rather than bladed) within the solar site to maintain root structure of vegetation and to keep the existing seed bed.
- PV panels will be mounted on driven piers to minimize site disturbance by avoiding the need for excavation and concrete placement.
- The PV panels will be elevated (and spacing increased in a portion of the array) above industry standard to accommodate tortoise movement and vegetation growth beneath arrays.
- Combiner boxes will be relocated to the center roadway to minimize trenching.
- Overall, ground disturbance will be kept to the minimum required.
- Any tortoises that are temporarily removed during construction will be returned to the Project Area once construction is completed. Tortoises will be individually marked, with the potential for radio telemetry or GPS tracking units to be attached.
- After construction is complete, lightweight UTVs will be used along the center access road with a speed limit of 15 mph.

- If UTVs are required off the center access road or a large vehicle is required along the center access road, ground guides will be used.
- All employees and contractors involved with the Project will be required to complete a sensitive resources education program approved by the USFWS. The program will cover the distribution, general behavior, and ecology of listed species; sensitivity to human activities; legal protections; penalties for violation of state and federal laws; reporting requirements; and minimization measures.

5.3.2 Power Line

- Ground disturbance will be kept to the minimum required.
- A 100-percent coverage survey will be conducted one week prior to the start of construction. Any burrows would be flagged and construction modified to avoid impacts. This may include moving pole locations.
- During construction, all minimization measures contained in Appendix D will apply. This includes having an authorized desert tortoise biologist or monitor onsite during Project activities. If a tortoise is observed within the construction area, Project activities shall cease until the desert tortoise moves out of harm's way or is moved out of harm's way by an authorized desert tortoise biologist. Relocation would be the minimum distance possible (with a maximum of 500 meters) within appropriate habitat to ensure its safety from death, injury, or collection associated with the Project or other activities. Other measures in Appendix D include restriction on speed limits, education for all construction personnel, and proper disposal of all trash and food items.
- Traffic on the access road following construction will be restricted to 20 mph.

5.4 Measures to Mitigate Unavoidable Impacts

The development of the Project will result in the disturbance of 80.65 acres of desert tortoise habitat. Disturbance related impacts will be minimized by design features that allow desert tortoise to return to the site following construction, and for vegetation growth to provide suitable habitat for tortoises. Further, following the 30-year life of the Project, it is anticipated that all equipment will be removed, including fencing; disturbance reclaimed (holes filled in with soil gathered in the immediate vicinity) and raked to match the surrounding topography; with the area allowed to recover naturally. As a result, no offsite mitigation is proposed. However, the Project will facilitate research and monitoring studies to evaluate the impact of the different PV panel configurations on vegetation as described in Section 3.1.3. These studies may allow for improved design of solar facilities, with fewer impacts on desert tortoise.

Table 5-1 Summary of minimization and mitigation measures and corresponding biological goals and objectives based on the level of impacts resulting from covered activities

Covered Activity	Type of Impact (Take[1] or Impact)	Quantity Take or Impact	Avoidance, Minimization, & Mitigation Measures	Biological Goals and Objectives Met
Activity 1	Harassment of any tortoises present during installation of temporary tortoise fencing	1-2 individuals	Qualified tortoise biologist would be onsite to survey for and relocate if necessary any tortoises	Goal #1, Objective #1
Activity 2	Harassment due to relocation	Up to 10 individuals	Qualified tortoise biologist would be onsite to survey for and relocate if necessary any tortoises	Goal #1, Objective #1
Activity 3	No impact	Minimal disturbance, no tortoises present	Translocation of tortoises prior to disturbance	Goal #1, Objective #1
Activity 4	Temporary habitat disturbance	76.6 acres	Vegetation mowed, clipped, or crushed to maintain root structure and preserve seed bed	Goal #2, Objectives #2 and #3
Activity 5	Permanent habitat disturbance	3.4 acres	Translocation of tortoises prior to disturbance	Goal #1, Objective #1
Activities 6, 7, & 8	Temporary and permanent disturbance as described for Activity 4 and 5	Temporary – 76.6 acres Permanent – 3.4 acres	Translocation of tortoises prior to disturbance	Goal #1, Objective #1
Activity 9	No impact	Flagging of burrows only	Translocation of tortoises prior to disturbance	Goal #1, Objective #1
Activity 10	Habitat disturbance	0.65 acres	Minimize disturbance	Goal #2, Objective #2
Activity 11	Harassment of any tortoises present during activities	1-2 individuals/year	Use of UTVs, use of ground guides, education program, and removal of structures following the 30-year term with area recovering naturally.	Goal #2, Objectives #2 and #3.
Activity 12	Harassment of any tortoises present during activities	1 individual/year	Use of ground guides, education program, and removal of structures following the 30-year term with area recovering naturally.	Goal #2, Objective #2

[1] Take as defined by the Act (e.g. harassment, injury, mortality, etc.).

5.5 Monitoring

To monitor effects resulting from the covered activities and compliance with the requirements specified in the HCP and permit, the permittee will submit an annual report to the USFWS for the duration of the permit term. During initial phases (i.e., construction) of the Project, the report will include details such as Project impacts (number of acres disturbed), and number of acres remaining to be impacted (if any), desert tortoise clearance survey results, including number of tortoises found, disposition of tortoises, general condition of tortoises, location of tortoise on the property, and date and time of day tortoise was found. Tortoises that are temporarily removed during construction will be monitored following their relocation to the Project Area. The goal of the monitoring will be to determine if the Project Area successfully supports resident tortoises. VEA will coordinate with the USFWS and any third parties to design the specifics of the monitoring program, i.e., whether tortoises will be marked or have radio telemetry or GPS tracking units attached, monitoring frequency, etc. Monitoring will be conducted for a minimum of 3 years, with monitoring ending after 3 years if results show resident tortoise use of the Project Area. Monitoring will not continue longer than 5 years. Throughout the Project (i.e., during the 3-5 year monitoring, as well as after), the annual report will continue to include details about any tortoises found within the Project Area, general condition, etc. In addition, any tortoises found within the Project Area and removed during the clearance survey will be monitored during their time in the temporary holding pens, with a separate report prepared documenting health and condition.

5.6 Adaptive Management Strategy

Adaptive management would be implemented in a four-step process: (1) information generated from monitoring activities would indicate when adaptive management is necessary (i.e., when unexpected impacts reach a "trigger" or "threshold" level); (2) once adaptive management is deemed necessary, VEA would identify the activity or method that needs adjusting and develop a proposal in coordination with USFWS to address the need; (3) once the trigger, need, and proposed improvement have been identified, VEA will coordinate with the USFWS to carry out the activity; and finally (4) the trigger, need, and implemented solution would be included in the permit holder's annual report.

The Project includes multiple features that are experimental in nature, being designed to not only minimize impacts to desert tortoises, but also to test design features that can be used in future projects. As a result, monitoring and research (described in Section 3.1.3) will be important in identifying the effectiveness of the various design features. Triggers that would indicate the need for adaptive management would include, but not be limited to, the following:

- Inability of the site to support vegetation necessary to provide desert tortoise habitat,
- Absence of desert tortoise within the site following relocation of any tortoises removed during construction (i.e., any tortoises release later vacate the Project Area), and
- Any unexpected take of desert tortoise within the Project Area.

Identifying specific activities or methods to address potential problems would occur in consultation with USFWS and with the third parties conducting on-site research. This may include additional design modification or off-site mitigation if necessary.

5.7 Reporting

Annual Reports to the USFWS will include:

1. Brief summary or list of project activities accomplished during the reporting year (e.g., this includes development / construction activities, and other covered activities).
2. Project impacts (e.g., number of acres graded, number of buildings constructed, etc.).
3. Description of any take that occurred for each covered species (includes cause of take, form of take, take amount, location of take and time of day, and deposition of dead or injured individuals), see Appendix E for an the applicable Desert Tortoise Handling and Take Report form.
4. Brief description of any new or additional conservation strategies implemented.
5. Monitoring results (compliance, effects, and effectiveness monitoring) and survey information (if applicable).
6. Description of any circumstances that made adaptive management necessary and how it was implemented. Describe all adaptive management changes to the HCP, including a very brief summary of each adaptive management action taken.
7. Description of any changed or unforeseen circumstances that occurred and how they were dealt with.
8. Description of any minor or major amendments.

6.0 FUNDING

6.1 Costs Associated with HCP Implementation

Costs associated with implementing the HCP, including the conservation strategy (minimization and mitigation measures), monitoring, and reporting are presented in Table 6-1.

Table 6-1 Costs by item/activity

Item / Activity	Unit Cost	One-Time Cost	Re-occurring Costs	Total (x # of years)
Conservation Strategy				
Temporary tortoise fence construction (solar field)		$65,000		$65,000
Temporary tortoise holding pen construction		$5,000		$5,000
Tortoise clearance		$8,500		$8,500

Item / Activity	Unit Cost	One-Time Cost	Re-occurring Costs	Total (x # of years)
surveys (100 % coverage)				
Tortoise monitoring during construction (power line)		$15,000		$15,000
Tortoise post-construction relocation		$3,000		$3,000
PV panel elevation (above industry standard)		$540,500		$540,500
Relocation of combiner boxes to center roadway to minimize trenching		$895,000		$895,000
Addition cost for modifications to accommodate not grading the site		$285,000		$285,000
Additional labor costs for uneven terrain complexities and panel modifications		$234,000		$234,000
Adding tortoise access to permanent fence		$5,000		$5,000
Subtotal				$2,056,000
Monitoring				
Tortoise holding pen monitoring & report (12 months)		$30,000		$30,000
Tortoise Monitoring (assumes maximum of 5 years)	$15,000/year			$75,000
Research Partner (assumes funding for 3 years)	$65,000/year			$195,000
Subtotal				$300,000
Decommissioning and Reclamation				
Removal of facilities and regrading		$65,000		$65,000
Reporting				
Annual Report	$5,000/year			$150,000
GRAND TOTAL				$2,571,000

6.2 Funding for Minimization and Mitigation Measures

VEA has long-term contracts with the site developer and funding secured to fully fund the Community Solar Project and conservation strategies (minimization and mitigation measures), monitoring, and reporting. The long-term contract in place is a 30-year power purchase agreement (PPA) between the site developer and VEA. The monetary rate of the electricity generated from the solar site is within the PPA. The rate was

developed to ensure funding for conservation strategies, monitoring, studies and for retirement of the project over the 30-year life of the Project.

7.0 ALTERNATIVES

Section 10(a)(2)(A)(iii) of the Endangered Species Act of 1973, [and 50 CFR sections 17.22(b)(1)(iii)(C) and §17.32(b)(1)(iii)(C)(3)] requires that alternatives to the taking of species be considered and reasons why such alternatives are not implemented be discussed.

7.1 Proposed Action Alternative

The proposed action alternative is implementation of the Community Solar Project as described in Sections 3 and 5 of this HCP. Under this alternative, VEA will avoid or minimize effects to desert tortoise during construction and operation of an 80-acre solar field and associated power line. This will be accomplished by surveying and clearing tortoises from the solar field construction site prior to disturbance, surveying and avoiding tortoises during power line construction, and incorporating design features that will allow tortoise use of the site to resume following construction and continuing concurrent with operation.

7.2 Traditional Solar Project Alternative

Solar projects traditionally involve blading and grading a site prior to installation of a PV array. The disturbed areas are fenced off with tortoise-proof fencing (without access points as included in the proposed action) to prevent tortoises from adjacent areas from accessing the Project Area and being placed in harm's way. In the case of the VEA Community Solar Project, traditional construction would have involved the complete loss of approximately 80 acres of desert tortoise habitat. Lethal take would be minimized by surveying or clearing tortoises prior to construction, which would result in impacts similar to those described for the proposed action alternative. However, the loss of habitat would have been considerably greater.

7.3 No Action Alternative

Under the No Action Alternative, a Section 10(a)(1)(B) permit would not be issued, and incidental take of desert tortoise associated with development of the VEA Community Solar Project would not be authorized and the site would not be constructed. Funding from VEA would not be available for research on the effects of design changes to vegetation and desert tortoise. Current conditions and activities on the site would continue.

8.0 PLAN IMPLEMENTATION, CHANGED AND UNFORESEEN CIRCUMSTANCES, AND AMENDMENTS

8.1 Changed and Unforeseen Circumstances

Section 10 regulations [969 Federal Register 71723, December 10, 2004 as codified in 50 CFR, sections 17.22(b)(2) and 17.32(b)(2))] require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. In addition, the HCP No Surprises Rule [50 CFR sections 17.22(b)(5) and 17.32(b)(5)] describes the obligations of the permittee and the

USFWS. The purpose of the No Surprises Rule is to provide assurance to the non-Federal landowners participating in habitat conservation planning under the ESA that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP, in light of unforeseen circumstances, without the consent of the permittee.

8.1.1 Changed Circumstances

Changed circumstances are defined in 50 CFR section 17.3 as changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by plan developers and the USFWS and for which contingency plans can be prepared (e.g., the new listing of species, a fire, or other natural catastrophic event in areas prone to such event). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and these additional measures were already provided for in the plan's operating conservation program (e.g., the conservation management activities or mitigation measures expressly agreed to in the HCP), then the permittee will implement those measures as specified in the plan. However, if additional conservation management and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the plan's operating conservation program, the USFWS will not require these additional measures absent the consent of the permittee, provided that the HCP is being "properly implemented" (properly implemented means the commitments and the provisions of the HCP have been or are fully implemented).

8.1.1.1 Listing of a New Species

If a species that occurs within the project boundary is listed under the ESA during the term of the incidental take permit, the USFWS may consider this as a changed circumstance. There are no proposed or candidate species, or species of concern, known to occur within the project boundaries, so the likelihood of such a listing is low. However, if a new listing occurred, the section 10 permit will be reevaluated by the USFWS and the HCP covered activities may be modified, as necessary, to insure that the activities covered under the HCP are not likely to jeopardize or result in the take of the newly listed species or adversely modify any newly designated critical habitat. The permittee shall implement the modifications to the HCP covered activities identified by the USFWS as necessary to avoid the likelihood of jeopardy to or take of the newly listed species or adverse modification of newly designated critical habitat. The permittee shall continue to implement such modifications until such time as the Permittee has applied for and the USFWS has approved an amendment of the Section 10 permit, in accordance with applicable statutory and regulatory requirements, to cover the newly listed species or until the USFWS notifies the Permittee in writing that the modifications to the HCP covered activities are no longer required to avoid the likelihood of jeopardy of the newly listed species or adverse modification of newly designated critical habitat.

8.1.1.2 Change in Desert Tortoise Listing Status

If the desert tortoise is delisted or if its listing status is changed from Threatened to Endangered, the HCP conditions will still apply. No changes to the minimization and mitigation measures included in this HCP will be required.

8.1.1.3 Fire

If wildfire were to affect the Project Area, much of the Project infrastructure would likely be damaged and tortoise habitat within the 80 acres destroyed. If this were to occur, changes in the minimization and mitigation measures included in this HCP may be required. For example, tortoise clearance surveys may be required to allow re-construction activities to occur, etc.

8.1.2 Unforeseen Circumstances

Unforeseen circumstances are defined in 50 CFR section 17.3 as changes in circumstances that affect a species or geographic area covered by the HCP that could not reasonably be anticipated by plan developers and the USFWS at the time of the HCP's development and that result in a substantial and adverse change in status of the covered species. The purpose of the No Surprises Rule is to provide assurances to non-Federal landowners participating in habitat conservation planning under the ESA that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP, in light of unforeseen circumstances, without the consent of the permittee.

Since effects to the desert tortoise from construction of the solar field and associated power line are expected to be low, unforeseen circumstances are not expected to occur. However, in case of an unforeseen event, the permittee will immediately notify USFWS staff that has functioned as the principal contacts for the proposed action. In determining whether such an event constitutes an unforeseen circumstance, the USFWS will consider, but not be limited to, the following factors: size of the current range of the affected species; percentage of range adversely affected by the HCP; percentage of range conserved by the HCP; ecological significance of that portion of the range affected by the HCP; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; and whether failure to adopt additional conservation measures will appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If the USFWS determines that additional conservation and mitigation measures are necessary to respond to the unforeseen circumstances where the HCP is being properly implemented, the additional measures required of the permittee must be as close as possible to the terms of the original HCP and must be limited to modifications within any conserved habitat area or to adjustments within lands or waters already set-aside in the HCP's operating conservation program. Additional conservation and mitigation measures may involve the commitment of additional land or financial compensation or restrictions on the use of land or other natural resources otherwise available for development or use under original terms of the HCP only with the consent of the permittee.

8.2 Amendments

Amendments to the HCP / permit may be minor or major. An amendment to either the HCP or the permit without an associated amendment to the other is possible. Minor changes in the HCP can be completed administratively without amending the permit. Similarly, amendment of the permit without changes to the HCP can also be

accomplished. The following sections define minor and major amendments as applicable to this HCP.

8.2.1 Minor Amendments

Minor amendments are changes that do not affect the scope of the HCP's impact and conservation strategy, change the amount of take, add new species, and/or change significantly the boundaries of the HCP. Minor amendments may be proposed by the permittee of the USFWS, with the amendment process accomplished through an exchange of letters between the permit holder and the USFWS Field Office. Minor amendments to the HCP may include (but are not limited to) the following:

- Corrections to site maps (Appendix A) to address errors in the covered area boundary location.
- Modification of existing incidental take avoidance measures, or establishment of new incidental take avoidance measures.
- Clarifying or modifying desert tortoise survey protocols or the disposition of desert tortoises.
- Modifying the reporting schedule or notification process
- Any other modifications to the HCP that are consistent with the biological goals and objectives of the HCP that the USFWS has analyzed and agreed to, and that will not result in operations under the HCP that are significantly different from those analyzed in connection with the HCP as approved.

8.2.2 Major Amendments

Major amendments to the HCP and permit are changes that do affect the scope of the HCP and conservation strategy, increase the amount of take, add new species, and change significantly the boundaries of the HCP. Major amendments often require amendments to the USFWS's decision documents, including the NEPA document, the Biological Opinion, and findings and recommendations document. Major amendments will often require additional public review and comment. Major amendments may include changes to the covered area and covered activities that were not addressed in the Proposed Action section of the HCP and do not meet the definition of a minor amendment, as well as changes in the duration of the covered activities beyond the term of the current permit.

8.3 Other Measures as Required by Director

In general, an Implementing Agreement between the permit applicant, the USFWS, and the appropriate State resource agency (when State-listed species are involved) is required by the Director. The Implementing Agreement is a legal contract to specify roles and responsibilities and to ensure compliance with the permit. Since this HCP is for a small, single-applicant project, the USFWS does not require an Implementing Agreement.

9.0 LITERATURE CITED

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APPENDIX A

Maps / Figures

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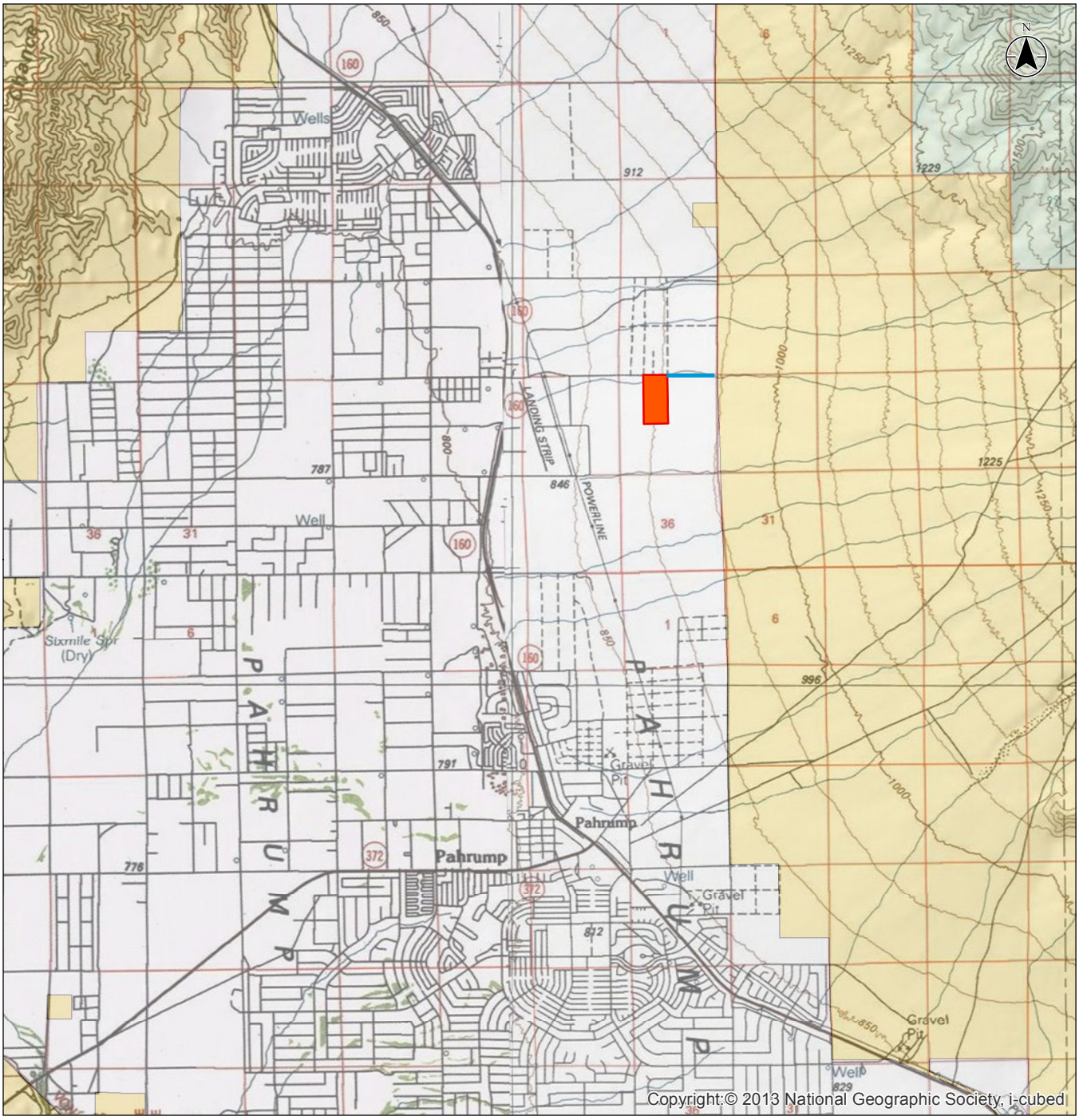

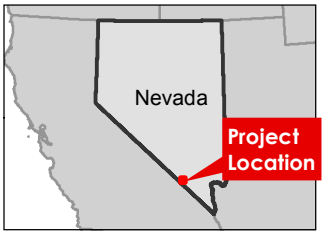

Proposed Solar Field
Proposed Power Line
BLM
Private
USFS

0 1 2 miles
1:100,000 (at original document size of 8.5x11)

Stantec

Project Location
T19S, R1253 E, S21
T. of Pahrump, Nye Co.,NV

203702035
Prepared by ST on 2015-08-18
Technical Review by EAH on 2015-08-18

Client/Project
Valley Electric Association
Community Solar Project HCP

Figure No.
1

Title
Project Area and Land Status

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © First Base Solutions, 20xx.

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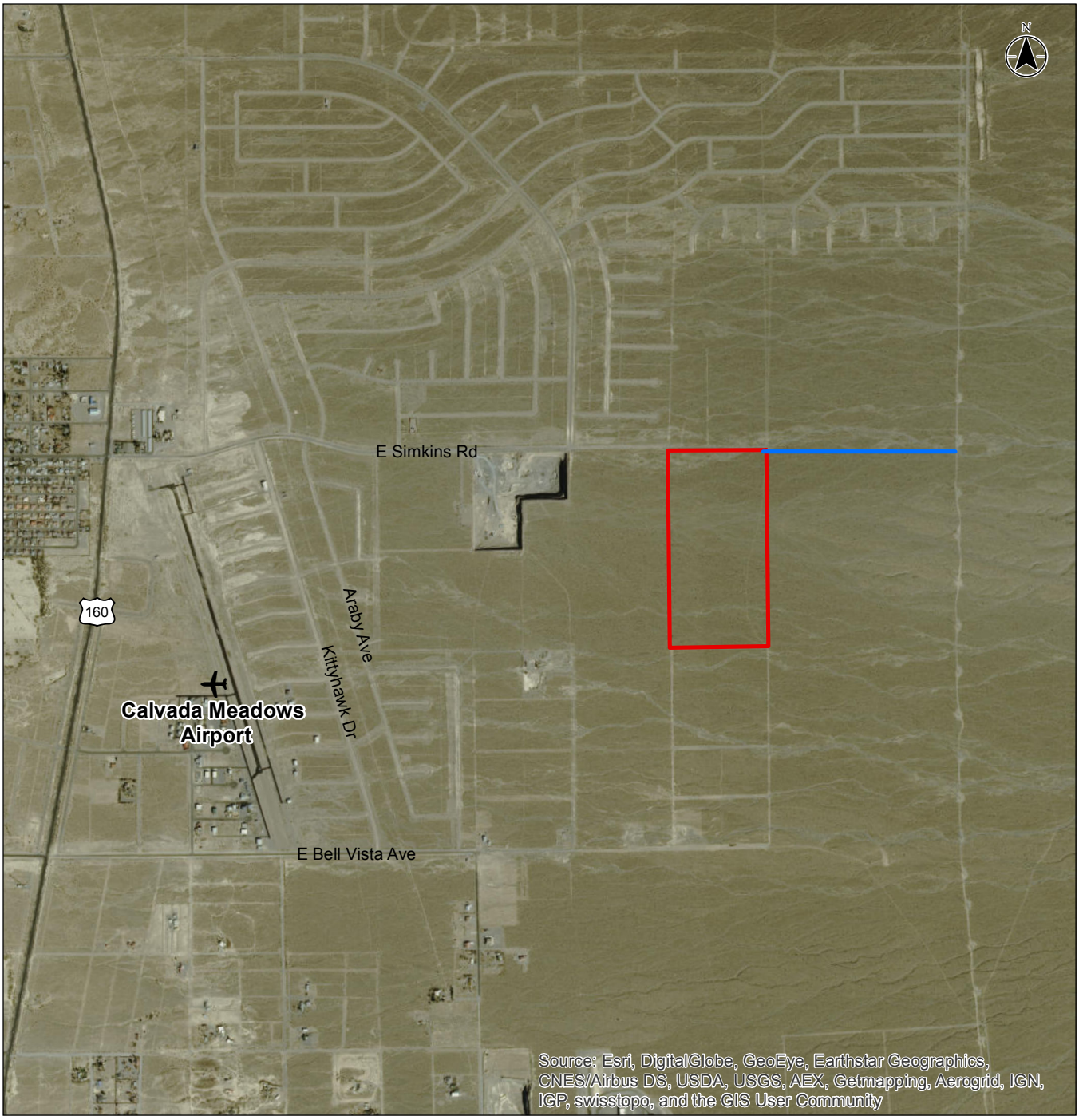

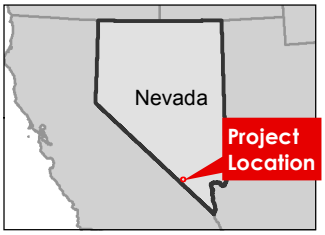

Proposed Solar Field
Proposed Power Line

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Stantec

Project Location
T19S, R1253E, S21
T. of Pahrump, Nye Co.,NV

203702035
Prepared by ST on 2015-08-18
Technical Review by EAH on 2015-08-18

Client/Project
Valley Electric Association
Community Solar Project HCP

Figure No.
2

Title
Project Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © First Base Solutions, 20xx.

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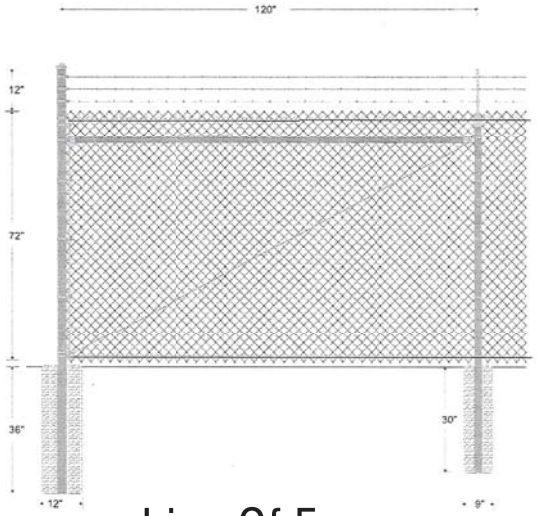

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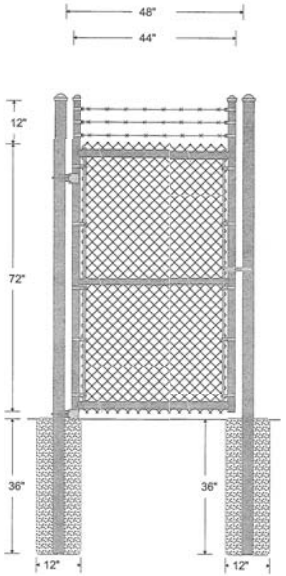
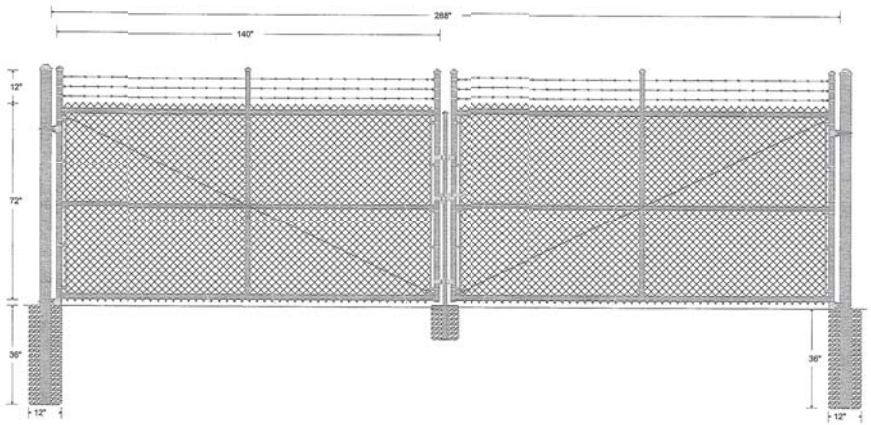
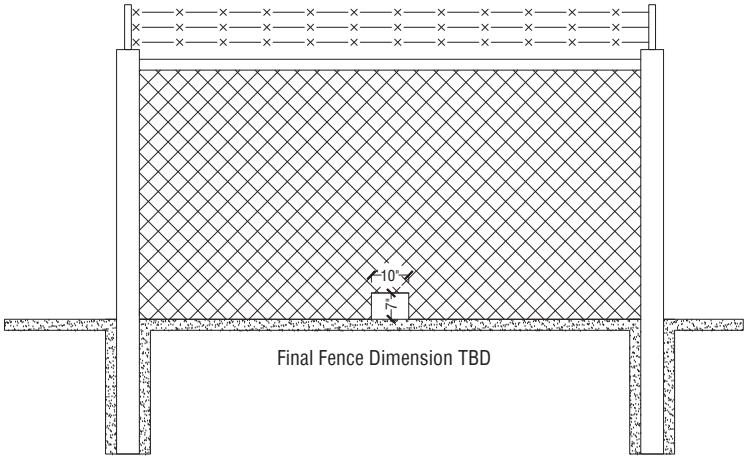


4' Single Gate
2" LG-40 Pipe Frame



24' Double Gate, 2" :G-40 Pipe Frame



Tortoise Crossing Fence Detail

BOMBARD
RENEWABLE ENERGY
A DIVISION OF BOMBARD ELECTRIC, LLC.
6434 S. ARVILLE ST. LAS VEGAS, NV. 89118 LICENSE #60327
Phone: (702) 492-0957 www.bombardre.com

VEA Community Solar Project
Pahrump, Nevada

REVISION

NO.	DATE	INITIAL	DESCRIPTION
0	6.11.15	VT	PRELIMINARY
1	8.18.15	VT	Project Name

Fence Detail

DATE	DRAWING #	SCALE	REV. #
6.11.15	P.V - 3.0	N/A	0

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NOT FOR CONSTRUCTION

SYSTEM SPECIFICATIONS

System Size:
17.28 MWDC/ 15.0 MWAC

Installation Type:
30° Ground Mount

Inverters:
(10) 1.5 MW Inverter Power Stations

Solar Modules:
(54,000) SolarWorld 320

LEGEND

Property Line

Fence

18 Modules Block

Class I Tortoise Burrows

Class II Tortoise Burrows

Tortoise Crossing Fence

1.5 MW Inverter Power Station

NOTE:

- 14' inner row spacing Power Block 1-6
- 20' inner row spacing Power Block 7-10
- Tortoise crossing fence location every 260ft
- Tortoise crossing fence opening dimension (See Fence Detail drawing)
- Road design (TBD)

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VEA Community Solar Project
Pahrump, Nevada

REVISION

NO.	DATE	INITIAL	DESCRIPTION
0	6.11.15	VT	PRELIMINARY DESIGN
1	8.18.15	VT	Project Name

SITE PLAN

DATE	DRAWING #	SCALE	REV. #
6.11.15	P.V - 1.0	N/A	0

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NOTE:
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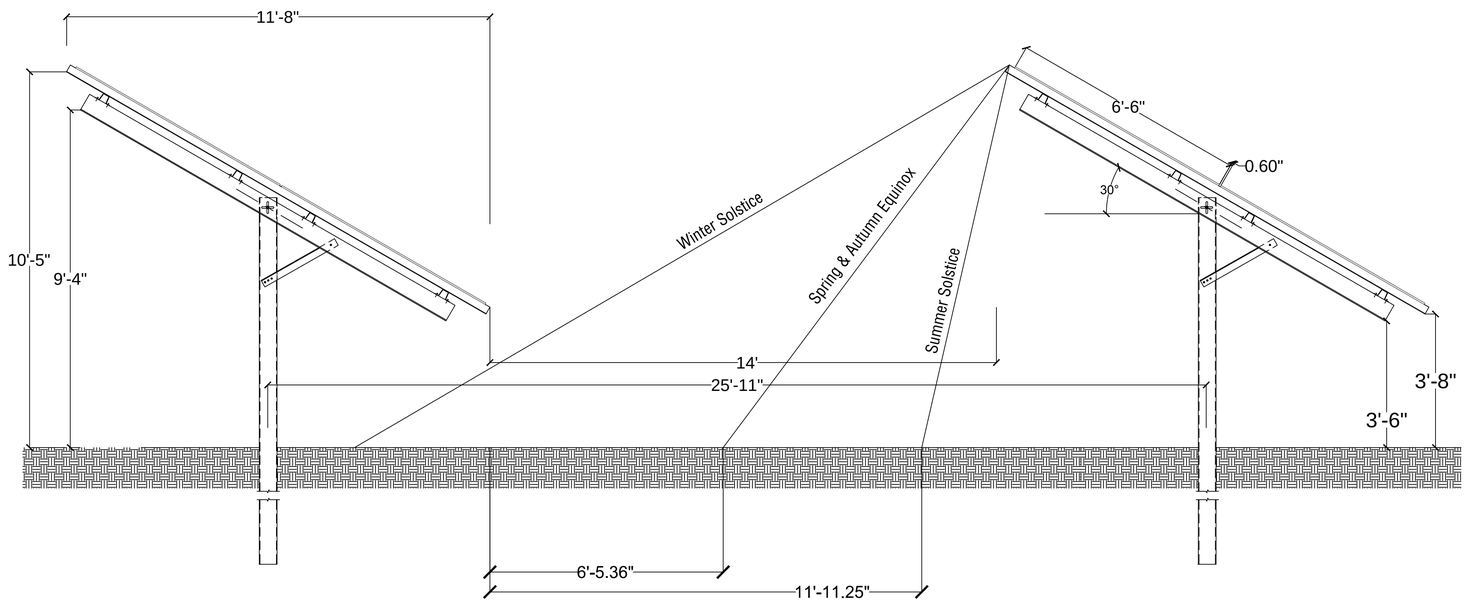
14 Feet Inner Row Spacing



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VEA Community Solar Project
Pahrump, Nevada

REVISION

NO.	DATE	INITIAL	DESCRIPTION
0	5.26.15	VT	PRELIMINARY
1	8.18.15	VT	Project Name

Elevation Details

DATE	DRAWING #	SCALE	REV. #
5.26.15	P.V - 1.0	N/A	0

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NOTE:
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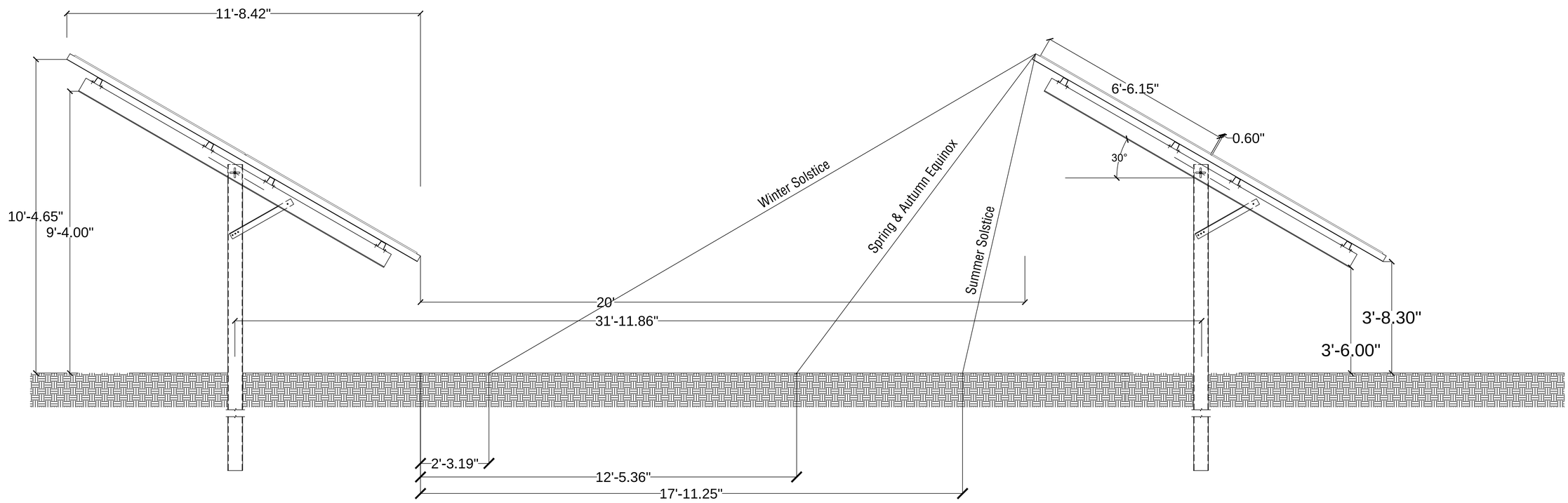
20 Feet Inner Row Spacing



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VEA Community Solar Project
Pahrump, Nevada

REVISION

NO.	DATE	INITIAL	DESCRIPTION
0	6.1.15	VT	PRELIMINARY
1	8.18.15	VT	Project Name

Elevation Details

DATE	DRAWING #	SCALE	REV. #
6.1.15	P.V - 1.0	N/A	0

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APPENDIX B

Biological Reports

TAVACI COMMUNITY SOLAR PROJECT
DESERT TORTOISE SURVEY
PAHRUMP, NEVADA

Prepared for:

Valley Electric Association
800 East Highway 372
Pahrump, Nevada 89041

Prepared by:

Stantec Consulting Services Inc.
321 North Mall Drive, Suite I-202
St. George, Utah 84790

Stantec Project Number 203702035

April 21, 2015

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ABBREVIATIONS/ACRONYMS

GIS	Geographic Information Systems
GPS	Global Positioning System
MCL	Midline Carapace Length
PV	Photovoltaic
Stantec	Stantec Consulting Services Inc.
VEA	Valley Electric Association

1.0 INTRODUCTION

In February 2015, Valley Electric Association, Inc. (VEA) contracted with Stantec Consulting Services Inc. (Stantec) to conduct a Mojave desert tortoise (*Gopherus agassizii*) survey within the proposed area for the Tavaci Community Solar Project (**Figure 1**). The survey was conducted on April 1 and 2, 2015 during the Active Survey Period for desert tortoise.

Construction of the solar field and associated power line would result in the disturbance of 80 and 0.65 acres of desert tortoise habitat (Survey Area), respectively, within the unincorporated town limits of Pahrump, Nye County, Nevada. The solar field parcel is zoned Village Residential (VR-20, medium density) with a Nye County approved Special Project Overlay zone for a renewable energy project. The power line area is also zoned VR-20.

VEA is a nonprofit electric utility headquartered in Pahrump, Nevada; incorporated in 1965. The proposed Project would provide a local renewable generation source to VEA's members. Currently, VEA purchases all of their power from sources outside of their service area and has no local area generation and no renewable generation. A portion of the output of the planned Project would be made available for VEA members to purchase as part of a community solar project. This would allow VEA members to purchase solar generation without installing solar panels on their roof tops and make it more cost effective to purchase renewable energy. VEA's service territory is in one of the best solar resource locations in the country for photovoltaic (PV) systems and solar development is included in the Nye County Master Plan.

The Mojave desert tortoise is listed as Threatened under the Endangered Species Act and the Survey Area is located in the Eastern Mojave Recovery Unit for the species (USFWS 2011). Desert tortoises occur in the Pahrump Valley at relatively low densities (Nye County 2009) and are known to exist in the Survey Area from past surveys (HDR 2015).

1.1 LOCATION

The Project would be constructed on 80 acres of vacant land within the town limits of Pahrump in Township 19 South (T19S) Range 53 East (R53E) Section 25. In addition, an associated power line would be constructed within a 2,640 by 20 foot (1.2 acres, actual disturbance is estimated at 0.65 acres) easement in T19S R53E Sections 24 and 25. The Survey Area is approximately 1.4 miles east of Highway 160 and immediately south of Simkins Road (**Figure 2**).

The Survey Area occurs in and the habitat is typical of that found within the Mojave Desert (**Photos 1 and 2**). Further, it is located near populated areas; as such, portions of the area have been impacted from off road use, dumping, and target shooting.

Vegetation in the Survey Area consists of a typical creosote-bursage vegetation community. The common species are creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), goldenhead (*Acamptopappus shockleyi*), Mojave yucca (*Yucca schidigera*), and Mormon tea (*Ephedra nevadensis*). A complete list of vegetation observed during the survey is located in **Appendix A**.

1.2 FIELD CONDITIONS

Field conditions during the winter and early spring of 2015 were marked by warmer than average temperatures and were wetter than average. National Weather Service climate data indicates that conditions in Pahrump during this survey were warmer than historically. During the survey the winds were light to moderate and the days were mostly sunny with high temperatures of 24 degrees Celsius (75 degrees Fahrenheit) on April 1 and 20 degrees Celsius (68 degrees Fahrenheit) on April 2.

2.0 METHODOLOGY

Stantec qualified tortoise biologists conducted protocol (USFWS 2010) desert tortoise surveys for the entire Survey Area. As required by the protocol, biologists walked parallel transects spaced 10 meters (approximately 30 feet) apart to achieve 100 percent coverage of the area. The Survey Area transects were mapped in a geographic information system (GIS) and uploaded to an Ashtech global positioning system (GPS) prior to the survey. The GPS was used to locate and follow the established transect lines in the field. A crew of two biologists walked parallel transects to achieve coverage of the Survey Area. During the survey, special attention was given to the identification of desert tortoises and their sign (e.g., burrows, scat, carcasses). Survey information was recorded on established data sheets (**Appendix B**) and digitally within a geodatabase loaded on the GPS.

During the tortoise survey, biologists also surveyed for burrowing owls (*Athene cunicularia*) and their sign (e.g., burrows, pellets, feathers), plus recorded all wildlife and plant species observed. A count of the cactus and yucca species in the Survey Area was also conducted. Cactus and yucca species were identified and counted along six 20-meter wide transects - two along the west side, two in the middle, and two along the east side - in order to estimate coverage and density across the Survey Area.

3.0 FINDINGS

A summary of the survey results are discussed in the sections below. Tables summarizing the observations made during the survey are also included. **Appendix B** contains data sheets that document desert tortoises and desert tortoise sign (e.g., burrows, scat, carcasses) observed during the survey. **Appendix C** contains photos of the Survey Area (**Photos 1 and 2**) as well as a typical tortoise burrow (**Photo 3**) and a tortoise (**Photo 4**).

3.1 DESERT TORTOISE SURVEY RESULTS

Two live tortoises were located in the Survey Area (**Figure 2**). The first tortoise (**Photo 4**) was found on April 1. The tortoise was not handled, but it had an estimated midline carapace length (MCL) of 254 millimeters and it was predicted to be a female based on the size of its gular horn. The tortoise was observed out of but near burrow B24 (**Table 1**) and walking. The eyes and nares appeared clear and dry from a distance and it appeared to have been eating recently. The second tortoise, also not handled, was observed on April 2 and had an estimated MCL of 127 millimeters. The tortoise was observed out of but near burrow B42 (**Table 1**) and walking. The eyes and nares appeared clear and dry from a distance and it appeared to have been eating recently. Both tortoises were observed during the middle of the day, observations were made from a distance, and both tortoises continued with their normal activity. A camera with a zoom lens was used to take pictures (**Appendix C**).

A total of 47 burrows, ranging in size and condition, were found during the survey (**Figure 2**, **Table 1**). There were 7 burrows that were currently active, having recent sign of tortoise use (Class 1), 24 burrows were in good condition but showed no sign of recent use (Class 2), and 14 burrows that were classified as deteriorated tortoise burrows (Class 3). The 2 remaining burrows were deteriorated and classified as being possible tortoise burrows (Class 5). The burrows were located scattered throughout the Survey Area in open areas, wash banks, and under shrubs. There were 14 burrows for which the back of the burrow was not visible and could have contained live tortoises.

Table 1. List of Burrows

Burrow #	Date	Class*	Other Sign	Cover	Width, Depth (in)	Back Visible
1	04-01-15	2	Old scat	Open	13,0	No
2	04-01-15	5		Under Shrub	12,15	Yes
3	04-01-15	3		Under Shrub	10,10	Yes
4	04-01-15	3		Under Shrub	8,8	Yes
5	04-01-15	2		Open	15,18	No
6	04-01-15	2		Under Shrub	22,36	No
7	04-01-15	2		Under Shrub	12,24	No
8	04-01-15	2		Under Shrub	11,16	Yes
9	04-01-15	2		Under Shrub	14,24	No
10	04-01-15	2		Open	14,24	No
11	04-01-15	2	Scat inside	Under Shrub	14,36	Yes
12	04-01-15	3		Under Shrub	12,14	No
13	04-01-15	2		Wash Bank	14,14	Yes
14	04-01-15	3		Under Shrub	10,8	Yes
15	04-01-15	3		Under Shrub	12,15	Yes
16	04-01-15	2		Under Shrub	15,24	Yes
17	04-01-15	2	2 burrows together	Under Shrub	15,24	Yes
18	04-01-15	5		Under Shrub	12,4	Yes
19	04-01-15	2	Scat	Open	10,24	No
20	04-01-15	3		Open	8,12	Yes
21	04-01-15	3		Open	10,14	Yes

Burrow #	Date	Class*	Other Sign	Cover	Width, Depth (in)	Back Visible
22	04-01-15	3		Under Shrub	13,19	Yes
23	04-01-15	2		Under Shrub	13,24	Yes
24	04-01-15	1	Tortoise near burrow	Open	11,24	Yes
25	04-01-15	3		Under Shrub	11,13	Yes
26	04-01-15	2		Open	14,60	No
27	04-01-15	1		Under Shrub	14,36	No
28	04-01-15	1	Tracks in burrow	Under Shrub	14,41	Yes
29	04-01-15	2		Open	14,38	Yes
30	04-02-15	3		Under Shrub	15,20	Yes
31	04-02-15	2		Under Shrub	17,26	Yes
32	04-02-15	3		Under Shrub	12,18	Yes
33	04-02-15	1	Scat at burrow	Under Shrub	6,40	No
34	04-02-15	2	Burrowing owl pellet at entrance, tortoise scat	Open	16,42	Yes
35	04-02-15	2		Under Shrub	12,15	Yes
36	04-02-15	1	Tracks in burrow	Under Shrub	13,15	Yes
37	04-02-15	3		Open	8,8	Yes
38	04-02-15	3		Under Shrub	8,9	Yes
39	04-02-15	1	Scat	Under Shrub	12,22	Yes
40	04-02-15	2		Wash Bank	14,17	Yes
41	04-02-15	3		Under Shrub	10,8	Yes
42	04-02-15	1	Tracks, tortoise near burrow	Under Shrub	12,14	Yes
43	04-02-15	2		Under Shrub	6,18	Yes
44	04-02-15	2		Under Shrub	14,28	No
45	04-02-15	2	Scat	Under Shrub	14,60	No
46	04-02-15	2		Wash Bank	13,12	No
47	04-02-15	2		Wash Bank	14,14	Yes

*Class 1. Currently active, with desert tortoise or recent desert tortoise sign.
Class 2. Good condition, definitely desert tortoise; no evidence of recent use.
Class 3. Deteriorated condition; this includes collapsed burrows; definitely desert tortoise.
Class 4. Good condition; possibly desert tortoise.
Class 5. Deteriorated condition; this includes collapsed burrows; possibly desert tortoise (USFWS 2009).

Eleven carcasses were observed (**Figure 2**) during the survey. With the exception of one, all of the carcasses were disarticulated and scattered (Class 5, **Table 2**); these varied in the amount of bones and scutes that were left. One carcass was found that was complete and had scutes still adhering to the bone (Class 2, **Table 2**), but there was no tissue on the inside. There was a small hole in the carapace that went through the scute and bone and appeared to be a bullet hole.

Table 2. List of Carcasses

Carcass #	Date	Class*	Age Class	Notes
1	04-01-15	5	Unknown	Bone fragments
2	04-01-15	5	Adult	Bone fragments and a few scutes
3	04-01-15	5	Unknown	Bone fragments
4	04-01-15	5	Adult	Bone fragments and a few scutes
5	04-01-15	5	Unknown	Bone fragments
6	04-01-15	5	Adult	Bone fragments and a few scutes
7	04-01-15	5	Adult	Bone fragment
8	04-02-15	5	Adult	Bone fragments and a few scutes
9	04-02-15	5	Unknown	Bone fragments
10	04-02-15	5	Adult	Bone fragments
11	04-02-15	2	Adult	Hole in carapace through the bone

*Class 1. Fresh
Class 2. Normal color, scutes adhere to bone
Class 3. Scutes peeling off bone
Class 4. Shell bone is falling apart, growth rings on scutes are peeling
Class 5. Disarticulated and scattered (USFWS 1992)

Other tortoise sign found during the survey included 9 scat groupings either associated with burrows or out in the open (**Figure 2**). The scat varied in the number of pieces and ranged in age from old to fresh.

3.2 CACTUS COUNT RESULTS

A count of cactus and yucca in the Survey Area was completed on six 20-meter wide transects. The results are presented in **Table 3** and can be used to estimate the total number of cactus and yucca in the Survey Area. Six different species were observed: Mojave yucca (*Yucca schidigera*), Joshua tree (*Yucca brevifolia*), hedgehog cactus (*Echinocereus engelmannii*), beavertail cactus (*Opuntia basilaris*), cholla (*Opuntia* sp.), and cotton-top cactus (*Echinocactus polycephalus*). The Mojave yucca was the most common yucca with a total of 303 counted along the six transects. Cholla was the most common cactus with 180 counted along the six transects. The counts were consistent between transects and only ranged from 85 to 100 cactus and yucca per transect (the average count per transect was 94), thus indicating that the Survey Area is uniformly covered with cactus and yucca and that data collected can be used to estimate density across the entire Survey Area. By using the average count for each species and multiplying that by the total number of 20-meter wide transects (29.5 within the Survey Area), the total estimated number of cactus and yucca is 2,778 (**Table 3**).

Table 3. Cactus and Yucca Counts in the Survey Area

TRANSECT	Species						TOTAL
	Mojave Yucca	Cholla	Joshua Tree	Hedgehog Cactus	Cotton-Top	Beaver tail	
1	53	34	2	3	6	2	100
2	44	36	4	1	3	4	92
3	56	28	3	4	7	2	100
4	40	28	4	3	4	6	85
5	56	27	5	0	0	6	94
6	54	27	1	4	1	7	94
Average Per Transect*	51	30	3	3	4	5	94
Estimate Per Survey Area*	1,490	885	93	74	103	133	2,778

*This number has been rounded to the nearest whole number and does not match exactly the number used to calculate the Estimate per Survey Area

**Based on 29.5 transects

3.3 OTHER WILDLIFE OBSERVATIONS

In addition to desert tortoises, Stantec biologists also observed other wildlife species including black-throated sparrows (*Amphispiza bilineata*) nesting in the white bursage - five nests were found (**Figure 2**). A burrowing owl pellet was found at the entrance of a tortoise burrow (**Figure 2**), but no other sign was observed to indicate that burrowing owls were nesting in the Survey Area. Other bird species observed were horned lark (*Eremophila alpestris*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Finally, other reptiles observed were side-blotched lizard (*Uta stansburiana*), whiptail lizard (*Aspidoscelis tigris*), and sidewinder rattlesnake (*Crotalus cerastes*).

4.0 SUMMARY

Stantec completed the protocol (USFWS 2010) desert tortoise survey on April 1 and 2, 2015. The Survey Area contained 47 burrows, 11 tortoise carcasses, and tortoise scat. Two live tortoises were observed out of burrows and walking around. The backs of 14 burrows were not visible and could have contained a live tortoise(s). A burrowing owl pellet was observed, but there was no sign of nesting in the Survey Area. Cactus and yucca are uniformly spread across the Survey Area. Cheat grass was the only 'invasive' species encountered.

5.0 REFERENCES

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Nye County. 2009. Draft: Pahrump Valley desert tortoise habitat conservation plan. Nye County Planning Department, Pahrump, Nevada.

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US Fish and Wildlife Service (USFWS). 2010. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). USFWS Desert Tortoise Recovery Office, Reno, Nevada.

US Fish and Wildlife Service (USFWS). 2011. Revised Recovery Plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). USFWS, Pacific Southwest Region, Sacramento, California.

FIGURES

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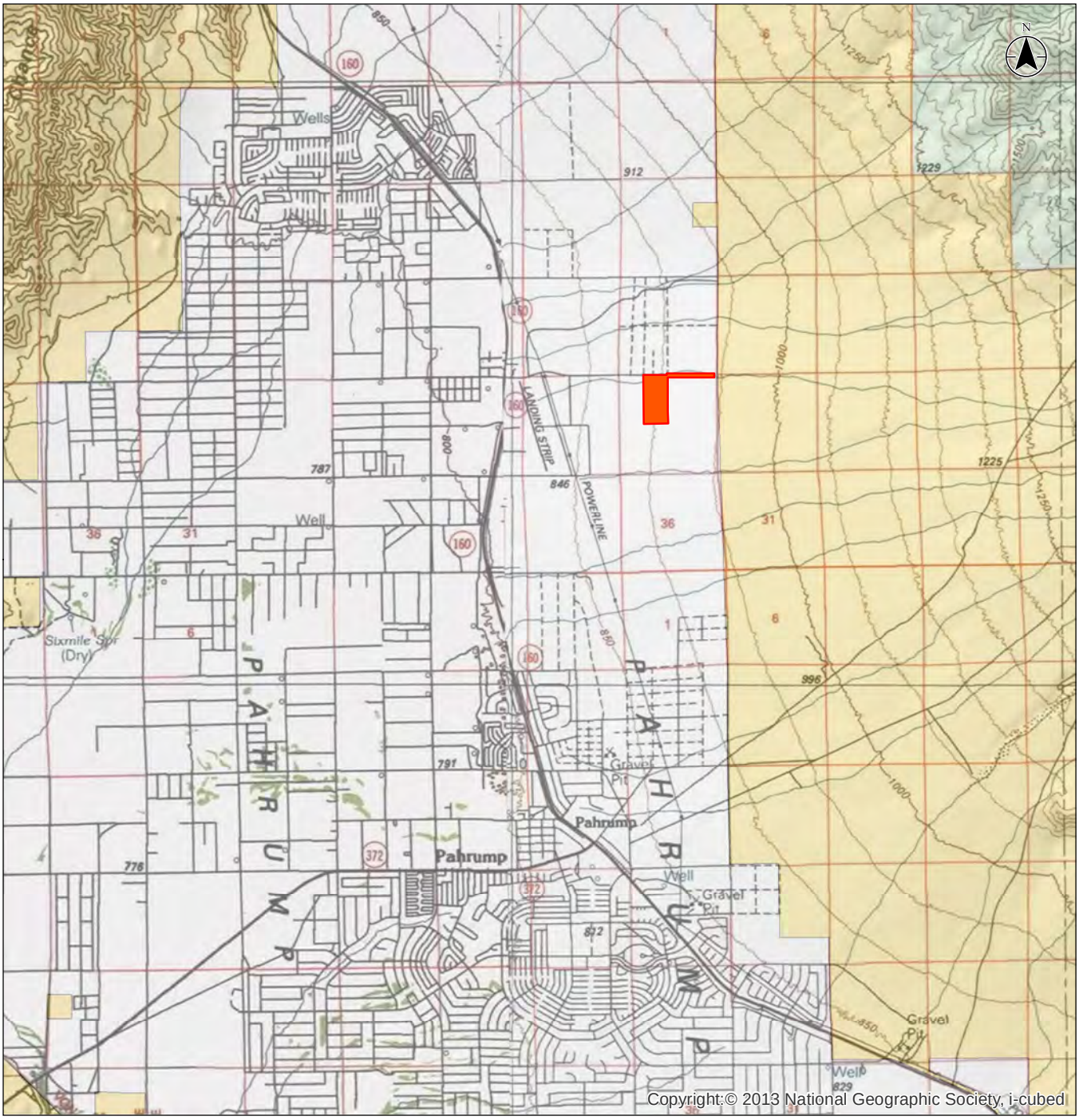

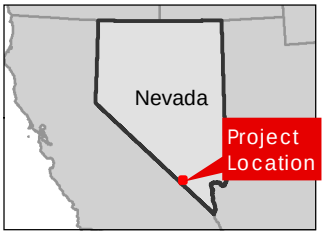

Survey Area
BLM
Private
USFS

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Stantec

Project Location
T19S, R1253 E, S21
Pahrump, Nye Co.,NV

203702035
Prepared by ST on 2015-04-14
Technical Review by EAH on 2015-04-14
Independent Review by JPM on 2015-04-14

Client/Project
Valley Electric Association
Tavaci Community Solar Project
Desert Tortoise Survey

Figure No.
1

DRAFT

Title
Project Area and Land Status

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

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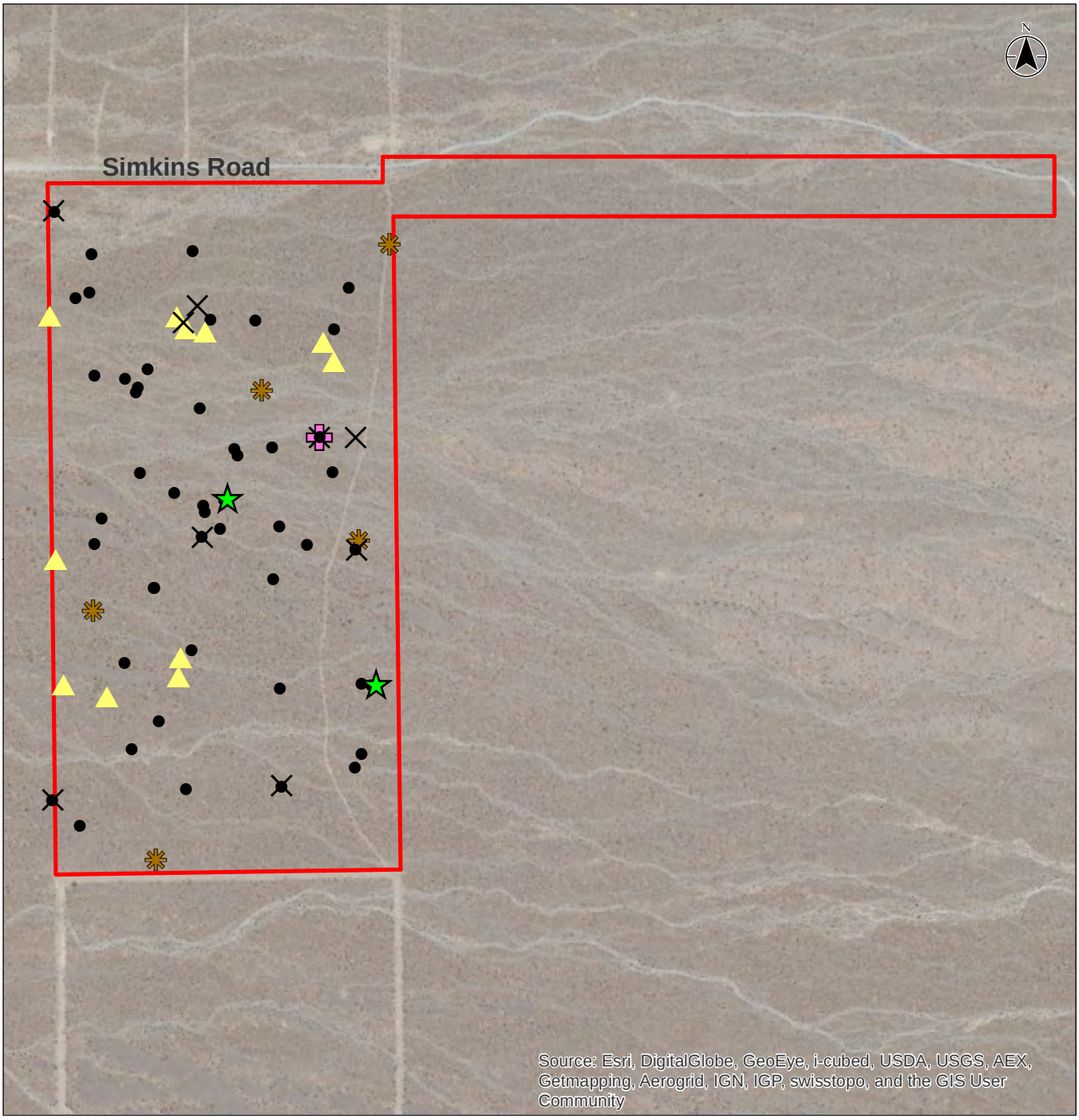

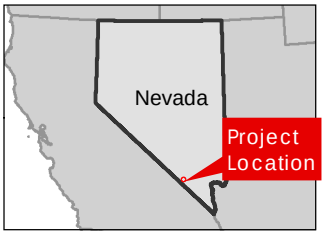

Survey Area
Live Tortoise
Tortoise Burrow
Tortoise Carcass
Tortoise Scat
Black-Throated Sparrow Nest
Burrowing Owl Pellet

0 0.1 0.2 miles
1:7,055 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N

Stantec

Project Location
T19S, R1253 E, S21
Pahrump, Nye Co.,NV

203702035
Prepared by ST on 2015-04-14
Technical Review by EAH on 2015-04-14
Independent Review by ABC on 2015-04-14

Client/Project
Valley Electric Association
Tavaci Community Solar Project
Desert Tortoise Survey

Figure No.
2

DRAFT

Title
Survey Results

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APPENDIX A

Vegetation List

Common Name	Genus	Species
Goldenhead	*Acamptopappus*	*shockleyi*
White Bursage	*Ambrosia*	*dumosa*
Devils Lettuce	*Amsinckia*	*tessellata*
Cheat Grass	*Bromus*	*tectorum*
Devils Spine Flower	*Chorizanthe*	*rigida*
Wingnut Cryptantha	*Cryptantha*	*pterocarya*
Flixweed	*Descurainia*	*sophia*
Cotton-Top Cactus	*Echinocactus*	*polycephalus*
Hedgehog Cactus	*Echinocereus*	*engelmannii*
Mormon Tea	*Ephedra*	*nevadensis*
Desert Trumpet	*Eriogonum*	*Inflatum*
Woolly Daisy	*Eriophyllum*	*wallacei*
Cheese Bush	*Hymenoclea*	*salsola*
Range Ratany	*Krameria*	*erecta*
Creosote	*Larrea*	*tridentata*
Smooth Desert Dandelion	*Malacothrix*	*glabrata*
Wishbone-Bush	*Mirabilis*	*laevis*
Beaver Tail Cactus	*Opuntia*	*basilaris*
Cholla	*Opuntia*	sp.
Fremont's Phacelia	*Phacelia*	*fremontii*
Desert Plantain	*Plantago*	sp.
Desert Chicory	*Rafinesquia*	*neomexicana*
Paperbag Bush	*Salazaria*	*mexicana*
Clump Grass	*Schismus*	sp.
Mojave Aster	*Xylorhiza*	*tortifolia*
Joshua Tree	*Yucca*	*brevifolia*
Mojave Yucca	*Yucca*	*schidigera*
Desert Larkspur	*Delphinium*	*parishii*
Beehive Cactus	*Escobaria*	*vivipara*

APPENDIX B

Desert Tortoise Data Forms

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-1-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Mojave desert Tavaci Solar Pahrump, NV. (project name and size; general location)

County: Nye Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: (100% coverage) or Sampling Area size to be surveyed: 80 acres Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: 0800 am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: 1715 am/pm

Start Temp: 60°F ~~°C~~ End Temp: 75°F ~~°C~~

Live Tortoises

Detection number	GPS location Easting	GPS location Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	GPS location Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B1 1	~~B1~~		burrow, scat	Good condition, old scat photo - 2877
Carcass1 2			Carcass	- bones pieces photo - 2886
B2 3			burrow	- deteriorated photo - 2889
B3 4			burrow	- deteriorated photo - 288990
B4 5			burrow	deteriorated photo - 2891
B5 6			burrow	Good condition, Photo - 2892
B6 7			burrow	deteriorated, photo 2893
B7 8			burrow	deteriorated, photo 2894

2010 Field Season

Transect number: 1-4

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-1-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County:_____ Quad:_____ Location:_____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: _____am/pm

Start Temp: _____°C End Temp: _____°C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
C2 1			Carcass	bones + some scutes Photo 2895
B8 2			Burrow	good Condition, Photo 2897
B9 3			Burrow	good Condition, Photo 2898
B10 4			Burrow	good Condition, photo 2899
B11 5			Burrow, scat inside	good Condition, 5 scat, photo 2900
B12 6			Burrow	deteriorated, photo 2901
B13 7			Burrow	good Condition, Photo 2902
B14 8			Burrow	deteriorated, photo 2907

Delete second B13 on GPS

Page: 2 of 5

Transect number: 1-4

2010 Field Season

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-1-15 (day, month, year) Survey biologist(s): Corey Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County: _____ Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: _____am/pm

Start Temp: _____°C End Temp: _____°C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B15 1			Burrow	deteriorated, Photo 2908
B16 2			Burrow	good condition, Photo ~~2909~~ (2910)
C3 3			Carcass	scattered bone, Photo ~~2910~~ 2911 2912
C4 4			Carcass	bone + scute pieces, Photo 2913
B17 5			2 burrows	Good shape, Photo 2914
C5 6			Carcass	few bones, Photo 2915
B18 7			Burrow	possible tort, Photo 2919
S2 8			Scat, 1 piece	Old, falling apart, Photo 2920

2010 Field Season

Transect number: _____

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-1-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County:_____ Quad:_____ Location:_____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: _____am/pm

Start Temp: _____°C End Temp: _____°C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
C6 1			Carcass	Bones + scutes, photo 2921
B19 2			Burrow	good condition, photo 2922
S3 3			Scat, 2 piece	old, photo 2923
B20 4			2 burrows	deteriorated, photo 2924, 2925
B21 5			burrow under shrub	deteriorated, photo 2926
B22 6			burrow	good condition, photo 2927
C7 7			Carcass	1 bone, photo 2928
B23 8			Burrow	good condition, 2929

Page: 4 of 5

Transect number: _____

2010 Field Season

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-1-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County: _____ Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____ am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: 1715 am/pm

Start Temp: _____ °C End Temp: 75°F ~~°C~~

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
T1 1	photo -	2932	1455	in open, eating	10 in	none
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
S4 1			scat, 4 pieces	New, brown w/ shine 2930, 2931
B24 2			burrow	Active, tort near burrow Photo 2933
B25 3			burrow	deteriorated, photo 2934
B26 4			burrow	Good condition, photo 2937
B27 5			burrow	Active, photo 2938
B28 6			burrow	Active, Photo 2939
B29 7			burrow	Good condition, Photo 2954
8				

Transect number: _____

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-2-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar Tavaci Solar (project name and size; general location)

County: _____ Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: 0900 am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: 1640 am/pm

Start Temp: 60° f °C End Temp: 75°f °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B30 1			burrow	deteriorated, photo 2955
B31 2			burrow	Good condition, photo 2956
B32 3			burrow	deteriorated, photo 2957
B33 4			burrow	Active, photo 2958, 2959
S5 5			scat, 10 piece	at B33, photo 2959 60
B34 6			burrow	good condition, photo 2962
S6 7			Scatt, 4 pieces	old at #34, photo 2963
B35 8			burrow	good condition, photo 2965

Transect number: _____

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-2-15 (day, month, year) Survey biologist(s): Greg Sharp Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County: _____ Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: _____am/pm

Start Temp: _____°C End Temp: _____°C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B36 1			Burrow	Active, photo 2966
C8 2			Carcass	bones + scutes, photo 2967
C9 3			Carcass	bones, photo 2968
B37 4			burrow	Collapsed, photo 2969
B38 5			burrow	deteriorated, photo 2970
S87 6			Scat	Fresh, photo 2971
B39 7			burrow	Active, photo 2972
S88 8			Scat	old, photo 2973

Transect number: _____

Not Field Season

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-2-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County: _____ Quad: _____ Location: _____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: _____am/pm

Start Temp: _____°C End Temp: _____°C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
T2 1			1226	In open not in burrow	127mm	none
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B40 1			burrow	good condition, photo 2974
B41 2			burrow	deteriorated, photo 2975
B42 3			burrow	Active ~~deteriorated~~, photo 2976
T2 4			Tortoise	Sindia, no markings, photo 2981 2982
B43 5			burrow	Good ~~Active~~, T2 15ft away, photo 2983
B44 6			burrow	Good condition, photo 2984
C10 7			Carcass	bone, photo 2985
C11 8			Carcass	intacked, hole in carcass through bone picture 2986 2987

Transect number: _____

Provided Sample

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 4-2-15 (day, month, year) Survey biologist(s): Greg Sharp, Seth Topham (name, email, and phone number)

Site description: Pahrump Solar (project name and size; general location)

County:_____ Quad:_____ Location:_____ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: _____ Transect #: ____ Transect length: _____

GPS Start-point: _____ (easting, northing, elevation in meters) Start time: _____am/pm

GPS End-point: _____ (easting, northing, elevation in meters) End time: 1640 am/pm

Start Temp: _____°C End Temp: 75°f °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
B45 1			burrow	Good condition, photo 2989
S79 2			scat	old, photo 2990
B46 3			burrow	Good condition, photo 2991
B47 4			burrow	Good condition, photo 2992
5				
6				
7				
8				

Transect number: _____

2015 Field Season

APPENDIX C

Site Photographs

Photo 1. View of typical vegetation/habitat within the Survey Area.

Photo 2. View of typical vegetation/habitat within the Survey Area.

Photo 3. View of typical tortoise burrow within the Survey Area.

Photo 4. View of a tortoise found within the Survey Area.

APPENCIX C

Temporary Captive Care of Wild Mojave Desert Tortoises: Examples of Protocols Used at the Desert Tortoise Conservation Center

SAN DIEGO ZOO GLOBAL

Temporary Captive Care of Wild Mojave Desert Tortoises: Examples of Protocols Used at the Desert Tortoise Conservation Center

Updated Oct 12, 2010

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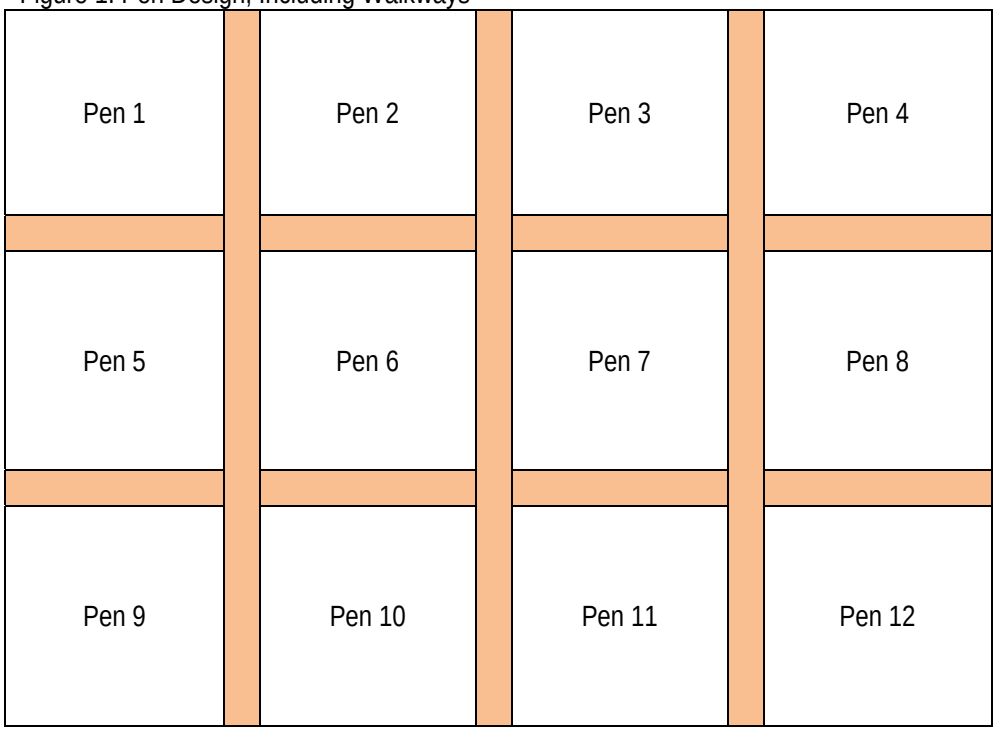
I. Housing

A. Individual Quarantine Enclosures

Desert tortoises (DTs) at the DTCC are housed outdoors in escape-proof pens, and if under 100mm are maintained in escape-proof, predator-proof pens. Each DT is housed individually to prevent potential disease transmission. The sites where pens are constructed have ample vegetation that is minimally disturbed during construction, and the soil is appropriate for tortoises to dig their own burrows. Pens are constructed with tortoise fencing with at least 60cm of fencing above the ground and at least 30cm buried below ground to ensure that they cannot escape (note that the fencing at the DTCC differs slightly from FWS-approved desert tortoise exclusion fencing). The fencing flares out 25cm at the bottom to ensure that if tortoises try to dig out from the inside or if predators try to dig in from the outside, they will hit fencing. Ideally, each pen has ample vegetation such as creosote bush, yuccas, ephedra, and bursage to provide shade, and other plants like globemallow to serve as food sources. In order to access each pen without the potential for contamination (see the section on Aseptic Techniques), walkways are constructed between individual pens and between each row of pens. If we need to walk inside any pen for any reason, we always disinfect our shoes while moving out of a pen and into a walkway.

Figure 1. Pen Design, Including Walkways



Wild DTs are housed individually to prevent potential disease transmission. Larger DTs (MCL > 124mm) that are less likely to be predated are ideally housed in pens that are 6m x 6m, while smaller DTs (MCL < 125mm) that are more likely to be predated are ideally housed in pens that are 2m x 2m. It is particularly important to us to make sure there are ample native food sources growing in the pens for smaller tortoises. In addition, all pens for smaller tortoises have a lid or cover, and all parts of the enclosure are predator proof, not just against large animals, but against smaller animals such as ground squirrels, which are able to squeeze through ½ inch x ½ inch fencing. We use½ inch x ¼ inch fencing, but not anything smaller, because smaller fencing can result in small animals, like lizards and snakes, getting stuck in

the fence and attracting potential predators. The most critical part of constructing a predator-proof enclosure is making sure that the entry points (the places where we open and close the fencing or lid) are completely predator-proof when they are in the closed position. As an example, here at the DTCC our predator proof enclosures are constructed of cement block and mortar with a steel diamond-pattern lid painted with reflective paint (picture A). We place shade cloth in the middle of the lid during summer to provide extra shade. Another type we use is a large walk-in predator-proof enclosure with 2m x 2m pens inside it (picture B). Other walk-in enclosures have been constructed at FWS approved head-starting and research facilities, and those facilities may be able to provide example designs and protocols.

Picture A: Hatchling pens with lids

Picture B: Hatchling pens, walk-in structure

B. Burrows

At least one artificial burrow is provided in each pen to fit the particular tortoise it will house. The burrow width is 5-8cm larger than the total length of the tortoise to ensure that the tortoise does not get stuck inside the burrow when it turns around. We measure from the longest anterior and posterior points on the tortoise's shells to get the correct measurement. Similarly, the height of the burrow is 3-5cm taller the height of the tortoise's shell to accommodate movement through the burrow. We do not provide burrows that are more than 10cm larger than the tortoise because tortoises naturally create burrows to fit their size - we are concerned that extra space in a burrow could be detrimental over the winter because it could allow more air flow when temperatures are too low for tortoises to tolerate. Also note that tortoises with special needs, such as those with missing limbs and other conditions that impair movement, are provided with a bigger burrow than they need because they are more likely to become stuck in what would normally be considered a proper size burrow for their body size.

At the DTCC we use PVC pipes to create artificial burrows. We cut them in half lengthwise and use the half pipe as the top of the burrow. The length of an artificial burrow is about 2 meters. To construct a burrow, we dig a trench at a 30-45 degree angle, and 2 meters long. The burrow is approximately 60cm deep at the chamber end. We lay the PVC half pipe in the trench to form the burrow with the front end of the pipe resting 10-15cm higher than the ground to serve as the mouth of the burrow. We sometimes add dirt in the front to make this possible because it's very important to raise the mouth of the burrow to prevent possible flooding. The outer sides of the PVC are lined with large rocks and the entire length of the PVC is covered with rocks and dirt – the rocks help prevent the dirt from blowing away in the wind. We pack at least 30cm of dirt and rocks on top of every part of the PVC. Dirt is moistened daily for 3 to 4 days to promote compaction. It is important that the PVC remains completely covered all the time because without the added

layers of dirt and rock, it provides no protection and can actually become an oven in summer and an ice box in winter – tortoises that try to use a burrow that is not properly covered are at a high risk for mortality. Once the burrow is complete, we look inside with a flashlight or mirror to make sure the entire path down the burrow is clear of debris and ready for a tortoise to enter. We check the temperature at the mouth and chamber of the burrow during the coolest and hottest parts of the day twice each week to ensure that temperatures inside the burrow are within a normal tolerable range for tortoises (15-30C).

Picture C: Artificial burrow

If you will be housing tortoises for an undetermined amount of time, another option for constructing more permanent artificial burrows is offered on the Tortoise Group website (http://www.tortoisegroup.org/pamphlet.php) on pages 10-14 of their Tortoise Adoption and Care Handbook. Please note that the San Diego Zoo is not affiliated with Tortoise Group, but offers this as a viable option for the construction of long term tortoise burrows because the method has been used extensively and is shown to be effective. However, the rest of the handbook specifically addresses long term care of captive pet desert tortoises, not wild tortoises, so we do not endorse any of their other material for use with wild tortoises.

We inspect and maintain all burrows, both natural and artificial, nearly every day. Table 1 shows our burrow maintenance schedule.

Table 1. Burrow Maintenance Schedule

Season	*Maintenance*
March-April	After most tortoises emerge from hibernation, remove remaining berms from burrows where DTs have not emerged. Check burrows daily and add dirt and rocks when necessary
May-October	Check burrows daily and add dirt and rocks when necessary
November-March	After most tortoises have bermed themselves in, berm in the remaining tortoises. Check burrows weekly and add dirt and rocks when necessary

After heavy rains, we check every burrow by looking inside with a mirror or flashlight. If burrows collapse, tortoises can become entombed so the burrow must be dug out immediately. For more information regarding what we do when we find a tortoise entombed after rains, see the Surveillance section.

In order to prevent disease transmission, tortoises are not moved among the pens, or newly placed in a pen where another tortoise was living without first disinfecting the burrow. For more information on how to disinfect burrows and pens, see the Aseptic Techniques section.

C. Irrigation

Every individual pen at the DTCC receives water on a regular basis. For most pens we use a drip system from a central well that leads to a drip head in every pen. We point the drip head toward the downward slope of each pen to avoid flooding the burrow if something goes wrong with the irrigation system. We dig out the earth below the drip head to make a catch basin or we use plant trays to catch the water so the tortoises will have plenty of time to drink before it evaporates.

A second option is to use a row of sprinklers connected to water tanks that are operated with generators and pumps. If you allow a 360 degree spray pattern, then many pens can be watered at once and it promotes the growth of native vegetation.

A final option that we use to irrigate some of our pens is to carry it to the pens manually. We put a large shallow terra cotta or plastic dish in each pen, and sink it into the ground so it is level. We only use shallow dishes so smaller tortoises won't drown if they flip over into it. We carry water to the pens and pour it directly into the dishes.

D. Site Security

It is important that the site where the tortoises are kept is secure from both predators and humans. The DTCC is surrounded with a chain link fence buried at least 30cm into the ground with the bottom flared outward to prevent digging in from the outside. Our fence it topped with 2 to 3 rows of razor wire. It is not recommended that lights be installed, even if they are on motion sensors, because they will likely come on frequently during the night, which can be disturbing to wildlife. If you believe you may have an issue with security at night, you could consider installing motion sensor cameras with night vision in key locations.

Picture D: Perimeter fence

II. Aseptic Techniques

The primary disinfectant we use for surfaces, totes, equipment, instruments, PVC burrows, footbaths, and potentially contaminated clothing and shoes is Trifectant™ (www.amazon.com). This product is a broad spectrum virucidal, bactericidal (including against *Mycoplasma spp*), and fungicidal product. It is effective on porous surfaces such as wood, in the presence of organic matter, in hard water, and at low and high temperatures. Unlike bleach, it is not inactivated by UV light. In addition, it has low toxicity and is biodegradable, and the required contact time is less than 5 minutes.

Trifectant™ is stored as a powder, dissolves quickly in water, and remains stable for 7 days. As per the instructions, we use a 1% solution using warm water - 0.325 oz (1/4 scoop) per quart or 1.3 oz (1 scoop) per gallon. We spray Trifectant™ on all potentially contaminated field equipment and allow it to air dry.

We always wear gloves when handling tortoises, regardless of their health condition, and we change gloves between handling different tortoises. To make sure that tortoises do not come into contact with our clothes, we wear reusable aprons that we disinfected with Trifectant™ after each use and between handling different tortoises. All equipment and supplies that touched a tortoise or that we touch with a gloved hand is disinfected. To prevent contamination of data sheets and some field equipment, we use the one glove technique for handling tortoises and recording data in which one hand remains ungloved and can therefore touch writing utensils, clipboards, field equipment, etc, without potential contamination. If the second hand is needed to help hold or manipulate the tortoise, we slide on a glove one size bigger than the proper fit so we can slide into it and out of it as needed to use equipment and record data.

In order to prevent disease transmission across the site, tortoises are not moved among the pens, or newly placed in a pen where another tortoise was living without first disinfecting the burrow. To disinfect a burrow, we remove the tortoise from the pen and pull the PVC burrow out of the ground. We spray both sides of the PVC with Trifectant™ and expose it to direct sunlight with no rain or moisture for a minimum of 5 days. In addition to sterilizing the burrow, we rake out the area where we pulled the burrow out of the ground and we spray the entire area with Trifectant™. We leave the pen unoccupied (with the burrow removed) and exposed to direct sunlight with no rain or moisture for a minimum of 5 days. However, if there is any moisture in the dirt when we rake it the first time, we spray the area with Trifectant™ and continue to rake and spray it every day until the area appears dry. We then begin the 5 day UV exposure period.

III. Food

Native vegetation and some produce (kale, collards, dandelion greens, etc) are the best sources of nutrition for desert tortoises. However, with large numbers of tortoises in captivity, SDZ Nutritionists and Veterinarians recommend supplementally feeding DTs Mazuri Tortoise Diet 5M21 (https://shop.mazuri.com/mazuritortoisediet.aspx). As per the product's feeding instructions, we give healthy tortoises 10 kibbles (10g)/kg of body weight at each feeding during the active season. The food comes in pellet form so we add water until it just reaches the top of the pellets and let it sit for 5 minutes before mixing it up with a gloved hand. If so much water is added that it can be poured off the top after 5 minutes, the food can lose water soluble nutrients so it is important not to overwater the kibble. For tortoises that need to gain weight, we provide additional moistened pellets at each feeding. When feeding the DTs at the DTCC, we walk outside the perimeter of each pen (not inside the pens) and place the approximate amount of food in a ball in front of or near the tortoise. If the tortoise is not out, we toss the ball of food near, but not in, the burrow. Before or during feeding, we remove all old food left behind from the last feeding, disinfecting our shoes when moving from pen to pen. It is important to note if you consistently do not see a tortoise out or if there is consistently food left behind at the next feeding.

Picture E: Mazuri Tortoise Diet soaking

Picture F: DT eating Mazuri Tortoise Diet

Table 2. Feeding Schedule

Season	*Frequency*
March/April-August	2x/week
September	1x/week
October-March/April	Do not feed

We feed the tortoises at the DTCC at the time of day when they are most active, usually as early in the morning as possible. In summer, we start feeding just before sunrise, with slightly later feeding times in spring and fall. In the spring, we begin feeding tortoises small amounts of food (3 kibbles/kg) for a week or two after they come out of hibernation, then proceed to the normal feeding schedule. In the fall, it is important that tortoises not go into brumation with food in the gastrointestinal tract so we stop feeding after the last week of September, even if temperatures are still relatively warm. It can take up to a month for DTs to digest and pass their food so it's best not to risk feeding so late in the season.

IV. Water

We provide the tortoises with water throughout the active season until the time they enter hibernation. Table 3 shows the frequency for watering captive tortoises using a drip system

Table 3. Watering Schedule for Drip System

Season	*Frequency*
March-April	3 days/week 2x/day for 15 minutes
May-August	4 days/week/ 2x/day for 15 minutes
September-October	3 days/week 1x/day for 15 minutes
October-March	Do not water*

* Note: While water is not provided to tortoises during the winter, continued watering of the pens in the winter months using a spray type of irrigation will increase the germination of annual plants in the spring.

We begin providing water during the warmest part of the day as soon as tortoises come out of brumation. Once comfortable spring temperatures set in and tortoises are more active in the morning, we provide water early in the day and evening. During the summer, we provide water during the coolest times of day. We check the irrigation system once a week throughout the season to make sure all drippers and/or sprinklers are functioning properly. When most of the tortoises have gone into brumation in October or November, we shut off the irrigation system and blow out all the water lines to prevent breakage over winter, which can lead to flooding in the burrows.

V. Surveillance

Captive DTs, their burrows, and their enclosures need to be examined consistently throughout the year, not just during the active season. It is particularly important to check on tortoises several times each day (morning, noon, and evening) for at least 2 weeks following their transfer to captivity because it is common for tortoises that are newly placed in captivity to pace the perimeter of the enclosure and not use the burrow provided. This can result in mortality from overheating or other complications related to exposure. To minimize the potential stress and effects of extreme temperatures, it is strongly recommended that tortoises not be removed from the wild and/or introduced to a captive environment when daily low temperatures are below 15C or daily high temperatures are above 30C on the day of and for 3 days following the move. It is also recommended that tortoises not be removed from the wild and/or introduced to a captive environment from Oct 1 to the time that brumation begins since this is a physiologically critical time for desert tortoises. Furthermore, tortoises should never be disturbed from brumation for any reason unless they are in mortal danger.

A. Keep a Daily Record of Tortoises

From spring emergence through winter hibernation, we try to get a visual of every tortoise held in individual quarantine pens every day, and record it in a field notebook and/or on an electronic spreadsheet. It is best to do this in the early morning when tortoises are active. We try to get a good look at their faces and record if they are showing any signs of disease or if they appear lethargic. This is important information in the future if their condition deteriorates.

For tortoises that are in burrows when we locate them, we record how deep they are in the burrow, and which direction they are facing. If they have not moved in 3 days, we either coax them out or tap them gently with a stick to make sure that they are alive and that they are not stuck. If a tortoise doesn't move from its burrow for 5 consecutive days during

active season, we gently pull him from the burrow to assess his condition. We do this because we have had cases in which we saw a tortoise in its burrow facing away from us, and it appeared to be fine, but after tapping it, we realized that it was lodged in the burrow and could not escape on its own.

During the winter months, tortoises are checked weekly and are not disturbed from their brumation. We do not pull them from their burrows unless they are sick, in distress, or dead.

i. Sick, Injured, and Dying Tortoises

We keep daily records of tortoises during the active season because it is helpful in identifying sick and injured tortoises, but our surveillance also includes tortoise checks during the hottest part of the day in warm months and during the coldest part of the day in cool months to check for tortoises that are improperly thermoregulating. If we find a tortoise that is sick, injured, or dying, we immediately remove it from the enclosure and place it in a clean tote. If it is injured or extremely ill, veterinary attention is sought immediately. If the tortoise appears mildly to moderately sick, we soak it in a tote of water with the water level just below the tortoise's chin. The water should be tepid to cool in warm months, and tepid to slightly warm in cool months. Often times a good soak to rehydrate is all a tortoise needs to feel better. Once the tortoise's condition has improved, if the temperatures are 15-30C and will remain in that range for at least 3 days following release, we place the tortoise back in its pen and monitor it 3 times each day for 7 days. If temperatures are outside that range, the tortoise is maintained indoors in a temperature controlled environment until outdoor temperatures are appropriate for release. The indoor housing consists of a very large, clean, dry bin or penned area with Timothy hay for bedding and a mercury halide light in a ceramic fixture on a timer for heat and UV light (ZooMed 160 watt PowerSun UV lamp). If tortoises are brought indoors and not allowed to hibernate due to their condition, we feed and water them weekly.

It is strongly advised that you make arrangements in advance with a veterinarian that specializes in desert tortoises in case an emergency occurs. Most veterinarians do not have desert tortoise or even reptile experience, but it is critical to find one that does. Your local reptile rescue organization may be able to direct you to the nearest desert tortoise veterinarian in your area.

ii. Dead Tortoises

If you find a dead tortoise, take photographs before removing the carcass and follow instructions provided by US Fish and Wildlife Service. If it is a recent death and your permit allows transfer of the carcass to a research institution, place the carcass in a plastic bag in the refrigerator so the tissues will remain viable for necropsy, and contact that institution immediately (for necropsies to be conducted by the San Diego Zoo, contact Dr. Josephine Braun, Pathology Postdoctoral Fellow 760-291-5470 or Dr. Paula Kahn, Conservation Program Manager at the DTCC 702-885-7640)

B. Check on Tortoises After Rains

Tortoises can become entombed in both artificial and natural burrows during the rainy seasons. During and/or after a rainstorm, we shine a light inside every individual burrow to make sure that the tortoises are safe. Many tortoises come out for a drink while we are inspecting the burrow, but we still look inside their burrows to make sure they have not collapsed. For those burrows that we can't see to the back, we use a burrow scope to check them.

If we find that a burrow has collapsed with a tortoise in it, we dig it out as quickly and as carefully as we can. It can be useful to put a hose, shovel handle, or other type of placeholder inside the burrow so we can find the tunnel in case of a collapse while we are digging. Once we remove the tortoise, we keep it in a safe place until we are able to re-dig the burrow. We have found that sometimes hatchlings and small juveniles will dig further back and sometimes upwards in their burrows during rainstorms, so we are particularly careful when digging in a pen with a small tortoise in it.

C. Burrows

Every burrow must be covered completely to effectively protect tortoises from harsh weather conditions so during routine surveillance of tortoises, we also check the burrows in each pen, looking for proper coverage over the top of the burrow, as well as inspecting them for cave-ins toward the back of the burrow. We carry a shovel to put more dirt on top of marginally covered burrows to ensure there is at least 25cm of dirt on top. We use rocks to hold down the dirt and sprinkle the dirt with water to promote compaction. If we consistently see a problem with a specific burrow, we dig it up and start over, digging it deeper or placing it in a different area of the pen.

D. Enclosures and the Perimeter Fence

We check the enclosures and perimeter fence weekly to make sure there are no holes, slides, or other evidence of breaches or escape routes. Tortoises can climb low fences to escape from their pens so if the dirt inside the pen is piled up too high near the fencing, we dig some of the dirt out and place it away from the fence. We also repair any holes or other issues immediately.

APPENCIX D

VEA Community Solar Project Habitat Conservation Plan Power line Construction Minimization Measures.

Appendix D

VEA Community Solar Project Habitat Conservation Plan
Powerline Construction Minimization Measures

a. An authorized desert tortoise biologist or monitor shall be onsite during project activities. All potential tortoise biologists shall complete the Qualifications Form (Enclosure A) and submit it to the Service for review and final approval as appropriate. Allow 30 days for Service review and response.

b. Prior to initiation of construction, the authorized biologist shall present a desert tortoise awareness program to all personnel who will be onsite, including but not limited to contractors, contractors' employees, supervisors, inspectors, and subcontractors. This program will contain information concerning the biology and distribution of the desert tortoise, their legal status and occurrence in the project area; the definition of "take"; required minimization measures; and reporting procedures and requirements.

c. An authorized biologist shall clear the right-of-way of tortoises immediately ahead of construction activities.

   Work areas: An authorized biologist shall survey for desert tortoises and their burrows using techniques providing 100-percent coverage of the work areas and an additional area approximately 90 feet from the work area perimeter. Transects will be no greater than 30 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, will be examined to determine occupancy of each burrow by desert tortoises and handled in accordance with the Desert Tortoise Field Manual (Service 2009; on the web at: http://www.fws.gov/nevada/desert_tortoise/dtro/dtro_manuals_forms.htm.

d. All potential desert tortoise burrows located within the project area shall be excavated by hand by an authorized desert tortoise biologist, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. All desert tortoise handling and removal, and burrow excavations, including nests, shall be conducted by an authorized desert

tortoise biologist in accordance with the Desert Tortoise Field Manual.

e. All desert tortoises observed within the project area or on access road shall be reported immediately to the authorized biologist. The biologists shall halt activities as necessary to avoid harm to a desert tortoise. Project activities that may endanger a desert tortoise shall cease until the desert tortoise moves out of harm's way or is moved out of harm's way by an authorized desert tortoise biologist.

f. Desert tortoises will be moved solely for the purpose of moving them out of harm's way. Desert tortoises will be relocated up to 500 meters into adjacent undisturbed habitat on protected public land. The disposition of all tortoises handled shall be documented.

g. Vehicles shall not exceed 20 MPH on access roads.

h. Project personnel shall exercise caution when commuting to the project area and obey speed limits to minimize any chance for the inadvertent injury or mortality of species encountered on roads leading to and from the project site. All desert tortoise observations, including mortalities, shall be reported directly to an authorized desert tortoise biologist and the Service.

i. Any time a vehicle is parked, whether the engine is engaged or not, the ground around and underneath the vehicle shall be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, an authorized biologist will be contacted.

j. The boundaries of all areas to be disturbed shall be flagged before beginning any activities, and all disturbances shall be confined to the flagged areas. All project vehicles and equipment will be confined to the flagged areas. Disturbance beyond the construction zone is prohibited. Authorized desert tortoise biologists will ensure that project vehicles and equipment occur only in designated areas and that no habitat is disturbed beyond the extent described in the proposed action.

k. Trash and food items shall be promptly disposed in predator-proof containers with re-sealing lids. Trash containers will be emptied daily, and waste will be removed from the project areas and disposed in an approved off-site landfill. Construction waste also will be removed from the site each day and properly disposed.

l. The on-site biologist shall record each observation of desert tortoise handled. Information will include the following: Location, date and time of observation; whether tortoise was handled, general health and whether it voided its bladder; location tortoise was moved from and location moved to; and unique physical characteristics of each tortoise. Reports will be provided as described in section 5.7 of the HCP and submitted to the Service's Southern Nevada Fish and Wildlife Office in Las Vegas.

ENCLOSURE A

Qualifications Form

DESERT TORTOISE AUTHORIZED BIOLOGIST REQUEST FORM

This form should be used to provide your qualifications to agency officials if you wish to undertake the duties of an authorized biologist with regard to desert tortoises during construction or other projects authorized under Sections 7 (Biological Opinions) or 10(a)(1)(B) (i.e. Habitat Conservation Plans) of the Endangered Species Act.

(If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required. Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at http://www.fws.gov/forms/3-200-55.pdf.)

1. Contact Information:

Name	
Address	
City, State, Zip Code	
Phone Number(s)	
Email Address	

2. Date:

3. Areas in which authorization is requested (check all that apply):

☐ San Bernardino, Kern, Inyo and Los Angeles Counties, California (Ventura office)
☐ Riverside, San Diego, and Imperial Counties, California (Carlsbad office)
☐ Nevada ☐ Utah ☐ Arizona

4. Please provide information on the project:

USFWS Biological Opinion or HCP No. When Applicable		**Date:**
Project Name		
Federal Agency		
Proponent or Contractor		

5. Permits: If you hold, or have held, any relevant state or Federal wildlife permits provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities

6. Education: Provide up to three schools, listing most recent first:

Institution	Dates attended	Major/Minor	Degree received

7. Desert Tortoise Training:

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1. Classes			
2. Field Training			
3. Translocation			
4.			

8. Experience – Include only those positions relevant to the requested work with desert tortoises. Distinguish between wild Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g., if 100 desert tortoises were handled on a project and you handled 5 of those desert tortoises, include only those 5. List most recent experience first. Handling a Mojave desert tortoise must be authorized by a biological opinion or other permit and reported to the USFWS. Information proved in this section will be used by the USFWS to track the numbers of desert tortoises affected by previous projects (baseline). **Be sure to include a project supervisor or other contact that can verify your skills and experience in relation to your job performance.** Attach additional sheets as necessary.

Experience by project and activity:

Project Name, Job Title, Dates	Project Contact name, phone no., & Email address		Conduct Clearance Surveys (Hrs/Days)	Excavate DT burrows (No.)	Locate DT No. < 100mm ≥ 100mm	Handled for Relocation DTs (No.)	Excavate, and relocate DT nests (No.)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Experience by project and activity (continued): Each project number should correspond with the project listed on the previous page.

Project Number (Corresponds to previous page)		**Construct Artificial Burrows (No.)**	**Monitor project equipment and activities (Hrs/Days)**	**Oversee project compliance (Hrs/Days)**	**Supervise DT field staff (Hrs/Days)**	**DT fence Installation and inspection (Hrs/Days)**	**Present DT Awareness Training (No.)**
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

9. Summary of experience:

Total time spent for all desert tortoise-related field activities (referenced above):
Specify total number of hours: _____
OR total number of 8-hour days: _____

Total number of miles/kilometers walked conducting survey transects: _____

Total number of wild, free-ranging desert tortoises you personally handled:

<100 mm: _____

≥100 mm: _____

Additional supervisory experience other than with desert tortoise work:

Project	**Hours**	**Staff (No.)**

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch. 47, Sec. 1001.

Signed: _____Date:_____

APPENCIX E

Desert Tortoise Handling and Take Report

ATTACHMENT A. DESERT TORTOISE HANDLING AND TAKE REPORT

If a desert tortoise is killed or injured, immediately contact the U.S. Fish and Wildlife Service by phone at the number below and complete Section 1 of the form.
Completed forms should be submitted to the Fish and Wildlife Service:

U.S. Fish and Wildlife Service
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5230

Project Name:	Report Date:
Fish and Wildlife Service File No.- 84320-	
Authorized Desert Tortoise Biologist: _____ Employed by:	
Section 1: Complete all information below if a desert tortoise is injured or killed in addition to initial contact described above.	
If tortoise was injured ☐ or killed ☐ (check appropriate box):	
Date and time found: _____ Found by: _____ GPS location (NAD 83): easting: _____ northing: _____ No. of photos taken: _____ Disposition: _____ _____ _____ Attach report with photos that describe in detail, the circumstances and potential cause of injury or mortality. For injuries include name of veterinarian and detailed assessment of injuries.	

Section 2: Complete all information below for each desert tortoise handled.

All instances of desert tortoise handling must be reported in this section and be included in the quarterly, annual, and final project reports.

Desert tortoise number: _____

Date and time found: _____ Sex of tortoise: _____

Air temperature when found: _____ Air temperature when released: _____

Tortoise activity when found: _____

Handled by: _____ Approx. carapace length _____

GPS location (NAD 83) found: easting: _____ northing: _____

GPS location released: easting: _____ northing: _____

Approximate distance moved: _____

Did tortoise void bladder; if so state approximate volume and actions taken:

_____

_____

Post handling or movement monitoring and observations:

_____

_____

_____

Section 3: Complete for each tortoise burrow penned.
All instances of desert tortoise penning must be reported in this section and be included in the quarterly, annual, and final project reports. Date and time of pen construction: Began: _____ Completed: _____ Date and time pen removed: _____ Pen constructed by: _____ Why was tortoise penned? _____ How frequently was pen monitored? _____ Observations of desert tortoise behavior including time and date of observation: _____ _____ _____ _____ _____ Include photos of pen and burrow with report.