VOLUME 1

Draft

Environmental Impact Statement

Chuckwalla Solar Projects

BUREAU OF INDIAN AFFAIRS
Bureau of Land Management
Environmental Protection Agency
US Fish and Wildlife Service
Bureau of Reclamation
National Park Service
Nevada Department of Transportation
Nevada Department of Wildlife

On Behalf of:
THE MOAPA BAND OF PAIUTE INDIANS

January 2022

Volume 1

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
(DEIS)

CHUCKWALLA SOLAR SOLAR PROJECTS

On Behalf of:

THE MOAPA BAND
OF PAIUTE INDIANS

BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
US FISH AND WILDLIFE SERVICE
BUREAU OF RECLAMATION
NATIONAL PARK SERVICE
NEVADA DEPARTMENT OF WILDLIFE
NEVADA DEPARTMENT OF TRANSPORTATION

January 2022

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Acronyms Used in the EIS

AC	Alternating Current
ACSP	Arrow Canyon Solar Project
ACEC	Areas of Critical Environmental Concern
ac-ft	acre-feet
ADT	Annual Average Daily Traffic
AFY	acre-feet per year
APE	Area of Potential Effect
ASME	American Society of Mechanical Engineers
BACT	Best Available Control Technology
Band	Moapa Band of Paiute Indians
BBCS	Bird and Bat Conservation Strategy
BESS	Battery Energy Storage System
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Blvd.	Boulevard
BMPs	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
CO2e	CO_2 Equivalent
CT	Census Tract
CWA	Clean Water Act
DAQEM	Department of Air Quality and Environmental Management
DEIS	Draft Environmental Impact Statement
DEM	Digital Elevation Model
DOT	Department of Transportation
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
EPRI	Electric Power Research Institute
ESA	Endangered Species Act

ESMSP	Eagle Shadow Mountain Solar Project
FSEIS	Final Supplemental Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy Management Act
FTE	Full-time Equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
HA	Hydrographic Area
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IPCC	Intergovernmental Panel on Climate Change
ITA	Indian Trust Assets
JD	Jurisdictional Determination
K Road	K Road Moapa Solar LLC
KOPs	Key Observation Points
kV	kilovolt
LEP	Limited English Proficiency
LOS	Level of Service
LWC	Lands with Wilderness Characteristics
m	meter
MBTA	Migratory Bird Treaty Act
mm	millimeter
MMT	million metric tons
MOA	Memorandum of Agreement
mph	miles per hour
MSDS	Material Safety Data Sheet
MSEC	Moapa Solar Energy Center
MSHCP	Multiple Species Habitat Conservation Plan
MW	megawatt
MWac	megawatts of alternating current
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD	North American Datum
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association

NNHP	Nevada Natural Heritage Program
NO2	Nitrogen Dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NOx	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	National Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSR	New Source Review
NV	Nevada
O_3	ozone
O&M	Operations and Maintenance
OHV	off highway vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PBO	Programmatic Biological Opinion
PCEs	primary constituent elements
PCS	Plant Control System
PLC	Programmable Logic Controller
PM	particulate matter
PM10	particulate matter 10 microns or less
PM2.5	particulate matter 2.5 microns or less
POD	Plan of Development
PPA	Power Purchase Agreement
PPE	personal protective equipment
Projects	Chuckwalla Solar Projects
psi	pound(s) per square inch
PV	photovoltaic
RCRA	Resource Conservation Recovery Act
Reclamation	Bureau of Reclamation
Reservation	Moapa River Indian Reservation
ROD	Record of Decision
ROW	right(s)-of-way
RPS	Renewable Portfolio Standard
SBSP	Southern Bighorn Solar Projects
SCADA	Supervisory Control and Data Acquisition
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMAs	Special Management Areas
SNWA	Southern Nevada Water Authority
SO2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Storm Water Pollution Prevention Plan

T&E	threatened and endangered
TDS	Total Dissolved Solids
TERO	Tribal Employment Rights Ordinance
TES	Thermal Energy Storage
Travel Plaza	Moapa Travel Plaza
Tribe	Moapa Band of Paiute Indians
µm	micrometer
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
URTD	Upper Respiratory Tract Disease
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCB	United State Census Bureau
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGCRP	United States Global Change Research Program
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEAP	Worker Environmental Awareness Program
WSA	Wilderness Study Areas
°C	degrees Centigrade
°F	degrees Fahrenheit

EXECUTIVE SUMMARY

The following sections summarize the Draft Environmental Impact Statement (DEIS) for the Chuckwalla Solar Projects (Chuckwalla Projects or Projects), up to four solar projects each using photovoltaic (PV) solar energy technology with battery storage. The Projects would be located on the Moapa River Indian Reservation (Reservation) about 30 miles northeast of Las Vegas in Clark County, Nevada.

EDF Renewables Development, Inc. (EDFR) has entered into an option agreement with the Moapa Band of Paiute Indians (Moapa Band or Band) to lease up to 6,500 acres for the development of the four solar projects that would total up to 700 megawatts (MWs) of solar energy generation each using photovoltaic (PV) technology and incorporating battery energy storage systems (BESS). The Chuckwalla Projects would include the four solar projects and all associated facilities. **Figure 1-1** (in **Appendix A**) shows the proposed general location for the Chuckwalla Solar Projects.

The Projects would include two new generation interconnection (gen-tie) lines approximately 10 to 12 miles long that would interconnect the solar projects to the regional electrical grid – one to the existing Harry Allen substation (via the approved Moapa Solar Energy Center [MSEC] line) and one directly to the existing Crystal Substation. Portions of these gen-tie lines would cross lands managed by the Bureau of Land Management (BLM) – both within a federally designated utility corridor on the Reservation and federal lands south of the Reservation. The Crystal Substation is part of the Navajo Transmission System, which is partially owned by the United States (US) Government with oversight from the Bureau of Reclamation (Reclamation).

Access to the Chuckwalla sites would be provided by two existing access roads on the Reservation – one providing access from the Valley of Fire Highway and the other from I-15. The water supply for the Projects would be provided by the Moapa Band from either existing tribal wells or a new well within the lease area. If the water is sourced from off-site wells, it could be delivered to the site via pipeline or truck. **Figure 1-3** provides an overview of the components of the Projects.

ES.1 Purpose of the Project

The purpose and need of the proposed Projects are to: (1) provide a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band; (2) allow the Moapa Band, in partnership with the Applicants, to optimize the use of the lease site while maximizing the potential economic benefit to the Moapa Band; and (3) develop clean renewable electricity generation from the Moapa Band's solar resources to support the State of Nevada's 50 percent renewable portfolio standard requirement by 2030 and a goal of 100 percent carbon-free resources by 2050 (State Bill 358). The Projects would also help meet the federal government's goals to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies.

The Moapa Band identified the proposed Projects as viable opportunities to meet its economic development goals because the leases would provide much needed revenue to the Moapa Band while occupying a small portion of the Reservation. The construction, operation and maintenance (O&M), and decommissioning of the Projects would afford employment opportunities to Moapa Band members. The Moapa Band has determined that the Projects would also be consistent with the Moapa Band's tradition of respect for the land and would fulfill the purposes for which the 70,564 acres were restored to the Moapa Band by the federal government in 1980 (Moapa Band 1980). The proposed use of the Moapa Band's water by the Projects would help the Moapa Band affirm and sustain its rights to the water.

ES.2 Agency Purpose and Need

The need for the BIA action is established by the BIA's responsibility to respond to a request for a business lease approval and ROW applications between the Moapa Band and the Applicants over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on tribal lands held in trust for the benefit of the Moapa Band (42 United States Code [U.S.C.] §§ 4321 et seq). The BIA purpose, pursuant to 25 U.S.C. § 415, is to deny, grant, or grant with modifications the solar energy ground leases for the solar fields and associated ROW agreements between the Moapa Band and the Applicant.

The need for the BLM action is established under Title V of the Federal Land Policy and Management Act ([FLPMA] 43 U.S.C. § 1761), where the BLM must respond to Applicants' ROW grant applications for the gen-tie lines, existing BLM-managed access roads, and connection with, access to, and maintenance of the previously approved MSEC gen-tie line. The BLM purpose is to deny, grant, or grant with modifications the ROW requests on BLM-managed lands.

The need for the Reclamation action is established by the partial ownership by the US government of a portion of the Navajo Project Western Transmission System of which the Crystal Substation is a part.

Because the BIA has a jurisdictional trust responsibility over Indian lands, the Projects are a major Federal action and must comply with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321 *et seq.*). Because the Projects would be located on tribal trust lands, the BIA is the lead federal agency. The Band, BLM, Reclamation, Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), Nevada Department of Wildlife (NDOW), and Nevada Department of Transportation (NDOT) are cooperating agencies on the EIS for the Project. The BIA will use this EIS to make their decision for approval of the solar ground leases on the Reservation. The cooperating parties will use this information to support their analyses and decisions, as needed.

ES.3 Public Involvement

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Projects in the *Federal Register* on April 23, 2021. In addition, notices were placed in local newspapers and two virtual public scoping meetings were held for the Projects on May 18 and May 19, 2021.

The key issues were identified by interested stakeholders and members of the public during scoping for the Chuckwalla Projects and include:

- Potential impacts to desert tortoise, birds, and other sensitive species
- Potential impacts to vegetation and need to control weeds
- Socioeconomic impacts to Band members and the regional economy
- Potential impacts to nearby Valley of Fire State Park and Valley of Fire Natural Landmark
- Potential impacts to cultural resources
- Impacts to water resources including water use and effects on ephemeral drainages
- Visibility of the Projects on the landscape from I-15 and the Old Spanish National Historic Trail
- Emissions of fugitive dust and potential worker exposure to Coccidioides spores, if present
- Impacts from other projects in the vicinity of the proposed Project

ES.4 Alternatives

This document analyzes the proposed Project and the No Action Alternative. This document also discusses alternatives that were considered but eliminated from further consideration. The proposed Projects is the Proposed Action. The alternatives are described in detail in Chapter 2 and are summarized below.

Proposed Action

The Proposed Action would consist of four PV solar power generation facilities incorporating BESS, two gen-tie lines that would interconnect the Projects to the regional electrical transmission grid, connection with an existing gen-tie line, access roads to the solar sites from the Valley of Fire Highway and Interstate 15 (I-15), and possibly a temporary pipeline to deliver water to the Projects during construction. All proposed facilities except segments of the gen-tie lines and associated access would be located on the Reservation. Parts of the gen-tie lines and associated access roads would be located within the utility corridor on the Reservation and on Federal lands south of the Reservation managed by the BLM.

The four Chuckwalla Projects are summarized in **Table ES-1** below. Chuckwalla 1a and 1b would be built at the same time to make up the first phase of the Projects. Chuckwalla 2 and 3 would be built separately in subsequent phases. In addition to the lease areas for each project, the four projects would collectively utilize a Shared Facilities Area of approximately 165 acres containing BESS facilities, operations and maintenance (O&M) facilities, helipad, site substations, laydown areas, batch plant, and a temporary water pond / water tank that would be utilized by all four projects.

The primary off-site ancillary facilities needed to support the Chuckwalla Projects include two new gen-tie lines and connection to an existing gen-tie line, two access roads, and a temporary water pipeline. The gen-tie line interconnecting Chuckwalla 1a and 1b would connect to the Harry Allen Substation via the Arrow Canyon solar site and the existing gen-tie line and would be approximately 10 miles of new single-circuit 230-kV overhead transmission. A 230kV or 500kV line would interconnect Chuckwalla 2 and 3 to the Crystal Substation. The two gen-tie lines follow the same ROW for most of their length and, where parallel, they could be built either as separate 230kV and 500kV lines (referred to as Option 1) or as a double-circuit 230kV line (referred to as Option 2). If built as a double circuit 230kV line, a 230/500

step-up station would be built near the Crystal Substation and a short section of 500kV line would run from the step-up substation to deliver the power to Crystal at 500kV.

Table ES 1
Summary of Proposed Chuckwalla Solar Projects

Project	Energy Output	Lease Study Acreage
Chuckwalla 1a	200 MW	1,976
Chuckwalla 1b	50 MW	480
Chuckwalla 2	200MW	1,572
Chuckwalla 3	250 MW	2,307
Shared Facilities Area		166
TOTAL		6,501

To provide the needed access, two existing roads located wholly on the Reservation would be utilized. An existing 2.25-mile road on the Reservation along its southern boundary between the Valley of Fire Highway and the site would be upgraded where needed. Another existing road on the Reservation approximately 1.0 mile long would provide access from I-15 to the northern portion of the lease study area.

Tables ES-2 and **ES-3** summarize the BIA and BLM jurisdiction and agency action required for each project component, respectively.

Table ES 2
Summary of BIA Jurisdiction for the Chuckwalla Solar Projects

Project Component		Location	Agency Action	Distance / Area miles/acres[1]
Solar Fields	Chuckwalla 1a	Reservation	Lease	1,976 acres
	Chuckwalla 1b	Reservation	Lease	480 acres
	Chuckwalla 2	Reservation	Lease	1,572 acres
	Chuckwalla 3	Reservation	Lease	2,307 acres
Shared Facilities Area		Reservation	Lease	166 acres
Existing Access Roads		Reservation	ROW	3.3 miles / 14 acres
Gen-Tie Lines[2]		Reservation	ROW	6.4 miles / 311 acres
Temporary Water Pipeline		Reservation	ROW	3.0 miles / 8 acres
TOTAL BIA				12.7 miles of ROW 6,833 acres

[1] All acreages approximate
[2] Gen-tie data provided for Option 1 to show worst-case impacts

Table ES 3 Summary of BLM Jurisdiction for the Chuckwalla Solar Projects				
Project Component		**Location**	**Agency Action**	**Distance / Area miles/acres[1]**
Gen-Tie Lines	Parallel 230/500	BLM-managed Corridor on Reservation	ROW	3.3 miles / 143 acres
	230kV Line	BLM-managed Corridor on Reservation	ROW	1.4 miles / 25 acres
	500kV line	BLM-managed Corridor on Reservation	ROW	0.9 miles / 29 acres
	500kV line	BLM	ROW	0.8 miles / 23 acres
Existing access road to Gen-Tie ROW		BLM-managed Corridor on Reservation	ROW	0.2 miles / 0.6 acres
Existing access road to Gen-Tie ROW		BLM	ROW	1.1 miles / 3.0 acres
Existing Arrow Canyon to Harry Allen 230kV line ROW (N-88870)		BLM	ROW	14.4 miles / 139 acres
TOTAL BLM				22.1 miles of ROW 362.6 acres
[1] All acreages approximate [2] Gen-tie data provided for Option 1 to show worst-case impacts				

No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Projects were not constructed. The No Action Alternative assumes that the lease agreements would be denied, the BLM ROWs would not be issued, and the Projects would not be built. Under the No Action Alternative, the purpose and need of the Projects would not be met. The Moapa Band would not benefit economically from the energy production that would be obtained from the solar Projects. The development of sustainable renewable resources would not occur, and the State of Nevada would not be assisted in efforts to meet its renewable energy goals.

ES.5 Environmental Consequences

The proposed Chuckwalla Projects would be some of the several utility-scale PV solar projects on the Reservation to be recently evaluated in an EIS. The previously evaluated solar projects on the Reservation include:

- **K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project** – The K Road Solar Project is a 350 MW PV solar project and the Final Environmental Impact Statement (EIS) and Record of Decision (ROD) were published in 2012 (BIA 2012a). K Road was sold and renamed the Southern Paiute Solar Project. It is located about 2.0 miles west of the lease option areas for the proposed Chuckwalla Solar Projects.
- **Aiya Solar Project (Aiya)** – The Aiya Solar Project is a 100 MW PV solar project and the Final EIS and ROD were published in 2016 and (BIA 2016). It is approximately nine miles north of the proposed Chuckwalla Projects.
- **Eagle Shadow Mountain Solar Project (ESMSP)** – The ESMSP is a 300 MW PV solar project and the Final EIS was published in December 2019 and the ROD was signed in February 2020 (BIA 2019a, 2020d). The ESMSP is located approximately 5.2 miles west of the proposed Chuckwalla

Projects.

- **Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP)** – The MSEC is a 200 MW PV solar project and the Final EIS and ROD was published in 2014 (BIA 2014). The MSEC Project was purchased and renamed the Arrow Canyon Solar Project (ACSP). A Final Supplemental EIS for the expansion of the solar field on Reservation lands was issued in December 2020 (BIA 2020c). The ACSP is located approximately 7.5 miles west of the proposed Chuckwalla Projects.
- **Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II)** – The SBSP I and SBSP II Projects were recently evaluated through the NEPA process. The Final EIS was published in June 2021 (BIA 2021). They are located about four miles west and 2.5 miles northwest of the proposed Chuckwalla Projects.

Figure 1-4 shows the relative location of these projects. While the solar site and gen-tie lines associated with the proposed Chuckwalla Projects would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to the Chuckwalla Projects. Analyses from the previous resource investigations are incorporated by reference in this EIS, where applicable. The FEISs for these previous projects can be found at the following link: https://www.chuckwallasolarprojectseis.com/previous-eiss.html .

Referencing allows the BIA to prepare environmental documents without duplicating relevant portions of the previous EISs and RODs. Since potential impacts to resources/uses from construction, O&M, and decommissioning of these previous solar energy generating facilities have been analyzed in previous NEPA documents, the analysis of the relevant resources/uses will not be repeated in this EIS. Table 3-1 in Chapter 3 identifies all the resources/uses considered by the BIA and cooperating agencies and describes which resources are evaluated in detail in subsequent sections of this EIS and provides the rationale for eliminating some resources/uses from further analysis.

Table ES-4 provides a comparative summary of the environmental impacts resulting from constructing, operating, maintaining, and decommissioning the Chuckwalla Projects and the No Action Alternative. This table summarizes the impacts on the resources evaluated in detail in Chapter 3 and those resources from **Table 3-1** with minor impacts.

Table ES 4 **Comparison of Alternatives**		
Resource	Proposed Project	No Action Alternative
Climate Change	Short-term negligible GHG emissions from construction and long-term, negligible beneficial impacts on climate change from the reduction of primary contributors to GHG emissions offset by the generation of renewable energy. See Section 3.1 for additional information on climate change.	Negligible long-term adverse effects on GHG emissions because there would be no offset from the generation of renewable energy.
Cultural Resources	The Chuckwalla Projects include nine archaeological sites that are currently recommended eligible for inclusion in the NRHP. All nine of the sites would be avoided by either being outside of the Projects' solar site development boundaries or by being fenced with an appropriate buffer to avoid impact. Mitigation of any unanticipated sites that cannot be avoided would include data recovery and curation with some non-invasive testing, if necessary. There would be no adverse effect to the railroad and the Old Spanish Trail. See Section 3.2 for additional information on cultural resources.	No impacts
Migratory Birds	Impacts on migratory birds would occur as the result of implementing the Proposed Action but these impacts would not affect populations and the implementation of design features and BMPs (**Appendix C**) and the BBCS (**Appendix H**) would minimize impacts. See Section 3.3 for additional information on migratory birds.	No impacts
Socioeconomics	Short- and long-term, direct and indirect, beneficial impacts on socioeconomics from the increase in employment, income, expenditures, and tribal and public revenues. Effects would be greatest during the construction and decommissioning phases due to the size of the workforce required. Although long-term benefits to employment and income would be less during O&M, the lease revenue generated by the Projects would have a long-term, beneficial effect on tribal revenue. The beneficial effects to socioeconomics on the Reservation would be major, while the beneficial effects on the regional economy would be negligible. See Section 3.4 for additional information on socioeconomics.	Moderate adverse effect on socioeconomics for the Moapa Band because there would be no increase in employment and income on the Reservation

Table ES 4
Comparison of Alternatives

Resource	Proposed Project	No Action Alternative
Threatened and Endangered Species	No direct impacts on Moapa dace due to the lack of suitable habitat in the Project area; minor, regional, short- and long-term, indirect, adverse impacts on the Moapa dace from groundwater withdrawals. Moderate, localized, short-term, adverse impacts on Mojave desert tortoise during construction and decommissioning due to harm, harassment, injury, and possible death to tortoise from ground-disturbing activities and tortoise translocation. Minor, localized, long-term, adverse impacts on Mojave desert tortoise during O&M due to permanent disturbance of 383 acres (65 acres for Chuckwalla 1a, 19 acres for Chuckwalla 1b, 67 acres for Chuckwalla 2, 100 acres for Chuckwalla 3, and 34 acres for the shared facilities area) of suitable habitat for Mojave desert tortoise. Negligible, localized, short- and long-term, adverse impacts on southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail due to the low numbers of these three species that occur in the vicinity of the Projects and the lack of suitable habitat . See Section 3.5 0for additional information on threatened and endangered species, **Appendix N** for the Biological Assessment.	No impacts to threatened and endangered species would occur.
Traffic	Minor to moderate, short-term, adverse impacts during construction and decommissioning of each project from workers commuting to and from the work site and the delivery of equipment and materials, which would temporarily increase the volume of traffic on Valley of Fire Highway. Negligible, localized, long-term, adverse impacts due to the small number of O&M personnel associated with the Projects. See Section 3.6 for additional information on traffic.	No impacts
Vegetation	Minor, localized, short- and long-term, direct, adverse impacts from temporary loss of approximately 4,835 acres of vegetation and the permanent loss of 374 acres of vegetation. Minor, localized, short- and long-term, indirect, adverse impacts on vegetation from shifts in the composition of vegetation communities due to vegetation management practices, increased water inputs, fugitive dust, and the potential introduction or spread of invasive plant species and noxious weeds. See Section 3.7 for additional information on vegetation.	No impacts
Visual Resources	Minor to moderate, short-term impacts during construction and decommissioning based on the viewing distance, type of activity taking place, and time of day. Moderate, long-term, localized, adverse impacts and minor, regional, adverse impacts during O&M because the landscape would appear to be substantially altered and would begin to dominate the visual setting of the visual resource study area. See Section 3.8 for additional information on visual resources.	No impacts

Table ES 4 Comparison of Alternatives		
Resource	Proposed Project	No Action Alternative
Water Resources	Minor, regional, short- and long-term, adverse impacts because of increased soil erosion and sediment loads during storm events and altered stormwater flows within floodplains. The withdrawal of groundwater for the Projects would not impact the availability of groundwater in the region. See Section 3.9 for additional information on water resources.	No impacts

CHAPTER 1
Purpose and Need

1.1 Introduction

EDF Renewables Development, Inc. (EDFR) has entered into an option agreement with the Moapa Band of Paiute Indians (Moapa Band or Band) to lease up to 6,500 acres for the development of up to four solar projects collectively referred to as the Chuckwalla Solar Projects (Chuckwalla Projects or Projects) to be located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The four solar projects would total up to 700 megawatts (MWs) of solar energy generation each using photovoltaic (PV) technology and incorporating battery energy storage systems (BESS). The Chuckwalla Projects would include the four solar projects and all associated facilities. **Figure 1-1** (in **Appendix A**) shows the proposed general location for the Chuckwalla Solar Projects approximately 30 miles northeast of Las Vegas and east of Interstate 15 (I-15).

The Moapa Band is federally recognized and has a Constitution that was approved by the Secretary of the Interior on April 17, 1942. The current total land base of the Reservation is 71,746 acres that are held in trust by the U.S. Government for the sole benefit of the Moapa Band. The Reservation lands originally set aside in 1874 consisted of 2 million acres, but in 1876, the Reservation was reduced to 1,000 acres. In December 1980, Congress added approximately 70,564 acres to the Tribal land base. The stated purpose of the restoration of these Tribal lands was to provide economic development opportunities. A solar project on the Reservation provides a viable economic development opportunity for the Moapa Band.

1.2 Project Background, Overview, and Location

The proposed Chuckwalla solar generating facilities would be constructed entirely within the Reservation within a lease study area of approximately 6,500 acres of tribal trust land. These lands are all located in the southeast corner of the Reservation in an area set aside by the Band exclusively for the Chuckwalla Projects. The solar fields and associated facilities would be in Sections 13, 14, 22, 23, 24, 25, 26, 27, 34, 35, and 36; Township 16 South, Range 65 East; Mount Diablo Base Meridian. The lease study area is shown on **Figure 1-2**.

The Projects would include two new generation interconnection (gen-tie) lines approximately 10 to 12 miles long that would interconnect the solar projects to the regional electrical grid – one to the existing Harry Allen substation (via the approved Moapa Solar Energy Center [MSEC] line) and one directly to the existing Crystal Substation. Portions of these gen-tie lines would cross lands managed by the Bureau of Land Management (BLM) – both within a federally designated utility corridor on the Reservation and federal lands south of the Reservation. The Crystal Substation is part of the Navajo Transmission System, which is partially owned by the United States (US) Government with oversight from the Bureau of Reclamation (Reclamation).

Primary access to the Chuckwalla sites would be provided from the Valley of Fire Highway via an existing 2.5-mile road on the Reservation that parallels its southern border and would be upgraded as needed. Additional access to the northern portion of the lease area would be provided via another existing road on the Reservation. **Figure 1-3** shows the locations of the proposed gen-tie lines and access roads.

The water supply required for the Projects would be provided by the Moapa Band and drawn from the Moapa Band's existing water rights. The water would be provided from either existing tribal wells or a new well on the Reservation within the lease area. If the water is sourced from off-site wells, it could be delivered to the site via pipeline or truck.

The Projects are described in more detail in **Section 2**.

The Reservation was selected as the proposed location for the Projects due to its abundance of solar resources, the availability of suitable land, transmission line accessibility, and absence of land use constraints and restrictive land use designations. The lease option area for the Chuckwalla Projects on the Reservation was selected by the Moapa Band to minimize environmental impacts and infrastructure needs due to its proximity to existing roads and transmission. In addition, the Projects would create employment opportunities and generate lease income for the Moapa Band, help the State of Nevada meet its renewable energy goals, and contribute to the local economy and encourage expenditures in local businesses.

The Projects would be some of the several utility-scale PV solar projects to undergo evaluation on the Reservation (see **Figure 1-4**). Of the previously evaluated projects, one is in operation, and another is currently under construction. Below are brief summaries of these projects.

K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project – The K Road Final Environmental Impact Statement (EIS) and Record of Decision (ROD) was published in 2012 and is a 350 MW PV solar project (BIA 2012a). K Road was sold after the completion of the Final EIS and ROD and the site was renamed the Southern Paiute Solar Project. The Southern Paiute Solar Project has been constructed and is currently in operation. The Southern Paiute Solar Project is located about 2.0 miles west of the lease option areas for the proposed Chuckwalla Solar Projects.

Aiya Solar Project (Aiya) – The Aiya Final EIS and ROD was published in 2016 and is a 100 MW PV solar project (BIA 2016). Aiya has no power purchaser and has not been constructed. If constructed, it would be in the northern portion of the Reservation, approximately 9 miles from the proposed Chuckwalla Projects.

Eagle Shadow Mountain Solar Project (ESMSP) – The ESMSP Final EIS was published in December 2019 and the ROD was signed in February 2020 and is a 300 MW PV solar project (BIA 2019a, 2020d). The ESMSP is currently under construction and is located approximately 5.2 miles west of the proposed Chuckwalla Projects.

Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP) – MSEC Final EIS and ROD was published in 2014 and is a 200 MW PV solar project (BIA 2014). In March 2017, the MSEC Project was purchased by EDFR and renamed the Arrow Canyon Solar Project (ACSP). This project was evaluated in a Supplemental EIS for the expansion of the solar field on Reservation lands and the Final SEIS was issued in December 2020 (BIA 2020c). The ACSP is located approximately 7.5 miles west of the proposed Chuckwalla Projects.

Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II) – The SBSP I and SBSP II Projects were recently evaluated through the NEPA process. The Final EIS was published in June 2021 (BIA 2021). They are located about 4 miles west and 2.5 miles northwest of the proposed Chuckwalla Projects.

In addition, the approved Gemini Solar Project is south of the Reservation on BLM land approximately 1.2 miles southeast of the proposed Chuckwalla Projects and is not yet constructed.

1.3 Purpose and Need of the Proposed Project

The purpose and need of the proposed Projects are to: (1) provide a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band; (2) allow the Moapa Band, in partnership with the Applicants, to optimize the use of the lease site while maximizing the potential economic benefit to the Moapa Band; and (3) develop clean renewable electricity generation from the Moapa Band's solar resources to support the State of Nevada's 50 percent renewable portfolio standard requirement by 2030 and a goal of 100 percent carbon-free resources by 2050 (State Bill 358). The Projects would also help meet the federal government's goals to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies.

The Moapa Band identified the proposed Projects as viable opportunities to meet its economic development goals because the leases would provide much needed revenue to the Moapa Band while occupying a small portion of the Reservation (9.2 percent). The construction, operation and maintenance (O&M), and decommissioning of the Projects would afford employment opportunities to Moapa Band members. The Moapa Band has determined that the Projects would also be consistent with the Moapa Band's tradition of respect for the land and would fulfill the purposes for which the 70,564 acres were restored to the Moapa Band by the federal government in 1980 (Moapa Band 1980). The proposed use of the Moapa Band's water by the Projects would help the Moapa Band affirm and sustain its rights to the water.

Because the Projects meet the Moapa Band's objectives, they have forwarded a resolution documenting their intent to enter into the lease agreements for the Projects to the BIA to initiate the environmental review process for the proposed combined 700 MW Projects.

1.4 Agency Purpose and Need

This Draft EIS was prepared to thoroughly examine the potential environmental impacts of the proposed action and alterative actions in order to support informed decision-making. This Draft EIS is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality's (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior's NEPA regulations (43 CFR Part 46); and Administration priorities and polices including Secretary's Order No. 3399 requiring bureaus and offices to use "the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect."

1.4.1 BIA Purpose and Need

The need for the BIA action is established by the BIA's responsibility to respond to a request for a business lease approval and ROW applications between the Moapa Band and the Applicants over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on tribal lands held in trust for the benefit of the Moapa Band (42 United States Code [U.S.C.] §§

4321 et seq).

The BIA purpose, pursuant to 25 U.S.C. § 415, is to deny, grant, or grant with modifications the solar energy ground leases for the solar fields and associated ROW agreements between the Moapa Band and the Applicant.

1.4.2 BLM Purpose and Need

The need for the BLM action is established under Title V of the Federal Land Policy and Management Act ([FLPMA] 43 U.S.C. § 1761), where the BLM must respond to Applicants' ROW grant applications for the gen-tie lines, existing BLM-managed access roads, and connection with, access to, and maintenance of the previously approved MSEC gen-tie line. In accordance with Section 103(c) of FLPMA, public lands are to be managed for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Department of Interior (DOI) is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501[a][4]).

The BLM purpose is to deny, grant, or grant with modifications the ROW request to construct, operate, maintain, and decommission the proposed new gen-tie lines located within the designated utility corridor on Reservation land managed by the BLM; the ROW request for use of existing access roads located on BLM land and Reservation land within the BLM-managed designated utility corridor; and the ROW request for connection with, access to, and maintenance of the previously-approved gen-tie line associated with the approved MSEC Project, located on BLM-managed federal land south of the Reservation. The ROWs would be in compliance with FLPMA, BLM ROW regulations (43 Code of Federal Register [CFR] § 2800), and other applicable federal and Nevada State laws and policies, and would be in compliance with all objectives, directions, and requirements of the BLM Las Vegas Resource Management Plan.

1.4.3 Reclamation Purpose and Need

The need for the Reclamation action is established by the partial ownership by the US government of a portion of the Navajo Project Western Transmission System of which the Crystal Substation is a part. The Navajo Generating Project and the associated transmission lines were authorized by the 1968 Colorado River Basin Project Act (Public Law 90-537, 82 Stat. 855). Reclamation is responsible for administration of the US government interests in this system and, along with the other owners, must approve the proposed interconnection into Crystal Substation.

1.5 Decisions To Be Made

Table 1-1 summarizes the agency decisions to be made for the proposed Chuckwalla Projects. The BIA and the BLM decisions, if approved, would assist in addressing the management objectives in Title II, Section 211 of the Energy Policy Act of 2005 (42 U.S.C. §§ 13201 et seq.) and Secretarial Order 3285A1 (March 11, 2009) that established the development of environmentally responsible renewable energy as a priority for the DOI. Refer to Chapter 2 for descriptions of Project components and the locations where leases would be required from BIA and where ROW would be required from BLM and BIA.

Table 1 1 Summary of Agency Decisions to be Made	
Agency	**Action**
BIA	Approval of solar energy ground lease and approval of ROWs for portions of the gen-tie lines and access roads located on the Reservation.
BLM	Approval of ROW for portions of the gen-tie lines within the BLM-managed designated utility corridor on Reservation land and BLM lands south of the Reservation; and approval of ROW for use of existing access roads and gen-tie ROW located on BLM-managed federal land and within the BLM-managed designated utility corridor on Reservation land.
Reclamation	Approval of interconnection to the Crystal Substation that is partially owned by US government.

Because the BIA has a jurisdictional trust responsibility over Indian lands, the BLM has land management responsibilities under FLPMA, and Reclamation must approve the interconnection to the Crystal Substation, the Projects are a major federal action and must comply with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321 et seq.). Because most of the Projects and related infrastructure would be located on tribal trust land, the BIA is the lead federal agency for purposes of compliance with NEPA. The Moapa Band, the BLM, Reclamation, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), Nevada Department of Wildlife (NDOW), Nevada Department of Transportation (NDOT), and the US Air Force are cooperating agencies on the EIS for the Projects. The BIA and the BLM will use this EIS to make their respective decisions and the other cooperating agencies will use this information to support their analyses and decisions, as needed.

1.6 Summary of Public Scoping and Issue Identification

1.6.1 Public Scoping Process

Scoping helps determine the significant issues, alternatives, and the appropriate scope of environmental analysis to be addressed in this EIS. Scoping also ensures that the issues and alternatives are within the scope of the decisions to be made by the BIA, the BLM, and other cooperating agencies.

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Projects in the Federal Register on April 23, 2021. In addition, notices were placed in local newspapers and two virtual public scoping meetings were held for the Projects. In accordance with interim guidance for NEPA public participation processes during the COVID-19 pandemic, the public scoping meetings were held virtually rather than in person. Virtual public scoping meetings were held on May 18 and May 19, 2021. The PowerPoint presentation was posted to the Projects' website prior to the virtual meetings and participants with access to the internet were able to watch a live presentation of the PowerPoint, ask questions about the Projects, and provide comments through a link on the website. A telephone line was set up for participants who did not have access to the internet. Additionally, the live presentation was recorded and made accessible for viewing throughout the scoping period. The scoping report (**Appendix B)** summarizes the comments received and provides a preliminary list of issues and/or concerns identified.

Table 1-2 provides a summary of the key issues identified by interested agencies, stakeholders, and members of the public during scoping for the Projects. These issues are the focus of the EIS analysis.

Table 1 2 Key Issues Identified During Scoping	
Issue Topic	**Issue/Comment**
Water Resources	Need to comply with relevant floodplain and stormwater requirements to minimize erosion and sediment production
	Avoid development within major washes
	Describe the amount and source of the water to be used during construction and operation
Soils	Should include measures to minimize grading and soil disturbance to the extent possible
Vegetation	Should include measures to minimize vegetation clearing to the extent possible
	Should include measures to control weeds to the extent possible
Cultural Resources	Determine whether the development could have potentials effects to significant cultural sites in the lease study area that would need to be mitigated or avoided.
	Determine whether the project could impact the Old Spanish National Historic Trail
Socioeconomics	Describe the economic development opportunity for the Band
	Describe the jobs for tribal members and others in the region that would be created
Land Use / Management	Determine potential impacts to nearby Valley of Fire State Park and Valley of Fire Natural Landmark
	Determine potential impacts to Air Force operations
Wildlife	Describe the potential impacts to threatened and endangered species (including the desert tortoise) and other sensitive wildlife species
	Consider measures that minimize impacts to desert tortoise habitat and connectivity such as fencing to allow tortoises to re-enter and utilize the site following construction
	Describe the potential impacts to avian species from construction and operation of the project
Visual Resources	Evaluate the impact the solar fields could have on views of the landscape
Air Quality/Public Health	Measures should be implemented to control and minimize fugitive dust and to prevent worker exposure to Coccidioides spores, if present
Regional Impacts	Identify impacts from other solar projects and other developments in the area
	Discuss trends of and collective impacts to key resources including desert tortoise

1.7 Policies and Programs

1.7.1 Relationships to Statutes, Regulations, and Other Plans

The Chuckwalla Projects will conform to the federal, tribal, State, and local laws, regulations, or policies that may apply to the Projects. It should be noted that portions of the Projects that lie wholly within the Reservation would also be regulated under the Moapa Band's Environmental Policy Ordinance, in accordance with NEPA, and in compliance with other federal regulations that apply on tribal lands (State, County, and local laws and policies are not applicable to tribal lands). Furthermore, the gen-tie lines and access roads on BLM-managed land off the Reservation may be regulated under County, State, and federal regulations that apply to the BLM.

1.8 Permits and Approvals Required for the Proposed Projects

Table 1-3 lists the anticipated federal, tribal, State, and local permits or approvals that may be required for the proposed Projects beyond the BIA, BLM, and Reclamation decisions and NEPA process. This table

has been subdivided by the components of the Projects and land jurisdiction (the Reservation, and lands managed by the BLM). In addition to the items listed in **Table 1-3**, the access roads will require ROW grants from BIA.

Table 1 3
Anticipated Permits and Approvals for the Project Components

Land Ownership / Jurisdiction	Solar Fields	Gen-Tie Lines
Moapa River Indian Reservation/BIA	• Lease approval, ROW grant (BIA) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Compliance with Tribal Environmental Policy Ordinance • CWA Section 404 nationwide or individual permit(s)	• ROW grant (BIA) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Compliance with Tribal Environmental Policy Ordinance • Construction Stormwater NPDES permit (USEPA) • CWA Section 404 nationwide or individual permit(s)
BLM	Not applicable	• ROW grant (BLM) • Interconnection approval (Reclamation) • Section 7 consultation (USFWS) • Section 106 consultation (SHPO) • Special Purpose Permit—Desert Tortoise Relocation (NDOW) • Fund for the Recovery of Costs (NDOW) • UEPA Permit (PUCN)

Table Abbreviations: BIA = Bureau of Indian Affairs; NDOW = BLM – Bureau of Land Management; Nevada Department of Wildlife; PUCN = Public Utilities Commission of Nevada; ROW = right-of-way; SHPO = State Historic Preservation Office; UEPA = Utilities Environmental Protection Act; USFWS = U.S. Fish and Wildlife Service

CHAPTER 2
Proposed Action and Alternatives

This chapter describes the Proposed Action and identifies potential alternatives to the Projects that were initially identified by the BIA, cooperating agencies, and the Applicant. Alternatives identified by these entities and those suggested by the public or developed to respond to issues identified during the scoping process were evaluated for feasibility. Potential alternatives are categorized as those that are carried forward for detailed analysis and those that were considered but not carried forward for detailed analysis.

2.1 Proposed Action Alternative

The Proposed Action would consist of four PV solar power generation facilities incorporating BESS, two gen-tie lines that would interconnect the Projects to the regional electrical transmission grid), access roads to the solar sites from the Valley of Fire Highway and Interstate 15 (I-15) and possibly a temporary pipeline to deliver water to the Projects during construction. All proposed facilities except segments of the gen-tie lines and associated access would be located on the Reservation. Parts of both gen-tie lines and associated access roads would be located within the utility corridor on the Reservation and on Federal lands south of the Reservation managed by the Bureau of Land Management (BLM). **Figure 1-3** shows the locations of the various Project components.

2.1.1 Proposed Solar Project Components

The solar fields for the Chuckwalla Projects would be located wholly on lands within the Reservation. They would be developed using PV solar technology to generate up to 700 MWs of solar energy for four separate projects summarized in **Table 2-1** below:

Table 2 1
Summary of Proposed Chuckwalla Solar Projects

Project	Energy Output	Lease Study Acreage
Chuckwalla 1a	200 MW	1,976
Chuckwalla 1b	50 MW	480
Chuckwalla 2	200MW	1,572
Chuckwalla 3	250 MW	2,307
Shared Facilities Area		166
TOTAL		6,501

Figure 2-1 shows the proposed locations of the lease study areas for each of the four proposed Projects. Chuckwalla 1a and 1b would be built at the same time to make up the first phase of the Projects. Chuckwalla 2 and 3 would be built separately in subsequent phases. In addition to the lease areas for each project, the four projects would collectively utilize a Shared Facilities Area of approximately 166 acres containing BESS facilities, operations and maintenance (O&M) facilities, helipad, site substations, laydown areas, batch plant, and a temporary water pond / water tank that would be utilized by all four projects.

Development of the Projects would include implementation of best management practices (BMPs) designed to guide project planning, construction activities, and operation of facilities to minimize environmental impacts. The BMPs and other design features incorporated into the Projects are summarized in **Appendix C.**

Solar Fields

The proposed PV solar fields would utilize crystalline silicon, bi-facial, or thin-film PV panels that would be mounted on single-axis trackers. The panels would be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day.

PV technology converts sunlight directly into direct current (DC) electricity. The process starts with PV cells that make up the solar modules. There are several types of PV solar cells. The two major types of cells are wafer-based silicon cells and thin-film cells. Several solar cells electrically connected to each other and mounted in a single support structure or frame is called a module. Several modules can be wired together to form an array and arrays can be connected in both series and parallel electrical arrangements to produce any required voltage and current combination.

The DC from the array is collected at inverters where the DC is converted to alternating current (AC). The voltage of the electricity is increased by a transformer at each inverter. Medium voltage electric lines (underground and/or overhead) are used to collect the electricity from each transformer and transmit it to the site substation, where the voltage is further increased by a high voltage transformer to be transmitted to the electric grid. Multiple transformers would be connected in parallel via low voltage (12.5kV or 34.5kV) collector lines to two Project substations, where the power from all four projects would be stepped up for delivery to the grid via the gen-tie lines described below. **Figure 2-2** shows the conceptual site plan for the full Project layout.

The PV modules, inverters, and transformers would be grouped into array blocks of up to 4.4 MWs each occupying approximately 23 acres. Inverter and transformer sizes would be selected based on cost and market availability prior to construction. A typical layout depicting the arrangement of a block of solar arrays for a single-axis tracker configuration is shown on **Figure 2-3**.

The highest point on the single axis-trackers would be up to 18 feet, occurring during the morning and evening hours when the panels are tilted to face the rising or setting sun. The degree of tilt would change over the course of each day for the single-axis trackers. **Figure 2-4** shows a cross-sectional view of a typical single-axis tracker. The PV units would be mounted on driven or pre-drilled H-pile foundations to support the panel mounting system. Site specific soil tests validate the preliminary engineering and if additional tests or installations conclude that further foundations are required, the vertical steel beams would be attached to concrete ballasts. The electrical equipment (inverters and transformers) would be in enclosures or covered by shade structures approximately 8 to 10 feet high.

The Projects would also include one or more small meteorological monitoring stations to track solar insulation, temperature, wind direction, and speed. These stations would have a height of approximately 10 feet and would be located within the disturbed site.

Battery Energy Storage System

The most likely BESS technology would be either lithium-ion (Li-ion) or redox flow battery. The first two projects (Chuckwalla 1a and 1b) would use Li-ion technology and the subsequent projects (Chuckwalla 2 and Chuckwalla 3) could use redox flow technology. The BESS could be integrated into each Project in two primary configurations - the BESS facilities would be distributed throughout each solar field at each array or the BESS facilities would be centrally located. Most of the BESS would be installed during construction. The remainder would be added to the project site later during the project life as needed to increase the BESS capacity as the system capacity degrades over time. This would be done as part of regular O&M activities.

Each BESS container would have its own fire detection system. In the case of BESS located in buildings, the building would comply with the local fire code and contain equipment at multiple sections of the building for fire detection, suppression, and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located such that it is readily accessible by the fire department.

Distributed BESS

In this configuration, Li-ion batteries would be in BESS containers that would be distributed throughout the Project site with each solar array block having up to two BESS containers placed adjacent to the solar inverters and the converters. Containers would be up to 13 feet tall, 70 feet long, and 12 feet wide. The total area on the solar sites attributed to the BESS facilities would be up to approximately 45 acres – about 13 acres for Chuckwalla 1a, about 4 acres for Chuckwalla 1b, about 13 acres for Chuckwalla 2, and about 15 acres for Chuckwalla 3.

The BESS containers could be made of steel or concrete. In addition to the battery modules, the containers would also contain a fire detection system; alarms and monitoring system; heating, ventilation and air conditioning (HVAC) system; data collection and control system; and other electrical wiring and auxiliary systems.

Centrally Located BESS

In this configuration, all the BESS facilities would be located at one location within the shared facilities area and the system would use either Li-ion or redox flow technology.

If Li-ion batteries are used, they would be in BESS containers (up to 13 feet tall, 70 feet long, and 12 feet wide) or in a warehouse-type building and would include the same support facilities described above. The total land disturbance within the shared facilities area attributed to the BESS facilities for all four projects under this scenario would be 45 acres at this one location.

If redox flow battery (RFB) technology is used for Chuckwalla 2 and 3, all battery equipment would be placed in one warehouse-type building or the batteries would be placed in multiple containers located within the shared facilities area. Redox flow battery modules are batteries that contain a reversible cell in which electrochemical components are dissolved in electrolyte fluids separated by a membrane. In addition to the battery modules, the building or containers would also have storage tanks for redox flow battery electrolytes, spill containment, plumbing, fire detection system, alarms and monitoring system, HVAC units, data collection and control system, and other electrical wiring and auxiliary systems. The building would be similar to the O&M building described below and the BESS inverter pads or

transformers would be located outside and adjacent to the building. The electrolyte storage tanks could also be located outside the building rather than being inside depending on the system design. The total disturbance for this BESS configuration for all four projects would be 95 acres at the shared facilities area.

The most established chemistry for RFB is vanadium and it would be the likely technology used for these Projects if RFB technology is used. Hybrid RFB technologies are being developed as well including those based on iron and manganese potentially substituting for vanadium. The leakage of electrolyte does not create a fire or explosion hazard. If any leakage is identified, operation of that module would be temporarily taken out of service and the point of leakage evaluated and repaired. The module would then be cleaned following the operating manual guidelines. In addition, full secondary spill containment would be included that would capture any electrolyte leakage from the storage tanks and battery modules.

Regular maintenance of the RFB would include the pumps, membranes, and electrolyte components. There is no ongoing demand for water as the RFB runs on a closed loop system. Regular maintenance is conducted to monitor the electrolyte and perform some balancing/addition of active material if necessary. Vanadium RFB electrolyte is recyclable and reusable. Membranes would be replaced every four to five years with the RFB vendors conducting the membrane replacement and disposal.

Operations and Maintenance Area

An O&M building would be developed on the site within the shared facilities area that would be used by all four projects and would contain administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building would likely consist of one single story building of approximately 6,000 square feet with a maximum height of approximately 25 feet. The building would have exterior lighting on motion sensors, fire and security alarms, and would comply with all applicable laws and regulations (including applicable Operational Safety and Health Act [OSHA] requirements).

In the shared facilities area, a helipad would be developed to provide first-responder access for Clark County Emergency Services as specified by the County. The dimensions of the helipad would be about 100 feet by 100 feet and the area would be compacted and covered with gravel and would provide sufficient clearance from all structures and any potential obstructions. Helicopters would use this pad infrequently and only in the case of emergencies during construction and operation.

Water Use

During construction, each phase of the Chuckwalla projects (1a and 1b together, 2, and 3) would use between 100 and 300 acre-feet per year (AFY) of water, primarily for dust control. Operations of each phase would require up to 30 AFY of water for a total of 90 AFY. Operational water would be used for panel washing, potable and sanitary uses, and other operational uses, such as dust control.

Water would be provided to the Project by the Moapa Band from either an existing groundwater well located on the Reservation or a new well developed on the solar site. The existing well is the Moapa Band's well at the Moapa Paiute Travel Plaza in Section 31, T16S, R65E. During construction, if water is

provided from the Moapa Band's off-site well, it would be delivered via a temporary water pipeline or trucked to the site. Construction water would be stored on site in temporary holding ponds or covered above-ground water tanks that would be located within the shared facilities area. Potable water would be provided via bottled water during construction.

If a temporary pond is developed, it would be approximately 200 feet by 200 feet and 10 feet deep. It would be lined and covered with a PVC liner. Multiple floating supports (barrels) would be included Inside the pond to help keep the cover supported. The cover will be anchored around the edges of the pond using onsite soil and/or sandbags.

If a new well(s) is developed on site, it would be located within the shared facilities area. In addition to construction water, it could provide water for personnel and panel washing during operations. If a new well is not developed on site, water for panel washing would be trucked to the site when needed and bottled drinking water would be provided for potable water during operations.

Wastewater Management

If a new well(s) is developed on-site, the Project could generate wastewater during operations from bathroom and shower facilities located within the O&M building. This wastewater would be treated and disposed at the site using a septic disposal system consisting of septic tanks and a leach field. If a new well is not developed on site, portable toilets would be used during operation.

Project Support Systems

The following project support systems would be developed for the Projects.

Site Substations

Two substations would be built on the solar site to facilitate interconnecting the Projects. One would accommodate the 230kV gen-tie connecting Chuckwalla 1a and 1b. The other would accommodate the 230kV or 500kV gen-tie connecting Chuckwalla 2 and 3. The two substations would be located adjacent to one another within the shared facilities area on the site.

The Chuckwalla 1a and 1b site substation would include medium voltage (34.5kV) to high voltage (230kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment. The site substation serving both Chuckwalla 2 and 3 would include the same equipment except that the step-up transformer could be 34.5/500kV if the gen-tie line were to be built at 500kV. If the Chuckwalla 2 and 3 gen-tie is built at 230kV, an additional 230/500kV step-up station would be built near the existing Crystal Substation from which a short 500kV line would provide the interconnection to Crystal at 500kV. This is described in more detail in Section 2.1.2 below and shown on **Figure 1-3**.

The relative location of the site substations is shown on the site layout plan for the Project (**Figure 2-2**) and **Figure 2-5** shows a conceptual substation layout. Each substation would be fenced for safety in accordance with applicable codes and one or more structures may be outside the fence for meters and control equipment. The communication system for the substation may include above-ground fiber optic cable and/or a microwave tower mounted on the control building or on a lattice tower up to 100 feet

tall. If a fiber optic line is used, it would be mounted on the gen-tie line structures as one of the shield-wires. The two gen-tie lines are described below.

Fencing

The perimeter of each solar field area would be secured with a minimum 6-foot tall, chain link metal-fabric security fencing with up to 2-foot barbed wire or razor wire on top. Controlled access gates would be located at the site entrance to each area. Temporary desert tortoise exclusion fencing would be installed and kept in place during construction. The permanent perimeter fence would be installed to leave a 6 to 8-inch opening at the bottom of the fence to allow for the movement of desert tortoises and other wildlife across and through the site once the construction of the facility is complete. The substation fence discussed above would not allow for wildlife movement.

Internal Site Roads

Within the solar fields, internal site roads would be built between the solar blocks to provide vehicle access to the solar equipment (e.g., solar panels, inverter stations, transformers). The existing soil surface of all internal site roads would be bladed with a road grader and roads to inverter stations would also be compacted and graveled with onsite materials. These internal site roads would occupy approximately 157 acres for all four sites. Turnarounds would be constructed where needed at the terminus of the roads to facilitate vehicle and equipment turn-around. The existing soil surface of all access roads would be leveled with a road grader. In addition to grading, access roads that lead to inverter stations would be compacted and graveled with onsite materials.

Fire Protection System

A shared fire protection water system would be supplied from up to three above-ground raw water storage tanks located on the site holding up to 12,000 gallons each. Fire protection pump flowrates would be in accordance with applicable standards. All fire protection system pumps must be shut off manually.

The piping network would be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. Portable fire extinguishers of appropriate sizes and types would be located throughout the Project sites.

In addition, each BESS container would have its own fire detection system. Whether the BESS is located in containers or buildings, the structures would comply with the local and federal fire code and contain equipment at multiple sections of the building for fire detection and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located such that it is readily accessible by the fire department.

A Fire Prevention Plan would be prepared prior to construction that would cover the construction, operation, and decommissioning of the facility. The plan would include measures to safeguard human life, prevent personnel injury, preserve property, and minimize downtime due to fire or explosion. Fire protection measures would include prevention methods using fire-safe construction, reduction of ignition sources, control of fuel sources, availability of water, and proper maintenance of fire-fighting systems. The plan would be coordinated with the BIA, Moapa Band, BLM, and Clark County.

Security

As mentioned above, each solar field would be fenced with a chain-link security fence open at the bottom to facilitate desert tortoise and other wildlife movement. Lights, triggered by motion sensors and powered by station power with backup battery power, would also be installed at each entry gate.

Perimeter signage at the substation, in both English and Spanish, would also be provided and installed at intervals along the perimeter fence stating the following: “Danger, Keep Out!”, and “Hazardous Voltage Inside”.

Lighting

The Projects’ lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions near each main entrance, the Project substations, and at the BESS facilities. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. There would be no lighting in the solar field except for emergency lighting at the BESS facilities. Therefore, light trespass on surrounding properties would be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used.

Erosion Control and Stormwater Drainage

The primary drainages flowing through the sites would be avoided by the solar fields. Stormwater flows from upstream of the sites would flow through the sites via these ephemeral drainages with the overall drainage patterns maintained. Most of these drainages would be left in their natural condition but improvements would be incorporated as needed to direct and maintain flow within the primary drainage paths and away from the solar arrays. It is expected that pre-construction stormwater flows and velocities traversing the sites would be generally unchanged. Detention basins or other design features could also be incorporated into the final solar field design to manage flows.

Most of the sites would continue to be drained by sheet flow to on- and off-site drainages. Areas of the facility that have the potential for release of contaminants due to vehicles and human activities, such as the O&M building, substations, BESS facilities, delivery areas, and paved roads would be addressed through source control best management practices (BMPs) and designed to accommodate runoff from the 100-year storm event at a minimum.

On-site erosion would be controlled through the implementation of BMPs detailed in erosion and sediment control plans developed by the contractor for the construction and operational phases of the Projects.

Spill Prevention / Containment

Local area containments would be provided around certain locations, such as oil-filled transformers and chemical storage areas and BESS facilities thereby preventing water coming into contact with oil or chemicals from leaving the site. A spill prevention control and countermeasure plan (SPCC) would be prepared to meet the applicable regulatory requirements.

2.1.2 Off-Site ROWs

As discussed previously, the primary ancillary facilities that would be located off the solar sites needed to support the Chuckwalla Projects include two gen-tie lines, two access roads, and a temporary water pipeline. The locations of these facilities are shown on **Figure 1-3**. The approximate length and acreage of each of these ROWs broken down by land jurisdiction is provided in **Table 2-2** and a description of each of these facilities follows.

Table 2 2
Dimensions of Off Site Project ROWs by Jurisdiction

Feature		Length (ft/mi)			Acreage		
		Reservation	BLM-administered Corridor on Reservation	BLM	Reservation	BLM-administered Corridor on Reservation	BLM
Gen-Tie Line ROWs[1]	Parallel 230/500	33,836 / 6.4	15,635 / 3.0	-	311	143	-
	230 Line	3,762 / 0.7	7,036 / 1.4	-	13	25	-
	500 Line	-	4,653 / 0.9	3,962 / 0.8	-	29	23
Site Access Roads		17,160 / 3.3	-	-	14	-	-
Temporary Water Pipeline		15,840 / 3.0	-	-	8	-	-
Existing Road providing access to Gen-Tie ROW		-	1,127 / 0.2	5,581 / 1.1		0.6	3
Existing Arrow Canyon to Harry Allen 230kV line ROW (N-88870)		-	-	76,137 / 14.4	-	-	138.18

[1] Gen-tie data provided for Option 1 to show worst-case impacts

Gen-Tie Transmission Lines

The proposed gen-tie lines would deliver the power generated by the currently proposed Project to the electrical grid. Two gen-tie routes would be developed to interconnect the Projects. A 230kV line would interconnect the Chuckwalla 1a and 1b Projects to the Harry Allen Substation. A 230 kV or 500kV gen-tie line would interconnect the Chuckwalla 2 and 3 Projects to the Crystal Substation.

The gen-tie line interconnecting Chuckwalla 1a and 1b would connect to the Harry Allen Substation via the Arrow Canyon solar site and would be approximately 10 miles of single-circuit 230-kV overhead transmission. From the Projects, its route would go west across tribal lands for about 2.5 miles where it would cross I-15. On the west side of I-15, it would continue in a northwesterly direction for approximately 2.9 miles where it would enter the designated utility corridor on the Reservation that is managed by the BLM. Inside the corridor, the line would go southwest and south for another approximately 3.1 miles where it would turn west for about 1.2 miles then exit the corridor and continue over tribal land into the ACSP site for about 0.7 miles to the location of the planned ACSP site

substation. Thereafter, it would connect with the approved MSEC Project gen-tie line to the Harry Allen Substation, located on BLM-managed federal land south of the Reservation (shown on **Figure 1-2**).

The 230kV or 500kV line would interconnect Chuckwalla 2 and 3 to the Crystal Substation. It would utilize the same route as the Chuckwalla 1a and 1b 230-kV gen-tie for about 8.5 to 8.9 miles to a point within the designated utility corridor north of the Crystal Substation. From that point, the Chuckwalla 2 and 3 Projects gen-tie line would extend south within the designated utility corridor where it would leave the Reservation and continue about 0.7 miles on federal land managed by the BLM to the Crystal Substation. If the line from the solar project is built at 230kV, a small 230/500 step-up substation would be built near the Crystal Substation to deliver the power at 500kV to Crystal.

Chuckwalla 2 and Chuckwalla 3 are currently requesting interconnection at Crystal and the interconnection queue positions are identified as NC5-005 (200MW) and NC5-007 (250MW). NC5-005 will require improvement within Crystal Substation such as installation of breakers, metering, protection equipment, communication and protection systems, and re-termination of transformers. The improvements/upgrades required for NC5-007 still need to be determined.

Two options for constructing these gen-tie lines could be used:

- **Option 1:** Where the lines are parallel to one another, they could be built as separate lines - one 230kV and one 500kV, with a combined ROW width of 400 feet and then split into a 150-foot ROW to the ACSP site and a 250-foot ROW to Crystal; or

- **Option 2:** Where the lines are parallel to one another, both lines could be built at 230kV on a double-circuit 230kV structure with a 150-foot ROW width for most of its length, a 230/500 step-up station would be built near the Crystal Substation and a short section of 500kV line would run from the step-up substation to deliver the power to Crystal at 500kV.

Tables 2-3a and **2-3b** show the temporary and permanent disturbance that would result from each of these options.
The Project would use H-frame or single steel pole structures that would be made of self–weathering or galvanized steel. The steel monopole transmission structures would be used for the 230kV gen-tie lines and H-frame structures for the 500kV line. The structures would range in height from 120 feet to 170 feet. Illustrations of the typical steel pole and H-frame structures that could be used for this Project are provided in **Figures 2-6** and **2-7.**

The design, construction, operation, and maintenance of the transmission lines would meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan's requirements for safety and protection of landowners and their property. Transmission line design would also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012). Additional measures from the Raven Control Plan such as affixing perch deterrents on cross-members of structures could also be implemented.

Site Access Roads

The Project solar sites will require vehicular access for construction, operation, maintenance, and decommissioning. To provide the needed access, two existing roads located wholly on the Reservation would be utilized. An existing 2.25-mile road on the Reservation along its southern boundary between the Valley of Fire Highway and the site would be upgraded where needed. Another existing road on the Reservation approximately 1.0 mile long would provide access from I-15 to the northern portion of the lease study area. These roads are shown on **Figure 2-8**.

The site access roads would be designed to accommodate equipment deliveries, the construction workforce, and ultimately, the operational needs of the Projects. The typical roadway section would have two travel lanes, would be approximately 24-foot wide with 5-foot shoulders, and have drainage swales on either side. These roads are existing and BIA will issue ROWs for them and any proposed expansion as needed. Final design for the access road would be consistent with BIA and tribal road standards and the road would be maintained by the Project.

Both these roads are relatively well-maintained. The current width and potential need for upgrades for these site access roads are described in Section 2.1.3 on construction.

Water Pipeline

Water for construction of the Projects would be provided by the Moapa Band either from an off-site existing well or from a new on-site well. During construction, if water is provided from the off-site well, it would be delivered to the Projects via a temporary water pipeline or by water trucks and would be stored on site as needed. If delivered via a water pipeline, the pipeline would originate at the Moapa Paiute Travel Plaza well in Section 31, T16S, R65E and would be routed to follow the proposed gen-tie route to the site. The route would be approximately 3 miles long and located wholly on the Reservation. **Figure 2-9** shows the proposed location of the water pipeline.

The water pipeline would follow existing roads and the gen-tie ROWs from the source to temporary pond or holding tanks the solar Projects shared facilities area. The pipeline would be 8 to 12 inches in diameter and, because it would be temporary, it would be placed on the ground surface to facilitate removal following construction. At periodic intervals, it could be elevated on blocks to allow the passage of desert tortoise and other small animals.

2.1.3 Proposed Project Construction

Solar Field Construction

Table 2-3 shows the temporary and permanent disturbance that would be expected to result from the construction of the four solar projects. All this disturbance would occur on tribal lands within the Reservation. Generally, permanent disturbance is expected to occur where grading occurs and it remains clear of vegetation. Temporary disturbance would occur in areas that are mowed and access is via overland travel and allowed to revegetate. The construction methods that would be used to develop the various components of the solar field are described below.

Table 2 3 CHUCKWALLA SOLAR PROJECTS Acres of Disturbance by Project All on Reservation/Tribal Land			
Project / Area	**Temporary Disturbance[1]**	**Permanent Disturbance**	**Total Acres Disturbance**
1a	1,576	64	**1,640**
1b	351	18	**369**
2	1,084	65	**1,149**
3	1,648	98	**1,746**
Shared Facilities Area	24	117[2]	**141**
TOTAL	**4,683**	**362**	**5,045**

[1] Includes mowing and other areas to be reclaimed following construction

[2] Includes 95 acres for BESS to show worst case if redox-flow battery system is used. If Li-ion system used, this disturbance would be reduced to 57 acres.

Grading / Site Preparation

Prior to the initiation of construction, the Project sites would be surveyed and staked. Preconstruction survey work would consist of locating the site and ROW boundaries, the locations of proposed facilities, and the centerlines of linear features. Clearance surveys will be conducted by authorized desert tortoise biologists prior to construction to translocate any desert tortoise on site. These surveys would be initiated following installation of the temporary tortoise exclusion fencing. Prior to the initiation of any preconstruction surveys, the necessary permits for rights-of-entry would be obtained.

Vegetation would be permanently cleared via grading from roadways, site access ways, and at inverter equipment within the solar field and substations, BESS locations, and O&M facilities within the shared facilities area. This would total approximately the acreage of grading / permanent disturbance identified in **Table 2-3** for each of the projects. Within the solar field, native vegetation would be left in place to the extent possible with some mowing and selective trimming as needed to create a safe work environment and avoid interference with the movement of the solar panels. Prior to construction, vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations. Construction equipment would drive over and crush the vegetation during installation of the arrays.

The cuts and fills associated with all earthwork required on the site are planned to be balanced on-site to the extent practicable. Within the solar field, some grading would be required for the Project substation, O&M area, BESS area(s), perimeter roads around the solar arrays, electrical equipment pads and where the panel support foundations are driven or drilled. A small graded pad could be required within each solar array to accommodate the inverter and transformer or they could be installed on driven piers.

Excavation would be required for trenches for electrically connecting some of the equipment on site. Following construction, all underground trenches would be filled with native soils and/or imported fill and compacted.

Construction Workforce

The projected construction work force includes all personnel required to complete construction of the Project including overall Project and site management, laborers, skilled craft, and startup personnel. Skilled craft and laborers would be drawn from the local area with construction management and startup functions provided by relocated personnel from the engineering, procurement, and construction (EPC) contracting firm and Applicant.

The Chuckwalla 1a and 1b, Chuckwalla 2, and Chuckwalla 3 Projects are each expected to create a peak of up to 450 and an average of 350 temporary construction jobs for the construction period.

Construction Sequencing

Construction of the solar fields for Chuckwalla 1a and 1b would be built at the same time and would take up to 20 months. Likewise, construction of Chuckwalla 2 and 3 would each also take up to 20 months. It is expected that each phase would be constructed over different, non-overlapping 20-month time frames. These schedules would be designed to meet the commercial operations date (COD) for delivery of the energy from each Project as required by each Project's PPA.

Construction would generally occur between 5 a.m. and 5 p.m., Monday through Friday, but could occur seven days a week. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier (as early as 3:00 am) to avoid work during high ambient temperatures. Also, construction requirements would require some nighttime activity for installation, service or electrical connection, or inspection and testing activities. Nighttime activities would be performed with temporary lighting.

The construction phases for each solar field are expected to be as follows:

- **Access Road**—The main access roads to the solar Projects would be upgraded where needed.
- **Fencing**–Temporary desert tortoise exclusion fencing would be installed around each solar field and kept in place during construction. Permanent fencing could be installed simultaneously with the temporary desert tortoise fence or later as a part of overall site development.
- **Clearing**—Vegetation removal for installation of the solar facilities would be completed only as necessary to advance ahead of equipment installation but conducted to minimize the amount of disturbed ground surface at any one time.
- **Parking and Laydown**—Parking areas for construction workers and laydown areas for construction materials would be prepared inside the Project areas. Detailed information regarding the location of the laydown and parking areas within each Project would be developed after a contractor is hired to construct the facility.
- **Temporary Construction Water Pond** – A temporary water pond or water tanks would be developed within the shared facilities area.
- **Site Roads**—The internal site roads would be constructed and maintained.
- **Site Grading / Mowing**—Because of the relatively flat topography at the site, minimal volumes of soil would be moved for grading. Areas not requiring grading would be mowed where needed to facilitate movement of construction equipment.
- **Foundation Construction** – Foundations for the substation, inverters and/or BESS containers (if necessary) would be constructed and may require some earthen fill.

- **Array Installation**–The solar arrays are installed first by driving piles (including pre-drilling if required by site soil conditions). The tracker is then attached to the piles and then the PV modules (panels) are attached to the tracker. Generally, at the same time the substation equipment, inverters, and BESS are installed. This also includes running cables between all equipment. Cables between the PV panels and inverter are commonly routed through hangers or trays. Cables from the inverters to the substation would be underground (installed by trenching, laying the cable, and backfilling).
- **Shared Facilities Area-** While the arrays are being built, the shared facilitie**s** area would be constructed and would include laydown areas, a batch plant, O&M facilities, site substations, water pond/tanks, and possibly a water well(s) and BESS.
- **Balance of Plant (BOP)**–With the major equipment in place, the remaining work would be electrical and smaller component installations.
- **Testing and Commissioning**–Testing of subsystems would be conducted as they are completed. Modules would be tested once all supporting subsystems are installed and tested.
- **Site Stabilization**—Disturbed areas would be stabilized during construction to minimize wind and water erosion and fugitive dust by watering and/or use of dust palliatives approved by the USFWS. Cleared and graded surfaces that would not be subject to future disturbance would be restored. Revegetation would be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success.
- **Demobilization**—Any temporary fabrication and construction facilities would be removed from the site once construction is complete.

The project construction contractor would mobilize and develop temporary construction facilities and laydown areas within each Project site. Once a final design has been established, the contractor would prepare site maps showing the construction project in detail. Temporary construction facilities would include:

- Full-length trailer offices or equivalent
- Generators
- Portable toilets
- Parking for construction vehicles
- Tool sheds/containers
- Parking construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Batch plant (if needed, may be located within one of the temporary laydown areas)

Construction materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck. Initial grading work would include the use of excavators, graders, dump trucks, and end loaders, in addition to support pickups, water trucks, and cranes.

Site Access and Traffic

All equipment, permanent materials, and commodities for the Projects would be transported to the site via rail and/or local highways. Any shipments by railroad would go to the nearest active railroad spur for

offloading and transported by truck to the Project sites. All equipment and material deliveries would utilize the identified site access routes.

Truck deliveries of equipment and materials would occur from the initial construction notice to proceed through the entire duration of each of the Projects. Initial truck deliveries would include haul trucks for importing construction equipment, as required, followed by concrete trucks for installation of major foundations. Array materials for the PV array (piles, cables and tracker assembly) would be delivered to the Project site early in the construction period corresponding to approximately the time frame for foundation array installation. Deliveries of larger equipment such as inverters, BESS equipment, and substation components would commence at about midpoint of the construction period. The batteries for the BESS facilities would be delivered last as they require back feed power prior to installation.

On-site roads would be left surfaced with the native soil and treated with water and/or a dust palliative approved by USFWS as needed.

Traffic generated during construction of each phase of the Projects would be from the delivery of equipment and supplies described above and the commuting of the construction workforce over the up to 20-month construction period. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 350 with a peak of 450 workers each day, generating an average of about 600 up to a peak of 800 daily trips, as carpooling is commonplace. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment, materials, with an additional 40 trips per day if/when water is trucked to the site for dust control purposes. Combined, these would result in an average increase of at least 700 vehicle trips (or 350 roundtrips) per day during construction. All Project related parking would be onsite during construction.

Gen-Tie Construction

The typical sequence of construction activities required for the completion of gen-tie line construction are described below. **Tables 2-4a** and **2-4b** summarize the temporary and permanent disturbance associated with each gen-tie option (Option 1 and 2).

Table 2 4a
CHUCKWALLA GEN TIE LINE IMPACTS
OPTION 1 PARALLEL ROWs

Impact Type	Work Area Type	Jurisdiction			Total Acres
		Reservation (Acres)	BLM-administered Corridor on Reservation (Acres)	BLM Land (Acres)	
Permanent Impacts					
	Structure Work Areas	7.7	4.9	0.7	13.3
	New Roads	15.7	12.7	1.2	29.6
	Spur Roads	1.4	0.9	0	2.3
Permanent Impacts Total		24.8	**18.5**	**1.9**	**45.2**

Temporary Impacts					
	Work/Laydown Areas	7.1	4.9	0.6	12.6
	Stringing Sites	30.6	32.1	6.9	69.6
Temporary Impacts Total		37.7	**37.0**	**7.5**	**82.2**

Lay-down Yards

Construction of the gen-tie lines would begin with the establishment of lay-down yards, which would be required for storing materials, construction equipment, vehicles and in some cases as a show-up yard for the construction crews. The gen-tie lines would likely have two lay-down yards – one at each end of the lines. These areas could each require approximately 5 to 10 acres and they would be located on tribal lands.

Vegetation would be cleared with possibly grading in these areas as needed. Unless otherwise directed, the lay-down yard would be restored following construction.

Table 2 4b
CHUCKWALLA GEN TIE LINE IMPACTS
OPTION 2 DOUBLE CIRCUIT LINE

Impact Type	Work Area Type	Jurisdiction			Total Acres
		Reservation (acres)	BLM-administered Corridor on Reservationr (Acres)	BLM Land (Acres)	
Permanent Impacts					
	Structure Work Areas	3.7	3.0	0.7	7.4
	New Roads	15.6	12.2	2.5	30.3
	Spur Roads	0	0	0	0
Permanent Impacts Total		19.3	**15.2**	**3.2**	**37.7**
Temporary Impacts					
	Work / Laydown Areas	3.2	2.7	0.5	6.4
	Stringing Sites	15.2	26.9	8.1	50.2
Temporary Impacts Total		18.4	**29.6**	**8.6**	**56.6**

Access to and along the Gen-Tie ROW (Permanent and Temporary)

For either gen-tie option, a new gen-tie road would be developed within the proposed gen-tie ROW for its entire length on both tribal and BLM-administered land. Access to each new structure location for the proposed 230kV line would be provided by these new gen-tie roads. Where the two gen-tie lines parallel each other in Option 1, access to the structures on the 500kV line would be provided by short spur roads from the new gen-tie road. New roads and spur roads would be up to approximately 20 feet wide and total approximately 13.3 miles in length. Roads would be constructed sufficiently to provide the access needed by equipment during construction and in accordance with tribal, BIA, BLM, and other relevant standards.

To access the gen-tie ROW on the west side of I-15, construction vehicles would use approximately 1.3 miles of an existing well-maintained road east of the existing Crystal Substation and no upgrades are expected to be required. The portion of this existing access road that would be used to access the gen-tie ROW is located outside the proposed ROW. On the tribal lands on the east side of I-15, the gen-tie ROW would be accessed by the access road to the site substation.

If affected, fences and gates may be built or replaced as required. If cattleguards, fences, and gates are damaged, they would be repaired or replaced to their original condition as required. Temporary gates would be installed only with the permission of the land manager or landowner.

After Project construction, existing and new permanent access roads would be used by maintenance crews and vehicles for inspection and maintenance activities.

Structure Site Clearing, Foundation Excavation, and Foundation Installation

Structure sites would be located 1,000 to 1,600 feet apart. Where the line parallels the existing lines, the new structures would be located adjacent to the existing structure where possible to best utilize the terrain and existing access. Where the line deviates from the existing lines, structure locations would be determined by topography and best engineering practices.

Vegetation clearing and ground disturbance would be required at each structure site for excavation of holes and pouring of concrete foundations. Each structure location would be cleared of vegetation, used for construction, and remain available for future line maintenance. Structure sites will only be graded if necessary. Each structure site would be approximately 125 feet by 60 feet in size resulting in approximately 0.17 acre of temporary disturbance per structure site. These sites would be smaller where needed if limited workspace is available. Tables 2-4a and 2-4b show the expected disturbance associated with these areas.

Foundation excavations would be made using mechanized equipment, with tubular steel structures for a 230kV line requiring holes 6 to 12 feet in diameter. If a separate 500kV line is built using H-frame structures, each structure would require two holes 6 to 8 feet in diameter. Turning structures would generally be tubular steel structures requiring either one, two or three holes 6 to 12 feet in diameter. Structure foundation excavations would be made with power drilling equipment. A vehicle-mounted power auger or backhoe would be used to excavate the structure foundations. In rocky areas, the foundation holes would be excavated by drilling. Although not expected, in some instances blasting could be necessary because of the specific geologic conditions. Further details on blasting procedures and safeguards would be included in a Blasting Plan that would be provided prior to construction if needed. Foundation holes left open or unguarded would be covered to protect the public and wildlife. Additionally, any holes left open would be cleared by a monitor to ensure any trapped wildlife are removed before work resumes.

Foundations would be installed by placing reinforced steel and transmission structure steel components into each foundation hole, positioning the steel components, and encasing them in concrete. Excess spoil material would be used for fill where suitable and any remaining soil would be spread on the access road.

Water would be used for soil compaction and dust abatement at each structure site and along access roads, as needed. Water for footer construction and dust abatement would be obtained from the Moapa Band or other local water sources and trucked to the construction area.

Structure Assembly and Erection

Structural steel components and associated hardware would be transported from the lay-down yards to each structure site by truck. Steel structure sections would be delivered to structure locations where they would be fastened together to form a complete structure and hoisted into place by a large crane. At each structure site, a work area of approximately 125 feet by 60 feet would be required for the structure foundation locations, structure assembly, and the necessary crane maneuvers. The work area would be cleared of vegetation only to the extent necessary. Concrete for use in constructing foundations would be dispensed from concrete mixer trucks. After line construction, all pads not needed for future maintenance would be restored to the greatest extent possible and revegetated where required.

Conductor Installation

After the structures are erected, insulators, hardware, and stringing sheaves would be delivered to each structure site. The structures would be rigged with insulator strings and stringing sheaves at each ground wire and conductor position.

For public protection during wire installation, guard structures could be erected where the line would cross I-15, existing power lines, and other obstacles. Guard structures would consist of H-framed wood poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, and equipment from falling on an obstacle, and would be removed following the completion of conductor installation in that area. Equipment for erecting guard structures would include augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or other areas where suitable safety measures such as barriers, flagmen, or other traffic controls could be used.

Conductor stringing operations begin with the installation of travelers or “rollers” on the bottom of each of the insulators using helicopters or aerial manlifts (bucket trucks). The travelers allow the conductor to be pulled through each structure until the entire line is ready to be pulled up to the final tension position. Following installation of the travelers, a pilot line or sock line (a small cable used to pull the conductor) is pulled onto the travelers from structure to structure using helicopters or aerial manlifts traveling along the ROW. Helicopters would be used for the I-15 crossing. Once the pilot line is in place, it is attached to a steel cable and pulled back through the travelers. The conductor would then be attached to the cable and pulled back through the travelers using conventional tractor-trailer pulling equipment located at the stringing sites. This process would be repeated until the ground wire or conductor is pulled through all sheaves.

Once in place, the shield wire (and/or optical ground wire [OPGW]) and conductors would be strung using powered pulling equipment at one end and powered braking or equipment tensioning at the other end of each conductor stringing segment. Sites for tensioning equipment and pulling equipment would be approximately 14,500 feet apart. Each pulling / tensioning site would temporarily disturb approximately 100 feet by 400 feet. There would be no blading at pull sites if the terrain is sufficiently level. Pull site locations will be confirmed during final design.

The number of pull sites would be different for Option 1 and Option 2. Under Option 1, approximately 39 pull sites would be needed (18 on the Reservation, 17 within the utility corridor managed by BLM, and 4 on federal land managed by BLM). Under Option 2, approximately 21 pull sites would be needed (7 on the Reservation, 10 within the utility corridor managed by BLM, and 4 on federal land managed by BLM).

Helicopter Use

As stated above, helicopters would be used for stringing the gen-tie lines across I-15 and could possibly be used to pull in pilot lines in other parts of the line as well. Where helicopters are used to support the conductor stringing operations, in addition to installing the ropes and cables between stringing sites, they could also be used to transport line workers, clip ladders, and other tools between pole locations. It is anticipated that one of the lay-down yards or the O&M area on the solar site would be used for helicopter staging. Where used, helicopter duration for construction at any one structure location would be about 20 to 30 minutes per structure. More details regarding helicopter use would be included in a detailed project-specific Helicopter Flight and Safety Plan developed prior to construction. A draft framework of this plan is included in the Plan of Development (POD) for the gen-tie lines included as **Appendix D** in this EIS. The construction contractor would also include a detailed helicopter plan specifically for each area where they would be proposed for use.

Geotechnical Testing

Geotechnical investigations would be needed to determine the site soil conditions and to provide geotechnical engineering data for the foundation design of the proposed gen-tie lines. Prior to final design of the lines, geotechnical testing would begin with a field survey staking each test location. This would be done from a standard light-duty pickup truck and a one or two-person survey crew. For the portions of the lines on the Reservation, access to test locations would be via overland travel and existing roads. On BLM-managed lands, access to test locations would be via existing adjacent roads and possibly some overland travel. A geotechnical testing plan of operations would be created and submitted to BIA and BLM for approval prior to conducting any testing on the lands under their respective management. Test locations would be marked with wooden stakes and flagged. Once marked, a drilling crew would collect samples via a truck-mounted drill rig at various depths along the boring. Samples collected from the borings would be analyzed to determine soil classification, moisture content, density, depth to groundwater and other characteristics. Each boring would be approximately 6 inches in diameter and up to 50 feet deep.

Work areas surrounding each geotechnical boring location that would be needed for construction equipment, vehicles, and personnel during geotechnical activities would be confined to a 30 by 40-foot area. After each test boring is completed, the spoils would be hand- backfilled into the boring hole and lightly compacted. After backfilling, the test location would be smoothed and hand graded as necessary to return the area to the pre-test grade.

Solar Site Access Road Construction

The proposed access to the solar sites would include two existing roads - one along the southern border of the Reservation and the other from I-15 to the northern portion of the lease study area. Where it leaves the Valley of Fire Highway, the southern access road would require no upgrades for the first 1.9

miles where its surface is approximately 28 feet wide. The next 0.9 miles of the road going east is approximately 10 feet wide and would require upgrading. From there, the access road would follow the Old Spanish Trail Road for about 1.3 miles to the northeast to the shared facilities area. This road is currently about 16 feet wide and would also need to be upgraded. The northern access road from I-15 is approximately 30 feet wide and would require no improvements.

Construction of the needed upgrades to the access roads would be conducted using the proposed techniques identified below. The existing access roads to the solar sites would be widened and improved as needed using a bulldozer or grader. Front-end loaders would be used to move the soil locally. Where upgrading is needed as identified above, the road surface would be widened to 24 feet with a 5-foot shoulder constructed on each side to facilitate drainage and to blend into the adjacent topography.

Following grading, the top 12 inches of the subgrade of the road could be scarified and moisture-conditioned and a roller would compact and smooth the ground surface. If needed, approximately 14 inches of Class 2 road base could be placed above the compacted subgrade, and it also could be moisture-conditioned and compacted.

After project construction, the upgraded permanent access roads would be used to provide access to the Projects. The installation of culverts and other road improvement amenities would be incorporated into the road design where needed on a site-by- site basis.

Disturbed areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance of the road would be restored in a manner consistent with BIA and Tribal or BLM respective requirements to encourage natural revegetation.

2.1.4 Proposed Operation and Maintenance

Operation and maintenance activities associated with the Projects are minimal. The four Projects would be expected to collectively require up to 12 personnel during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. The panels would be facing east in the morning and rotate on the single axis to follow the sun throughout the day. In the evening, the trackers would be rotated back to the east using power from the electrical grid so that the panels are once again in position to receive the morning sun.

Maintenance and administrative staff would typically work 8-hour days, Monday through Friday. During periods when non-routine maintenance or major repairs are in progress, the maintenance force could work longer hours and contract labor could be utilized as necessary.

Long-term maintenance schedules would be developed to include periodic maintenance and equipment replacement in accordance with manufacturer recommendations. Solar panels are designed for a 35-year life. Solar panels and BESS components would be replaced as needed. Moving parts, such as motors and tracking module drive equipment would be serviced on a regular basis, and unscheduled maintenance would be conducted as necessary.

No heavy equipment would be used during normal plant operation. Operation and maintenance vehicles would include trucks (pickups, flatbeds, dump trucks), forklifts, and loaders for routine and

unscheduled maintenance, and occasionally water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement.

Operation of the Projects would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur but would be relatively infrequent as the panels could be cleaned only periodically. If panel washing were to occur, each event would generate up to 33 water truck trips. There could also be other deliveries of supplies or equipment that could occur to support operations and maintenance. This would result in a maximum of up to 34 daily round trips (during washing events) and more commonly less than one daily round trip during the operational phase of the Project. Potable water would be stored in a 15,000-gallon storage tank.

2.1.5 Proposed Project Decommissioning

The Projects would operate at a minimum for the life of their PPAs or other energy contracts as well as their lease with the Moapa Band. It is possible, because much of the needed electrical infrastructure would have been developed, the Projects would continue to be upgraded and used to generate solar energy even beyond the term of the initial energy purchase agreements and/or lease. Therefore, it is possible that the sites would remain in solar energy production for the foreseeable future.

If the Project were to be decommissioned, the solar field, support structures, and electrical equipment would be removed from the sites, and it would be revegetated as needed with native species.

Prior to decommissioning, a final restoration plan would be developed. It would be designed to meet the requirements applicable at that time and would include the following information:

- Goals and objectives of the plan
- Methods to be used to achieve site restoration
- Criteria to be used to determine the success or failure of the restoration
- Monitoring and maintenance of the site during and periodically after restoration
- What facilities and access routes would be removed, reclaimed and/or restored
- How facilities and access routes would be removed, and the disturbed areas restored
- The time of year the facilities and access routes would be removed and restored
- Noxious weed control during rehabilitation
- Stabilization and reclamation techniques to be used during restoration
- Annual reporting procedures
- Restoration implementation and monitoring schedule

2.1.6 Management Plans, Best Management Practices, and Mitigation Measures

The following Management Plans would be prepared by the Applicants and would be submitted to the Moapa Band, BIA, BLM, and USFWS (as appropriate) for approval. Management plans not included as an appendix to this EIS will be prepared and approved prior to implementation of the Projects.

In addition, the Proposed Action for the four Projects includes BMPs intended to avoid or reduce environmental impacts associated with the Projects. These can be found in **Appendix C.** Additional resource-specific plans would also be developed and are listed below:

- Site Restoration Plan (**Appendix E**)
- Integrated Weed Management Plan (**Appendix F**)
- Decommissioning Plan (**Appendix G**)
- Bird and Bat Conservation Strategy (**Appendix H**)
- Raven Control Plan (**Appendix I**)
- Gila Monster Reporting Protocol (**Appendix J**)
- Desert Tortoise Translocation Plan (**Appendix K**)
- Helicopter Flight Safety Plan
- Spill Prevention Control and Countermeasure Plan
- Emergency Response Plan
- Fire Management Plan
- Dust Abatement Plan
- Health and Safety Program
- Hazardous Materials and Waste Management Plan
- Stormwater Pollution Prevention Plan
- Site Drainage Plan
- Worker Environmental Awareness Program
- Unanticipated Discoveries Plan
- Blasting Plan (if needed)

2.2 No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Projects were not constructed. The No Action Alternative assumes that the lease agreements would be denied, the BLM ROWs would not be issued, and the Projects would not be built. Under the No Action Alternative, the purpose and need of the Projects would not be met. The Moapa Band would not benefit economically from the energy production that would be obtained from the solar Projects. The development of sustainable renewable resources would not occur, and the State of Nevada would not be assisted in efforts to meet its renewable energy goals.

2.3 Alternatives Considered but Eliminated from Detailed Analysis in the EIS

Federal agencies are required under NEPA to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternative not developed in detail (40 CFR § 1502.14). Several alternatives were considered during the development and scoping phases of the Projects. The alternatives below were not carried forward for detailed analysis because they would be ineffective (it would not respond to or meet the purpose and need), were determined to not be technically or economically practical or feasible or would cause greater environmental effects than the alternatives analyzed in detail. The justifications for eliminating these alternatives are described briefly below.

2.3.1 Alternative Reservation Locations

The Applicants and the Moapa Band considered other areas on the Reservation for potential solar development. This evaluation considered a variety of factors, including the need for up to 6,500 contiguous developable acres, topography, drainage, potential impacts to sensitive resources (including special status species and cultural resources), and proximity to existing infrastructure, transmission interconnection points, and access. The Moapa Band dismissed some areas on the Reservation due to resource constraints. Other suitable development sites on the Reservation either have been already developed, approved for other solar projects, are under consideration for other solar projects, or would have similar or greater consequences.

This process was designed to identify areas with the greatest potential for development while minimizing potential adverse impacts and permitting issues. This included making use of existing infrastructure to minimize disturbance and impacts associated with the access roads and gen-tie lines. Large portions of the Reservation were eliminated from further consideration by applying these criteria - the approved SBS sites, ACSP site, the approved Aiya Solar site, the approved ESMSP site, and other sites on the Reservation previously studied and eliminated by the K Road (now called Southern Paiute Solar Project) EIS (BIA 2012a) were not considered. In addition, the 6,000 acres of desert tortoise relocation areas associated with the Southern Paiute Solar Project are not available for development.

Also, the Moapa Band has been working very closely with several other solar power developers on current partnerships for additional solar projects and they intend to propose construction of additional solar facilities on tribal land on the southern half of the Reservation over the next ten years. Therefore, many potentially suitable areas outside the designated area for the Chuckwalla Projects are precluded from consideration because they are committed for other energy projects (primarily solar) or have other constraints, including potential impacts on desert tortoise and other wildlife.

Considering all these factors, the Moapa Band has designated the boundary of the lease study area for consideration for the Chuckwalla Projects. Areas outside the designated lease study area have been determined by the Moapa Band to be not available for consideration for the Chuckwalla Projects.

2.3.2 Alternative Off-Reservation Locations

The Projects are, by the terms of their purpose, limited to locations on the Reservation on land held in trust by the federal government for the Moapa Band. Accordingly, BIA did not consider off-Reservation alternatives as these locations would not meet the purpose and need of providing a long-term, viable economic revenue base (lease income) and job opportunities for the Moapa Band.

2.3.3 Alternative Gen-Tie Line Alignments

The gen-tie lines are necessary to connect each of the four solar fields to the Harry Allen and Crystal substations. The gen-tie lines were routed to utilize the BLM-managed designated utility corridor, avoid existing and approved solar projects, and utilize existing access associated with existing utilities to the extent possible. Therefore, other route alignments were eliminated from further consideration and additional evaluation.

2.3.4 Concentrated Photovoltaic (CPV) Technology

Concentrated Photovoltaic (CPV) technology uses layers of wafers to absorb different wavelengths of sunlight and provide more power conversion efficiency than typical PV solar panels. This technology requires dual tracking technology to provide critical alignment with direct sunlight to be efficient. CPV is generally mounted on taller structures than traditional PV (as high as 40 feet above the ground surface). Because this technology is relatively new, there are risks for long-term performance reliability and manufacturing capacity to supply large-scale utility projects. Therefore, this alternative has not been carried forward for detailed analysis.

2.3.5 Distributed Solar Generation

The concept of distributed solar generation locates smaller projects near the demand for electricity. Generally, these projects would generate power using PV solar panels (like all PV technologies). The PV solar panels could be installed on private or publicly owned residential, commercial, or industrial building rooftops, or in other disturbed areas such as parking lots or adjacent to existing structures such as substations. To be a viable alternative to the proposed Projects, there would need to be enough locations where new distributed solar generation could be installed to cumulatively generate up to 700 MW of capacity, and enough local demand for this electricity.

To meet the purpose and need, generation would need to be located on the Reservation and there are insufficient rooftops or other disturbed areas on the Reservation to make this option viable. Also, a true distributed generation project typically generates less than 10 MW and could not meet one of the fundamental objectives of the proposed utility-scale solar project: to provide renewable energy to a utility provider. Rooftop systems that lack transmission only generate power for onsite consumption, and the limited on-Reservation uses create only a fraction of the demand that these Projects seek to serve. Distributed generation projects cannot fill the same energy needs as utility-scale projects, and one is not a feasible alternative for the other.

2.3.6 Wind Energy

Wind carries kinetic energy that can be utilized to spin the blades of wind turbine rotors and electrical generators, which then feed AC electricity into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind ‘s kinetic energy into electricity. A single 1.5 MW turbine operating at a 40 percent capacity factor generates 2,100 MW hours annually. In 2012, the average size of wind turbines was 2.5 MW with 7.5 MW turbines the largest in use today (American Wind Energy Association 2018).

The technology is well developed and can be used to generate significant amounts of power. The use of wind energy on the Reservation could potentially be feasible at the scale/size of the Proposed Action if enough wind resources were available, but it would not eliminate impacts caused by the Proposed Action. The acreage of the impacted area would be dependent on the size of the turbines selected. A wind project could result in impacts on biological and cultural resources, and visual effects greater than with the Proposed Action.

Wind energy was eliminated from detailed discussion because this area has not been identified to have a sufficient wind resource and this alternative would not be technically or economically feasible to implement. Additionally, wind energy would not meet the BIA's purpose and need to respond to the Applicant's applications.

CHAPTER 3
Affected Environment and Environmental Consequences

This chapter describes the physical, biological, social and economic characteristics of the area that would be affected (Affected Environment) and the environmental impacts that would result (Environmental Consequences) from implementation of the Chuckwalla Projects and alternatives. The terms "effect" and "impact" are used synonymously in this document. Potential impacts are described in terms of duration, intensity, type, and context per the updated NEPA regulations (CEQ 2020).

For the purposes of this analysis, duration of the impact is defined as follows:

- ***Short-term*:** impacts that would be less than five years in duration.
- ***Long-term*:** impacts that would be five years or greater in duration.

For the purposes of this analysis, intensity or severity of the impact is defined as follows:

- ***Negligible*:** changes would not be detectable and/or measurable. The resource would be essentially unchanged or unaltered.
- ***Minor*:** changes would be detectable, localized, and/or measurable. The resource would be slightly changed or altered.
- ***Moderate*:** changes would be clearly detectable, measurable, and/or have an appreciable effect on the resource. The resource would be notably changed or altered.
- ***Major*:** changes would be readily detectable, and/or have a severe effect on the resource. The resource would be substantially changed or altered.

For the purposes of the type of impact is defined as follows:

- ***Adverse:*** impacts that would have a detrimental effect to a resource.
- ***Beneficial:*** impacts that would have a positive effect to a resource.

The proposed Chuckwalla Projects would be some of the several utility-scale PV solar projects on the Reservation to be recently evaluated in an EIS. The previously evaluated solar projects on the Reservation are:

- **K Road Moapa Solar Facility (K Road)/Southern Paiute Solar Project** – The K Road Solar Project is a 350 MW PV solar project and the Final Environmental Impact Statement (EIS) and Record of Decision (ROD) were published in 2012 (BIA 2012). K Road was sold and renamed the Southern Paiute Solar Project. It is located about 2.0 miles west of the lease option areas for the proposed Chuckwalla Solar Projects.
- **Aiya Solar Project (Aiya)** – The Aiya Solar Project is a 100 MW PV solar project and the Final EIS and ROD were published in 2016 and (BIA 2016). It is approximately nine miles north of the proposed Chuckwalla Projects.
- **Eagle Shadow Mountain Solar Project (ESMSP)** – The ESMSP is a 300 MW PV solar project and the Final EIS was published in December 2019 and the ROD was signed in February 2020 (BIA 2019a, 2020d). The ESMSP is located approximately 5.2 miles west of the proposed Chuckwalla

Projects.

- **Moapa Solar Energy Center (MSEC) / Arrow Canyon Solar Project (ACSP)** – The MSEC is a 200 MW PV solar project and the Final EIS and ROD was published in 2014 (BIA 2014). The MSEC Project was purchased and renamed the Arrow Canyon Solar Project (ACSP). A Final Supplemental EIS for the expansion of the solar field on Reservation lands was issued in December 2020 (BIA 2020c). The ACSP is located approximately 7.5 miles west of the proposed Chuckwalla Projects.
- **Southern Bighorn Solar Project I (SBSP I) and Southern Bighorn Solar Project II (SBSP II)** – The SBSP I and SBSP II Projects were recently evaluated through the NEPA process. The Final EIS was published in June 2021 (BIA 2021b) and the ROD was published in July 2021. They are located about four miles west and 2.5 miles northwest of the proposed Chuckwalla Projects.

Figure 1-4 shows the relative location of these projects. While the solar site and gen-tie lines associated with the proposed Chuckwalla Projects would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to if not the same as the Chuckwalla Projects. Analyses from the previous resource investigations are incorporated by reference in this EIS, where applicable. The FEISs for these previous projects can be found at the following link: https://www.chuckwallasolarprojectseis.com/previous-eiss.html .

Referencing allows BIA to prepare environmental documents without duplicating relevant portions of the previous EISs and RODs. Since potential impacts to resources/uses from construction, operation, maintenance, and decommissioning of these previous solar energy generating facilities have been analyzed in the previous NEPA documents, the analysis of the relevant resources/uses will not be repeated in this EIS.

Table 3-1 outlines all the resources/uses considered by the BIA and cooperating agencies (including the issues identified during scoping) for evaluation in this EIS. Each resource/use was evaluated for its potential to be affected by the Proposed Action and whether implementation of the proposed Chuckwalla Projects could result in a change to existing conditions. The table also identifies those resources evaluated in detail in subsequent sections of this chapter of the EIS and provides the rationale for eliminating some resources/uses for further analysis.

TABLE 3 1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS	
Resource/Use	**Rationale for Not Analyzing in Detail**
Air Quality	The proposed Chuckwalla Project lease area lies within the same airshed (HA 218 – California Wash) as the five previous EISs for solar projects on the Reservation - K Road (BIA 2012), MSEC (BIA 2014a), Aiya (BIA 2016), ESMSP (BIA 2019), and SBS (BIA (2021). These analyses determined that potential impacts from development, operation and maintenance, and decommissioning of a solar facility and gen-tie line on local and regional air quality would result from fugitive dust emissions and vehicle exhaust emissions primarily during construction. Further, they determined that the impacts would be minor because of implementation of Best Management Practices (BMPs) for dust control and would not require additional measures to minimize or avoid adverse impacts. Following construction, operation of the solar projects was not expected to contribute to measurable or detectable impacts to air quality (BIA 2012: pages 4-26 through 4-31, BIA 2014a: Pages 4-22 through 4-32; BIA 2016: Pages 4-20 through 4-30, BIA 2019a: page 3-3, BIA 2021: Page 3-2). The types of construction and operational/maintenance activities that would be undertaken for the Chuckwalla Projects would be the same as those analyzed for the five previous solar projects and all the same BMPs are included as part of the Projects design features (**Appendix C**). Exhaust and fugitive dust emissions generated from construction equipment and mobile sources would increase ambient concentration of regulated air pollutants. Wind-driven emissions of fugitive dust would be generated following disturbances by construction activities, including mobile sources traveling on paved and unpaved roadway surfaces. Operation of the Chuckwalla Projects would include combustion emissions from worker commutes, delivery trips, and construction equipment used for maintenance. However, these impacts are anticipated to be well below thresholds that define any noticeable change to local/regional air quality. The Proposed Action would have short-term and long-term, negligible adverse air quality impacts resulting from the construction and decommissioning of the Project and long-term, negligible adverse impacts resulting from operations. There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Areas of Critical Environmental Concern (ACECs)	There are no ACECs in the vicinity of the Project area so no impact to this resource would result from the Projects. The nearest ACEC is the Hidden Valley ACEC approximately nine miles south of the Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.

TABLE 3 1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS	
Resource/Use	**Rationale for Not Analyzing in Detail**
BLM Sensitive Species and Nevada State Listed Species	The Chuckwalla Projects occur primarily on the Reservation with only a small portion of one of the gen-tie lines (23 acres) occurring outside the Reservation on BLM lands. This is the only portion of the Projects where protection of BLM-Sensitive Species and Nevada State Listed Species is applicable. An evaluation of the potential for BLM-Sensitive and Nevada State Listed Species to occur within the Project area on BLM-managed lands is provided in **Appendix L**. The previous EISs for solar projects on the Reservation analyzed impacts on these species (BIA 2012: pages 4-50 through 5-60; BIA 2014: pages 4-52 through 4-53; BIA 2016: pages 4-42 through 4-48; BIA 2019a: pages 4-44 through 4-48, and BIA 2021: page 3-3). Like the previous projects, this project would involve limited impacts on BLM land. Construction of the short segment of gen-tie on BLM land would not be likely to impact any BLM-Sensitive or Nevada State Listed Species. Implementation of reduced speed limits and other design features and BMPs (**Appendix C**) and management plans (see **Appendices E** through **J**) during construction, O&M, and decommissioning would minimize the potential for impacts to sensitive wildlife species. The Proposed Action would have negligible, localized, short- and long-term, adverse impacts on BLM-Sensitive and Nevada State Listed plant and wildlife species. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Climate Change	See analysis in Section 3.1.
Cultural Resources	See analysis in Section 3.2.
Environmental Justice	The tribal members on the Reservation meet the criteria of a minority population and are subject to environmental justice consideration under Executive Order 12898. The proposed Projects are being developed by and to benefit the Moapa Band by creating temporary and long-term jobs and would not disproportionately negatively affect the Moapa Band. The Chuckwalla Projects would provide beneficial impacts of creating both jobs and revenue for the Band and tribal members. These impacts would be short-term during construction and decommissioning and long-term during operations. No displacements or permanent changes in populations would occur. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Farm Lands (prime or unique)	There are no U.S. Department of Agriculture-designated prime or unique farmlands within the analysis area so no impact to this resource would result from the Chuckwalla Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
Fire Management	Development of the Chuckwalla Projects would have a minor long-term beneficial effect by reducing the potential for wildland fires in the area by eliminating some of the fuel source on up to 6,500 acres where a portion of the vegetation could be mowed to a height of 18 inches. At the same time, the Projects would introduce a minor short-term increase in the likelihood for ignitions from activities during construction and decommissioning. The proposed Projects are in a remote area, located approximately 10 miles from the nearest residential/urban area. Fire management would be similar for the Chuckwalla Projects as the other solar projects on the Reservation. The BLM responds to all wildland fires on both BLM and the Reservation and structure fire response would be covered by Clark County Rural Fire and/or Moapa Fire Protection District. BIA is drafting a fire management plan that includes the project area to improve direction in the future. The previous EISs provide analysis of potential impacts from fire associated with the construction, operation, maintenance, and decommissioning of a PV solar facility (BIA 2012: pages 4-100 through 4-102; BIA 2014: pages 4-111 through 4-112; BIA 2016: page 4-96; BIA 2019a: page 3-5; BIA 2021: pages 3-4 and 3-5). The Chuckwalla Projects would be located on the same sparse vegetation types as those the previous projects. These analyses concluded that the threat of harm or loss to structures from wildfires would be negligible. Like for the previous projects, all applicable BMPs to minimize and control fire risk would be incorporated into a fire management plan for the Chuckwalla Projects that would be submitted to BIA and BLM for approval and implemented during construction, operation, maintenance, and decommissioning. Therefore, impacts would be negligible so this resource topic has been eliminated from further analysis in this EIS.
Floodplains/Flood Hazards	There are mapped Federal Emergency Management Agency (FEMA)-designated 100-year floodplains within the lease option area associated with California Wash and its tributaries (FEMA Flood Insurance Rate Maps [FIRM] 32003C1475E and 32003C1075E). However, the Projects would be designed to avoid the 100-year floodplain and other major ephemeral drainages within the lease option area. No onsite or offsite facilities would be constructed within the 100-year floodplain. All large ancillary facilities (e.g., shared facilities area) will be located outside of the ordinary high-water mark of any drainages. Some PV supports could be placed within ungraded drainages where technically feasible. Road crossings would be designed to meet standards for low-water crossings within floodplains. Temporary disturbance in drainages would also occur from trenching across drainages for underground collector line installation. The low-water crossings and trenches would not affect the grade or flow within the floodplain. A hydrology report was prepared which modeled flood depths in the Project area and Project infrastructure was designed in consultation with hydrology experts to protect infrastructure for the life of the Projects and in accordance with local, State, and federal standards. A number design features and BMPs (**Appendix C**) would be implemented to manage stormwater runoff and erosion in the Project area, which could otherwise have downstream effects on floodplains. With the implementation of these design features and BMPs, the Proposed Action would not lead to the modification of any floodplains or increased flood hazards. Therefore, the Proposed Action would have negligible, short- and long-term, adverse impacts on floodplains and flood hazards, and this resource topic has been eliminated from further analysis in this EIS.
Forest Resources	The BIA and Moapa Band do not consider yucca and cacti to be forest resources so this topic would not apply to tribal lands. The project area on BLM lands does not contain forests or woodlands so no impact to this resource would result from the Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
General Wildlife	The previous EISs for solar projects on the Reservation provide analysis of potential impacts to general wildlife species from construction, O&M, and decommissioning of solar facilities on the Reservation (BIA 2012: pages 4-46 through 4-49; BIA 2014: pages 4-48 through 4-52); BIA 2016: pages 4-44 through 4-48; and BIA 2019a: pages 3-38 through 3-40). Ground-disturbing activities during construction, O&M, and decommissioning of the Chuckwalla Projects would result in direct mortality, altered foraging and breeding behavior, abandonment of habitat, and avoidance behaviors. Increased noise and human presence could result in short-term, impacts to wildlife by causing wildlife to alter foraging and breeding behavior. Loss of burrows due to construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows. These impacts would be minimized by implementation of design features and BMPs (**Appendix C)** and management plans (see **Appendices E** through **K**). Therefore, effects to general wildlife would be negligible. Removal and modification of vegetation within the solar fields, new access roads, and gen-tie line ROWs would reduce forage, shelter, and nesting opportunities. The permanent disturbance of 374 acres of habitat by the Projects could cause wildlife to rely more heavily on habitat in the surrounding areas. The area of permanent impact for the Projects is relatively small and is not expected to result in any change in habitat availability or cause habitat fragmentation in comparison to existing conditions. Permanent disturbance to habitat would result in a negligible, long-term, adverse impact on general wildlife. Following decommissioning, these disturbed areas would be revegetated, which would minimize the long-term impacts to general wildlife species and their habitats. Following construction, the regrowth of 4,835 acres of temporarily impacted vegetation would allow for many species to utilize the solar fields during O&M, resulting in a negligible, long-term, beneficial impact on general wildlife. The increase in perches for avian predators such as ravens and raptor species could increase the risk of predation to prey species, but the use of perch deterrents would minimize this impact. With the implementation of design features and BMPs (**Appendix C**), the Proposed Action would result in negligible, localized, short- and long-term, adverse impacts on general wildlife. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Hunting, Fishing, and Gathering	No hunting, fishing, or gathering has been reported or documented by the Moapa Band in the vicinity so no impact to these activities would result from the Chuckwalla Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.
Indian Trust Assets	Like the previous solar projects, the proposed Chuckwalla Projects would impact Reservation lands and vegetation and wildlife resources where the Projects and associated ROWs are constructed. Indian Trust Assets, such as fishing rights and minerals would not be impacted by implementation of the Chuckwalla Projects the same as described in the previous EISs (BIA 2012: Page 4-78; BIA 2014a: Page 4-94; BIA 2016: Page 4-79; BIA 2019a: page 3-6; and BIA 2021: page 3-7). The Chuckwalla Projects' proposed use of tribal water would exercise the Moapa Band's water rights which would demonstrate the Band's legitimate need for these water rights. This would support the Band against any adverse claims by others in the future. Since this Project would not negatively impact Indian Trust Assets, this resource topic has been eliminated from further analysis in this EIS.

TABLE 3 1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS	
Resource/Use	**Rationale for Not Analyzing in Detail**
Invasive Plant Species and Noxious Weeds	The previous solar EISs - K Road (BIA 2012: pages 4-41 through 4-45), MSEC (BIA 2014: pages 4-41 through 4-45), Aiya (BIA 2016: pages 3-37 through 3-42), ESMSP (BIA 2019a: page 3-7); and SBSP (BIA 2021, page 3-7 - provide a detailed analysis of potential impacts and mitigation for noxious weeds and invasive plants during the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie. Each EIS contains a Weed Management Plan in the appendices for each project. Weed sources could include construction vehicles if not properly cleaned, imported fill, hay bales, and invasion from adjacent lands via natural movement such as wind. Invasive weed species could out-compete native plants for resources such as water and space. The proposed location for the Chuckwalla Projects is within the same vegetation types and has the potential to encounter the same weed species (including Sahara mustard) as the previous projects and the Project has the same potential to generate short and long-term, adverse effects from weed species. A site reconnaissance was conducted for the Chuckwalla lease area and about 26 acres of Sahara mustard was found along the gen-tie routes. All applicable BMPs associated with weed management specified by BIA and BLM policies were incorporated into the management plans for the previous projects and would likewise be implemented as design features for the Chuckwalla Projects. The Integrated Weed Management Plan (**Appendix F**) would be reviewed and approved by BIA and BLM prior to implementation. With the implementation of design features and BMPs (**Appendix C**) and the Integrated Weed Management Plan (**Appendix F**), the Proposed Action would result in minor, short-term, adverse impacts associated with introduction and spread of invasive plant species and noxious weeds during construction, and negligible long-term, adverse impacts during O&M and decommissioning. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Lands and Realty	The Chuckwalla Projects solar fields, access ROWs, and portions of the gen-tie ROWs would be constructed on Reservation land. A portion of the ROWs for the gen-tie lines would be on Reservation land within the BLM-managed designated utility corridor and a very small portion of the ROWs for the gen-tie lines would be federal land managed by the BLM. The ROW necessary for access to the gen-tie line connecting the Project substations to the Harry Allen Substation would also be on BLM-administered federal lands. Collectively, this would affect 6,833 acres of tribal lands under BIA jurisdiction and 234 acres under BLM jurisdiction. The solar site lands and surrounding lands on the Reservation are currently vacant. The Chuckwalla Projects are in an area designated by the Moapa Band for economic development and a portion of the gen-tie route is located within the BLM-managed designated utility corridor set aside for this specific purpose. Additional discussion regarding adjacent land uses and existing leases and ROWs, as well as potential impacts, are discussed in the previous solar EISs (BIA 2012: pages 3-66 through 3-70 and pages 4-79 through 4-81); BIA 2014: pages 3-58 through 3-59 and pages 4-92 through 4-95; 2019a: pages 3-58 through 3-60; BIA 2019a: page 3-8; BIA 2021: page 3-7 and 3-8). The Chuckwalla Projects would be consistent with federal, State, and local land-use plans and policies, existing BLM land-use authorizations, and public land disposition, and would not require any land tenure adjustments. The Projects would also meet the desired purpose indicated by the Moapa Band for the use of these lands which were specifically set aside for these Projects. There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Lands with Wilderness Characteristics	There are no lands with wilderness characteristics within or near the Project area so no impact would result from the Chuckwalla Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
Lifestyle and Cultural Values	New solar projects (two constructed, three approved awaiting construction, and the proposed Chuckwalla Projects) have been determined by the Moapa Band to offer an opportunity to expand economic development on the Reservation while holding fast to tribal values for respect and care for tribal land. The Projects would not preclude tribal members from accessing any on- or off-Reservation residences, amenities, or places of work. Therefore, the Chuckwalla Projects would not impact this resource topic and it has been eliminated from further analysis in this EIS.
Livestock Grazing	There are no grazing allotments on this part of the Reservation and no grazing is conducted in the Project area. Therefore, no impact to this resource would result from the Chuckwalla Projects. Therefore, this resource topic has been eliminated from analysis in this EIS.
Migratory Birds	See detailed analysis in Section 3.3.
Minerals	On tribal lands, the Chuckwalla Projects would not be located in an area identified by the Moapa Band for mineral development so would have no effect on mineral exploration and mining, leasing or mineral material sales on the Reservation or Affected BLM lands. Therefore, the Chuckwalla Projects would not impact this resource topic and it has been eliminated from analysis in this EIS.
Native American Religious Concerns	The BIA coordinated with the Moapa Band to arrange appropriate cultural resources survey methods and to provide for tribal members to accompany the archaeologists during the survey efforts that were conducted for the Projects. In addition, the BIA sent letters to eight tribes in the region with traditional interests in the area inquiring if there were any concerns about the effects of the proposed Projects on historic properties or areas of traditional or cultural importance. These tribes included the Las Vegas Paiute Tribe, Kaibab Band of Paiute Indians, Hualapai Indian Tribe, Fort Mojave Indian Tribe, Hopi Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, and Paiute Indian Tribe of Utah. The analysis in the five previous solar EISs concluded that there are no identified Native American religious concerns in or near the Project area that would be impacted by the construction, O&M, and decommissioning of a solar facility. Since no sensitive Native American religious concerns would be adversely impacted, no measures to minimize or avoid adverse impacts were required (BIA 2012: pages 3-53 through 3-54 and pages 4-61 through 4-64; BIA 2014: pages 3-46 through 3-47 and pages 4-76 through 4-79; BIA 2016: pages 3-46 through 3-51 and pages 4-65 through 4-68; BIA 2019a: page 3-51; BIA 2021: pages 3-8 and 3-9). Similarly, the Project area contains numerous cultural features that contribute to the history and the long-term use of this region by the Southern Paiutes and, specifically, the Moapa Band. They have a deeply rooted spiritual connection to the land that weaves stories and songs into the landscape, connecting all elements of the universe. These connections involve water, trails, flora, fauna, geographic structures, and spiritual, historical, and ceremonial events. Through coordination and consultation, no specific concerns have been raised by the Moapa Band and other tribes regarding traditional cultural properties (TCPs) or other religious issues. Therefore, the Projects would have no impact on Native American Religious Concerns and this resource topic has been eliminated from further analysis in this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
Noise	The five previous solar EISs provide a detailed analysis of potential noise impacts associated with the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie on this area of the Reservation. These analyses indicated that there are no sensitive human receptors anywhere near the area that would be adversely impacted by noise from short-term construction or long-term operation of the projects and no measures to minimize or avoid adverse impacts were required (BIA 2012: pages 4-32 through 4-39; BIA 2014a: pages 4-33 through 4-38; BIA 2016: pages 4-30 through 4-35; BIA 2019a: page 3-51; BIA 2021: page 3-9). The currently proposed Chuckwalla Projects would be located in undeveloped terrain in a relatively remote area east of I-15 and north of the Valley of Fire Highway. There are no nearby identified noise receptors. Noise impacts from the Chuckwalla Projects would be generated primarily by equipment and vehicles during construction and decommissioning but these impacts would be short-term and negligible. Noise impacts from the Chuckwalla Projects during operations would be long-term but negligible. There is no potential for new or modified impacts that have not been disclosed in the prior environmental documents. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Paleontological	The five previous solar EISs determined that paleontological materials are unlikely to exist in the Project area, which is categorized as having a low potential for paleontological resources (BIA 2012: page 3-9; BIA 2014: page 3-5; BIA 2016: page 3-6; BIA 2019a: page 3-8; BIA 2021: page 3-9). The previous projects, like the proposed Chuckwalla Projects, are located in Quaternary alluvium deposited by flowing water (Stewart and Carlson 1978). These analyses indicated that potential paleontological materials are unlikely to exist in the alluvial deposits and the project area is categorized as low potential for paleontological resources. Therefore, no impact to this resource would result from the Proposed Action and this resource topic has been eliminated from analysis in this EIS.
Public Health and Safety	Potential impacts to public health and safety from development of solar projects on the Reservation have been analyzed in the K Road (BIA 2012: pages 4-95 through 4-102), MSEC (BIA 2014: pages 4-107 through 4-112), and Aiya (BIA 2016: pages 4-92 through 4-96) EISs. Potential health and safety impacts could result from spills of hazardous materials, electrical hazards, or fire hazards but the potential risk to public health was concluded to be minor. The Chuckwalla Projects, like the previous projects, would be required to comply with all applicable design codes and develop and finalize a variety of plans prior to the start of construction to minimize these risks during the Project such as spill control plans, hazardous materials management plans, emergency response plans, fire management plans, and health and safety programs. Therefore, the potential risk to public health during construction, operations, and decommissioning the proposed Chuckwalla Projects would be minor and this resource topic has been eliminated from further analysis in this EIS. In addition, the project area is suspected endemic for *Coccidioides immitis*, a fungus causing Valley Fever and construction workers could potentially be exposed. Additional measures to reduce potential worker exposure have been added to **Appendix C** of this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
Recreation	Public recreation does not occur on the Reservation within or near the project area, with minor recreation activities happening on the small amount of public lands at the southern end of the gen-tie line to the Crystal Substation. The primary public road that would be used to access the Chuckwalla Projects (Valley of Fire Highway) provides access to the Valley of Fire State Park and National Natural Landmark (NNL) located about 4 miles east of the Project area. These areas are used by the public for recreation and users of the Park and NNL would not be directly impacted by the Projects because the Projects would not be visible from this location because of the intervening topography (discussed in more detail in the visual resources section (Section 3.8)). The Valley of Fire Highway would remain open to the public throughout the construction and operation of the Projects but users may experience brief congestion during construction due to increased traffic (also discussed in more detail in the traffic section (Section 3.6)). Therefore, the Proposed Action would have a negligible effect on recreation, and this resource topic has been eliminated from further analysis in this EIS.
Socioeconomics	See detailed analysis in Section 3.4
Soils	Soils in the Chuckwalla Projects fall within four soil series classification as defined by the USDA NRCS, with three soil classifications (Tonopah gravelly sandy loam, Morman Mesa loamy fine sand, and Arada fine sand) making up over 95 percent of the Project area (USDA NRCS 2021). The previous EISs evaluated the potential impacts to these soils from the construction, O&M, and eventual decommissioning of the solar facilities (BIA 2012: pages 4-11 through 4-13; BIA 2014: pages 4-9 through 4-12). The previous evaluations looked at the soil characteristics and evaluated the soil erosion rates from wind and water, soil productivity, and potential for contamination. Approximately 362 of the 6,500 acres within the four lease option areas and shared facilities areas would be permanently cleared, graded, and/or disturbed (64 acres for 1a,.18 acres for 1b, 65 acres for 2, 98 acres for 3, and 117 acres for the shared facilities area). Vegetation on the remainder of the solar fields (1,576 acres for 1a, 351 acres for 1b, 1,084 acres for 2, 1,648 acres for 3, and 24 acres for the shared facilities area) would be driven over and crushed or trimmed, thereby leaving soil intact, whereas grading would result in loosening and exposure of bare soil. In addition to impacts to soils, the Chuckwalla Projects would have long-term impacts on areas where biocrust and desert pavement are present, which would affect the soil stabilization benefits they provide. The potential for wind and water erosion would be increased by soil disturbance during construction and decommissioning, resulting in potential adverse impacts. Rather than graded, vegetation in the solar fields would be mowed and crushed, leaving roots intact, which would minimize the potential for erosion. To reduce the potential for water erosion, each Project would develop a Stormwater Pollution Prevention Plan (SWPPP) as part of the final Project design. The drainage plan would incorporate existing, natural offsite washes to allow the stormwater flow to pass through the site naturally. Any onsite drainage control features would be implemented to dissipate flow and minimize scouring and erosion. These features would be designed to protect the integrity of existing drainages and not channelize flows within the site. With the implementation of design features and BMPs (**Appendix C**) to prevent potential increases in soil erosion and sedimentation, including physical soil stabilization and revegetation as outlined in applicable plans (e.g., Site Restoration Plan, SWPPP, and drainage plan), impacts to soils would be minimized. Therefore, the Proposed Action would have minor, localized, short- and long-term, adverse effects on soils, and this resource topic has been eliminated from further analysis in this EIS
Threatened or Endangered Species	See analysis in Section 3.5.
Timber Harvesting	The project area does not contain forests or woodlands that could be harvested for timber. Therefore, no impact to this resource would result from the Chuckwalla Projects and this resource topic has been eliminated from further analysis in this EIS.

TABLE 3 1
RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS

Resource/Use	Rationale for Not Analyzing in Detail
Topography/Geology	The proposed Chuckwalla Project sites would avoid major drainages and would be graded only where necessary, so contour changes would be minor and would not create a long-term effect to local topography or drainage. Construction, operation/maintenance, or decommissioning of the proposed Project would not alter the soil stability of the solar site or along the gen-tie corridor. The Project area has moderate to high potential for strong earthquake shaking but all proposed Chuckwalla Project structures would be required to comply with applicable seismic building codes reducing the potential for earthquake-related structural damage to the Project. Therefore, no impact would result from the Chuckwalla Projects and this resource topic has been eliminated from further analysis in this EIS.
Traffic / Transportation	See analysis in Section 3.6.
Vegetation	See analysis in Section 3.7.
Visual Resources	See analysis in Section 3.8.
Wastes, Hazardous or Solid	The K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) EISs provide a detailed analysis of potential impacts from hazardous materials associated with the construction, operation, maintenance, and decommissioning of a PV solar facility on the Reservation and gen-tie on or near the Reservation as part of the analysis of public health and safety. Potential risks could result from spills of hazardous materials but the potential risk to public health was concluded to be minor. All potential applicable BMPs associated with hazardous materials and wastes to reduce or prevent environmental impacts will be outlined in plans developed prior to construction of the Chuckwalla Projects. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Water Resources (Surface/Ground)	See analysis in Section 3.9.
Wetlands/Riparian Zones	See analysis in Sections 3.7
Wild and Scenic Rivers	There are no Congressionally designated Wild and Scenic Rivers within or immediately adjacent to the project area so no impact to this resource would result from the Chuckwalla Projects. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Wilderness/Wilderness Study Areas	There are no wilderness or wilderness study areas near the Project area so no impact to this resource would result from the Chuckwalla Projects. The nearest wilderness area is the Muddy Mountains wilderness approximately 8.5 miles south of the Projects. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Wild Horses and Burros	Wild horses and burros are not found in the Project area. The nearest Herd Management Area (HMA) (Muddy Mountain HMA) is approximately five miles southeast of the Chuckwalla Projects. The Red Rock HMA is located in southern Nevada approximately 36 miles southwest of the project area. Therefore, this resource topic has been eliminated from further analysis in this EIS.

[1] Highlighted resource topics are analyzed in detail in this chapter.

In addition to the previously analyzed solar projects on the Reservation discussed above, there are other solar projects in the vicinity that have been or could be developed and could collectively contribute to impacts to various resources. On the Reservation, this includes the proposed Yahthumb Solar Project located northwest of the proposed Chuckwalla Projects and, on nearby federal land, the Gemini Solar Project located just southwest of the proposed Projects. The list below identifies these and other nearby solar projects that could contribute collectively to impacts generated by the proposed Chuckwalla Projects. The potential collective impacts are discussed in the impact analysis for each resource in Sections 3.1 through 3.9 below.

Project	Size	Location	Status
Yahthumb Solar Project	138 MWs, 1400 acres	Reservation, 5 mii NW	Proposed
Gemini Solar Project	690 MW, 7100 acres	BLM, 1 mi SW	Under construction
Dry Lake Solar Energy (Harry Allen)	20 MWS, 155 acres	BLM, 5 mi SW	Planned
Dry Lake Solar Energy Center	150 MWs, 694 acres	BLM SEZ, 6 mi SW	Planned
Harry Allen Solar	130 MWS, 725 acres	BLM SEZ, 6 mi SW	Planned
Dry Lake East Leasing Area	1,813 acres	BLM, 4 mi SW	Proposed
Red Flats Solar	500 MWs, 4000 acres	BLM, 4 mi NE	Proposed
Red Valley Solar	200 MWs, 2000 acres	BLM, 10 mi N	Proposed
Greenlink West Transmission	525kV line, 350 miles	BLM, 10 mi W	Proposed
Eastern Nevada Transmission	230kV lines, 21/33 miles	BLM, 9 mi NE	Proposed

3.1 Climate Change

3.1.1 Background

Climate change typically refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended time. Climate change could be affected by a number of factors including natural cycles (e.g., changes in the sun's intensity or Earth's orbit around the sun); natural processes within the climate system (e.g., changes in ocean circulation); and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

Climate change science continues to expand and refine our understanding of the impacts of anthropogenic activities. Electricity generation and transportation were the two sectors responsible for the majority of GHG emissions during the last few decades both in Nevada and nationally. The next largest contributors to emissions are the residential, commercial, and industrial fuel use sectors (NDEP 2020).

The current guidance for considering GHG emissions and climate change effects in NEPA analysis can be found in Section 5 of Secretary Order (SO) 3399 issued in April 2021 and a February 19, 2021 Federal Register Notice by the Council on Environmental Quality (CEQ). That Federal Register Notice indicates that "In the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance - Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews. In essence, this guidance suggests using the projected GHG emissions associated with

proposed actions as a proxy for assessing proposed actions' potential effects on climate change in NEPA analyses.

Currently, there are no emission limits for suspected greenhouse gas (GHG) emissions, for this project, and no technically defensible method for predicting potential climate change contributions from GHG emissions during construction of the proposed action. However, there are, and would continue to be, several efforts to address GHG emissions from federal activities, including federally authorized uses in future planning documents.

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Renewable energy projects like the Chuckwalla Solar Projects generally have an overall net long-term beneficial effect on climate change by their operations offsetting fossil-fuel generation. The previous EISs for solar projects on the Reservation provide an analysis of potential impacts to climate change associated with the construction, operation, maintenance, and decommissioning of PV solar facilities. These analyses concluded that there would be short-term minor increases in GHGs from construction and decommissioning associated with exhaust from construction equipment and vehicles and long-term benefits from operations (BIA 2012: pages 4-4 through 4-7; BIA 2014a: pages 4-4 through 4-5; BIA 2016: pages 4-3 through 4-4).

Construction

The GHG emissions from construction of the Chuckwalla Projects phases were estimated as described below. The construction of each of the three phases of the Proposed Project (Chuckwalla 1a and 1b together, Chuckwalla 2, and Chuckwalla 3) is estimated to last up to 20 months and would consist of nine construction activities that would overlap. **Table 3-2** identifies these activities and the estimated duration of each.

Table 3 2
Proposed Project Construction Schedule for Each Phase

Construction Activity ID	Construction Activity	Duration (months)
1	Move on (mobilization)	1
2	Site Preparation & Grading	4
3	New Access Road Construction	1
4	Gen-Tie Line Construction	2
5	Internal Roads Construction	2
6	Shared Use Facility Construction	2
7	Electrical Substation	3
8	Batch Plant Operations	2
9	Solar Array Structural, Underground and Panel, and Battery Installation	10

Each activity has a unique fleet of equipment and vehicles. Therefore, the emissions for each were calculated separately. Then all the activities were combined for duration of project construction.

Construction equipment emission factors were developed using EPA MOVES2014a-20151201 (MOVES) model for nonroad sources and the emission factors were reported in units of grams per horsepower-hour (g/hp-hr). These factors were based on the year of construction start (2022), a Clark County Nevada location, and a default fleet of diesel-powered construction vehicles. If a vehicle type was not included in the MOVES default fleet, these were categorized as "Other Construction Equipment" (see **Appendix K**).

CO2 equivalent (CO2e) emissions were based on CO_2 and CH_4 emissions from the construction fleet. Any other potential GHGs were assumed to be negligible. **Table 3-3** presents the estimated GHG emissions for each year of construction and compares these to statewide emissions for 2017. Gross statewide GHG emissions exclude carbon sinks that reduce generated emissions. Therefore, net GHG emissions were used for this comparison.

These results show that the 20 months of construction would contribute negligible amounts of GHG emissions relative to the statewide GHG emissions. Although construction emissions are not applicable to stationary source air permitting rules, GHG emissions during the construction phase would be well below the Clark County and federal air permitting threshold for stationary sources (75,000 tons per year). Details for the construction GHG calculations are presented in **Appendix K**.

Table 3 3
GHG Emissions from Each Phase of Proposed Project vs Statewide GHG Emissions

	GHG Emissions (MMCO2e[1])
Proposed Project Year 1	0.011
Proposed Project Year 2	0.012
Nevada 2017 Gross	43.813
Nevada 2017 Net	38.066
	Percent
Project Year 1 Percent of Nevada 2017 Net Emissions	0.029 %
Project Year 2 Percent of Nevada 2017 Net Emissions	0.030 %

[1] Million Metric Tons of CO2 Equivalent

Operations

Long-term, operation of the Projects would generate renewable electricity through solar power and would have long-term air quality benefits. In 2017, electrical generation (86 percent) was the primary contributor to gross GHG emission sources in Nevada (NDEP 2020). The Proposed Project could reduce these contributions and would support regional and national goals to replace other forms of electricity production that have much higher levels of air pollutant and GHG emissions. The Proposed Project would therefore be consistent with federal and state goals for reducing GHG emissions and supporting the development of renewable energy.

Climate change that could occur in the future has the potential to affect the Project area. This could include the potential for increased storm flows through the site and to the Muddy River, the potential success of reclamation and restoration efforts after construction and decommissioning, and potential impacts on sensitive species and their habitats. The potential magnitude of these effects cannot be predicted but the Project would employ adaptive management to respond to any changes requiring mitigation.

In addition, the management of desert vegetation and soil disruption associated with the proposed construction methods to be used for the Chuckwalla Projects (mowing vs grading) could have a small reduction in the effect on the ability of the local ecosystem to cycle or sequester carbon and modulate atmospheric CO_2 levels during the operational life of the Project when compared to projects where significant grading would occur. Grading would be minimized on the Projects to only those areas where necessary and existing vegetation would be mowed to 18 inches over most of the solar field. This would allow on-site vegetation to re-establish more quickly following construction, reducing the impact on the local ecosystem's ability to continue to cycle or sequester carbon.

The Chuckwalla Projects would have short-term, negligible adverse impacts from the construction and decommissioning of the solar facilities and long-term, negligible beneficial impacts on climate change from the reduction of primary contributors to GHG emissions offset by the generation of renewable electricity. In addition, the Projects would promote federal or state goals to reduce GHG emissions levels.

Collectively, as discussed previously, there are several utility-scale solar projects in addition to the Proposed Action that have been developed or planned in the region. These include the previously approved solar projects and the proposed Yahthumb Solar Project on the Reservation as well as multiple planned and proposed solar projects on nearby BLM-managed federal lands. These projects are identified in the introduction of Chapter 3. Like the Proposed Action, all approved and foreseeable projects would each have very minor short-term contributions to GHG emissions during construction and decommissioning from construction equipment. All these projects (existing and foreseeable) would collectively contribute to long-term beneficial impacts on climate change from offsetting GHG emissions from fossil fuel electrical generation replaced by solar generation.

3.1.2.2 No Action

Under the No Action Alternative, the Proposed Action would not be constructed so there would be no effects to GHG emissions and climate change.

3.2 Cultural Resources

3.2.1 Affected Environment

The area of potential effect (APE) for cultural resources is defined as the area within which resources could be affected by the proposed Chuckwalla Solar Projects. The APE for direct effects includes all project components (solar field area and ROWs in **Figure 2-1**. The BIA, in consultation with the Moapa Tribal Historic Preservation Office (THPO) and Nevada State Historic Preservation Office (SHPO), defined the APE for indirect effects to include a five-mile radius around the solar site and a one-mile radius

around the gen-tie route. The cultural resource study consisted of a literature review for both the direct and indirect APEs while the field inventory only included the direct APE.

The pedestrian field inventory consisted of surveying 6,445 acres for the solar field and 490 acres for the proposed gen-tie routes for a total of 6,935 acres surveyed.

3.2.1.1 Cultural History

Prehistoric sites across the Great Basin and the greater American southwest exhibit the presence of humans during the late Pleistocene about 15,000 years ago. Around 1,500 years ago, Ancestral Puebloan inhabitants of the greater southwest came into the vicinity. There is clear evidence of Southern Paiute people in the vicinity of the proposed Chuckwalla Solar Projects area by at least 850 years ago. Historically, the area was settled by Mormon farmers and ranchers in the 1800s.

3.2.1.2 Results of The Literature Review and Field Inventory

The literature review identified a total of 140 previously recorded cultural resource sites in both the direct and indirect APE. Most of these sites were lithic scatters, rock rings, historic railroad sites, and trash scatters within the indirect APE and many were unevaluated for National Register of Historic Places (NRHP) eligibility. The direct APE has eight previously recorded sites within it – three within the solar field and five within the gen-tie corridor.

The proposed Chuckwalla Projects are located on the Moapa River Indian Reservation which was established in the early 1870s. The APE does not contain sites or resources identified by the Moapa Band as having historic, cultural, or religious significance based upon tribal consultations.

The pedestrian field inventory recorded 18 new sites within the solar field area. The 18 new sites and three previously recorded sites were evaluated for NRHP eligibility. The three previously recorded sites within the solar field are recommended as not eligible. The 18 newly recorded sites include 12 prehistoric lithic scatters and six historic era trash scatters. Eleven of the new sites are recommended as not eligible and seven are recommended eligible for inclusion in the NRHP. All seven are lithic scatters. The sites associated with the solar field and their potential eligibility are listed in **Table 3-4**.

Table 3 4. List of Sites Recorded in the Direct APE of the Solar Field

Site No.	Site Type	Project Location	Previously Recorded	Current NRHP Recommendation
26CK3869	Prehistoric Isolated Lithic	Solar Field	Yes	Not Eligible
26CK10600	Historic Road	Solar Field	Yes (Not inside APE until this project)	Not Eligible
26CK10616	Historic Road	Solar Field	Yes	Not Eligible
26CK11139	Historic Trash	Solar Field	No	Not Eligible
26CK11140	Prehistoric Lithics	Solar Field	No	Eligible
26CK11141	Historic Trash	Solar Field	No	Not Eligible
26CK11142	Prehistoric Lithics	Solar Field	No	Eligible
26CK11143	Historic Trash	Solar Field	No	Not Eligible
26CK11144	Prehistoric Lithics	Solar Field	No	Eligible
26CK11145	Prehistoric Lithics	Solar Field	No	Eligible
26CK11146	Prehistoric Lithics	Solar Field	No	Eligible

Table 3 4. List of Sites Recorded in the Direct APE of the Solar Field				
Site No.	**Site Type**	**Project Location**	**Previously Recorded**	**Current NRHP Recommendation**
26CK11147	Prehistoric Lithics	Solar Field	No	Eligible
26CK11148	Prehistoric Lithics	Solar Field	No	Eligible
26CK11149	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK11150	Historic Trash	Solar Field	No	Not Eligible
26CK11151	Historic Trash	Solar Field	No	Not Eligible
26CK11152	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK11153	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK11154	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK11155	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK11156	Historic Trash	Solar Field	No	Not Eligible

The proposed gen-tie corridor has five previously recorded sites – the NRHP Listed Old Spanish Trail/Mormon Wagon Road (26CK3536), the NRHP eligible Union Pacific Railroad (26CK4429), two historic trash scatters, and one prehistoric lithic scatter. One of the trash scatters has one element that is recommended eligible, the other trash scatter and lithic scatter are recommended not eligible. The segment of the Old Spanish Trail/Mormon Wagon Road identified along the gen-tie corridor has a loss of integrity from the modern construction and maintenance of large utilities along the corridor as well as off-road use, making the trace non-contributing to the site's status as a NRHP-listed site. The railroad has been upgraded and maintained as part of its continued use, making it also non-contributing to its NRHP status. There are also segments of the Old Spanish Trail in the indirect APE.

There are six newly identified cultural resource sites along the gen-tie corridor. Five of these sites are historic trash sites and recommended not eligible, and one is a prehistoric lithic site that is recommended eligible. The sites associated with the gen-tie corridor and their potential eligibility are listed in **Table 3-5**.

Table 3 5. List of Sites Recorded in the Direct APE of the Gen Tie Corridor				
Site No.	**Site Type**	**Project Location**	**Previously Recorded**	**Current NRHP Recommendation**
26CK3536	Historic Wagon Road	Gen-Tie	Yes	Non-contributing
26CK4429	Historic Railroad	Gen-Tie	Yes (Not inside APE until this project)	Non-contributing
26CK5020	Historic Trash	Gen-Tie	Yes	Not Eligible
26CK7370	Historic Trash	Gen-Tie	Yes (Original recording misplotted)	Eligible – 1 Element
26CK9415	Prehistoric Lithics	Gen-Tie	Yes	Not Eligible
26CK11157	Prehistoric Lithics	Gen-Tie	No	Eligible
26CK11158	Historic Road with Trash	Gen-Tie	No	Not Eligible
26CK11159	Historic Trash	Gen-Tie	No	Not Eligible
26CK11160	Historic Trash	Gen-Tie	No	Not Eligible
26CK11161	Historic Trash	Gen-Tie	No	Not Eligible
26CK11162	Historic Trash	Gen-Tie	No	Not Eligible

The lithic scatter sites and trash scatter sites that are not eligible to the NRHP have been completely recorded so their information potential is exhausted and no further information could be obtained from further studies. The sites are surface sites with no potential for depth and are on the eroded surface with caliche and some bedrock exposed. The sites that are recommended eligible have the potential to provide further information to answer future research questions important to prehistory or history.

One site in the indirect effects area was determined to warrant further investigation. This site is currently unevaluated for the NRHP. A visual simulation was completed for this site and this indicated no adverse effect to the site from the project.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The Chuckwalla Projects site includes nine archaeological sites that are currently recommended eligible for inclusion in the NRHP. All nine of the sites would be avoided by either being outside of the Projects' solar site development boundaries or by being fenced with an appropriate buffer to avoid impact. Mitigation of any unanticipated sites that cannot be avoided would include data recovery and curation with some non-invasive testing on obsidian, if necessary. Direct effects to cultural resources are permanent and irreversible and any direct effect to a historic property that cannot be avoided requiring mitigation would be an adverse effect.

The Congressionally designated alignment of the Old Spanish National Historic Trail is located about one-third of a mile west, at its closest point, of the solar field and crosses the gen-tie corridor. This section of the Trail does not have an archaeological site record or designation and its alignment is representative of the many routes taken through this area. There is no archaeological evidence of the trail where it crosses the gen-tie line. This Trail is managed jointly by the National Park Service (NPS) and BLM. A visual assessment was conducted to determine whether the viewshed from the Trail would be potentially affected by the presence of the proposed Projects. The visual assessment and simulations are discussed in the visual resources section (Section 3.8). This analysis indicated that the Projects would be seen from the Trail.

There would be no adverse effect to the railroad and the Old Spanish Trail/Mormon Wagon Road from the gen-tie line. This is because both these resources are non-contributing to their NRHP eligibility in the area due to their current condition. Therefore, the gen-tie line would not alter the characteristics that make these two resources (trail/road, railroad) eligible or listed to the NRHP.

Disturbance and/or loss of other currently unidentified sites resulting from the implementation of the Chuckwalla Projects could add to the collective loss of information about our heritage in the area and in the region. Such losses are not expected because an Unanticipated Discoveries Plan would be developed and implemented during construction of the project.

A Memorandum of Agreement (MOA) is being prepared between the Moapa Band, BIA, BLM, THPO, and SHPO. This MOA would define the steps to be taken to lessen, resolve, and/or mitigate the adverse effects to the properties identified above. A detailed mitigation/monitoring plan would be prepared, discussing mitigation of any NRHP eligible site that would be adversely affected, along with monitoring procedures to ensure that any eligible sites outside the disturbance area are not affected.

Collectively, the other previously approved and planned solar projects in the region identified in the introduction to Chapter 3 could or have affected cultural resources and could affect resources with similar information about a particular tribe or timeframe. Impacts on cultural resources from other projects in the area would result largely from the foreseeable additional solar development. These

projects and other projects under BLM, BIA, or other federal jurisdiction in the region would be subject to the same Section 106 requirements, requiring similar mitigation and impact minimization as the Chuckwalla Projects. The proposed Chuckwalla Projects and other solar development projects in the region could collectively result in substantial impacts. The Proposed Action's contribution to these effects on cultural resources would be negligible because the identified potential adverse effects would be minimized by avoidance of the sites currently recommended eligible for inclusion in the NRHP and also by implementation of the MOA.

3.2.2.2 No Action

Under the No Action alternative, the Proposed Action would not be developed and therefore would not create a change to any historic properties, or cultural or religious resources. These lands would be available for future use by the Band as needed.

3.3 Migratory Birds

3.3.1 Affected Environment

Migratory bird species are protected under the Migratory Bird Treaty Act ([MBTA] 16 U.S.C. §§ 703–711). The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid permit issued pursuant to federal regulations. All species native to the U.S. or its territories are protected under the MBTA.

Migratory bird species found within the Moapa Valley include the American pipit (*Anthus rubescens*), ash-throated flycatcher (*Myiarchus cinerascens*), cactus wren (*Campylorhynchus brunneicapillus*), black throated sparrow (A*mphispiza bilineata)*, blue grosbeak (*Passerina caerulea*), black-chinned hummingbird (*Archilochus alexandri*), loggerhead shrike (*Lanius ludovicianus*), Lucy's warbler (*Leiothlypis luciae*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), phainopepla (*Phainopepla nitens*), vermilion flycatcher (*Pyrocephalus rubinus*), Gambel's quail, (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), and yellow-breasted chat (*Icteria virens*) (Audubon 2021; BIA 2012). Additional Nevada State Listed species and BLM-Sensitive Species may also occur within the Project area, including the burrowing owl (*Athene cunicularia*), Le Conte's thrasher (*Toxostoma lecontei*), greater roadrunner (*Geococcyx californianus*), verdin (*Auriparus flaviceps*), Bendire's thrasher (*Toxostoma bendirei*), and golden eagle (*Aquila chrysaetos*)(**Appendix L**). The only portion of the Projects that BLM-Sensitive Species and Nevada State Listed species apply is along the short section of the gen-tie near the Crystal Substation on federal lands managed by the BLM.

The golden eagle is protected under the MBTA and the Bald and Golden Eagle Protection Act (16 U.S.C. § 668). The Project areas support suitable foraging habitat for golden eagles, but no suitable nesting habitat. The nearest nesting habitat for golden eagles is approximately 10-12 miles north and west of the Proposed Projects in the Arrow Canyon Mountain Range.

There are no Important Bird Areas (IBAs) within the Project areas; the nearest IBA is the Moapa Valley IBA approximately 10 miles east of the Projects (Audubon 2021).

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Impacts on migratory birds and eagles from construction, O&M, and decommissioning would be minimized through implementation of design features and BMPs (**Appendix C**) and the Bird and Bat Conservation Strategy (BBCS) (**Appendix H**), which include the following measures:

- Scheduling vegetation treatments and other ground-disturbing activities to avoid the migratory bird breeding season (February 15 to August 31) to the extent practicable
- Pre-construction surveys for all bird species nests would be conducted if work must be scheduled during the migratory bird breeding season
- Pre-construction surveys for western burrowing owl within suitable habitat would be conducted within 30 days prior to construction
- Biological monitors to ensure protection of wildlife, including migratory birds
- Overhead power line structures designed to be avian-safe according to Avian Power Line Interaction Committee (APLIC) standards (APLIC 2006, 2012)
- Use of flight diverters and perch deterrents, where appropriate
- Minimal lighting focused inward and downward toward solar fields to avoid lighting habitats beyond the solar fields
- Proper disposal and storage of garbage
- Monitoring for presence of ravens would be conducted and a Raven Control Plan would be implemented
- Closing of holes and spaces during construction to prevent entrapment
- Implementation of the Worker Environmental Awareness Program (WEAP) and worker training

Migratory Birds

Implementation of the Proposed Action could affect migratory birds during the construction, O&M, and decommissioning phases from the potential to cause visual and auditory disturbance which could result in avoidance of otherwise suitable habitats. This could indirectly contribute to stress and increased energetic costs as birds may end up nesting and foraging in less suitable habitat. Active bird nests in shrubs or near the ground could be affected during ground-disturbing activities which could result in nest abandonment, nest destruction, and loss of chicks or eggs. These impacts would be minimized by implementation of the BBCS (**Appendix H**), which includes BMPs such as conducting ground-disturbing activities outside the migratory bird season when practical or avoiding active nests if the work cannot be conducted outside of the migratory bird breeding season.

Burrowing owls may be present within the Project areas and are particularly susceptible to the impacts associated with ground-disturbing activities that can result in injury or mortalities to adult owls, nestlings, or eggs that occupy a previously undetected burrow. Adult birds and fledglings are likely to avoid moving vehicles and other construction equipment. Increased human activity and alterations to otherwise suitable habitats could displace birds. Impacts would be minimized by implementation of

BMPs (**Appendix C**) including surveys prior to vegetation clearing during the breeding season for burrowing owls (February 15 through August 31).

Migratory birds are susceptible to collision and electrocution associated with overhead power lines. The Projects propose overhead gen-tie lines that would total approximately 10 miles in length. Impacts associated with collision and electrocution would be minimized by implementation of design features and BMPs (**Appendix C**) which include designing overhead power lines to be avian-safe in accordance with APLIC suggested practices (APLIC 2006, 2012) and successful implementation of the BBCS (**Appendix H**).

Operation of the Projects may also result in migratory bird mortalities from collision with the PV solar panels and other Project infrastructure. Collision potential would be greatest during bird migration season (Kosciuch et al. 2020). In addition, insectivorous birds may be attracted by high concentrations of insects drawn to the solar fields (Horváth et al. 2009). Collision with buildings, radio towers, and other structures, especially those with night lighting may contribute to mortality in small migratory birds (Longcore et al. 2012; Loss et al. 2014). However, bird mortality is expected to be minimal for the proposed Projects. The Southern Paiute Solar Project is located on the Reservation approximately two miles to the west of the Chuckwalla Solar Projects and within the same habitat types and has been conducting avian mortality surveys since January 2017. Surveys from January 2017 to January 2019 (29 months) have found nine total avian mortalities at the solar site, four of which were determined to be caused by collision and all were common species (BIA 2021). This indicates that issues related to avian mortalities in this area would be minor. In addition, O&M staff would be required to participate in the Worker Environmental Awareness Program training, which would include a reporting protocol for avian mortalities incidentally found during regular O&M activities.

Birds flying at night could be attracted to steady light sources in the Project areas and may adjust their flight altitudes, putting them at risk for collision with PV solar panels, power lines, or other Project infrastructure (Gauthreaux 1991; Longcore et al. 2012). Impacts associated with lighting would be minimized through use of minimal lighting within the solar field that is only used when needed and focused in and downward toward solar fields to avoid lighting habitats beyond the immediate area (**Appendices C** and **H**).

Little research exists regarding population-level impacts of PV solar facility mortality on birds. It has been theorized that water bird species could potentially mistake the solar panels for water features on which the birds would try to land and this is referred to as the “lake effect hypothesis” (Horváth et al. 2009). These behaviors could potentially lead to collisions with PV solar panels resulting in mortality, injury, or stranding of species that require water to take off again (e.g., grebes and loons). Because bird fatality data for PV solar facilities is limited, science-based predictions of potential bird risk are also limited. Avian collision with PV panels was a cause of death at PV solar facilities identified in the Multiagency Avian-Solar Coordination Plan (The Multiagency Avian-Solar Collaborative Working Group 2016) but the level of mortality observed at solar facilities is variable and remains uncertain (Walston Jr. et al. 2016). Two studies from 2015 and 2016 reviewed avian mortality data from several PV solar facilities and concluded that additional research is needed to address hypotheses regarding how solar facilities may interact with bird populations, including whether some project features may attract birds to the facility and increase risk of mortality (Argonne National Laboratory and the National Renewable Energy Laboratory 2015; The Multiagency Avian-Solar Collaborative Working Group 2016). A more recent study from 2020 also reviewed avian mortality data from PV solar facilities in California and

Nevada and came to four main conclusions: (1) the four most common species of birds impacted were species with populations in the millions and three of these four were ground-dwelling birds; (2) most bird impacts occurred in the fall; (3) there was no evidence that large-scale facilities result in greater impacts to nocturnal migrating birds or water-associated or water-obligate birds; and (4) most detections of impacts were of unknown cause (Kosciuch et al. 2020).

The presence of water birds within the Project areas is not expected since there are no major water bodies in the area to concentrate water birds during migration, breeding, or stopover periods. The nearest perennial water source is at the Muddy River located 7.5 miles north of the Projects. Because water birds generally move along migratory corridors with existing water sources and available stopover habitat, it is unlikely that water birds would occur within the Project areas.

The impacts to migratory birds during decommissioning activities would be similar to the impacts that would occur during construction, including nest abandonment, nest destruction, loss of chicks or eggs, visual and aural disturbance, and habitat avoidance by migratory birds. These impacts would be minimized by implementation of the mitigation discussed for construction. The future removal of Project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in an increase of foraging and nesting habitat for migratory birds and elimination of potential collision hazards.

While impacts on migratory birds would occur as the result of implementing the Proposed Action, these impacts would not affect populations, and the implementation of design features and BMPs (**Appendix C**) and the BBCS (**Appendix H**) would minimize impacts. Therefore, implementation of the Proposed Action would have negligible, short- and long-term, adverse impacts on migratory birds.

Bald and Golden Eagles

The Project areas do not contain any suitable nesting habitat for golden eagles, though there is the potential for golden eagles to forage in the vicinity of the Projects given their proximity to areas that could potentially be used for nesting. Bald eagles are not expected to use any habitats present in or immediately surrounding the Project areas based on the lack of aquatic habitats.

During construction, O&M, and decommissioning, foraging golden eagles may be subject to visual and noise disturbance potentially resulting in alteration of foraging behaviors. Based on the distance between the Projects and the nearest nesting habitat (greater than 10 miles) and the general availability of suitable foraging habitat in the area, impacts are anticipated to be negligible. Golden eagles could still forage within the Project areas during O&M, when there would be less human activity and disturbance.

Golden eagles are susceptible to collision and electrocution associated with overhead power lines. As discussed above these impacts would be minimized by implementation of design features and BMPs (**Appendix C**) and measures in the BBCS (**Appendix H**), which include designing overhead power lines to be avian-safe. Therefore, adverse impacts to golden eagles are highly unlikely.

The Proposed Action would have negligible, short- and long-term, adverse impacts on migratory birds and golden eagles. Implementation of mitigation measures would minimize impacts during construction, O&M, and decommissioning.

Collectively, development of the Chuckwalla Projects along with the other approved and proposed solar

projects in the area on both Reservation and nearby federal lands identified in the introduction to Chapter 3 could affect migratory birds during construction and operation. Impacts would result from visual and auditory disturbances causing avoidance of suitable habitats and ground-disturbing activities affecting active bird nests in shrubs or near the ground resulting in nest abandonment or destruction and loss of chicks or eggs. Also, migratory birds and golden eagles could be impacted by collision and electrocution associated with overhead gen-tie lines associated with each of the projects. Impacts to migratory birds and golden eagles would be minimized by implementation of design features / BMPs and BBCS measures required for the approved and foreseeable projects.

3.3.2.2 No Action Alternative

Under the No Action Alternative, the Chuckwalla Solar Projects would not be constructed and there would be no impacts to migratory birds.

3.4 Socioeconomics

3.4.1 Affected Environment

The Chuckwalla Projects would be located on undeveloped lands on the Reservation. Census data for the Reservation is available as Block Group 2 within census tract (CT) 59.02. Data for CT 59.02 covers a large portion of rural northern Clark County, in addition to the Reservation. Socioeconomic information is also provided for Clark County for comparison and because it physically borders the Reservation and because some of the labor and materials employed in the construction of the Projects would be sourced from the surrounding Clark County area. Data for the state of Nevada is also provided as a basis for comparison.

According to the 2018 American Community Survey 5-Year Estimate (U.S. Census Bureau 2018), there were 294 people residing on the Reservation, 1,295 people residing in CT 59.02, 2,141,574 people residing in Clark County, and 2,922,849 people residing in the state of Nevada. The racial makeup of the Reservation is predominantly American Indian and Alaskan Native (78 percent), which is substantially higher than the Indian population for the county and state (1 percent for both). Approximately 22 percent of the population in CT 59.02 is American Indian or Alaskan Native, but the majority (230 of 284) reside within the Reservation. The Hispanic population within the Reservation (15 percent) is smaller than that of CT 59.02 (28 percent), Clark County (31 percent), and Nevada (31 percent). **Table 3-6** summarizes demographic characteristics for each geographic area.

Table 3 6. Selected Demographic Characteristics

	Population	White (Percent)	Black (Percent)	American Indian / Alaska Native (Percent)	Asian (Percent)	Native Hawaiian / Pacific Islander (Percent)	Other Race (Percent)	Two or More Races (Percent)
Reservation	294	22 (8)	8 (8)	230 (788)	0 (0)	19 (7)	9 (3)	6 (2)

Table 3 6. Selected Demographic Characteristics								
	Population	White (Percent)	Black (Percent)	American Indian / Alaska Native (Percent)	Asian (Percent)	Native Hawaiian / Pacific Islander (Percent)	Other Race (Percent)	Two or More Races (Percent)
CT 59.02	1,295	855 (66)	76 (6)	282 (22)	0 (0)	19 (1)	47 (4)	16 (1)
Clark County	2,141,574	1,299,138 (61)	245,827 (11)	16,590 (1)	205,824 (10)	15,846 (1)	246,907 (12)	111,442 (5)
Nevada	2,922,849	1,935,103 (66)	261,123 (9)	35,845 (1)	234,693 (8)	19,352 (1)	296,234 (10)	140,499 (5)

Source: U.S. Census Bureau 2018

3.4.1.1 Employment, Earnings, and Income

In 2018, the unemployment rate on the Reservation was approximately 6.8 percent, which is lower than the rate for CT 59.02 (9.3 percent), Clark County (7.2 percent), and Nevada (6.9 percent). In 2018, the median income for a household on the Reservation was $35,313, which is substantially lower than the median household income in CT 59.02 ($62,560), the county ($56,802), and the state ($57,598). **Table 3-7** provides income and employment characteristics for each geographic area.

Table 3 7. Selected Income and Employment Characteristics			
	Median Household Income	Poverty Rate (Percent)	Unemployment Rate (Percent)
Reservation	$35,313	25.0	6.8
CT 59.02	$62,560	10.0	9.3
Clark County	$56,802	14.1	7.2
Nevada	$57,598	13.7	6.9

Source: U.S. Census Bureau 2018

The Clark County economy is heavily dependent on the leisure and hospitality sector, as well as closely linked supporting sectors in arts, entertainment, and retail trade establishments. This is reflected in the census data which indicates the arts, entertainment, recreation, and hospitality industries are the largest employers in Clark County (282,094 employees or 28.1 percent of the workforce). The retail industry ranks fourth in the county and employs 118,647 workers or 11.8 percent of the workforce. In addition, hotel and resort renovation, development, and expansion within Las Vegas have traditionally been a mainstay of the Clark County economy. The census data indicate that 77,140 workers (7.0 percent of the workforce) are employed in the construction industry (U.S. Census Bureau 2018). In contrast, the largest employer within the Reservation is public administration (33 employees or 27.3 percent of the workforce). Education, healthcare, and social services is the second largest industry on the Reservation, employing 19 workers (15.7 percent of the workforce), and the arts, entertainment, recreation, and hospitality industries are third, employing 66 workers (13.2 percent of the workforce;

U.S. Census Bureau 2018).

According to the U.S. Census Bureau (2016), an impoverished community is defined as one in which more than 20 percent of the population is below the poverty level. For a single person (not a family) the poverty income threshold is $13,011. For a family of four with two children under the age of 18, the poverty income threshold is $26,172. The median incomes for both the Reservation and Clark County are above the current poverty thresholds. Despite a lower unemployment rate, the Reservation has a substantially higher poverty rate (25 percent) as compared to CT 59.02 (10 percent), the County (14 percent), and the State (14 percent) With the exception of the Reservation, these are all relatively similar to the national poverty rate of 14.1 percent (U.S. Census Bureau 2018). These income data support the conclusion that there are environmental justice communities defined by income. In addition, Native American persons residing on the Reservation are considered an eligible environmental justice community as defined by Executive Order 12898.

Tribal and Public Revenues

Tribal revenue sources include lease income from other development projects on the Reservation as well as sales taxes generated by the purchase of goods and services from tribal businesses. Public revenues include sales and income (payroll) taxes.

3.4.2 Environmental Consequences

This section discusses effects on social and economic resources that may occur from implementation of the Proposed Action. The additional jobs created by the Projects would be a benefit to the Moapa Band and community. In addition to employment benefits, there would also be benefits to Reservation-area businesses (both tribal and private) from the sale of food, gasoline, and water during construction and, to a lesser extent, during O&M. The Moapa Band would also benefit from the lease revenues generated by the Projects over the life of the Projects.

There are no specific federal thresholds of significance for socioeconomic impact assessments. Significance varies based on the setting of the proposed project (40 CFR § 1508.27[a]), but 40 CFR § 1508.8 states that effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In addition, the regulations state: “Effects include...cultural, economic, social, or health.” Effects may also include those resulting from actions that may yield both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial (40 CFR § 1508.8).

3.4.2.1 Proposed Action

Population, Demographics, and Public Services

Most workers employed during all phases of the Projects would be sourced from the labor pool within the Reservation and surrounding region. Therefore, the Chuckwalla Projects would not result in any long-term change in the population size, demographics, housing availability, or demand for services. During construction, the workforce for each phase of the Projects (1a and 1b together, 2, and 3) would vary over the construction period and is expected to average up to approximately 350 with a peak of 450 workers, most of whom would be tribal members or Clark County residents. Those workers that

could stay at hotels near the Project area during construction would be easily accommodated by the regional infrastructure which is designed for seasonal demands and fluctuations from global tourism. Since mostly tribal and Clark County residents would be employed, the Projects would not cause a temporary population increase that would necessitate additional public services or investment in infrastructure capacities that could not be provided from existing resources. Up to 12 full-time equivalent workers would be employed collectively by all four Projects during the O&M phase and all would be tribal members and Clark County residents. Therefore, there would be no long-term impact on population, demographics, and public services on the Reservation and surrounding region. Decommissioning is expected to have similar impacts as construction, though less workers would be required and for a shorter period of time.

Employment, Earnings & Income

Construction employment and spending would provide a short-term economic benefit within the Reservation and Clark County. Construction would provide a short-term boost to the local/regional construction sector since most construction workers would be hired from within the Reservation and/or Clark County. Under the Tribal Employment Rights Ordinance agreement between the Moapa Band and the Applicants, tribal members would have first right of refusal for any job positions for which they are qualified. As examples of tribal employment on the Reservation solar projects that have been or are being constructed - two of the five operating staff for the existing Southern Paiute (K Road) Project are tribal members; the Eagle Shadow Mountain Project which is finishing construction employed over 190 tribal members during peak construction; and the Arrow Canyon Project which is just initiating construction currently employs approximately 25 tribal members.

During construction of the Chuckwalla Projects, employment for each Project phase would reach an average of 350 workers with a peak not expected to exceed 450 workers at any given time. Construction of each phase is expected to take up to approximately 20 months. The three Project phases are expected to be constructed sequentially.

Most of the workforce would be tribal members or would commute from the Clark County/greater Las Vegas region. Therefore, most of their earnings would be recycled back into the Clark County regional economy through spending of disposable income. In addition, any non-local workers would provide a temporary stimulus to the local economy as they spend per diem money on hotels, meals, and consumables. This spending in the area would also support local jobs.

The construction jobs are expected to be relatively high paying. These jobs are clean/renewable energy opportunities that are expected to grow at above-average rates and pay above-average wages. Therefore, the Chuckwalla Projects would help diversify the labor force of Clark County and add capacity and valuable utility-scale solar installation experience to the labor pool. The construction phase of the Projects is expected to have a short-term, beneficial impact on unemployment levels. The level of employment impact would be minor for the county but moderate for Moapa Band members on the Reservation. As mentioned above, Moapa Band members would have first right of refusal for any job positions for which they are qualified. As a result of this agreement, unemployment levels within the Reservation could decrease in the short- and long-term.

During O&M, payroll and Project-related spending would have a minor, long-term, beneficial impact on the employment and income within the Reservation and surrounding region. The impacts to employment and income from decommissioning would be similar but less than those from construction.

Tribal and Public Revenues

During construction, the Chuckwalla Projects would generate a non-recurring contribution to the Moapa Band and non-tribal public revenues from the sale of water, aggregate, and other materials. In addition, the Moapa Band could benefit from increased sales at the Tribal Plaza restaurant and store. The workforce would generate payroll taxes that would flow to federal, State, and local treasuries. In addition, tax revenues for the Reservation and Clark County would be generated from expenditures on materials, equipment, and supplies.

Over the term of the lease agreements for the Chuckwalla Projects, the proposed Projects would generate an annual rent to the Moapa Band as specified in the lease agreements. This long-term, predictable revenue would be used by the Moapa Band to expand social programs, economic development, resource protection, and other programs that would benefit the Moapa Band. Payments would also be made to the Moapa Band by the Applicants in lieu of taxes, in accordance with the Tribal Tax Agreement.

In addition, the BLM would collect revenues from the annual rents for ROWs associated with the gen-tie lines and existing access roads. In accordance with the provisions of Public Law 96-491 that established the BLM-managed designated utility corridor on the Reservation, "The Secretary of the Interior shall be responsible for establishing and collecting fees for the use of such right-of-way…[and] any payment of such fees to the Secretary…shall be made for the benefit of the Moapa Band of Paiutes." This would provide additional long-term revenue to the Moapa Band.

During O&M, expenditures on materials and supplies would generate tax revenues for Clark County over the operational lifespan of the Projects. Payroll taxes during O&M would also generate revenue for federal, state, and local treasuries. The potential effects on tribal and public revenues from decommissioning would be similar to those from construction. These activities would also provide a short-term stimulus to the local economy. Following decommissioning, the land occupied by the Projects would become available for other uses.

Effects would be greatest during the construction and decommissioning phases due to the size of the workforce required. Although long-term benefits to employment and income would be less during O&M, the lease revenue generated by the Projects would have a long-term, beneficial effect on tribal revenue. The beneficial effects to socioeconomics on the Reservation would be major, while the beneficial effects on the regional economy would be negligible.

Overall, the Project would have a minor, short-term, beneficial impact on tribal and public revenues during construction and decommissioning. During O&M, the Projects would have a long-term, major, beneficial impact on tribal revenues, and a long-term, negligible, beneficial impact on public revenues in the surrounding region.

Collectively, there are several utility-scale solar projects in addition to the Proposed Action that have been approved or planned in the region located both on federal lands and on the Reservation. As identified in the introduction to Chapter 3, there are multiple solar projects that have been approved on the Reservation including two existing solar projects (Southern Paiute and ESM), one under construction (ACSP), and three that have already been approved but not yet constructed (Aiya, SBS, and SBS2). In addition, the Yahthumb Solar Project is also proposed on the Reservation. Together, these solar projects on the Reservation would generate a significant amount of lease revenue for the Moapa Band and

employ tribal members reducing unemployment and increasing earnings. Based on the recently constructed or ongoing projects on the Reservation, each foreseeable Reservation solar project (including each phase of the Chuckwalla Projects) could employ up to 100 to 200 tribal members during construction. In addition, after construction, up to 40 percent of their operational staff could be tribal members resulting in 20 or more long-term jobs.

Construction of the other proposed solar facilities on BLM lands in the area could also generate employment opportunities for tribal members and would also generate additional revenue from the purchase of goods and services. The approved and foreseeable projects (both on and off the Reservation) would also employ other workers within Clark County and purchase additional goods and services within the county. Payroll and sales taxes generated from this employment and purchase of materials would generate additional revenue for the county and state. The approved and proposed solar projects would create an increased demand for construction workers and other skilled jobs in the renewable energy sector. This could contribute to regional construction labor shortages.

Collectively, effects of the Proposed Action and other regional projects would result in moderate, beneficial effects on socioeconomics. These effects would be moderate within the Reservation and minor regionally.

3.4.2.2 No Action

Under the No Action Alternative, the Proposed Action would not be developed and no socioeconomic impacts (adverse or beneficial) would occur. The Moapa Band would not benefit economically from the lease income and sale of materials that would be generated by the solar Projects. There would be no increase in employment and income on the Reservation or in Clark County, and no additional tax revenues would be generated.

3.5 Threatened and Endangered Species

3.5.1 Affected Environment

An official list of federally-listed species that may occur within the Project areas was obtained from the USFWS Information for Planning and Consultation System (IPaC) and additional species were also considered due to proximity to the Project areas (USFWS 2021a). A copy of the USFWS official species list can be found in the Biological Assessment (**Appendix M**). **Table 3-8** identifies the species and their likelihood to occur within the Project areas. There is no designated or proposed critical habitat for these species in the Project areas.

Table 3 8. Federally Listed Species Considered

Common Name	Scientific Name	Status	Potential to Occur within Project Areas
Moapa Dace	*Moapa coriacea*	Endangered	No potential to occur within the Project areas. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River 11.5 miles NNW of the Projects. This species is addressed

Table 3 8. Federally Listed Species Considered			
Common Name	**Scientific Name**	**Status**	**Potential to Occur within Project Areas**
			due to the potential for groundwater withdrawals to affect habitat in the Muddy River.
Mojave desert tortoise	*Gopherus agassizii*	Threatened	Known to occur within all the Project areas.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Not likely to occur. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River and 12 miles NNW of the Projects.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	Not likely to occur. Nearest suitable habitat is associated with the Warm Springs area of the Muddy River 11.5 miles NNW of the Projects.
Yuma Ridgway's rail	*Rallus longirostris yumanensis*	Endangered	Not likely to occur. Nearest suitable habitat is associated with the Overton Wildlife Management Area of the Muddy River 14 miles east of the Projects.

Moapa Dace

The Moapa dace was listed as an endangered species under the Endangered Species Act (ESA) on March 11, 1967 (USFWS 1967). The original recovery plan for this species was prepared in 1983 and subsequently revised in 1996 (USFWS 1983a, 1996). Threats to the Moapa dace include habitat loss and alteration, introduction of non-native species, fragmentation, and parasites (USFWS 2009).

The Moapa dace inhabits a variety of habitats throughout its several life stages. As individuals age, they occupy habitats with increasing flow velocities: larval dace are limited to slackwater of the upper reaches of tributaries of the Muddy (Moapa) River, and adults can be found in the river's mainstem. The species prefers warmer temperatures (67–89.6°F); cooler temperatures in the middle portion of the Muddy River mainstem may function as a barrier to downstream movements (USFWS 1996). The species is omnivorous and often forages from drift stations in large groups (up to 30 individuals). These sites are often characterized by overhanging vegetation or particularly deep areas (USFWS 1996).

The Moapa dace is endemic to and occurs in the Muddy River system (and associated thermal spring systems). Specifically, it occurs in the Warm Springs area which is located approximately 11 miles north-northwest of the Projects. Previous surveys found adult Moapa dace occurring in low numbers in restricted portions of three springs and less than two miles of spring outflow and river in the Warm Springs area (USFWS 1983a). Moapa dace likely once inhabited 25 springs and approximately 16 kilometers (9.9 miles) of the upper Muddy River (Ono et al. 1983).

Mojave Desert Tortoise

The Mojave desert tortoise was listed as threatened under the ESA on April 2, 1990 (USFWS 1990). A total of 6.4 million acres of critical habitat was designated in 1994 (USFWS 1994a). Genetics, morphology, behavior, ecology, and habitat use were used to define recovery units for six distinct population segments of the desert tortoise in the 1994 Recovery Plan (USFWS 1994b). The boundary of these units was refined in the Revised Recovery Plan (USFWS 2011) The Projects are located within the Northeastern Mojave Recovery Unit, which encompasses almost five million acres extending from southwestern Utah/northwestern Arizona (northern boundary) to Las Vegas/Las Vegas Wash (southern boundary). This unit includes the Beaver Dam Slope, Gold Butte-Pakoon, and Mormon Mesa critical habitat units, though there is no critical habitat present within the Project areas (USFWS 2019c).

Tortoises in this portion of the Mojave Desert are active in late summer and early autumn in addition to spring. This region receives up to 40 percent of its annual rainfall in the summer which supports two distinct annual floras on which tortoises can forage. Desert tortoises feed on cacti, perennial grasses, and herbaceous perennials. Desert tortoises dig burrows (usually located under shrubs) and den in caliche caves in bajadas, washes, or caves in sandstone rock outcrops for winter hibernation and summer estivation (USFWS 2011, 2019b). Additional detail about the natural history and status of desert tortoise can be found in the Biological Assessment that was prepared for the Projects (**Appendix M**).

Two separate desert tortoise surveys were conducted to assess the presence of the Mojave desert tortoise in the Project areas. The first survey was conducted in September and October 2020 and covered approximately 6,437 acres. This survey covered the Chuckwalla 1a, 1b, 2, 3, and the shared facilities area on Reservation land. The second survey took place in November 2020 and covered the 9.5-mile-long gen-tie line and an 80-meter buffer surrounding the gen-tie line for a total of 297 acres. The surveys covered 100 percent of the Project areas and were conducted in accordance with current USFWS protocols (USFWS 2019b). The field surveys were conducted to determine presence or absence of desert tortoises, estimate the number of tortoises (abundance), and assess the distribution of tortoises within the Project areas (USFWS 2019b)(Heritage 2021).

A total of 50 adult desert tortoises (≥180 mm midline carapace length [MCL]) and 3 juveniles were observed during the 2020 surveys - seven adults in Chuckwalla 1a (including the shared facilities area), zero adults in Chuckwalla 1b, 11 adults in Chuckwalla 2, and 32 adults in Chuckwalla 3 (**Table 3-9, Figure 3-1)**. Desert tortoise sign (i.e., scat, carcasses/shell fragments, tracks, pallets, and burrows) were observed throughout the Project areas, but were concentrated in the southern and eastern portions of the lease study area. For Chuckwalla 1a and the shared facilities area, the estimated number of adult tortoises within the Project area was calculated to be 13.9, with a 95-percent confidence interval of 7.18 to 27.06 adult tortoises. For Chuckwalla 1b, no desert tortoise were observed, so the estimated number of adult tortoises cannot be estimated. For Chuckwalla 2, the estimated number of adult tortoises within the Project area was calculated to be 20.5, with a 95-percent confidence interval of 10.61 to 39.76 adult tortoises. For Chuckwalla 3, the estimated number of adult tortoises within the Project area was calculated to be 59.7, with a 95-percent confidence interval of 36.99 to 96.47 adult tortoises.

Desert tortoise health assessments were conducted within the Project areas in the fall of 2021 (Ironwood and Heritage, unpub). More tortoises were found during health assessments (66 adults and 17 juveniles) resulting from different survey methods and more time spent surveying.

Table 3 9. Mojave Desert Tortoise Observations and Density Estimates by Project Area				
Project Components	**Number of Adult DT Observed**	**Number of Juvenile DT Observed**	**Estimated Number of Tortoises within Each Project Area**	**95% Confidence Interval (Lower - Upper**
Chuckwalla 1a Solar Project (including Shared Facilities Area)	**7**	**0**	**14.0**	**7.20 – 27.11**
Chuckwalla 1b Solar Project	**0**	**0**	**n/a**	**n/a**
Chuckwalla 2 Solar Project	**11**	**1**	**20.5**	**10.61 – 39.76**
Chuckwalla 3 Solar Project	**32**	**2**	**59.7**	**236.99 – 96.47**
Chuckwalla Off-site Components	**0**	**0**	**n/a**	**n/a**
Totals	**50**	**3**	**n/a**	**n/a**

Source: Heritage 2021

Southwestern Willow Flycatcher

On February 27, 1995, the southwestern willow flycatcher was listed as endangered within its entire range under the ESA (USFWS 1995). Critical habitat for the species was originally established in 1997 (USFWS 1997) but was subsequently vacated. Incidental protection was provided along the Virgin River and its 100-year floodplain from the Arizona/Nevada border to Halfway Wash in Nevada based on designation of critical habitat for two fish species, woundfin (*Plagopterus argentissimus*) and Virgin River chub (*Gila seminude*) (USFWS 2000).

Critical habitat was again proposed on October 12, 2004 (USFWS 2004), redefined and re-instituted in 2005 (USFWS 1997, 2005), and designated in 2013 (USFWS 2013). Critical habitat for the southwestern willow flycatcher in Nevada is currently limited to portions of the Virgin River above its confluence with the Muddy River, approximately 17 miles east of the Projects (USFWS 2005).

For nesting, southwestern willow flycatchers require dense riparian habitats with microclimatic conditions dictated by the local surroundings. Saturated soils, standing water, or nearby streams, pools, or cienegas are components of suitable nesting habitat. No suitable riparian or microhabitat conditions exist within the Project areas. The closest known breeding habitat for this species is located along the Muddy River at Warm Springs Ranch approximately 12 miles north-northwest of the Projects. During 2019 surveys within Warm Springs Ranch, eight southwestern willow flycatcher territories were identified, including two confirmed pairs, three unpaired residents, and one non-resident (Southern Nevada Water Authority [SNWA] 2019). There is no suitable habitat for the species within or near the Project areas.

Yellow-billed Cuckoo

On October 3, 2014, the yellow-billed cuckoo was listed as threatened under the ESA (USFWS 2014a, 2014b). Critical habitat has not yet been designated but was proposed on February 27, 2020 (USFWS

2020). The yellow-billed cuckoo has always been rare in Nevada. There are still small areas of suitable habitat within the state, with documented breeding occurring very rarely in southern Nevada. Yellow-billed cuckoos may still utilize remnant habitats present within the state during migration. The scattered cottonwoods on the Colorado River tributaries (Virgin, Muddy, and Pahranagat) are the last places in Nevada where the yellow-billed cuckoo can potentially occur.

The only known nesting sites in Nevada for the yellow-billed cuckoo are at Warm Springs Ranch Natural Area along the Muddy River in the Moapa Valley (SNWA 2019) approximately 11.5 miles north-northwest of the Projects. While two individual cuckoos were detected during 2019 surveys at Warm Springs Natural Area, there is no suitable habitat for the species in or near the Project areas.

Yuma Ridgway's Rail

The Yuma Ridgway's rail (previously called the Yuma clapper rail) was listed as endangered under the ESA on March 11, 1967 (USFWS 1967). The Recovery Plan was finalized in 1983 and portions of the recovery action plan were initiated over the ensuing years (USFWS 1983b). The Yuma Ridgway's rail is one of the smaller subspecies of clapper rail, with adult males standing eight inches tall and weighing 266.8 grams, on average (Todd 1986). Females are slightly smaller. Adult Yuma clapper rails of both sexes are similar in plumage; they possess a long, slender bill and long legs and toes compared to body size (Todd 1986).

The present range of the Yuma Ridgway's rail in the U.S. includes portions of Arizona, California, and Nevada. The Yuma Ridgway's rail lives in freshwater marshes dominated by cattail (*Typha* sp.) and bulrush *(Scirpus* spp.) with a mix of riparian tree and shrub species (*Salix exigua*, *S. gooddingii, Tamarix* spp., *Tessaria sericea*, and *Baccharis* spp.) along the shoreline of the marsh (Eddleman 1989). This species is known to occur along the Muddy River within the Overton Wildlife Management Area approximately 14 miles east of the Projects. No suitable habitat for this species occurs within or near the Project areas. However, recent research suggests this species can undertake long migrations and that movement is not limited to river corridors. A recent study using satellite transmitters on Yuma Ridgway's rails found that, while this species has been considered non-migratory, some Yuma Ridgway's rails conduct fall migratory movements between the U.S. and Mexico, migrating long distances over inhospitable terrain (Harrity and Conway 2020). This indicates that while breeding habitat does not occur in the Project areas, this species may migrate over the Projects.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Five federally listed species have the potential to occur in or around the Project areas and have the potential to be impacted if the Proposed Action is implemented (see **Table 3-8**). Surveys for federally listed species and analysis of their habitat indicate that only the Mojave desert tortoise occurs in the proposed Project areas. The other four species (Moapa dace, southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail) are known to occur in habitats in the region along the Muddy River and are analyzed in this section due to their proximity to the Project. Potential impacts are summarized for these species below and more detail can be found in the Biological Assessment that has

been prepared concurrently with this EIS (**Appendix M**).

Mojave Desert Tortoise

The potential effects to Mojave desert tortoise resulting from implementation of the Proposed Action include**:**

- Injury or mortality from construction activities
- Temporary stress from handling during translocation efforts
- Temporary constriction of movement during construction
- Disturbance from vibrations during construction near the boundary of the construction areas
- Temporary and permanent loss of suitable habitat and burrows
- Noise and lighting effects on behavior and movement
- Exposure to chemicals (herbicides, palliatives, and spills from equipment)
- Increased raven and other predator populations resulting from perches provided by solar structures, perimeter fencing, overhead collector line structures, and human introduction of trash

The Proposed Action includes implementation of mitigation measures intended to avoid, reduce, and minimize effects on the Mojave desert tortoise, as identified in the Biological Assessment for the Projects (**Appendix M**) and list of BMPs (**Appendix C**). The minimization measures and BMPs include preconstruction surveys, biological monitoring, temporary exclusionary fencing, translocation of desert tortoise out of construction areas, and implementation of the Integrated Weed Management Plan (**Appendix F**), Raven Control Plan (**Appendix I**), and WEAP during construction, O&M, and decommissioning.

Potential construction-related effects on the desert tortoise would include mortality or injury from being crushed by moving vehicles while outside of burrows and being crushed while in burrows during ground disturbing activities. Implementation of the Proposed Action, particularly during construction, could also temporarily disturb desert tortoises by creating vibrations, noise, and lighting. Such disturbance could cause tortoises to temporarily avoid otherwise suitable and occupied habitats near the construction activities. Desert tortoises would also be affected during translocation which can result in harassment, injury, and/or mortality. Refer to the Biological Assessment (**Appendix M**) for detailed analysis of these potential effects.

These construction-related effects could impact up to 164 desert tortoises - 27 for Chuckwalla 1a, 40 for Chuckwalla 2, and 97 for Chuckwalla 3. These impacts would be minimized by the installation of exclusionary fencing and translocation of desert tortoises outside of the construction areas and the implementation of other BMPs and minimization measures (**Appendix C**). While there is a potential for some adult desert tortoises to be injured or killed, the numbers are expected to be small. Adult desert tortoises are more easily detected during preconstruction surveys because of their large size, and therefore it is expected that all adult desert tortoises that occur within the construction-phase exclusionary fence would be identified and translocated. Because of the difficulty in locating juvenile desert tortoises and eggs, some may not be found during preconstruction surveys and could be crushed or injured during Project construction. Capturing, handling, and relocating desert tortoises out of the

solar site could also result in injury or death (Blythe et al. 2003). To minimize this, tortoises would be handled in accordance with USFWS handling protocols.

Exclusionary fences would be constructed prior to construction of each phase. Clearance surveys would be conducted for Chuckwalla 1a and 1b first and translocations would occur for both Projects at the same time. Clearance surveys and translocations for Chuckwalla 2 and 3 would occur in the future and at different times. Tortoises within approximately 500 meters (1,640 feet) of the exclusionary fence for each Project would be relocated outside the fence and those on the interior of the solar field (greater than 500 meters [1,640 feet] from the fence) would be moved to temporary holding pens and returned to the site following construction. The recipient sites for these translocated desert tortoises are shown in the Biological Assessment for the Projects (**Appendix M**) and would be included in the Desert Tortoise Translocation Plans that would be appended to the Biological Opinion.

Construction-related effects to desert tortoise would also be minimized by implementation of several Project plans including the Raven Control Plan (**Appendix I**), which would require trash and litter control and reduce potential for predator-related effects on desert tortoises; the WEAP, which would educate all Project personnel about desert tortoise; and the Desert Tortoise Translocation Plans.

The Projects would be constructed in three 20-month phases – Chuckwalla 1a and 1b together, Chuckwalla 2, and Chuckwalla 3. Because of this planned construction phasing, the duration of effects would be up to 60 months but the intensity of effects would be spread out over a longer period.

In addition to the effects of construction on the tortoise, temporary and permanent disturbance to desert tortoise habitat would occur (**Table 3-10**). For the temporary disturbance, vegetation would be impacted initially during construction. The vegetation would be trimmed to a height of 18 inches and driven over and crushed. This treatment would leave the roots intact allowing herbaceous and woody vegetation to re-establish following construction, so that these impacts to desert tortoise habitat would not be permanent.

Table 3 10. Acres of Disturbance to Desert Tortoise Habitats by Project

Project/Area	Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Disturbance (acres)
On-site Components			
Chuckwalla 1a Solar Project	1,576	65	**1,641**
Chuckwalla 1b Solar Project	351	19	**370**
Chuckwalla 2 Solar Project	1,084	67	**1,151**
Chuckwalla 3 Solar Project	1,648	100	**1,748**
Shared Facilities Area	25	117	**142**
Off-site Components			
Gen-tie Option 1	83	48	**131**
Gen-tie Option 2	59	40	**99**
Site Access Roads	0	10	**10**
Temporary Water Pipeline	10	0	**10**
Total[1]	**4,836**	**466**	**5,302**

[1] Gen-tie Option 1 was used for the total to show worst-case impacts.

O&M activities along the gen-tie lines, access roads, and within the solar sites could result in mortality or injury of tortoises from being crushed by vehicles. Desert tortoises are expected to re-inhabit the solar fields during operations because the perimeter fences would be elevated to allow their passage but the level of their potential re-use of the habitat within the solar fields is unknown. In addition, implementation of mitigation measures and BMPs such as reduced speed limits and environmental awareness training for personnel would minimize impacts to desert tortoises during O&M activities. Decommissioning would result in similar effects as those described for construction. The Proposed Action would have moderate, localized, short-term, adverse impacts on Mojave desert tortoise during construction and decommissioning from harm, harassment, injury, and possible death to tortoise from ground-disturbing activities and tortoise translocation. Implementation of the Proposed Action would have minor, localized, long-term, adverse impacts on Mojave desert tortoise during O&M as the result of permanent disturbance of 426 acres of suitable habitat for desert tortoise and temporary disturbance of 4,777 acres that is expected to be returned to suitable habitat following construction activities. Impacts would be minimized through implementation of Project design features and BMPs (**Appendix C**) and the Raven Control Plan (**Appendix I**).

The Biological Assessment for the Projects determined that implementation of the Proposed Action may affect and is likely to adversely affect the Mojave desert tortoise (**Appendix M**). Implementation of the Proposed Action would have moderate, localized, short-term, adverse impacts on Mojave desert tortoise during construction and decommissioning, and minor, localized, long-term, adverse impacts on Mojave desert tortoise during O&M.

Moapa Dace

The Moapa dace is only known to occur in the Muddy River and several associated headwater springs in the Warm Springs area. The Moapa dace would not be affected by the construction, O&M, or decommissioning of the Projects. Up to 100 and 300 acre-feet per year (AFY) of groundwater would be withdrawn for construction for each of the three phases. Chuckwalla 1a, 1b, the shared facilities area, the 230-kV gen-tie line, and access roads would all be built as part of first phase and Chuckwalla 2 and 3 and the gen-tie line to Crystal Substation would be built in the subsequent phases. Up to 30 AFY of groundwater would be withdrawn during O&M for each of the three phases result in up to 90 AFY during O&M if all four Projects are constructed. These withdrawals represent the only potential effect to this species. The effects of groundwater withdrawals of up to 16,100 AFY were previously analyzed in a 2006 Programmatic Biological Opinion (PBO) that addressed groundwater withdrawals in the Lower White River Flow System (LWRFS) Hydrographic Basin (USFWS 2006). Groundwater withdrawals for the Projects would contribute to current and future adverse effects that were analyzed in the PBO and the Biological Assessment for the Projects determined that groundwater pumping associated with the Proposed Action may affect and is likely to adversely affect the Moapa dace (**Appendix M**).

The Proposed Action would have no impacts on Moapa dace or their habitat due to the lack of suitable habitat in the Project areas but could have minor, regional, short- and long-term, adverse impacts on the species due to the drawdown of water during construction, O&M, and decommissioning.

Southwestern Willow Flycatcher, Yellow-Billed Cuckoo, and Yuma Ridgway's Rail

No suitable habitat for the southwestern willow flycatcher, yellow-billed cuckoo, or Yuma Ridgway's rail occurs within or adjacent to the Project areas. These species may use the nearby Muddy and Virgin

Rivers for migration to and from breeding habitat and during dispersal, and these species could migrate over the Projects.

The Project gen-tie lines would be constructed above ground and there is potential that southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail could collide with them. However, the likelihood of this impact is very low due to the low probability of these birds occurring within the Project area.

Groundwater withdrawals proposed for the Projects could result in insignificant reductions in flow in the Muddy River, but the magnitude of effects to these species or their habitats would be too small to be discernable and there is not likely to be any effect on riparian vegetation along the Muddy River.

A migrating or dispersing southwestern willow flycatcher, yellow-billed cuckoo, or Yuma Ridgway's rail could collide with the PV solar panels but is expected to be extremely unlikely to occur. These birds could fly over the Project areas but are not likely to use habitats within the Project areas because of lack of suitability for these species.

The USFWS recently addressed the potential for solar projects to cause injury or mortality to Yuma Ridgway's rail and yellow-billed cuckoo because two mortalities of Yuma Ridgway's rails and one yellow-billed cuckoo had been documented at solar facilities in California even though the circumstances and causes of death have not been confirmed (USFWS 2019a). For other solar projects on the Reservation located near to and within similar habitats as the Chuckwalla Solar Projects, the USFWS recognized that the low number of known recorded mortalities, the lack of habitat in the area, and the long distance from any known occurrence of these birds suggests low potential for mortality associated with solar projects in this area (USFWS 2019a, 2021b, 2021c). In addition, post-construction monitoring for the Southern Paiute Solar Project (located nearby and west of the Projects) from January 2017 to July 2019 found a total of nine avian mortalities, none of which were federally listed bird species (BIA 2019). Therefore, the potential for interactions between Yuma Ridgway's rail, southwestern willow flycatcher, and yellow-billed cuckoo and PV solar facilities are improbable and effects are expected to be negligible.

Due to the low numbers of these species that occur in the vicinity of the Projects and the lack of habitat in the vicinity of the Project areas, the potential for impacts to these species is low, and the potential risk would be insignificant and discountable. The Biological Assessment for the Projects determined that the Proposed Action may affect, but is not likely to adversely affect, the southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail (**Appendix M**). The Proposed Action would have negligible, localized, short- and long-term, adverse impacts on these species.

Collectively, construction of the proposed Projects and the other solar projects in the area on the Reservation and on nearby federal lands identified in the introduction to Chapter 3 would affect desert tortoise habitat within the Northeastern Mojave Recovery Unit for Mojave desert tortoise and more specifically within the California Wash and Dry Lake playa watersheds. Each of these projects could increase desert tortoise mortality and injury over the short-term during construction due to collisions with vehicles and equipment, crushing of burrows and eggs, and harm and harassment during translocation. The presence of multiple solar projects on the Reservation and on BLM-managed lands in the region could also restrict some movement and impact connectivity. Together, these impacts could have moderate impact on local tortoise populations but impacts are anticipated to be lessened by the current requirements for open fencing for each of the recent and proposed projects. While some of the past solar projects have been fenced to restrict tortoise movement, those currently under-construction

and foreseeable projects would allow desert tortoise to re-inhabit and move through the sites after construction as required by USFWS.

There are more than five million acres within the Northeastern Mojave Recovery Unit for Mojave desert tortoise and approximately 4,800 acres have been developed as part of previously approved and constructed solar projects. Another approximately 34,500 acres of solar projects are currently proposed for future construction within the Unit (USFWS 2021b). The combined acreage of these projects would make up 0.92 percent of the recovery unit. The relatively small size of the Chuckwalla Projects in comparison to the recovery unit (0.13 percent) and the collective projects (0.92 percent) along with implementation of design features, BMPs, and management plans would result in the Proposed Action and foreseeable projects having a moderate short-term and minor long-term contribution to the collective effects on the Mojave desert tortoise within the region.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the Chuckwalla Solar Projects would not be constructed and there would be no effects on any threatened, endangered, or candidate species.

3.6 Traffic

3.6.1 Affected Environment

Primary Access to the Chuckwalla Project sites would be provided via I-15 to the Valley of Fire Highway (State Route (SR) 40) to an existing 2.25-mile road on the Reservation paralleling its southern border. In addition, another existing road on the Reservation approximately 1.0 mile long would provide access from I-15 to the northern portion of the Project area. **Figure 2-1** shows the Project components and the access road locations.

The primary roadways providing access in the area are I-15 and the Valley of Fire Highway. I-15 provides access to the Chuckwalla Projects area from Las Vegas to the south and Mesquite, Nevada and Salt Lake City, Utah to the north. Valley of Fire Highway provides access east of I-15 to Valley of Fire State Park (**Table 3-11**). **Table 3-12** provides detailed information on the annual average daily traffic volume (AADT) for the access roads in the vicinity of the Projects.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

Construction Phase

The Chuckwalla 1A and Chuckwalla 1B are anticipated to begin construction simultaneously as the first phase, followed by the construction of Chuckwalla 2 and Chuckwalla 3 in subsequent phases. Construction is expected to take approximately 18-20 months per phase.

Construction traffic associated with the solar site would use the access route from Valley of Fire Highway and also the northern access route that would provide direct access to the northern part of the

site from I-15. The Valley of Fire Highway route currently has limited traffic made up primarily of visitors to Valley of Fire State Park land the Valley of Fire NNL located east of the Project area. There is very limited to no existing traffic on the northern access route. No upgrades to existing roads are anticipated to be necessary to provide the access needed for these Projects but it is possible that maintenance during construction and operations could be needed, as required. The roadways listed in **Table 3-11** are anticipated to be impacted by the proposed Projects. The impacts to these roadways could include increased wear on the road from the construction loads, increased traffic volumes during construction, and potential delays during the construction peak periods.

TABLE 3 11
PUBLIC ROUTES PROVIDING ACCESS TO THE PROPOSED PROJECT

Route	Direction	Type	Lanes	Description
I-15	north-south	Paved Interstate Freeway	2 (each direction)	Provides a connection between Las Vegas, NV and Salt Lake City, UT. Provides access to the Projects via Valley of Fire Road (previously SR 40).
Valley of Fire Highway (SR 40)	east-west	Paved Rural Arterial	1 (each direction)	The Valley of Fire Highway is a road in northeastern Clark County, Nevada serving the Valley of Fire State Park and providing primary access to southwest of the Projects.
Project Access Road	east-west	Project-specific access	1 (each direction)	This road would provide access from Valley of Fire Road across Moapa River Indian Reservation Land to the Projects.
Northern Access Road	east-west	Project-specific access	1 (each direction)	This road would provide access for construction and emergency services from the I-15 across Moapa River Indian Reservation Land to the Projects.

TABLE 3 12
AADT SUMMARY FOR ROADS NEAR THE PROPOSED PROJECT
2021

Location	AADT
I-15, N/B on-ramp at Valley of Fire Interchange (Exit 75)	1,100
I-15, N/B off-ramp at Valley of Fire Interchange (Exit 75)	1,500
I-15, S/B on-ramp at Valley of Fire Interchange (Exit 75)	1,100
I-15, S/B off-ramp at Valley of Fire Interchange (Exit 75)	790
I-15, Segment between Exit 75 and Exit 64	26,900
I-15, Segment between Exit 75 and Exit 80	22,000
Valley of Fire Road (previously designated SR 40)	860
Project Access Road	No data
Northern Access Road	No data

Source: NDOT Traffic Records Information Access data, 2021.

Construction of the solar fields for Chuckwalla 1a and 1b would occur at the same time starting in the second half of 2022 and would be expected to take up to 20 months. Likewise, construction of Chuckwalla 2 and 3 would each also be expected to take up to 20 months and their schedules are expected to be sequential and would be designed to meet the commercial operations date (COD) required by their respective power purchase agreement (PPA). Construction would generally occur between 5 a.m. and 5 p.m., Monday through Friday, but could occur seven days a week and start earlier and end later.

All equipment, permanent materials, and commodities for the Projects would be transported to the site via local highways. Any shipments by railroad would go to the nearest active railroad spur for offloading and transported by truck to the Project sites. Most equipment and material deliveries would utilize the primary site access route.

It is expected that most Project-related construction traffic (equipment, materials, and workers) would originate from the south in Las Vegas with some construction workers coming from the north. The number of workers expected on the site during construction of each phase of the Projects (1a and 1b together, 2, and 3) would vary over the construction period and is expected to average up to approximately 350 with a peak of 450 workers each day, generating an average of about 600 up to a peak of 800 daily trips, as some carpooling is expected. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment, materials, with an additional 40 trips per day if water is trucked to the site for dust control purposes. Combined, these would result in an average increase of at least 740 vehicle trips (or 370 roundtrips) per day during construction. All Project related parking would be onsite during construction.

Heavy truck trips are estimated to be 50 per day based on assumptions regarding daily deliveries of materials, equipment, and water anticipated for construction. It was assumed that the trucks would enter the facility throughout the day, and therefore only a portion of the trucks would overlap with the peak AM and PM hours.

While I-15 would not be expected to be impacted due to its high AADT, traffic on the portion of Valley of Fire Highway from the I-15 interchange to the Project access road could be affected by the increase in vehicles. Most motorists using Valley of Fire Highway would be likely traveling to the Valley of Fire State Park / Valley of Fire NNL. The total distance of the portion of Valley of Fire Road between I-15 and the site access road is 1.1 miles.

Valley of Fire State Park (Park) sees about 9,000 visitors annually with peak visitor months being October through April. The Park is open year-round with a visitor center open from 8:30 am to 4:30 pm daily. It is likely that a majority of visitor would be entering the park between 7:30 am and 9:30 am in the morning and leaving between 3:30 pm and 6:30 pm.

Based on start times for construction (5:00 am or earlier) and potential visitor times (7:30 am or later), the morning peak construction traffic would not be expected to overlap with or impact Park visitors on the road. However, construction end time and visitors exiting the Park could overlap and cause traffic delays and impacts to the I-15 / Valley of Fire interchange and the Valley of Fire Highway.

Several potential measures could be used to reduce potential traffic impacts and these would be itemized in detail in the final traffic management plan that would be developed by the EPC contractor and approved prior to the start of construction.

This plan would include:

- Proposed vehicle routes
- Projected schedule for traffic to and from the site
    - Delivery of equipment and supplies
    - Expected numbers of workers over time along with expected shift schedules
- Plans for worker parking and potential carpooling
- Vehicle movement onto, on, and from the site
- Signage / flagging
- Public information plans (if needed)

In addition to the traffic impacts from general project construction, traffic on I-15 would be temporarily affected during the stringing of the gen-tie conductor across I-15. During this this crossing, temporary traffic control, speed reductions, and intermittent traffic stops would be required for the safety of the public and workers. A typical schedule for a highway crossing would last about a week and follow the schedule below:

- Day 1 - Traffic control would be put in place and guard structures would be placed at the crossing locations in the shoulder of the road
- Day 2 – Finish guard structure installation, install pulling line
- Day 3 – Install conductor
- Day 4 – Position conductor
- Day 5 – Secure Conductor
- Day 6 – Remove guard structures
- Day 7 – Finish guard structure removal, remove traffic control

Traffic control would remain in place throughout the duration of the stringing activities and adjusted to each activity to minimize the impact of traffic interruptions. Guard structure and pulling line installation would likely have the greatest impact and interruption on traffic. During pulling line installation, it is estimated that a 15-minute traffic stop would be required for each wire pulled across the road. Because I-15 has multiple travel lanes in each direction, a lane closure in each direction would be likely to funnel the flow of traffic safely as guard structures and pulling lines are installed. The specific details and schedule for these crossing activities would be included in a plan submitted to NDOT for approval.

Operations and Maintenance Phase

The Chuckwalla Projects are expected to require up to 12 personnel collectively for all four projects during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. When all four Projects become operational, it would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur during the operations phase. This could require up to 33 round trips per day but this would occur relatively infrequently as the panels would be cleaned only periodically as needed. There could also be other deliveries of supplies or equipment that could

occur to support operations and maintenance which could result in a maximum of up to 10 or less during normal operations of the Projects. The roadways and intersections used for access would be unaffected during operations.

Collectively, of the several solar projects proposed for development on the Reservation and surrounding federal lands identified in the introduction of Chapter 3, the Gemini Solar Project on federal lands immediately south of the Reservation, is the only one that would utilize the same primary access as the Proposed Action (I-15 and Valley of Fire Highway). The other solar projects on the Reservation and in the area would utilize access from I-15 at other interchanges and would not contribute to effects on these roads.

The Gemini Project has started construction and the first phase of the proposed Chuckwalla Projects (1a and 1b together) is expected to commence in mid to late 2022. The effect on traffic flow on I-15, the Valley of Fire Highway, and associated on/off-ramps would be greatest when construction for these projects occurs simultaneously. The exact amount of this overlap is unknown but could occur during more than 50 percent of the Chuckwalla 1a/1b construction schedule.

To determine the effects on traffic that could occur during these overlap periods, the level of service (LOS) on these roadways were evaluated. LOS is a qualitative measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Impacts to LOS were evaluated for the Gemini Project and **Table 3-13** below incorporates information for Chuckwalla 1a/1b into that analysis.

The traffic evaluation for the Gemini Project assumed a peak construction labor force of 900 while the Chuckwalla 1a/1b Projects estimate a peak of 450 workers. Therefore, using the same traffic generation assumptions, the Chuckwalla 1a/1b Projects would be expected to generate half of the traffic during peak construction periods.

Table 3 13
Combined Construction Traffic Anticipated from the Chuckwalla 1a/1b Projects and the Gemini Project

Roadway/Location	Existing Volume[1]	Gemini Peak Volume[1]	Chuckwalla 1a/1b Peak Volume	Existing plus Both Projects	Hourly/Daily	LOS C Capacity[1]	Volume Less than Capacity
I-15/VoF NB Off-Ramp	123	282	141	546	Hourly	1,440	Yes
I-15/VoF NB On-Ramp	85	282	141	508	Hourly	1,440	Yes
I-15/VoF SB Off-Ramp	71	282	141	494	Hourly	1,440	Yes
I-15/VoF SB On-Ramp	152	282	141	575	Hourly	1,440	Yes
Valley of Fire (VoF)	570	3,186	1,593	5,349	Daily	5,100	No

[1] *From Gemini Solar EIS, Table 3.16-1*

As shown on **Table 3-13**, if peak estimated construction traffic for both projects were to occur simultaneously, the LOS for the I-15 ramps would be maintained at a level of C or better while the traffic on Valley of Fire Highway could exceed the LOS level C capacity by approximately 5 percent. However, it is very unlikely that peak construction of both projects would occur simultaneously since Gemini construction has already started and Chuckwalla 1a/1b is not anticipated to start until later in 2022. Therefore, it is likely that the LOS on Valley of Fire Highway would be maintained above level C for the duration of the construction of both projects.

If traffic impacts on Valley of Fire Highway were to become significant during an overlap of construction of the Chuckwalla and Gemini projects and during the Valley of Fire State Park's peak season (October through April), the Chuckwalla Projects would work with the other project to minimize impacts through the scheduling of equipment and materials deliveries, the scheduling of show-up times for workers and shift changes, and potential increased car-pooling.

3.6.2.2 No Action

Under the No Action Alternative, the Proposed Action would not be developed and no traffic impacts would occur. There would be no temporary increase in traffic on I-15 and Valley of Fire Highway.

3.7 Vegetation

3.7.1 Affected Environment

The Projects are located in the Mojave Warm Desert and Mixed Desert Scrub habitat. These habitats support a diverse array of wildlife species including many birds, small mammals, and reptiles that depend on or at least partially use this habitat (Wildlife Action Plan Team 2012).

Throughout the Mojave Desert, native understory vegetation is being replaced with invasive species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola* spp.). Non-native annual grasses such as red brome, cheatgrass, and Mediterranean grass (*Schismus barbatus*) compete with native forage plants, and the fuel these plants create has led to increased fires in parts of the Mojave Desert where they were historically rare (Invasive Weed Awareness Coalition 2006). In riparian areas, dense stands of saltcedar (*Tamarisk* spp.) have replaced native riparian vegetation communities throughout much of the region. Climate change is also anticipated to have a significant effect on desert scrub communities with creosote-bursage communities expanding northward, while blackbrush communities losing much of their shrub cover (Wildlife Action Plan Team 2012).

Land cover types in the Project area were identified using the Southwest Regional Gap Analysis Project data (Lowry Jr. et al. 2005; U.S. Geological Survey [USGS] 2005), which uses satellite imagery to delineate land cover types (vegetation communities). Vegetation in the Chuckwalla lease study area and the off-site components is primarily composed of Sonora-Mojave Creosotebush-White Bursage Desert Scrub (69 percent), while North American Warm Desert Wash (30 percent) accounts for a majority of the remainder of the vegetation. Very small areas of Sonora-Mojave Mixed Salt Desert Scrub, North American Warm Desert Bedrock Cliff and Outcrop, North American Warm Desert Pavement, Invasive Southwest Riparian Woodland and Shrubland, and Developed, Medium – High Intensity are also present in the area accounting for less than one percent (**Figure 3-2**). **Tables 3-14** and **Table 3-15** present the

acreages of each dominant vegetation community by proposed Project feature for Reservation lands and BLM-managed lands, respectively.

On the Reservation, the Project areas are composed entirely of Sonora-Mojave Creosotebush-White Bursage Desert Scrub and North American Warm Desert Wash. Each Project has very similar vegetation types (**Table 3-13**). The small areas of Sonora-Mojave Mixed Salt Desert Scrub, North American Warm Desert Bedrock Cliff and Outcrop, North American Warm Desert Pavement, Invasive Southwest Riparian Woodland and Shrubland, and Developed, Medium – High Intensity that occur on Reservation land are all associated with the off-site Project components.

Figure 3-2 shows the distribution of vegetation communities in the vicinity of the solar fields. **Table 3-14** provides the acreage of the each of the vegetation communities in the Project areas on Reservation land, including associated access road and collector line ROWs.

On federal land managed by the BLM, the Project area includes the gen-tie ROW options and the existing access road that provides access to the gen-tie ROW. These areas are also dominated by Sonora-Mojave Creosotebush-White Bursage Desert Scrub and North American Warm Desert Wash, but also contain small areas of Invasive Southwest Riparian Woodland and Shrubland. **Table 3-15** provides the acreage of the vegetation communities in the Project area on BLM-managed land.

Sonora-Mojave Creosotebush-White Bursage Desert Scrub

Creosote scrub is typical of the Mojave Desert and is the most abundant vegetation community in the region and within the Project area. Creosote scrub occurs on well-drained sandy flats and bajadas from 150 to 1500 meters (492–4,921 feet) elevation in Nevada. Its range extends from the Colorado River on the south to Pahranagat Valley on the north (Wildlife Action Plan Team 2012). This community is typically dominated by creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), which can be sparse to moderately dense (2–50 percent cover). Many other shrubs, dwarf-shrubs, and cacti may be present, often as a sparse understory. In southern Nevada, common species include saltbush (*Atriplex* spp.), Mormon tea (*Ephedra nevadensis*), desert wolfberry (*Lycium andersonii*), brittlebush (*Encelia farinosa*), and beavertail cactus (*Opuntia basilaris*). The herbaceous layer is typically sparse but can be abundant with ephemerals after spring rains. Herbaceous species common in the region include phacelia (*Phacelia* spp.), desert trumpet (*Erigonium inflatum*), cryptantha (*Cryptantha* spp.), and low woollygrass (*Dasyochloa pulchella*) (USGS 2005).

Creosotebush is used by many desert animals for shelter and forage. The roots of the creosotebush help to stabilize the soil and support burrows for a variety of reptiles and amphibians, including the desert tortoise (*Gopherus agassizii*), and mammals such as the kit fox (*Vulpes macrotis*). Other animals bed in or under the bushes and birds use them for perching and nesting (Wildlife Action Plan Team 2012).

On the Reservation, Chuckwalla 1a includes approximately 1,074 acres of creosote scrub vegetation, Chuckwalla 1b contains approximately 409 acres, Chuckwalla 2 contains approximately 1,144 acres, Chuckwalla 3 contains approximately 1,791 acres, the Shared Facilities Area contains approximately 80 acres, and the off-site components on Reservation land contain approximately 229 acres. On federal land managed by the BLM, there are approximately 223 acres of creosote scrub vegetation.

North American Warm Desert Wash

The desert wash vegetation community is restricted to the small, intermittently flooded washes scattered throughout the Project area; it is more prevalent in the Chuckwalla 1a, 2, and 3. The vegetation of desert washes is highly variable, ranging from sparse and patchy to moderately dense. It typically occurs along the banks of washes but may occur within the channel. The woody layer is typically intermittent and relatively open and is usually dominated by shrubs and small trees such as catclaw (*Senegalia greggii*) and desert willow (*Chilopsis linearis*) (USGS 2005). In southern Nevada, washes tend to support a higher diversity and density of cacti and yucca than the surrounding landscape. Vegetation surveys conducted for previously approved solar projects on the Reservation (BIA 2012, 2014, 2019a) identified numerous cacti and yucca species including cholla (*Cylindropuntia* spp.), barrel cactus (*Ferocactus cylindraceus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), and Mojave yucca (*Yucca schidigera*). Higher densities of big galleta grass (*Pleuraphis rigida*) are also commonly reported in washes in this region.

On the Reservation, Chuckwalla 1a includes approximately 902 acres of desert wash vegetation, Chuckwalla 1b contains approximately 71 acres, Chuckwalla 2 contains approximately 428 acres, Chuckwalla 3 contains approximately 516 acres, the Shared Facilities Area contains approximately 86 acres, and the off-site components on Reservation land contain approximately 97 acres. On federal land managed by the BLM, there are approximately 172 acres of desert wash vegetation.

Sonora-Mojave Mixed Salt Desert Scrub

This community is typical of saline basins in the Mojave Desert and most often occurs around the edge of playas. Vegetation is typically composed of one or more saltbush species and other halophytic (salt tolerant) plants such as iodinebush (*Allenrolfea occidentalis*), seepweed (*Suaeda* spp.), and alkali sacaton (*Sporobolus airoides*) (USGS 2005). Salt scrub vegetation is restricted to a very small portion (approximately one acre) along the temporary water pipeline on Reservation land. This vegetation type does not occur within the Project areas on federal land managed by the BLM.

North American Invasive Southwest Riparian Woodland and Shrubland

This community represents areas that are dominated by introduced woody species such as saltcedar and Russian olive (*Elaeagnus angustifolia*) (USGS 2005). Due to the lack of perennial water in the Project area, this vegetation is limited to approximately nine acres that includes a few small patches of saltcedar along larger drainages within the gen-tie options on federal land managed by the BLM. This vegetation type does not occur within the Project areas on Reservation land.

North American Warm Desert Bedrock Cliff and Outcrop

This vegetation community includes barren, sparsely vegetated (less than 10 percent cover) landscapes of cliff faces, narrow canyons, and smaller outcrops of various bedrock types, as well as scree and talus slopes. Although vegetation density may be low, species diversity can be high, and may include beargrass (*Nolina bigelovii*), teddybear cholla (*Cylindropunita bigelovii*), and other succulents. Lichens may be the predominant life form in some areas, and small patches of shrubs from adjacent areas may also be present (USGS 2005). This vegetation community occupies a very small area (approximately four acres) along the gen-tie options and the temporary water pipeline on Reservation land. This vegetation

type does not occur within the Project areas on federal land managed by the BLM.

North American Warm Desert Pavement

The desert pavement community is composed of unvegetated to sparsely vegetated (<2 percent) landscapes. This community is common in flat, open basins where exposure to wind has developed a cover of fine to medium gravel coated with "desert varnish." These areas are subject to extreme temperature variation and support very limited populations of desert scrub species such as creosotebush and Eastern Mojave buckwheat (*Eriogonum fasciculatum*). However, these areas may briefly experience high densities of ephemeral herbaceous vegetation following seasonal precipitation events (USGS 2005). This vegetation community occupies a small area (approximately 15 acres) along both gen-tie options and the temporary water pipeline on Reservation land.

Developed, Medium – High Intensity

The developed community is composed of areas that have been highly disturbed by human activities. These areas consist of roadways and other developed areas and only occur on approximately four acres of Reservation land along gen-tie Option 1 and the site access roads.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Under the Proposed Action, vegetation would be permanently cleared from new access roads, stream crossings, drainage ditches, inverter pads, O&M areas, substation areas, helicopter pad, and the battery storage yard. Estimated acres of permanent disturbance to vegetation by the Projects are Chuckwalla 1a (64 acres); Chuckwalla 1b (18 acres); Chuckwalla 2 (65 acres); Chuckwalla 3 (98 acres); Shared Facilities Area (31 acres); and off-site Project components (98 acres) (**Table 3-16**). Most permanent vegetation removal would occur within the creosote scrub vegetation community.

During construction, vegetation within the solar blocks may be trimmed to a height of 18 inches, where necessary. Construction equipment would drive over and crush trimmed and un-trimmed vegetation, but the root systems would remain largely intact, which would allow vegetation to regrow more quickly than graded areas within the solar blocks after construction. Where trenches are excavated for the installation of electrical conduits, vegetation would take longer to regrow because of the destruction of root systems. Vegetation would also be cleared permanently from roadways, site access ways, and at inverter equipment within the solar field and substations, BESS locations, and O&M facilities within the shared facilities area during construction.

Table 3-16 lists permanent and temporary disturbance within each of the major vegetation communities for each of the on-site Project components and the off-site Project components. Estimated acres of temporary disturbance to vegetation by Project are Chuckwalla 1a (1,576 acres); Chuckwalla 1b (351 acres); Chuckwalla 2 (1,084 acres); Chuckwalla 3 (1,648 acres); Shared Facilities Area (24 acres); and off-site Project components (92 acres) (**Table 3-16**).

Construction of off-site Project components would require vegetation clearing. This would include the two gen-tie lines where some of the vegetation would be permanently disturbed for structure work

areas, new roads, and spur roads. **Table 3-16** lists permanent disturbance within each vegetation community within the gen-tie line ROW for gen-tie Options 1 and 2. This disturbance would total approximately 48 total acres for Option 1 and approximately 40 total acres for Option 2. Temporary disturbance for the gen-ties would include work/laydown areas and stringing sites which would total approximately 83 total acres for Option 1 and approximately 59 total acres for Option 2. These disturbances would occur primarily on Reservation lands (including the BLM-managed designated utility corridor) and federal land managed by the BLM.

Access to the solar fields would be provided by two existing roads. The road surface would be widened to 24 feet with a 5-foot shoulder in all areas where the road is not currently wide enough. This would permanently disturb approximately 10 acres of vegetation communities on Reservation lands and no temporary disturbance would occur. Permanent and temporary disturbance within each vegetation community for offsite access roads is listed in **Table 3-16**.

Impacts to vegetation from construction, O&M, and decommissioning of the Projects are primarily associated with soil disturbance and vegetation management. Soil disturbance from ground-disturbing activities and the use of vehicles and heavy equipment in the solar fields and gen-tie line ROW has the potential to reduce the native seed bank and could introduce or spread invasive plant species and noxious weeds. Reduction of native plant cover could leave bare areas that would be susceptible to the establishment of invasive plant species and noxious weeds and increased erosion.

Invasive plant species and noxious weeds may be transported to the site in hay bales and straw wattles used for erosion control and construction equipment and vehicles, if not properly cleaned. Repeated crushing and trimming of vegetation within the solar fields and shading by solar panels could create conditions that are more favorable for non-native plants, including invasive plant species and noxious weeds.

Table 3 14. Major Vegetation Communities in the Project Areas on Reservation Lands								
Project Component	**Sonora-Mojave Creosotebush-White Bursage Desert Scrub (acres/percent)**	**North American Warm Desert Wash (acres/percent)**	**Sonora-Mojave Mixed Salt Desert Scrub (acres/percent)**	**North American Warm Desert Bedrock Cliff and Outcrop (acres/percent)**	**North American Warm Desert Pavement (acres/percent)**	**Invasive Southwest Riparian Woodland and Shrubland (acres/percent)**	**Developed, Medium – High Intensity (acres/percent)**	**Total (acres)**
On-site Solar Project Components								
Chuckwalla 1a Solar Field	1,074; 54%	902; 46%	0	0	0	0	0	1,976
Chuckwalla 1b Solar Field	409; 85%	71; 15%	0	0	0	0	0	480
Chuckwalla 2 Solar Field	1,144; 73%	428; 27%	0	0	0	0	0	1,572
Chuckwalla 3 Solar Field	1,791; 78%	516; 22%	0	0	0	0	0	2,307
Chuckwalla Shared Facilities Area	80; 48%	86; 52%	0	0	0	0	0	166
On-site Solar Project Components Total	**4,498**	**2,003**	**0**	**0**	**0**	**0**	**0**	**6,501**
Off-site Components								
Gen-tie Option 1	192; 66%	81; 28%	0	2; <1%	13; 4%	0	3; 1%	291
Gen-tie Option 2	26; 67%	11; 28%	0	1; 3%	1; 3%	0	0	39
Site Access Roads	8; 80%	1; 10%	0	0	0	0	1; 10%	10
Temporary Water Pipeline	3; 30%	4; 40%	1; 10%	1; 10%	1; 10%	0	0	10
Off-site Components Total	**229**	**97**	**1**	**4**	**15**	**0**	**4**	**350**

Table 3 14. Major Vegetation Communities in the Project Areas on Reservation Lands								
Project Component	**Sonora-Mojave Creosotebush-White Bursage Desert Scrub (acres/percent)**	**North American Warm Desert Wash (acres/percent)**	**Sonora-Mojave Mixed Salt Desert Scrub (acres/percent)**	**North American Warm Desert Bedrock Cliff and Outcrop (acres/percent)**	**North American Warm Desert Pavement (acres/percent)**	**Invasive Southwest Riparian Woodland and Shrubland (acres/percent)**	**Developed, Medium – High Intensity (acres/percent)**	**Total (acres)**
On- and Off-site Components Total	**4,727; 69%**	**2,100; 31%**	**1; <1%**	**4; <1%**	**15; <1%**	**0**	**4; <1%**	**6,851**

Source: Lowry Jr. et al. 2005; USGS 2005

Table 3 15. Major Vegetation Communities in the Project Area on BLM managed Lands								
Project Component	**Sonora-Mojave Creosotebush-White Bursage Desert Scrub (acres/percent)**	**North American Warm Desert Wash (acres/percent)**	**Sonora-Mojave Mixed Salt Desert Scrub (acres)**	**North American Warm Desert Bedrock Cliff and Outcrop (acres)**	**North American Warm Desert Pavement (acres)**	**Invasive Southwest Riparian Woodland and Shrubland (acres/percent)**	**Developed, Medium – High Intensity (acres)**	**Total (acres)**
Off-site Components								
Gen-tie Option 1	149; 58%	104; 40%	0	0	0	5; 2%	0	258
Gen-tie Option 2	73; 51%	65; 46%	0	0	0	4; 3%	0	142
Existing Road providing access to Gen-tie ROW	1; 25%	3; 75%	0	0	0	0	0	4
Off-site Components Total	**223; 55%**	**172; 43%**	**0**	**0**	**0**	**9; 2%**	**0**	**404**

Source: Lowry Jr. et al. 2005; USGS 2005

Dust generated by construction, O&M, and decommissioning activities, and by vehicles and equipment travelling on access roads, could also indirectly affect vegetation by reducing photosynthetic activity. Some of these effects could extend to vegetation outside the Project areas. The implementation of dust control measures (**Appendix C**) would minimize the potential effects to vegetation. Surface water flows would continue to pass through the Project sites, so there would be no effects on downstream vegetation from altered or reduced surface water flows.

The implementation of design features and BMPs (**Appendix C)** would reduce the potential for adverse effects to vegetation. Invasive plant species and noxious weeds within the Project areas would be managed with mechanical treatments whenever possible. Herbicides approved by the Moapa Band and/or BLM (as appropriate) would be used if necessary. The treatment (mechanical or chemical) of invasive plant species and noxious weeds could result in inadvertent injury to native plants that are in close proximity. An Integrated Weed Management Plan (**Appendix F**) has been developed that specifies procedures for managing vegetation and minimizing the spread of invasive plant species and noxious weeds.

Prior to the end of the lease for the Projects, the solar fields would be taken out of service and associated on-site and off-site facilities would be removed. Some buried components (such as cabling) may be left in place. The Applicants have prepared a draft Decommissioning Plan (**Appendix G**) to minimize the adverse effects of the permanent closure of the facilities. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the Moapa Band, BIA, and BLM with input from other agencies. Following decommissioning, all disturbed areas would be stabilized and revegetated as described in the draft Decommissioning Plan and Site Restoration Plan (**Appendices G** and **E**). The area of temporary vegetation disturbance associated with decommissioning would be comparable to the area temporarily disturbed during construction.

Implementation of the Proposed Action, including both onsite and offsite facilities, would result in the temporary and permanent loss of the acres of vegetation identified in **Table 3-16**. With the implementation of design features and BMPs, the Proposed Action would have minor, short- and long-term, adverse impacts on vegetation.

Table 3 16. Temporary and Permanent Disturbance by Major Vegetation Community[1]												
	Sonora-Mojave Creosotebush-White Bursage Desert Scrub		North American Warm Desert Wash		North American Warm Desert Bedrock Cliff and Outcrop		North American Warm Desert Pavement		Invasive Southwest Riparian Woodland and Shrubland		Total Disturbance Acres	
	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres
Chuckwalla On-site Solar Project Components												
Chuckwalla 1a Solar Field	835	34	741	30	0	0	0	0	0	0	**1,576**	**64**
Chuckwalla 1b Solar Field	297	16	54	2	0	0	0	0	0	0	**351**	**18**
Chuckwalla 2 Solar Field	788	48	296	17	0	0	0	0	0	0	**1,084**	**65**
Chuckwalla 3 Solar Field	1,292	79	356	19	0	0	0	0	0	0	**1,648**	**98**
Chuckwalla Shared Facilities	0	106	24	11	0	0	0	0	0	0	**24**	**117**
On-site Components Total	**3,212**	**283**	**1,471**	**79**	**0**	**0**	**0**	**0**	**0**	**0**	**4,683**	**362**
Chuckwalla Off-site Components												
Gen-tie Option 1	56	26	23	19	1	1	1	1	2	1	**83**	**48**
Gen-tie Option 2	32	20	24	17	1	1	1	1	1	1	**59**	**40**
Site Access Roads	0	9	0	1	0	0	0	0	0	0	**0**	**10**

Table 3 16. Temporary and Permanent Disturbance by Major Vegetation Community[1]

	Sonora-Mojave Creosotebush-White Bursage Desert Scrub		North American Warm Desert Wash		North American Warm Desert Bedrock Cliff and Outcrop		North American Warm Desert Pavement		Invasive Southwest Riparian Woodland and Shrubland		Total Disturbance Acres	
	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres	Temporary Disturbance Acres	Permanent Disturbance Acres
Temporary Water Pipeline	3	0	4	0	1	0	1	0	0	0	**9**	**0**
Off-site Components Total[2]	**91**	**57**	**51**	**40**	**3**	**2**	**3**	**2**	**3**	**2**	**151**	**98**
On- and Off-site Components Total[2]	**3,303**	**314**	**1,522**	**119**	**3**	**2**	**3**	**2**	**3**	**2**	**4,835**	**434**

[1] This table lists significant impacts to vegetation communities. Vegetation communities with small permanent or temporary impacts were not included [Sonora-Mojave Mixed Salt Desert Scrub (1 acre of temporary disturbance)].

[2] Gen-tie Option 1 was used for the total to show worst-case impacts.

With the implementation of the BMPs and other design features in **Appendix C**, no additional measures to minimize impacts are recommended.

Collectively, several projects or actions in the general area would contribute to impacts to vegetation including other existing and proposed solar development and associated transmission lines located on the Reservation and nearby federal lands. The Proposed Action would result in the temporary loss of approximately 4,835 acres of vegetation and the permanent loss of approximately 434 acres of vegetation. The other approved and planned projects on the Reservation and on BLM-managed federal land in the region identified in the introduction to Chapter 3 would potentially impact thousands of additional acres of vegetation. The Chuckwalla Projects and the other collective projects are located within the California Wash and Dry Lake playa watersheds. Most of the acreage impacted by the Chuckwalla Projects and the other collective projects would occur predominantly within the creosote-white bursage desert scrub vegetation community which is the most common vegetation / habitat type throughout the region. The combined acreage of the two watersheds is approximately 300,000 acres and the identified approved and proposed projects together would total approximately 32,000 acres. Therefore, the collective impacts from the projects to the common vegetation types in the area would represent about 11 percent of the total acreage within the two watersheds and a very small fraction of these vegetation types in the region.

Most lands within the region that would be affected by other actions are on the Reservation or federally managed lands. These projects, like the Proposed Action, would need to develop and implement mitigation measures to minimize potential effects to vegetation. With the implementation of design features and BMPs for these projects as well as the Proposed Action, there would be moderate, short- and long-term, adverse impacts on vegetation in the region.

3.7.2.2 No Action

Under the No Action Alternative, the Moapa Band would not approve leases for the Chuckwalla Solar Projects, and the solar fields would not be constructed. The BLM would not approve the ROW, and the gen-tie lines and associated access roads would not be constructed. There would be no temporary or permanent removal of vegetation, and vegetation would not need to be trimmed for the O&M of the solar fields. Therefore, there would be no impacts to vegetation under the No Action Alternative.

3.8 Visual Resources

The term “visual resources” refers to the composite of basic terrain, geologic, and hydrologic features; vegetative patterns; and built features that influence the visual appeal of a landscape. Visual impacts are defined as the change to the visual environment resulting from the introduction of modifications to the landscape. This section describes the existing context of the visual environment and assesses the potential impacts from the Proposed Action and the No Action Alternative within the visual resource study area.

3.8.1 Affected Environment

The proposed Chuckwalla Projects area is located in the Basin and Range physiographic province. The prominent natural features within the visual resource study area include three mountain ranges— the

foothills of the North Muddy Mountains to the immediate east, the Arrow Canyon Range to the west, and the Dry Lake Range to the south. The area contains exposed rock and soil and vegetation characteristic of the Mojave Desert dominated by low, widely spaced shrubs such as creosotebush, sagebrush, brittlebush, and cholla, with scattered occurrences of yucca on flat terrain. Most of the foothills and mountainous areas are vegetated along their slopes with scattered creosote-bursage and other desertscrub, which become smaller and scarcer with elevation.

There are several built features within the visual resource analysis area. On the east side of I-15 where the solar Projects and portions of the gen-ties would be located, there is the Moapa Paiute Travel Plaza, the under-construction Gemini Solar Project, and the Valley of Fire Highway. On the west side of I-15 where portions of the gen-tie would be located the built features include two solar projects and another under construction, the Crystal Substation, several large transmission lines with varying sizes and types of structures (mostly within the designated utility corridor), and a railroad. The natural landscape setting has been heavily modified by these exiting projects and utilities. The Crystal and Harry Allen substations and the Harry Allen Power Plant where the gen-ties would connect are also visible from I-15 at locations south of the Project area.

The proposed Chuckwalla solar fields are located in the southeastern corner of the Reservation and east of I-15. The existing landscape character and condition of the lease option areas for the Chuckwalla Projects is relatively uniform with northwest sloping gentle grades and common vegetation communities and patterns.

As confirmed in the previous EISs for the other solar projects on the Reservation, the overall scenic quality of the area is low due to the lack of variety and distinctiveness of the landforms and vegetation when compared to the region in which it occurs (BIA 2012: pages 3-80 through 3-83, BIA 2014a: Pages 3-62 through 3-65; BIA 2016: Pages 3-66 through 3-68, BIA 2019a: page 3-61 to 3-62, BIA 2021: Page 3-32). The landforms are relatively flat and while the local mountain ranges add visual interest, there is little variety and contrast in the local vegetation and the landscape color variations are subtle. In addition, the manmade modifications detract from the natural visual character.

The small portion of the gen-tie on BLM-administered land is adjacent to the Crystal Substation and the multiple high voltage transmission lines that run through the area. The BLM RMP indicates that these BLM lands are designated as VRM Class IV because of the high level of modification to the landscape in this area. This classification allows major modifications of the existing character of the landscape. Likewise, while not formally classified because it is located on the Reservation, the lands within the BLM-managed designated utility corridor would also be considered to be VRM Class IV. This is consistent with how BLM manages utility corridors on federal land.

A viewshed analysis was conducted by overlaying the proposed Chuckwalla Projects on a Digital Elevation Model (DEM) of local terrain. A height of 20 feet above site grade was used for the solar site to determine the areas from which the solar facility (PV solar modules and associated facilities) could be visible within 10 miles of the solar fields. Transmission structures 150 feet tall were also evaluated in the visibility analysis to identify the areas within five miles from which the proposed gen-ties could potentially be seen. The locations of travel routes and historic trails (for example, I-15 and the Old Spanish National Historic Trail) were also overlain on this map. **Figure 3-3** shows the areas from which the solar facilities and gen-tie lines could potentially be visible.

As shown on **Figure 3-3**, the proposed Projects and gen-ties could be seen from surrounding areas primarily north, west and south of the Projects area. These include locations on I-15, Valley of Fire Highway, and the Old Spanish National Historic Trail (OSNHT)which is less than one mile west of the proposed solar sites at its closest point. As **Figure 3-3** shows, the Project would not be visible from the Valley of Fire State Park and NNL because of the intervening topography of the Muddy Mountains. There are no residences or other high use areas / sensitive viewpoints in the immediate area.

3.8.1.1 Key Observation Points

Key Observation Points (KOPs) represent a critical or typical viewpoint at or near an identified location. They are used to provide representative views from locations where the Projects could be visible by people to evaluate visual impacts of a proposed action. I-15 is the location from which the proposed Chuckwalla Projects could be potentially seen by the most people. Also, the Projects could be seen by travelers on the Valley of Fire Highway, from the Moapa Paiute Travel Plaza, and from portions of the OSNHT near the Projects.

KOP locations were selected through consultation with the BIA and cooperating agencies and represent views from locations where the Chuckwalla Projects could be seen as identified by the visibility analysis. Linear viewpoints were selected along I-15, the Valley of Fire Highway, and the OSNHT to provide views representative of many locations around the Project. As shown on **Figure 3-3**, the linear platforms from which the Project could potentially be seen include approximately 11 miles of I-15, about 10.5 miles of Valley of Fire Highway, and about 18 miles of the OSNHT. A stationary viewpoint at the Moapa Paiute Travel Plaza was also selected. **Figure 3-3** shows the KOP locations that were selected, and they are described below:

- KOP 1 – This location is where I-15 and the OSNHT intersect northwest of the site from which the solar fields could be seen. This view looks southeast and is located approximately one mile northwest of the Chuckwalla Projects. The existing view is dominated by the horizontal lines and colors associated with I-15 in the foreground. From this KOP, the middleground contains vegetation is creosote/scrub desert displaying colors of browns, tans, and yellows and the foothills of the Muddy Mountains are in the distance. **Figure 3-4a** shows the existing view from this location.
- KOP 2 – This view looks south and is on southbound I-15 just north of the location where the gen-tie lines would cross the highway. The existing view is dominated by the horizontal lines and colors associated with I-15 in the foreground and middleground. From this KOP, the middleground contains the highway and road signs and the Moapa Paiute Travel Plaza. The Muddy Mountains are in the background. **Figure 3-5a** shows the existing view from this location.
- KOP 3 – This view is looking north on northbound I-15 just north of the I-15 / Valley of Fire interchange and south of the location where the gen-tie lines would cross the highway. The existing view is dominated by the horizontal lines and colors associated with I-15 in the foreground and middleground. From this KOP, the middleground also contains typical desert vegetation displaying colors of browns, tans, and yellows. The foothills of the Muddy Mountains are in the background. **Figure 3-6a** shows the existing view from this location.
- KOP 4 – The view from this KOP looking east from the eastern side of the Moapa Paiute Travel Plaza and is representative of what customers of the travel plaza could see. It is located about 2.5 miles west of the solar projects. The existing view is dominated by the cleared / disturbed area adjacent to the travel center in the foreground. From this KOP, the middleground contains

a relatively thin horizontal line of vegetation with brown, tan, and green colors. The foothills of the Muddy Mountains are in the distance. **Figure 3-7a** shows the existing view from this location.

- KOP 5 – This KOP on northbound I-15 south of the I-15 / Valley of Fire interchange from which the solar facilities could potentially be seen. This view is looking to the east-northeast and is located about 3.6 miles east of the solar site. The left side of the existing view is dominated by the horizontal lines and colors associated with I-15 in the foreground and middleground. On the right side of the view from this KOP, the foreground and middleground contains limited vegetation displaying colors of tans and yellows with some browns and greens. The foothills of the Muddy Mountains are in the background. **Figure 3-8a** shows the existing view from this location.
- KOP 6 – This point is located on the Valley of Fire Highway at a point near the southern border of the Reservation where the site access road intersects with the highway. This view is looking east about 2.25 miles west of the southern part of the solar projects. It is representative of the view of southeast-bound travelers on Valley of Fire Highway. The existing view is dominated by the lines and colors associated with existing access road in the foreground and middleground on the right side. The middleground on the left contains desert vegetation is creosote/scrub desert displaying colors of browns, tans, and greens. The foothills of the Muddy Mountains are in the background. **Figure 3-9a** shows the existing view from this location.
- KOP 7 – The view from this point is looking northeast from the congressionally-designated location of the OSNHT where it intersects with the site access road about 1.5 miles west of the solar sites. The existing view is dominated by the horizontal lines and colors of the access road in the foreground. From this KOP, the foreground on the left side and the middleground contains typical desert vegetation showing browns, tans, and greens. The foothills of the Muddy Mountains are in the background. **Figure 3-10a** shows the existing view from this location.
- KOP 8 – This point is about 0.25 mile west of the proposed Projects site and is representative of the views toward the solar project from the designated OSNHT where it is closest to the solar Projects site. The existing view is dominated by previous disturbance in the foreground and creosote/scrub desert vegetation in the foreground and middleground displaying colors of browns, tans, and yellows and the foothills of the Muddy Mountains are in the distance. **Figure 3-11a** shows the existing view from this location.
- KOP 9 – This point is on the Valley of Fire Highway where it crosses the OSNHT about 2.25 miles southwest of the solar Projects. This existing view is representative of the view of travelers on the highway and from the OSNHT looking northeast. It is dominated by the horizontal lines and colors associated with Valley of Fire Highway in the foreground. Part of the foreground and middleground contain vegetation exhibiting browns, tans, greens, and yellows. The foothills of the Muddy Mountains are in the background. **Figure 3-12a** shows the existing view from this location.
- KOP 10 - This is looking north from the Valley of Fire Highway about three miles south of the solar Projects. It provides a view that is representative of what northwest-bound travelers on the highway would see as they emerge from the Muddy Mountain topography and first able to see the solar Projects. The view is dominated by the horizontal lines and colors associated with the highway in the foreground. Part of the foreground and middleground contain exposed soil and sparse vegetation exhibiting tans, greens, and yellows. The foothills of the Arrow Mountains are in the distant background. **Figure 3-13a** shows the existing view from this location.

3.8.2 Environmental Consequences

This assessment considered the regional visual character of the Project area, visual features of the proposed Chuckwalla Projects, representative views of the project from KOPs, and change in landscape character that would result from proposed Project implementation.

3.8.2.1 Proposed Action

The proposed Chuckwalla Projects are located on relatively flat terrain below the foothills of the Muddy Mountains. There are many locations from the linear viewpoint on I-15, Valley of Fire Highway, and OSNHT from which the Projects would be visible. The dominant man-made Project features that would be visible would be the solar fields and the gen-tie lines.

Within the viewshed from I-15, Valley of Fire Highway, or the OSNHT there are other existing built elements that are similar in form, line, color, texture, and scale to the proposed Chuckwalla Projects. In addition to the highways themselves, on the east side of I-15 these include the under-construction Gemini Solar Project and the west side of I-15 these include two existing solar projects and one under construction, the multiple transmission lines primarily within the designated utility corrido, the existing Crystal Substation on the south end, and the railroad.

Short-term visual impacts would occur during construction from the exposure of lighter colored soils from site clearing, generation of fugitive dust, movement of equipment and vehicles, stockpiling of materials, and the introduction of the lines, forms, and colors of the solar field components. These short-term impacts may last up to 20 months during each of the three construction phases (1a/1b, 2, 3).

Long-term, the presence of the Projects would change the existing landscape character and visual quality of the area. The Proposed Action would introduce solar field elements (rows of PV solar panels, inverters, and other equipment) not currently present within the area, although these elements are present nearby. The proposed Projects would be visually prominent within the foreground and middleground zones of most views of the Project. These introduced features and rectangular / linear forms would contrast with existing landscape patterns and reduce the overall scenic quality.

The proposed gen-tie lines would also be readily visible particularly at and near where they cross I-15. They would also introduce linear forms and colors that contrast with the existing landscape. West of I-15 where the lines would be located in the designated utility corridor, they would be consistent with the existing lines there and would not attract the attention of the casual observer.

As shown on **Figure 3-3**, the Chuckwalla solar facilities would be visible from I-15 from areas north, south, and west of the Projects. The gen-tie lines would also be visible from I-15 near where they cross the highway. The Projects would be visible from Valley of Fire Highway between its intersection with I-15 and where it enters the foothills of the Muddy Mountains. Views of the Projects from both highways would be limited and would vary by the lane / direction the vehicle is traveling in and the local topography and vegetation along the roadway.

Ten KOPs were identified in the Project area in consultation with the involved agencies. KOPs 1, 2, 3 and 5 are located on I-15 and representative of the views from I-15 in the vicinity of the Projects. KOP 4 is representative of the view from the Moapa Paiute Travel Plaza. KOPs 5, 6, 9, and 10 are representative

of the views from the Valley of Fire Road. KOPs 1, 7, 8, and 9 are representative of views from segments of the Congressionally designated location of the OSNHT.

A visual simulation was prepared for each KOP to depict the view of the Chuckwalla Projects from each location. **Figures 3-4b** through **3-13b** show the existing views and the visual simulations of the Proposed Action from KOPs 1 through 10.

Effects on Views from I-15

The Chuckwalla solar fields would be visible in the foreground and middleground of the views of travelers on I-15. Southbound motorists on I-15 would have peripheral views of the Proposed Action from the freeway for approximately 44 percent of the miles where the Projects could be visible (4.8 of the approximately 11 miles). This would equate to approximately six minutes when driving at 75 miles per hour (mph). Northbound motorists on I-15 would have peripheral views of the Proposed Action for approximately 65 percent of the time (7.1 of the 11 miles) or for approximately nine minutes when driving at 75 mph. Traveling in both directions, the views of the Proposed Action would be partially intermittent/obstructed due to intervening landforms and vegetation. **Figure 3-4b** shows a simulation from southbound I-15 (KOP 1) at a location about 1.0 mile from the Projects and **Figure 3-8b** shows a simulation of the Projects from northbound I-15 (KOP 5) approximately 3.6 miles from the Projects.

The proposed gen-tie lines would also be readily visible in the head-on views of both northbound and southbound motorists as they approach the location where the lines cross the highway. **Figure 3-5b** shows a simulation from southbound I-15 (KOP 2) at a location about 0.25 mile from the gen-tie crossing and **Figure 3-6b** shows a simulation of the Projects from northbound I-15 (KOP 3) approximately 0.2 mile from the gen-tie lines.

Effects on Views from Valley of Fire Road

The Chuckwalla solar fields would be visible in the middleground of the views of both eastbound and westbound travelers on Valley of Fire Road. Eastbound motorists on Valley of Fire Highway would have peripheral views of the Proposed Action for approximately 53 percent of the miles where the Projects could be visible (5.5 of the approximately 10.5 miles). This would equate to approximately 3 minutes when driving at 35 mph. Westbound motorists on the highway would have peripheral views of the Proposed Action for approximately 61 percent of the time (6.4 of the 10.5 miles) or for approximately 4 minutes when driving at 35 mph. The proposed gen-tie lines would only be readily visible from Valley of Fire Highway to westbound travelers as they approach the travel plaza. While visible from locations farther east, the lines would not be discernable to the casual viewer because of distances from which they would be viewed.

Figure 3-9b shows a simulation from eastbound Valley of Fire Highway (KOP 6) at a location about 2.25 miles west of the Projects where the highway and proposed access road intersect. The Projects would be readily visible in peripheral views from this location. **Figure 3-12b** shows a simulation of the view of an eastbound traveler from where the highway crosses the OSNHT about 2.25 miles southwest of the solar Projects (KOP 9). The Projects would be visible as a thin band at the base of the distant foothills and may not be easily discernable to the casual viewer. **Figure 3-13b** shows a simulation of the Projects from northwest-bound Valley of Fire Highway (KOP 10) approximately 3.0 miles south of the Projects

where motorists leave the foothills. Here the Projects would also be visible only as a thin band on the horizon and may not be easily discernable to the casual viewer.

Effects on Views from the OSNHT

The Chuckwalla solar fields would be visible in the foreground and middleground of the views of from the OSNHT. Northbound visitors on the trail would have peripheral views of the Proposed Action for approximately 74 percent of the miles where the Projects could be visible from the OSNHT (13.3 of the approximately 18 miles). Southbound visitors on the trail would have peripheral views of the Proposed Action for approximately 42 percent of the time (7.5 of the 18 miles). Two of the previously discussed representative views are from locations where the congressionally-designated trail location crosses the local highways – I-15 at KOP 1 (**Figure 3-4b**) about one mile northwest of the Projects and Valley of Fire Highway at KOP 9 (**Figure 3-12b**) about 2.25 miles south of the Projects.

Two additional simulations were developed from the OSNHT near the Projects. **Figure 3-10b** shows a simulation from where the OSNHT crosses the proposed site access road (KOP 7) at a location about 1.5 miles west of the Projects. The Projects would be readily visible in peripheral views of hikers from this location. **Figure 3-11b** shows a simulation of a representative view of the Projects seen by a visitor on the OSNHT where the OSNHT is closest to the Projects - about 0.25 miles west (KOP 8). The Projects would be readily visible at both these locations.

Effects on Views from Moapa Paiute Travel Plaza

The Chuckwalla solar fields would be visible in the middleground of the views to the east of customers of the travel plaza. **Figure 3-7b** shows a simulation of an unobstructed view of the Proposed Action from the eastern edge of the plaza (KOP 4). Most customers would be focused at the central and western part of the plaza where the fuel pumps and store are located. Therefore, most customer views of the solar Projects would be obstructed by vehicles and the fuel pump infrastructure. Those who have views of the Projects would notice the landscape alterations because of the contrast created by the proposed solar fields in terms of scale, color, line, texture, and form. The gen-ties would be visible from the northern side of the travel plaza but this area is not generally used by customers.

Light and Glare

Light. The proposed Chuckwalla Projects solar fields are located on the Reservation. There is currently no source of light or glare within the Project footprint. Lighting could be used during construction if needed. During operations, sources of light would be located on the solar site primarily at the O&M building or substation area. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward-facing and shielded to focus illumination on the desired areas only. Therefore, the proposed Chuckwalla Projects are not anticipated to create a new source of substantial light which would adversely affect nighttime views in the area and would not impact users of the nearby areas (e.g., campers, stargazers, and recreational users of the desert).

Glare. PV modules are designed to absorb as much light as possible to maximize efficiency. In addition, PV modules generally use anti-reflective coatings to decrease reflection and increase conversion efficiency. The time and duration of any potential reflections from the panels are determined by the

orientation of the panels and the position of the observer in relation to those panels. PV solar projects use single-axis tracking mounting structures to rotate the panels throughout the day to keep the panels perpendicular to the sun to maximize solar absorption and energy output. This consistent orientation of the panels towards the sun results in the majority of incoming light being reflected back into the sky.

The amount of light reflected upwards would not be expected to potentially affect training conducted at Nellis Air Force Base (NAFB) or any other air traffic in the area. Two factors are relevant to the intensity of reflected light – the amount reflected and the distance from the source. Only two to 10 percent of ambient light is reflected by PV solar panels (Newton, 2007) and the index of refraction for the glass that covers most panels is generally the same as the windshield of a car since it is made of the same material. Therefore, the intensity of the reflected light would be low. Also, light intensity decreases with distance from the source so the intensity of light reflected from the PV solar panels at locations any distance from the source would be a small fraction of its original intensity. In addition, any viewers who could see the reflected light would also be exposed to significantly brighter ambient light.

The proposed Chuckwalla Projects would not use materials that have the potential to create on-and off-site glare. Therefore, future development of the project site is not anticipated to create a significant new source of glare that would adversely affect daytime views in the area or affect local aviation / training.

In the long-term, the Proposed Action would result in local, moderate, adverse impacts to visual resources in the area.

Collectively, several solar projects and associated infrastructure have been and are planned to be foreseeably developed within the regional viewshed where the Chuckwalla Projects are proposed. As described in the introduction of Chapter 3, several solar projects have been approved and proposed on the Reservation and the nearby BLM-managed federal lands. These projects would all contribute to impacts to visual resources along I-15 in the Dry Lake and California Wash drainages within the Moapa Valley. The combined acreage of these two watersheds is approximately 300,000 acres. In the aggregate, the Proposed Action and these additional actions on the Reservation and nearby federal lands would generally result in a transformation of about 32,000 acres of the natural landscape to a more developed setting with addition of more solar arrays and associated gen-tie lines to the many solar projects and transmission lines that already exist in this area. The Proposed Action would have a minor to moderate contribution to the collective effects to visual resources because of the scale and strong contrast of the existing projects in place. Visual resource impacts created by the solar facilities would be largely reversible with decommissioning of the projects at the end of their useful life and restoration of the landscape.

Views from I-15, the primary viewing platform from which to see the projects in the Moapa Valley, would be changed for the long-term. It is anticipated that views of, from, and on the Reservation would also be changed substantially in the long-term. Collectively, these existing, approved, and foreseeable actions would result in moderate to major, long-term, adverse impacts to visual resources that would reduce scenic quality and notably transform the characteristic landscape.

3.8.2.2 No Action

Under this alternative, the Chuckwalla Projects would not be developed so there would be no additional impact to visual resources.

3.9 Water Resources

3.9.1 Affected Environment

The proposed Chuckwalla Solar Projects are in the northeastern portion of the Mojave Desert in the California Wash Groundwater Basin within the Colorado River watershed (NDWR 2019). The Arrow Valley Range lies to the north and the North Muddy Mountains lie to the east. The project lies east of the California Wash which flows north to the Muddy River. The elevation within the Project lease area ranges from about 1,900 to 2,200 feet above mean sea level (**Figure 3-1**).

3.9.1.1 Surface Water

The proposed Chuckwalla project area is located on relatively flat topography. The Projects area drains to the west via ephemeral waterways, to the California Wash located just outside the western site boundary. California Wash flows north into the Muddy River. The Muddy River, which drains to the Virgin River, is the only non-ephemeral (perennial) surface water within the project area and is located about eight miles north of the Project lease area. The drainages along the gen-tie routes are also within the California Wash watershed on the east side of I-15 and within the Dry Lake Valley watershed west of I-15 where water flows generally southwest to the Dry Lake playa. **Figure 3-14** shows the floodplains designated by the Federal Emergency Management Agency (FEMA) for the project area.

A preliminary hydrology study was conducted for the Chuckwalla Project area to determine flow paths and flow volumes onto and from the site (NV5 2021) and has been included as **Appendix N** of this EIS. Drainage sub-basins were delineated to determine peak flows at various points within the area.

Overall, the analysis shows low water depths and velocities across the majority of the site outside the concentrated channelized areas. During a 100-year, 6-hour storm, the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1.5 feet/second.

Surface Water Quality

The EPA regulates water quality on tribal lands under Section 401 of the Clean Water Act (CWA). Additionally, Section 303(d) of the CWA requires the Nevada Department of Environmental Protection (NDEP) to develop a list of impaired waterbodies needing additional work beyond existing controls to achieve or maintain water quality standards. The NDEP has furthermore set water quality standards contained in the Nevada Administrative Code (NAC) 445A defining the water quality goals for important water bodies by designating uses of the water and by setting criteria necessary to protect beneficial uses and prevent degradation. However, based on tribal sovereignty, state water quality standards are not applicable on Tribal lands.

There are no perennial waterbodies within the solar site and consequently no surface water quality data available. The ephemeral drainages leaving the solar project lease area are tributaries to California Wash which flows to the Muddy River, a perennial water. The Muddy River is fed by springs connected to the regional groundwater system. It is considered impaired and is on Nevada's 303(d) list for exceeding state water quality standards (NDEP 2014).

The entire flow of the Muddy River is derived from discharge from the regional carbonate aquifer except during infrequent precipitation events that increase river flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows (Mifflin 2001).

The river is managed via the Muddy River Recovery Implementation Program - a coordinated, multi-agency effort to protect the species and habitat of the Muddy River, while ensuring the responsible management of water resources in the Muddy River and Coyote Spring Valley (SNWA 2015).

3.9.1.2 Groundwater

The water proposed to be used by the Chuckwalla Projects during construction and operation would be provided by the Moapa Band from either an existing groundwater well located on the Reservation at the Moapa Paiute Travel Plaza in Section 31, T16S, R65E or a new well developed on the solar site. If a new well(s) is developed on site, it would be located within the shared facilities area.

The bedrock of the upland portions of the Project area is largely composed of Paleozoic carbonate rocks, ancient marine sediments that contain the minerals calcite and dolomite as their primary constituents. Fracture zones and associated solution cavities within these carbonate rocks provide highly transmissive aquifers where they are saturated and such transmissive zones can be continuous over large areas independent of surface topographic basins and ranges. Locally, alluvial gravel aquifers with a thickness of up to 100 feet occur beneath the narrow floodplains of the major local drainages such as California Wash.

Groundwater quality in the hydrologic basins of the Mojave Desert in California and Nevada is generally acceptable for most uses of groundwater. However, since many of the basin-fill aquifers have closed surface drainage and limited inter-basin flow, aquifers may contain poor quality, saline waters, elements from natural geothermal activity, and/or contaminants from mining or energy operations. Groundwater in the California Wash is generally high in salinity.

3.9.1.3 Water Rights

The water provided from the existing well or a new well(s) is part of a 2,500 AFY groundwater right issued to the Moapa Band by the State Engineer in 1989. These groundwater rights are described in the MSEC FEIS (BIA 2014, Section 3.5.3, page 3-14).

3.9.1.4 Jurisdictional Waters, Drainages, and Riparian Areas

There are no perennial waterbodies within the Project areas or along the gen-tie route. California Wash is located west and northwest of the Projects and is connected to the Muddy River, a perennial river that is connected downstream to a Traditionally Navigable Water (TNW). Of the eight primary ephemeral drainage systems identified within the solar lease area, six drain directly into California Wash and into the Muddy River north of the Projects (see **Figure 3-15**). The proposed gen-tie route crosses four ephemeral drainage systems and two eventually drain into the Muddy River, one is disconnected from the Muddy River, and one flows south to the Dry Lake playa and is the downstream extent of a wash that was evaluated for the Eagle Shadow Mountain Solar Project (ESMSP) which concluded that this ephemeral

wash is not jurisdictional based on lack of downstream connection to a TNW (AJD; SPK-2019-00147; USACE 2020a).

Aquatic resources within the Project area are comprised of dry land fluvial systems. Alluvial fans, bajadas, and alluvial plains within xeric desert environments exhibit a high degree of variability in the specific location of surface flows and often change pathways from storm to storm. The spatial extent of aquatic features (all ephemeral washes) was delineated in the field and using aerial imagery in accordance with US Army Corps of Engineers (USACE or Corps) guidance in published manuals and field guides to identify potentially jurisdictional waters of the United States (WOUS).

No TNWs, Relatively Permanent Waters (RPWs) or wetlands were identified within the Project area. The Muddy River, to which all project-area ephemeral drainages that are connected to California Wash flow, is the only RPW near the Project area. Most of the ephemeral drainages leaving the solar site and two within the gen-tie corridor could be considered jurisdictional by the Corps under the current Corps guidance (pre-2015). Other features, such as erosional gullies, swales, washes that are not connected to California Wash and washes that flow to the terminal playa, would not be regulated under the current Corps guidance. None of the ephemeral drainages would be regulated under the Navigable Waters Rule that was recently challenged in Arizona.

Drainage morphology in the ephemeral features ranges from 3-foot-wide single channels to features up to 85 feet wide (bank to bank). Several drainages lost identifiable flowpath organization as they went downslope and surface characteristics were consistent with sheet flow (continuous and well-developed upland vegetation and no definable bed and bank).

Limited xero-riparian habitats were associated with many of the ephemeral washes in the project area. Desert wash habitats are associated with the small washes that cross the various portions of the project area. These habitats typically resemble the creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) habitats that dominate the upland portions of the Project area but have a higher overall density of vegetation as well as a greater abundance of big galleta grass (*Pleuraphis rigida*). Other species may include buckwheat, Mojave yucca and catclaw (*Acacia greggi*).

3.9.2 Environmental Consequences

This section discusses effects on water resources/hydrology that could occur as a result of implementation of the proposed Chuckwalla Projects or alternatives.

3.9.2.1 Proposed Action

3.9.2.1.1 Surface Water

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, or otherwise changing the character of surface waters. There is very little precipitation within this part of the Mojave Desert, but suspended sediments could be high during significant storm events. The Applicant's SWPPP and emergency response plan (construction phase) and SPCC Plan (operation phase) would minimize impacts from these sources making potential impacts minor.

The Projects have been configured to avoid construction within the largest washes located on the solar sites and along the gen-ties. The drainage plan has been designed to allow all surface flows upstream of the site to flow to the ephemeral drainages downstream of the site. Overall drainage patterns on site would be maintained and this would help minimize the loss / disturbance of these drainages, would help maintain drainage functions, and would help reduce erosion and sedimentation impacts during and following construction. In addition, avoidance of grading larger drainages would result in reduced construction costs and improvement to the effectiveness of post-closure reclamation. Limited grading would take place within the solar sites, leaving most of the site naturally vegetated, reducing the potential for erosive runoff.

Preliminary hydrologic modeling conducted for the project (NV5 2021) is included in **Appendix N** and shows that during a 100-year storm, flood depths across most of the project area would be less than 0.5 feet with velocities less than 1.5 feet/second. By avoiding the development of areas of high flood depths and velocities, the proposed solar development on the site would minimize effects to local hydrology and flood flows as well as the corresponding erosion and sedimentation. In general, flow depths on the site after development of the Project would remain similar or less than pre-development conditions.

The Applicant would also incorporate construction-phase erosion and sediment control measures consistent with regional BMPs and Federal, state, and local regulations, including the Project's General Permit (issued by EPA) and SWPPP. These measures would control erosion and sediment transport during construction.

Construction activities causing ground disturbance, such as grading and "drive and crush", would disrupt the soil surface and dislodge biological crusts that bind soil together. Minimizing disturbance on the solar site to only those areas where necessary would reduce the surface area subject to increased erosion.

The Applicant would develop and implement erosion and sedimentation control measures to minimize water quality impacts during the life of the project. At a minimum, these controls would include:

- Soil stabilization measures to offset loss of vegetation;
- Biannual and post-storm monitoring of erosion and sedimentation; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water collection on or at the site.

The erosion and sediment control measures and SWPPP would be approved prior to the beginning of construction and the resulting potential impacts on surface waters are expected to be minor.

Decommissioning activities would result in water quality and hydrology impacts similar to but less than construction. Once decommissioning has occurred and vegetation has reestablished, erosion would naturally be controlled.

Gen-tie structures would not be expected to affect surface water flows as the pole locations would be located outside the larger drainages and foundations would be designed to withstand the anticipated low-velocity flooding during a 100-year storm event at these locations. This conclusion is supported by the presence of existing transmission lines in this area. With proper implementation of these design

elements, including adaptive management of practices, effects related to flooding would be reduced to negligible levels.

3.9.2.1.2 Groundwater

Each of the three phases of the Chuckwalla Projects (1a and 1 b together, 2, and 3) would require up to 100 to 300 acre-feet (AF) for the 20-month construction period and up to approximately 30 acre-feet per year (AFY) for O&M activities (90 AFY total). Water is needed primarily for dust suppression and soil compaction during construction. During operation, water would only be needed for panel washing, fire protection, dust control, and worker consumptive uses. For construction and operation, water would be supplied by the Moapa Band from their existing well located at the Moapa Paiute Travel Plaza or a new well that would be developed within the shared facilities area on the solar site.

The potential impacts of groundwater withdrawal from the California Wash hydrographic basin were evaluated in an earlier study on the potential extraction of up to 7,000 AFY of groundwater (Mifflin 2001). This analysis evaluated three different scenarios and concluded that only under the least probable scenario would the proposed 7,000 AFY withdrawal result in observable changes to the Muddy River Springs Area hydrology, and those would only occur during prolonged drought periods.

Under both options for the Moapa Band to provide water to the Chuckwalla Projects (from an existing well or new well on site,) the wells are also located in the California Wash basin. The proposed long-term use of 90 AFY total proposed for the Chuckwalla Projects would not be expected to impact local water levels or flows at the Muddy River Springs area.

Groundwater is located around well below ground surface so any hazardous materials or waste produced by the Projects would not be expected to affect groundwater quality. In addition, a Hazardous Materials and Waste Management Plan and SPCC Plan would be prepared for each Project to protect the environment from spills during operation. Adequately sized secondary spill containment would be incorporated with all chemical storage vessels to ensure proper capture and control measures for potential spills. An Emergency Response Plan would also be developed to respond to any emergencies including leaks and spills during construction. Successful implementation of these measures would minimize the potential for a spill and minimize the impact of any spills that occur. This, in combination with the depth to groundwater, makes it unlikely that any surface spill would infiltrate the groundwater so the potential for impacts is low.

3.9.2.1.3 Water Rights

The relatively low amount of groundwater water used during construction (between 100 and 300 acre-feet per year (AFY) for each phase) and the short duration of use for construction (up to 20 months for each phase) would not be expected to impact groundwater uses. The use of up to 30 AFY during operations for of each phase (90 AFY total) would also not be expected to impact local water levels or flows. Additionally, the 90 AFY would not cause the Moapa Band to exceed their currently issued 2,500 AFY groundwater right. The Projects' proposed use of tribal groundwater would not have a negative impact on Band's water rights. The use of this water would help demonstrate their legitimate need for these water rights against any adverse claims by others in the future.

It is acknowledged that there is some uncertainty regarding the quantity of groundwater that can be sustainably pumped and the associated water rights based on the Nevada State Engineer's findings on the Lower White River Flow System (LWRFS) discussed in Order #1309 issued on June 15, 2020. Future decisions issued by the Nevada State Engineer could address these issues.

3.9.2.1.4 Jurisdictional Waters, Drainages, and Riparian Areas

As described above, most of the ephemeral washes in the Project area are potentially jurisdictional WOUS under the current guidance. **Figure 3-15** shows the potentially jurisdictional waters identified on the site. The conceptual site plan currently avoids all the major washes and most of the smaller washes. Minor grading may occur in the smaller washes, piles may be driven into them, and access roads and collector lines would cross them.

It is expected that the USACE would also assert jurisdiction over some of the ephemeral drainages located along the gen-tie route. Jurisdictional WOUS crossed by the gen-tie would be impacted primarily from upgrading existing roads or the establishment of new access roads to provide the needed access along the ROW. Pole locations for the gen-tie would be located outside defined drainage channels and the drainages would be spanned by the line.

The amount of WOUS that would be impacted by the solar arrays and associated components would be relatively minor. Preliminary estimates indicate approximately 4.6 acres of WOUS would be impacted by all four Projects (impacts for each Project vary from 0.4 to 2.1 acres). Detailed field mapping would occur prior to construction to determine the exact extent of WOUS and would be coupled with the final design to determine the impact acreages and type(s) of permit that would be required for each Project. The required applications would be submitted at that time. Impacts resulting in the loss of 0.5 acre or less would be covered by Nationwide Permits (NWP) 51 (renewable energy projects), NWP 14 (road crossings), or a combination of both. NWP 51 authorizes the loss of up to 0.5 acre. Under NWP 14, each separate distinct road crossing of a waterbody is treated as a separate and complete project and limits impacts to jurisdictional waters to 0.5 acre for each crossing. The roads associated with each crossing would impact less jurisdictional WOUS than the 0.5-acre limit for NWP 14. If impacts to jurisdictional WOUS are greater than 0.5 acre, the Project(s) would obtain an Individual Permit (IP). Section 404 permits (individual and some NWPs) would require Section 401 certifications. The EPA would administer this for activities on tribal lands.

The amount of WOUS that would be impacted by the gen-tie (gen-tie road crossings) would be minor. These impacts would be covered by NWP 57 (utility line activities). Under this NWP, each separate distinct crossing of a waterbody by a utility line is treated as a separate and complete project and NWP 57 limits impacts to jurisdictional waters to 0.5 acre for each crossing. The roads associated with each crossing would impact less jurisdictional WOUS than the 0.5-acre limit for NWP 57. Authorizations under NWP 57 will require individual Section 401 certification which would be administered by the EPA for activities on tribal lands.

Adverse impacts to surface water resources including potential jurisdictional WOUS resulting from the Proposed Project would be minor and short-term. Major drainages would be avoided by the layout of the solar project and gen-tie route. Erosion and sedimentation would be expected to increase during construction but would be mitigated by the application of stormwater controls and other BMPs. Impacts to groundwater would be negligible.

Collectively, surface waters on the Chuckwalla Projects site and on the other solar project sites in the area on the Reservation and nearby BLM-managed lands (as identified in the introduction to Chapter 3) are ephemeral drainages that flow only in response to precipitation events. Some project areas on the southwestern part and south of the Reservation are within a disconnected closed drainage basin (the Dry Lake Playa). The Chuckwalla Projects and other projects to the west and north flow into California Wash and other larger ephemeral washes that in some cases connect to perennial streams. The combined acreage of the two watersheds is approximately 300,000 acres and the proposed Projects plus the other identified approved and proposed projects together would impact about 32,000 acres within these watersheds. The collective acreage affected by the identified projects would represent about 11 percent of the two watersheds. The Chuckwalla Projects and other existing / foreseeable projects have been designed to avoid construction within floodplains and large washes and to allow all surface flows upstream of the sites to continue flowing to the ephemeral drainages downstream of the sites. Therefore, no collective change in flow volumes would be expected.

Construction of Chuckwalla Projects and the other identified approved and foreseeable projects would contribute to short-term localized increases in sediment production during storm events. These would be mitigated by the implementation of BMPs incorporated into the stormwater management plans that would be required for each project.

Groundwater in the area is produced from an extensive carbonate aquifer including the Band's well that would provide the water supply for the Chuckwalla Projects. Many of the projects on the Reservation and surrounding federal lands would utilize groundwater with most use occurring during construction when each project or phase could use up to 300 AF of water over about two years (or approximately 150 AFY). The construction water consumption for each project would be temporary but together could contribute to declining groundwater in the region. The timing of the construction of the various projects may or may not overlap for periods but most construction water use would be expected to occur sequentially as the various projects are ready for construction. Long-term operational use for each project is expected to use about 20 to 40 AFY of water. Together, the existing and proposed projects on the Reservation would use up to 250 AFY or about 10 percent of the Band's 2,500 AFY of groundwater rights.

Previous testing of the wells and modeling has been conducted of groundwater withdrawals significantly greater than those collectively proposed in the area and on the Reservation. The modeling effort for the MSEC Project included withdrawals of up to 800 AFY on the Reservation and provided clear evidence that the groundwater use proposed for the Projects and other foreseeable solar projects would not result in observable changes to groundwater levels or flows (BIA 2014).

3.9.2.2 No Action

Under the No Action Alternative, the proposed Chuckwalla Projects would not be constructed so there would be no corresponding effects on water resources.

3.10 Unavoidable Adverse Impacts

The following section describes the unavoidable adverse impacts that would occur as a result of the construction, O&M, and decommissioning activities associated with the Chuckwalla Projects. This

section also includes a discussion of the irreversible and irretrievable commitments of resources associated with the Project.

The primary drainages on the solar site would not be affected but smaller drainages on the site and along the gen-tie line would be affected and erosion and sediment flow could be increased temporarily during and after construction. While these impacts would occur, due to the implementation of BMPs, the unavoidable adverse risk of flooding and sediment production would be negligible. The Chuckwalla Projects would also withdraw water for construction and O&M from an existing well or new well on the Reservation.

Contamination of surface water could occur from spills associated with the Projects but implementation of BMPs outlined in the Spill Response and Emergency Response Plan would make the unavoidable adverse impact negligible.

The loss of 374 acres of habitat by implementing the Projects would result in an unavoidable adverse impact to vegetation and wildlife habitat for the life of the project. The loss of this amount of native vegetation would not be expected to cause an irreversible and irretrievable commitment of the resource on a regional basis.

Localized and long-term, unavoidable, adverse impacts on wildlife, including special status species, would occur. Unavoidable impacts to desert tortoise would occur and would be mitigated by the terms of the take permit that would be issued for each Project.

Construction of the Chuckwalla Projects would not affect properties eligible for listing on the NRHP. All nine identified sites would be avoided. In the event that ground disturbance causes the inadvertent discovery of previously unidentified subsurface cultural resources, these would be managed based on guidance from the appropriate agency and the Moapa Band. Therefore, no irreversible impacts or irretrievable impacts to cultural resources are anticipated.

Each of the three phases of the Project is expected to create an average of 350 and up to 450 construction jobs for a period of up to 20 months. After the Projects are commissioned, up to 12 full time-equivalent positions would be required to operate and maintain the facilities and provide plant security. This employment would have a beneficial impact on the local economy. The Project would provide long-term lease and ROW revenues to the Moapa Band and increase local spending which would also be beneficial. Therefore, there would be no unavoidable adverse impacts or irreversible and irretrievable commitments of the economic resources.

As discussed above, it is anticipated that the Projects would have a positive effect on the local population including members of the Moapa Band by creating both temporary and long-term jobs and revenues. No unavoidable adverse impacts or irreversible and irretrievable commitments of resources are expected.

The Projects would limit future use of approximately 6,500 acres of the Reservation for other uses for their life. This would not irreversibly and irretrievably commit the land resource as the use could change after Project decommissioning.

The Projects would be visible from I-15, Valley of Fire Highway, and the Old Spanish National Historic Trail. Construction of the Projects would cause unavoidable, short-term and long-term, adverse impacts on visual resources by adding additional man-made features to the viewshed. However, this impact would not be irreversible or irretrievable commitment of visual resources as these features would be removed during Project decommissioning.

3.11 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment

Construction, operation, and maintenance of the Chuckwalla Projects would result in the loss of resources over the life of the Project. Impacts to water, biological, and visual resources would occur. While there would be irreversible and irretrievable commitments of some resources, as noted above, there would be no permanent loss of the overall productivity of the environment due to the proposed Chuckwalla Projects.

CHAPTER 4
List of Preparers and Consultation/Coordination

4.1 List of Preparers and Reviewers

Below is a list of the individuals who contributed to the development of this EIS.

Name	Title / Responsibility
Bureau of Indian Affairs, Western Regional Office	
Chip Lewis	BIA Project Lead / Regional Environmental Protection Officer
Garry J. Cantley	Regional Archeologist
Tamera Dawes	Realty Specialist
Christina Varela	Realty Specialist
BIA Southern Paiute Agency	
Clarence Begay	Acting Agency Superintendent
Department of the Interior, Office of the Solicitor	
Christopher Ruedas	DOI Solicitor
Moapa Band of Paiutes	
Laura Parry	Chairwoman
Terry Bohl	Director of Business Enterprises
BLM Las Vegas Office	
Beth Ransel	Renewable Energy
Vivian Browning	Realty Specialist
Matt Klein	Planning and Environmental Coordinator
US Environmental Protection Agency	
Karen Vitulano	Environmental Review
US Fish and Wildlife Service	
Glen Knowles	Field Supervisor
Kelly Douglas	Threatened and Endangered Species
Roy Averill-Murray	Desert Tortoise Recovery Coordinator

Name	Responsibility
ENValue, EIS Consultant	
Randy Schroeder	Project Manager
Patrick Golden	APM, Biological Assessment
Scott Albrecht	Biological Resources
Will Van Vleet	Physical Resources, Biology
Mark Button	Visual Simulations
Emily Critchfield	Socioeconomics, Land Use
Jeud Perez	Biological Resources
Rachel Clark	GIS Mapping
AJ Thompson, Knight & Leavitt	Cultural Resources
OTHERS	
Patricia McCabe, Logan Simpson	Consultant to BIA – Environmental Planning
Diane Simpson-Colebank, Logan Simpson	Consultant to BIA – Environmental Planning
Lisa Young, Logan Simpson	Consultant to BIA –Biology
Mary Barger	Consultant to BIA – Cultural Resources

4.2 Consultation and Coordination

The BIA informed the public, landowners, Government agencies, tribes and interested stakeholders about the proposed Project and solicited their comments.

2.4 4.2.1 Public Scoping

The NOI to prepare an EIS was published in the Federal Register on April 23, 2021 and a correction to the NOI was published on April 29, 2021 correcting the comment deadline (May 24, 2021).. Federal, state, and local agencies that could be interested or may be affected by the Proposed Project were contacted to request their participation.

In addition, over 70 scoping letters were sent by the BIA to other various non-governmental organizations and other interested stakeholders. The scoping letter briefly explained the project (including maps), outlined the federal review process, announced the public scoping meetings, and described the various ways to provide comments. A project website: https://www.ChuckwallaSolarProjectsEIS.com/ was also available to the public and provided project information as well as an online comment form.

A legal notice/public notice announcing the public scoping meetings was published in two local newspapers on May 5, 9, and 12, 2021. The BIA hosted two virtual public information and scoping meetings on May 18 and 19, 2021.

Details about the public scoping process and the input received can be found in the Scoping Report included in **Appendix B** of this EIS.

2.5 4.2.2 Consultation with Others

In addition to the outreach to public stakeholders, the following federal, state, and local agencies were provided an opportunity to consult during preparation of the Draft EIS:

- Moapa Band of Paiute Indians (cooperating agency)
- Bureau of Land Management (cooperating agency)
- U.S. Fish and Wildlife Service (cooperating agency)
- US Environmental Protection Agency, Region 9 (cooperating agency)
- Nellis Air Force Base
- Nevada Department of Wildlife
- National Park Service
- Nevada Department of Conservation and Natural Resources
- Nevada Department of Air Quality and Environmental Management
- Nevada Division of Environmental Protection
- Nevada State Historic Preservation Office
- Nevada Department of Transportation
- Nevada Natural Heritage Program
- Conservation District of Southern Nevada
- Nevada Energy
- Natural Resources Conservation Service (Mojave Special Projects Office)
- Nevada Department of Transportation
- U.S. Army Corps of Engineers
- Federal Aviation Administration
- Clark County
- Clark County Flood Control District
- Clark County Department of Air Quality
- City of Mesquite
- Southern Nevada Water Authority
- The Honorable Jack Rosen, US Senate
- The Honorable Catherine Masto, US Senate
- The Honorable Dina Titus, US House of Representatives
- The Honorable Mark Amodei, US House of Representatives
- The Honorable Steve Horsford, US House of Representatives
- The Honorable Susie Lee, US House of Representatives

2.6 4.2.3 Non-Governmental Organizations

The following non-governmental organizations (NGOs) were provided an opportunity to comment during preparation of the EIS:

- The Nature Conservancy
- Lahontan Audubon Society
- Red Rock Audubon Society
- Desert Tortoise Council
- Friends of Nevada Wilderness
- Nevada Wilderness Project
- Sierra Club
- Center for Biological Diversity
- Sierra Nevada Alliance
- Nevada Clean Energy Campaign
- Center for Energy Efficiency and Renewable Technologies
- Desert Tortoise Council
- Great Basin Resource Watch
- Nevada Wildlife Federation
- Nevada Natural Resource Education Council
- Natural Resources Defense Council
- Nevada Conservation League
- Western Resource Advocates
- Environmental Defense Fund
- Conservation District of Southern Nevada
- Sierra Nevada Alliance
- Friends of Gold Butte
- Union Pacific Railroad Company
- Kern River Pipeline
- Old Spanish Trail Association

NGOs, private citizens and state and federal agencies provided comments during the public scoping period. See **Appendix B** for details on the comments received during scoping.

2.7 4.2.4 Native American Tribes

Under consultation provisions of the NHPA, BIA approached the following Tribes asked if they attached religious or cultural significance to any historic properties in the APE:

- Las Vegas Paiute Tribe
- Kaibab Band of Paiute Indians
- Hualapai Indian Tribe
- Fort Mojave Indian Tribe
- Hopi Tribe
- Colorado River Indian Tribes
- Chemehuevi Indian Tribe
- Paiute Indian Tribe of Utah

CHAPTER 5
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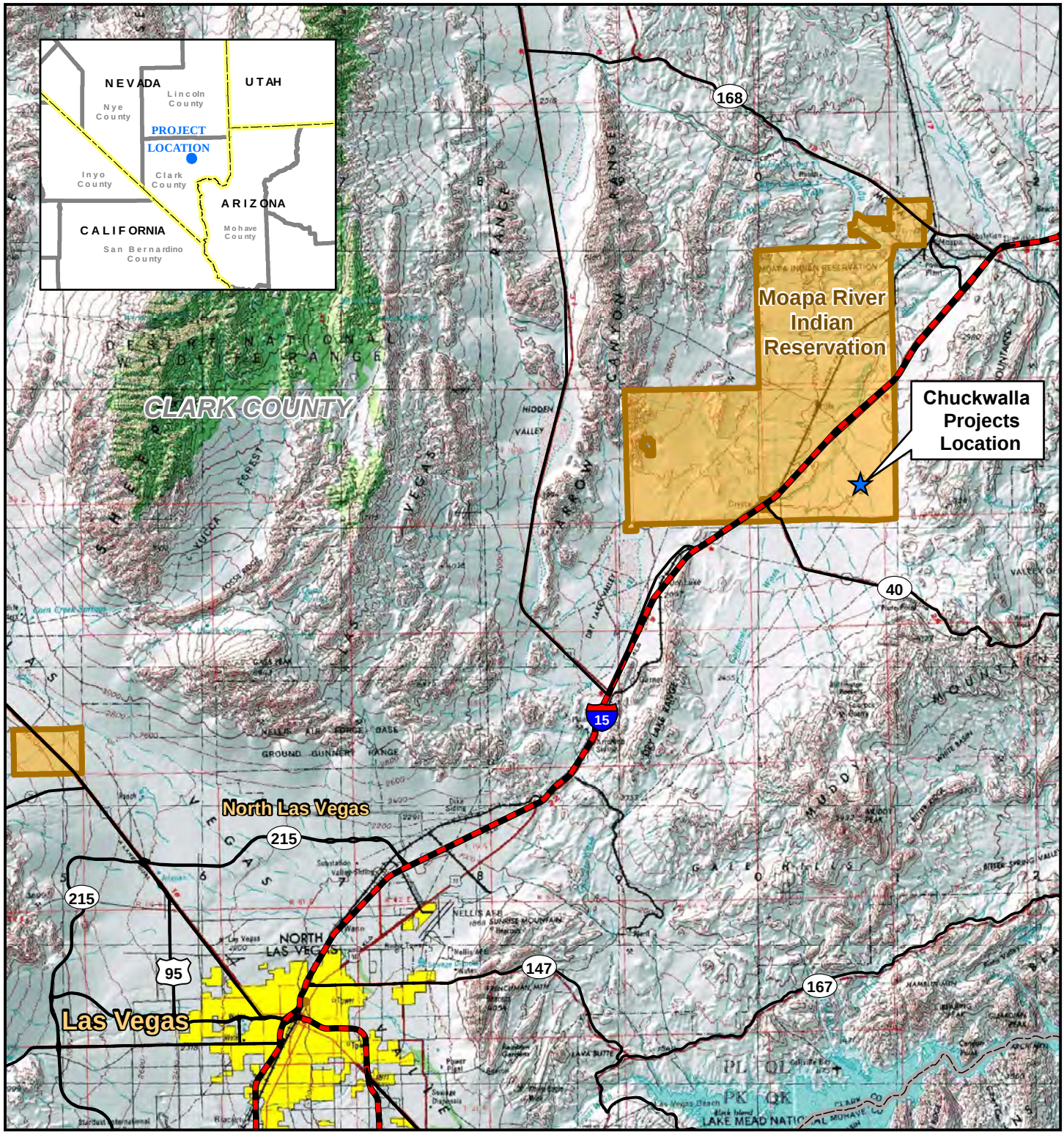
Appendix A

Figures



Legend

- Solar Project Location
- Interstate
- US/ State Highway
- Railroad

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

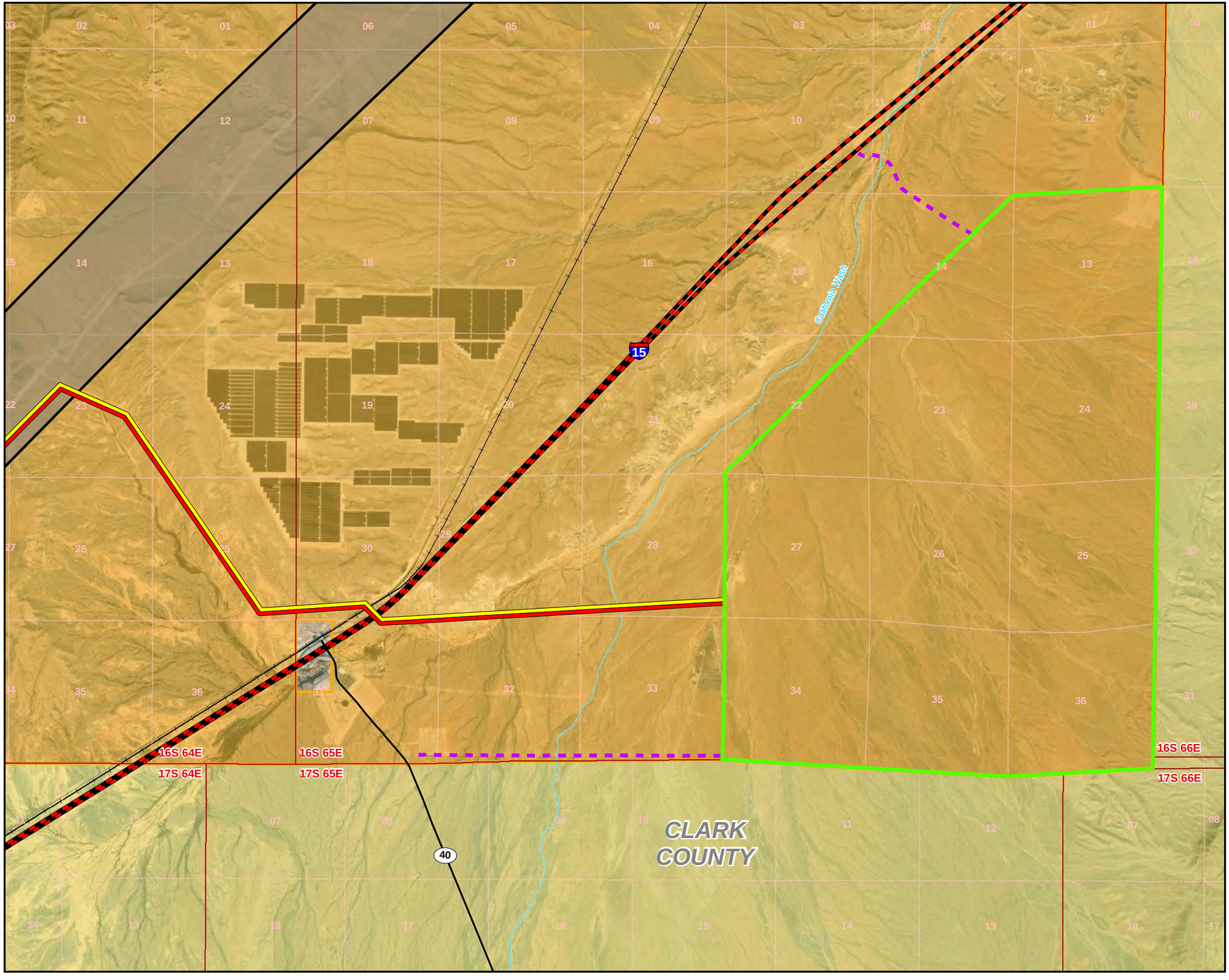
Chuckwalla Solar Projects

FIGURE 1-1
General Location

Map Extent: Clark County, Nevada

Date: 11-03-20		Author: rnc

G:\Chuckwalla Solar Project/MXD's/Project Location 8.5x11 110320.mxd



Legend

Project Components

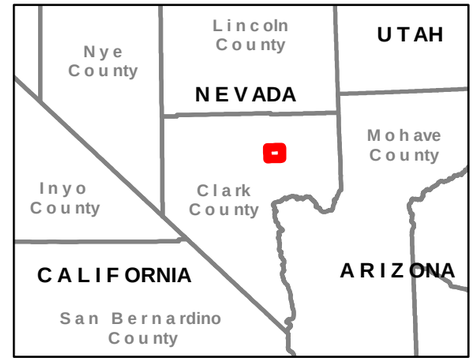
- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Access Road
- Chuckwalla Solar Lease Area
- Approved ROW Arrow Canyon - Harry Allen

General Features

- Interstate
- Major Highway
- Railroad
- Stream / River
- Designated Utility Corridor
- Township
- Section

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land



0 0.5 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Chuckwalla Solar Projects

Figure 1-2
Project Lease Area

Map Extent: Clark County, Nevada

Date: 06-19-21		Author: rnc

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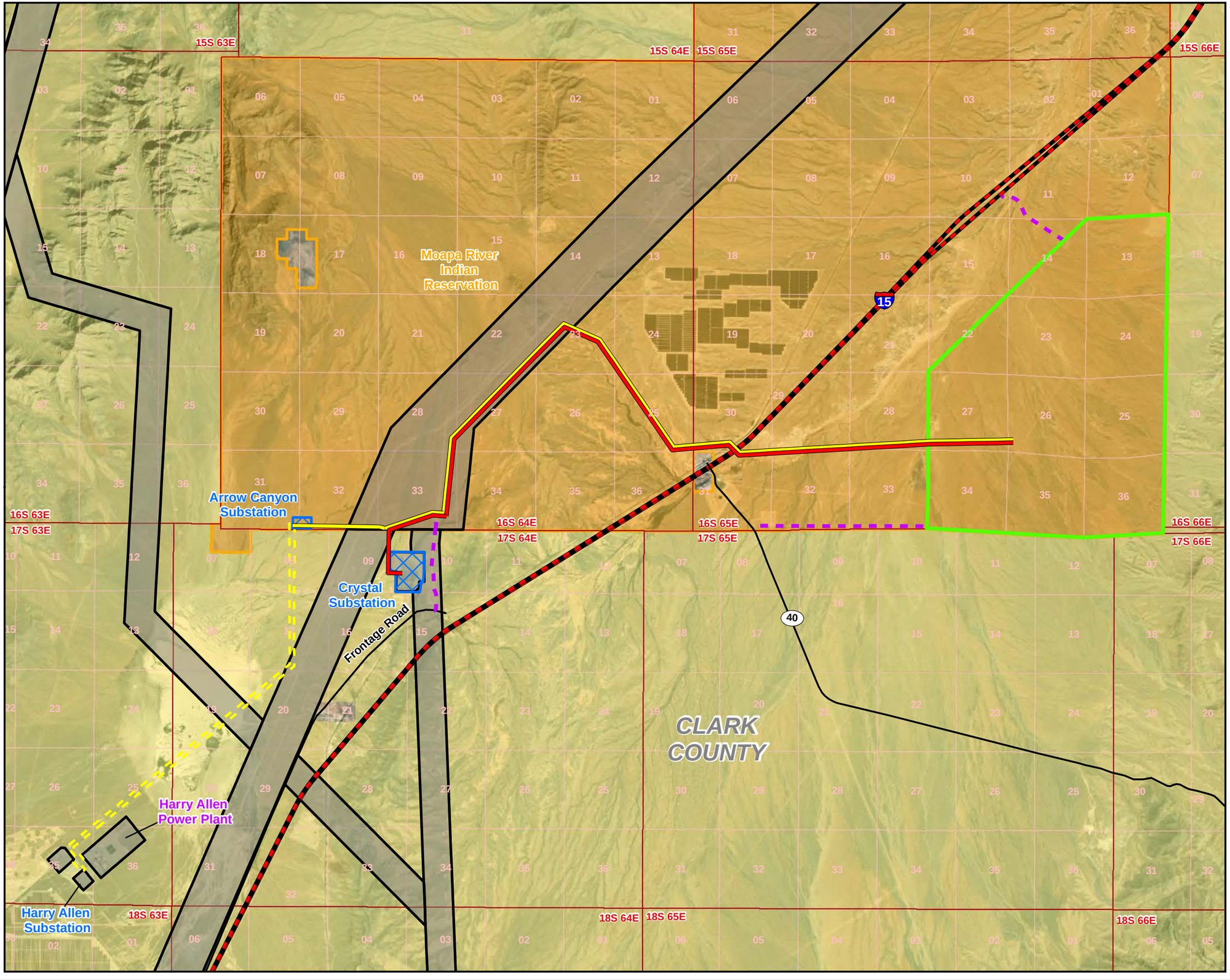


Legend

Project Components

- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Access Road
- Chuckwalla Solar Lease Area
- Approved ROW Arrow Canyon - Harry Allen

General Features

- Interstate
- Major Highway
- Railroad
- Stream / River
- Existing Substation
- Designated Utility Corridor
- Township
- Section

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

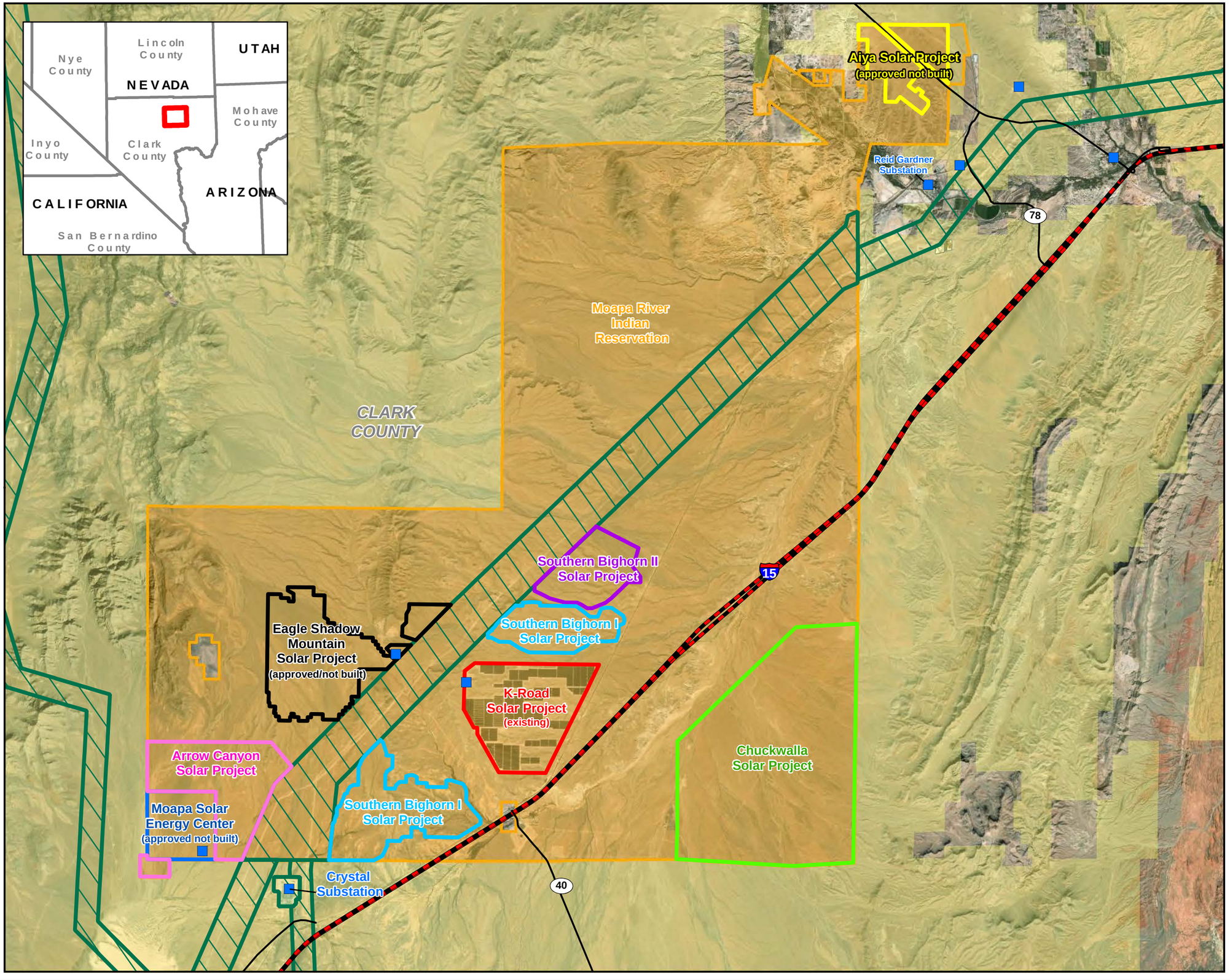
Chuckwalla Solar Projects

Figure 1-3
Project Overview Map

Map Extent: Clark County, Nevada

Date: 07-26-21		Author: rnc

G:\MXD's\Project Location_072621.mxd



Legend

Solar Projects

- Eagle Shadow Mountain Solar Project
- Aiya Solar Project
- K-Road Solar Project
- Moapa Solar Energy Center
- Arrow Canyon Solar Project
- Southern Bighorn I Solar Project
- Southern Bighorn II Solar Project
- Chuckwalla Solar Project

General Features

- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Designated Utility Corridor
- Municipal Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation
- Private Lands

0 1 2 3

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

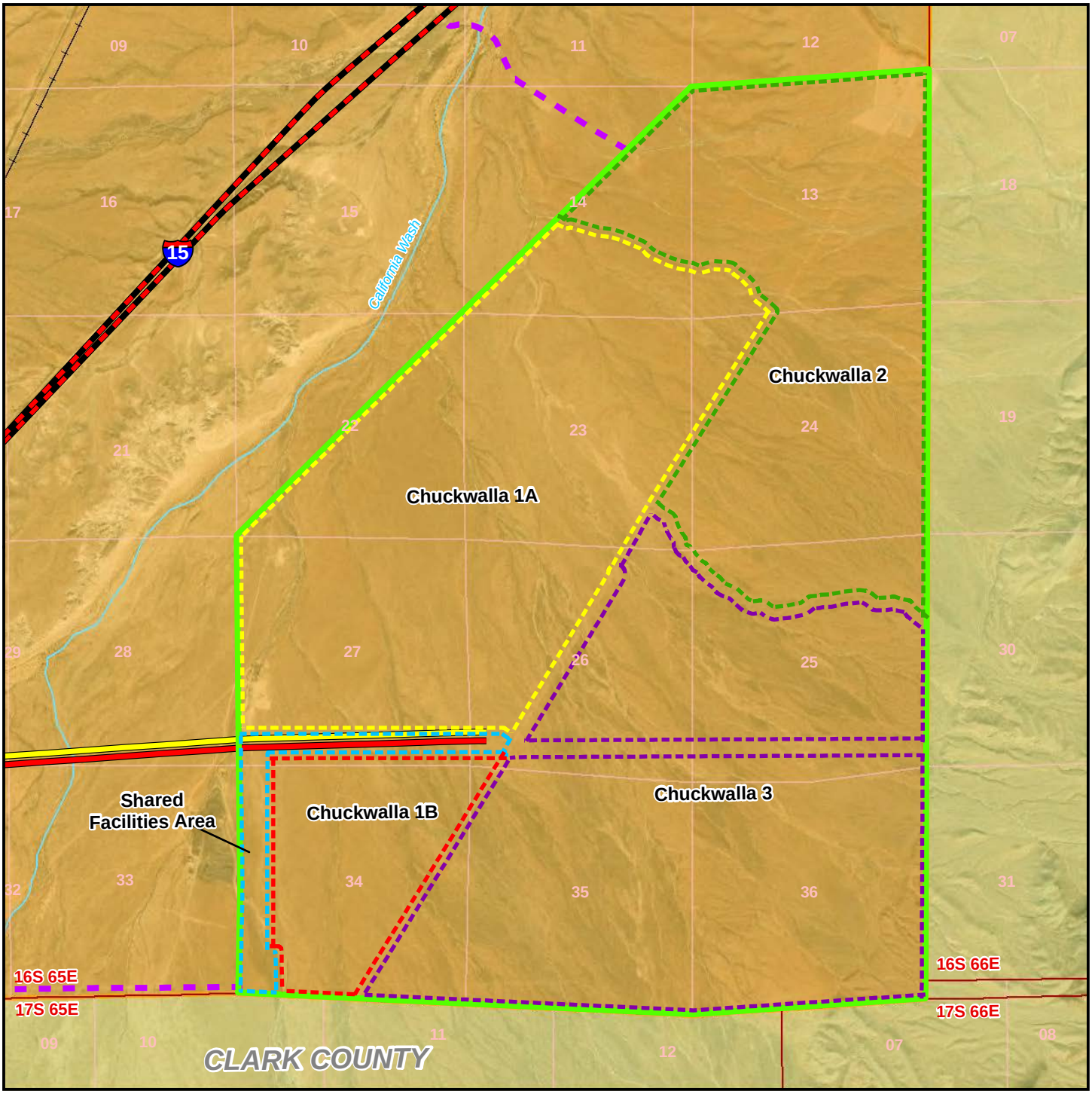
Chuckwalla Solar Projects

Figure 1-4
Solar Projects on the Moapa River Indian Reservation

Map Extent: Clark County, Nevada

Date: 06-22-21		Author: rnc

G:\MXD's\Project Location_062221.mxd



Legend

- Chuckwalla Solar Lease Area
- Chuckwalla 1A
- Chuckwalla 1B
- Chuckwalla 2
- Chuckwalla 3
- Shared Facilities Area
- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Access Road
- Interstate
- Railroad
- Township
- Section
- Jurisdictional Land Ownership
- Indian Reservation
- Bureau of Land Management Land

Chuckwalla Solar Project

Figure 2-1
Solar Project Lease Areas

Map Extent: Clark County, Nevada

Date: 10-13-21		Author: rnc

G:\Chuckwalla Solar Project/MXD's/Project Location 8.5x11 101321.mxd

0 0.25 0.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

- Met Tower
- Microwave Tower
- Water Well
- Tavaci Gentie
- Proposed Fence Line
- Railroads
- Collection Line Stream Crossings
- Project Roads
- Controlled-access Highway
- Solar Panel Area
- Inverters & Co-Located DIstributed BESS
- Drainage Ditch
- Battery Storage Yard
- Laydown Yards - Temporary
- O&M Large
- O&M Small
- Substation Main Site
- Substation Alternate Site
- Batch Plant Yard
- Construction Staging Area/Parking Lot
- HeliPad
- Dust Control Retention Pond - 180' x 300'
- Chuckwalla Phase 1A
- Chuckwalla Phase 1B
- Chuckwalla Phase 2
- Chuckwalla Phase 3
- Shared Use Area

Chuckwalla Phase 1A
1576.1 acres
Chuckwalla

Chuckwalla Phase 2
1573.6 acres
Tavaci

Shared Use
164.9 acres

Chuckwalla Phase 1B
478.7 acres
Tavaci

Chuckwalla Phase 3
2224.6 acres
Tavaci

Valley of Fire Hwy

S R 40

0 0.17 0.35 0.7 1.05 1.4 Miles

Source: Source | YYYY| G:\Projects\SA_West\Tavaci\05_GIS\Tavaci.aprx | Layout: Site_Plan_Chuckwalla_BIA_20210913 | Last Updated 10/7/2021 by peter.boxer

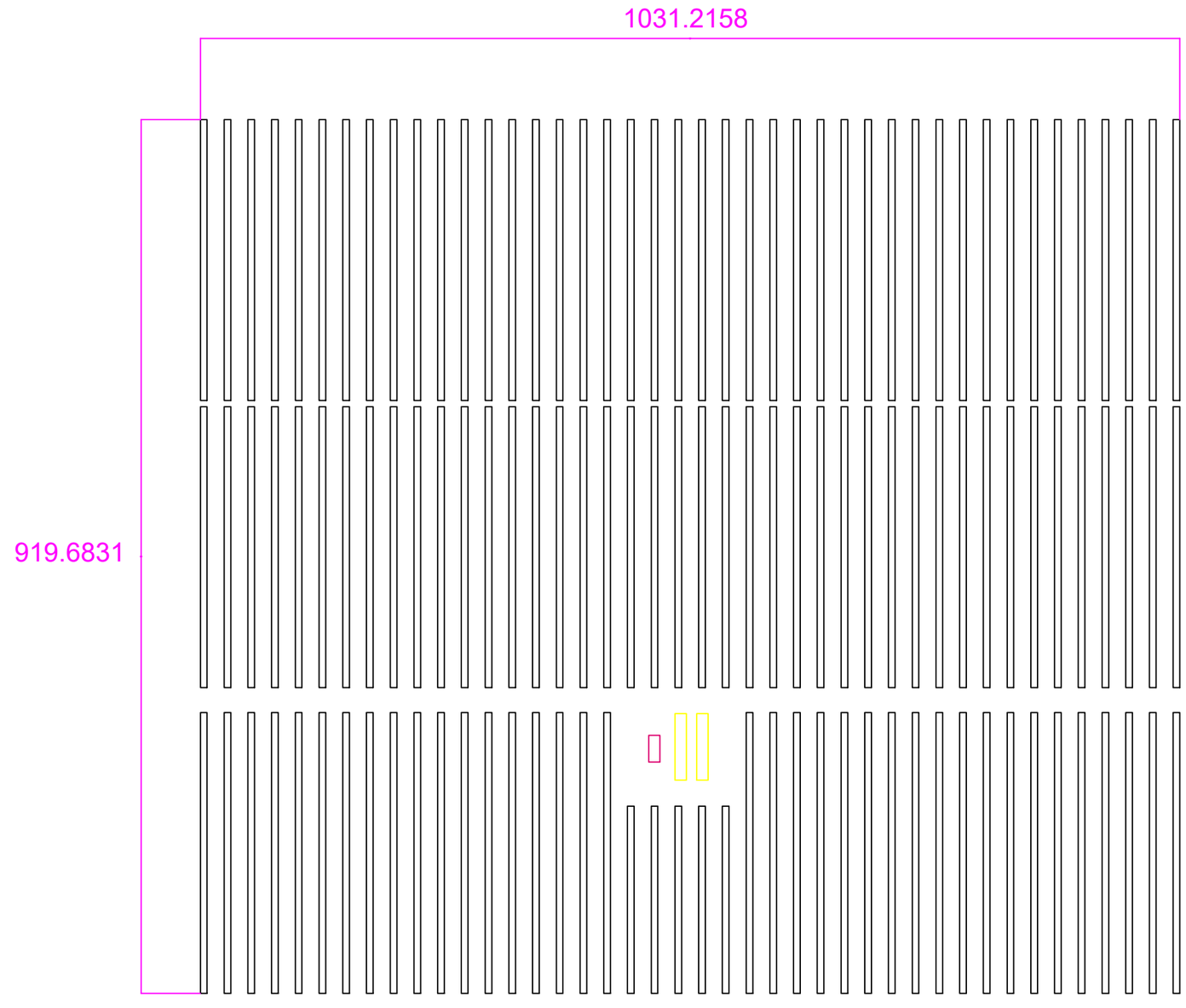
edf renewables

Figure 2-2 Site Plan

Chuckwalla Solar Project | Clark County, Nevada

SP

Conceptual



N

EDF- Renewable Energy
15445 Innovation Drive
San Diego, CA 92128

PROJECT OWNER

EDF- Renewable Energy
15445 Innovation Drive
San Diego, CA 92128

PROJECT ENGINEER

Job Name	Project Name
Date	
Designed By	
Drawn By	
Checked By	

REVISION BLOCK

Symbol	Date	By	Revisions

LEGEND

Figure 2-3

PROJECT DETAILS

Chuckwalla Solar

PROJECT NAME

Conceptual Block Design

TITLE SHEET

1. Conceptual design. Actual design to be provided by contractor.
2. Drawings are preliminary and draft unless otherwise stated. Variations in system design can occur.
3. Designs, Layouts, Locations and any other information found in this or any linked set of drawings are property of EDF Renewable Energy Corp.
   Use of the drawings or any part of these drawings requires prior consent from EDF Renewable Energy Corp.
4. This drawing is for permitting purposes only. Not for Construction.

NOTES

v.1

SHEET NO.

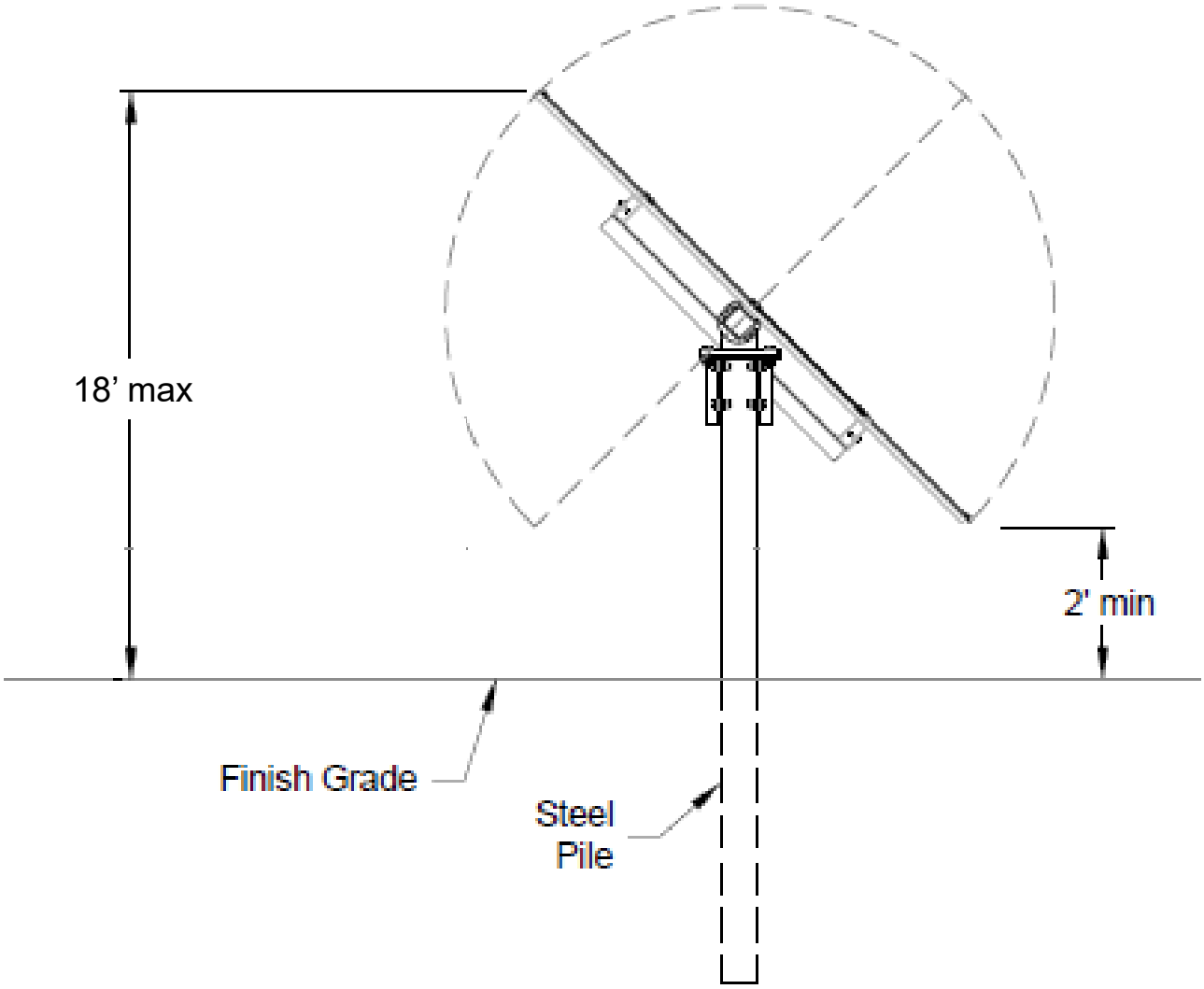
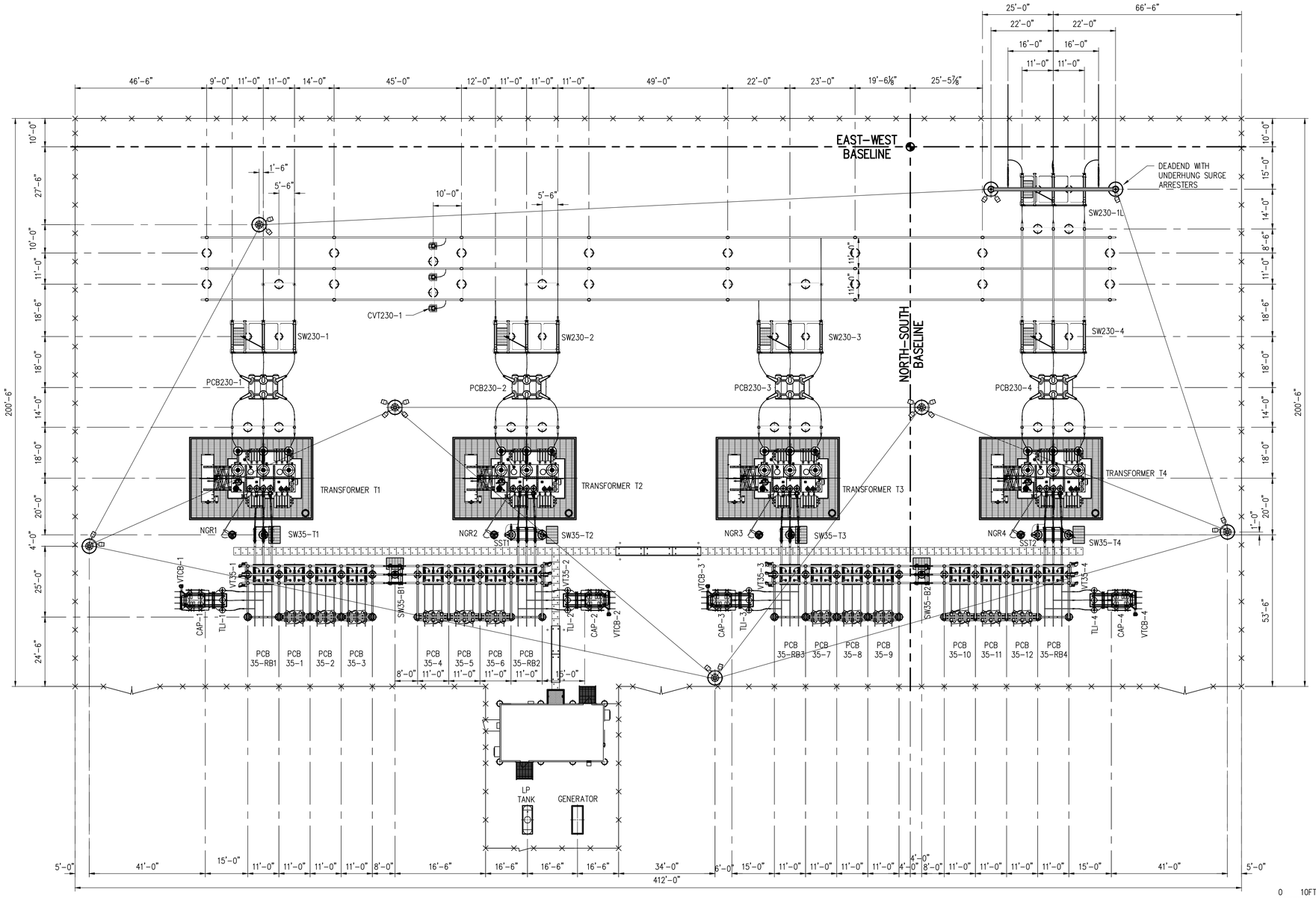


Figure 2-4

Typical Tracker PV Mounting System



STRUCTURE DESIGN CRITERIA

230 kV CLEARANCE: (900kV BIL)

LIVE PARTS: MIN ø–G=71"
MIN ø–ø=89"

TO GRADE: 15'–0" (BUS)
27'–0" (DRIVEWAY)

34.5 kV CLEARANCE: (200 kV BIL)

LIVE PARTS: MIN ø–G=13"
MIN ø–ø=18"

TO GRADE: 10'–0" (BUS)
22'–0" (DRIVEWAY)

NOTES

CHUCKWALLA SOLAR PROJECTS

Figure 2-5

Site Substation Conceptual Layout

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\EDF RENEWABLE\EDF–XXX PALEN\SUBSTATION\100 CADD\110 WORKING\111 PHYSICAL\PALEN 460 MW\ALS–D–P003–1–OPTION 2.DWG LAST SAVED BY: jdpinnick 9/12/2018 3:36 PM PLOTTED BY: Jill D. Pinnick 9/12/2018 3:37 PM Tab: ALS–D–P003–1

"Engineering with Distinction"
ELECTRICAL CONSULTANTS, INC.
BILLINGS, MONTANA

NO	REVISION	DATE	BY	APR
A	PRELIMINARY	08/23/18	STD	JMT

edf renewables

ENGINEERING RECORD		DATE
DRAWN	DENNING	08/23/18
DESIGNED	DENNING	08/23/18
CHECKED		
APPROVED		
DWG SCALE: 1" = 20'	PLT SCALE: 1:1	

DWG. NAME: ALS–D–P003–1 – OPTION 2 | REVISION NO : A

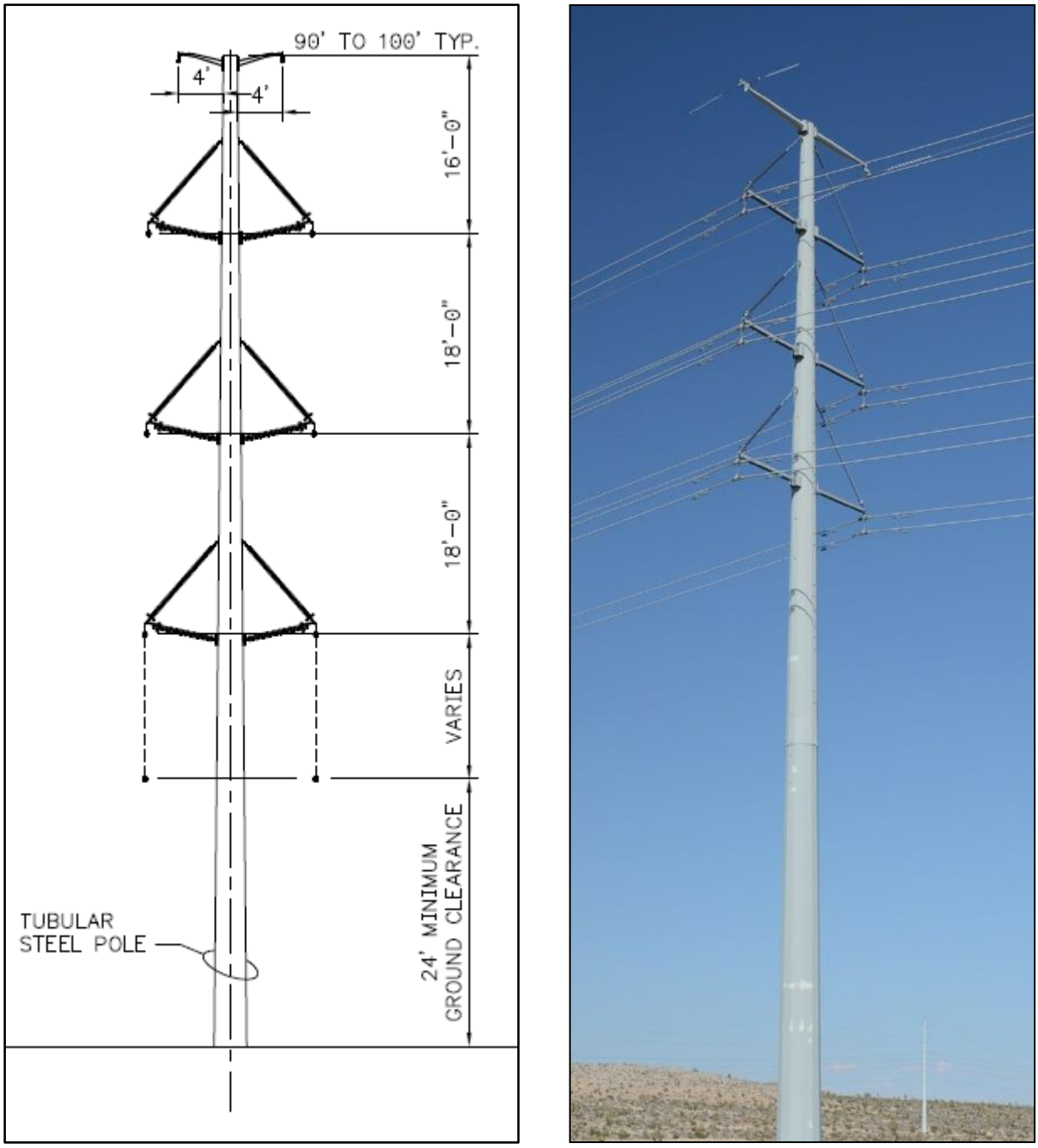


Figure 2-6
Typical Steel Pole Gen-Tie Transmission Structure

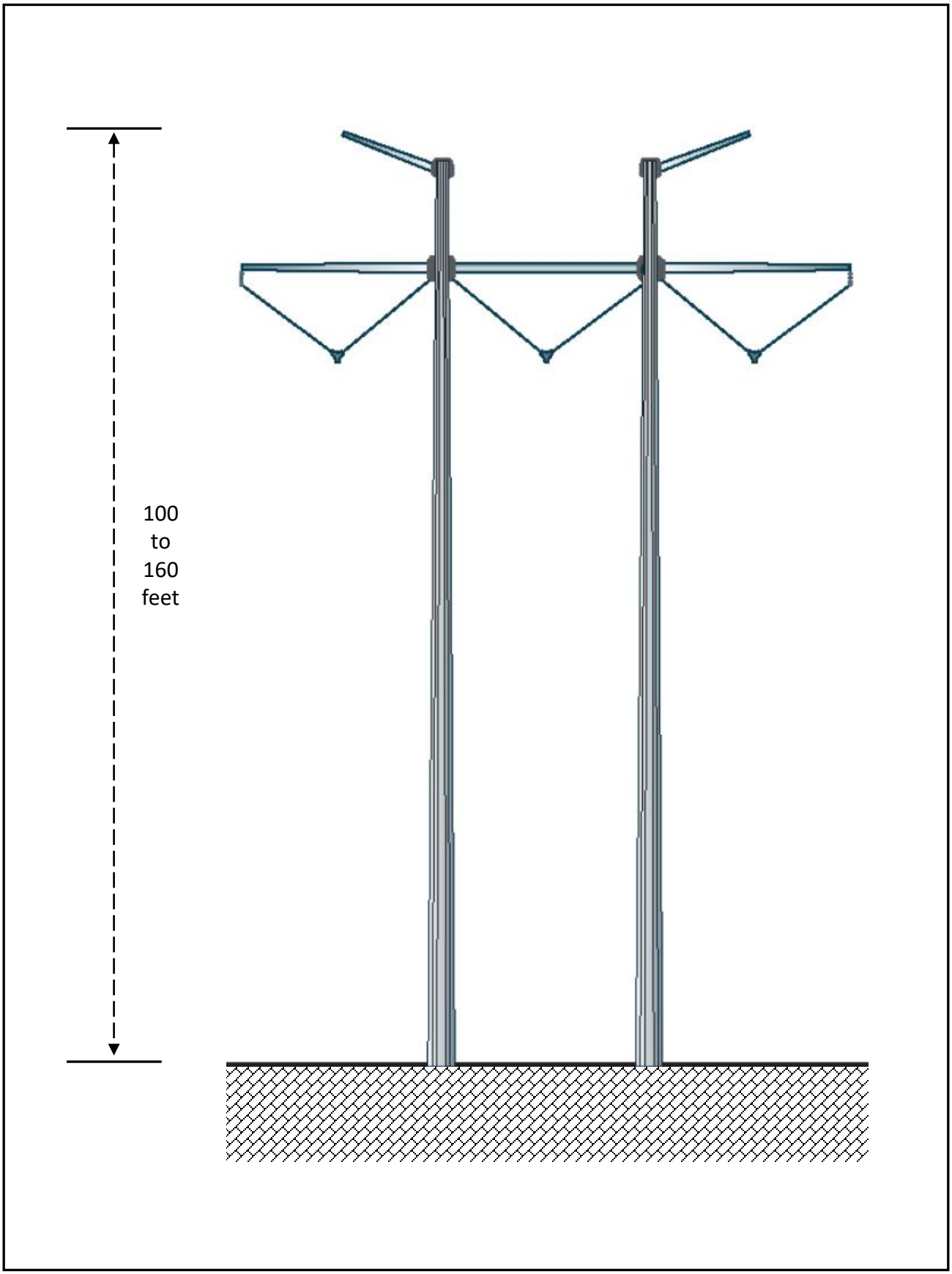
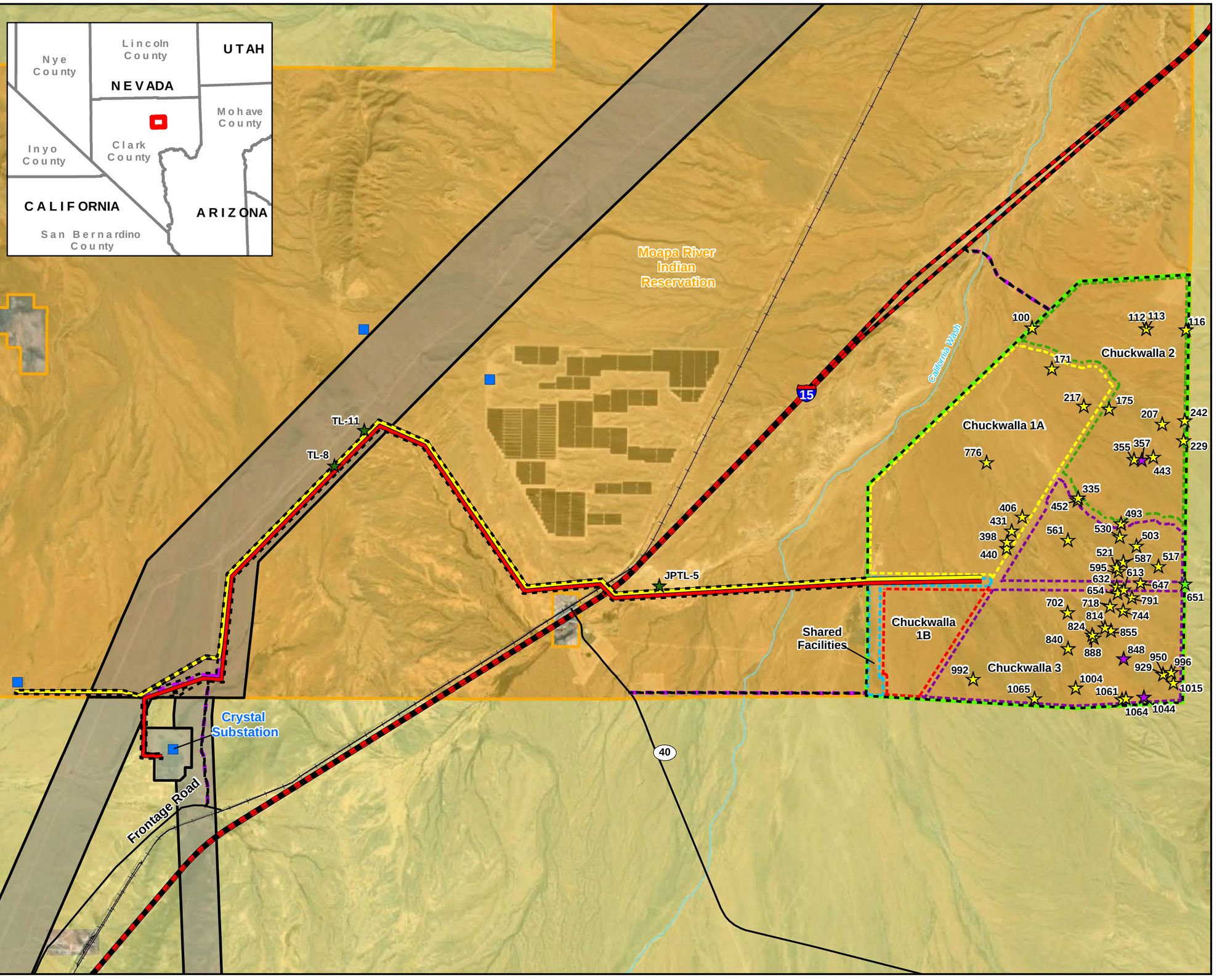


Figure 2-7
Typical 500kV H-Frame Structure



Project Components

- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Access Road
- Chuckwalla Solar Lease Area
- Study Area
- Chuckwalla 1a
- Chuckwalla 1b
- Chuckwalla 2
- Chuckwalla 3
- Shared Facilities

General Features

- Existing Substation
- Interstate
- Major Road
- Railroad
- Stream or River

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

Survey Results

- Live Desert Tortoise - Adult
- Live Desert Tortoise - Juvenile
- Live Desert Tortoise - Adult (Outside Survey Area)
- Live Desert Tortoise - Juvenile (Outside Survey Area)

0 0.5 1 1.5 2
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

Chuckwalla Solar Projects

Figure 3-1
Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-12-21 | Author: rnc

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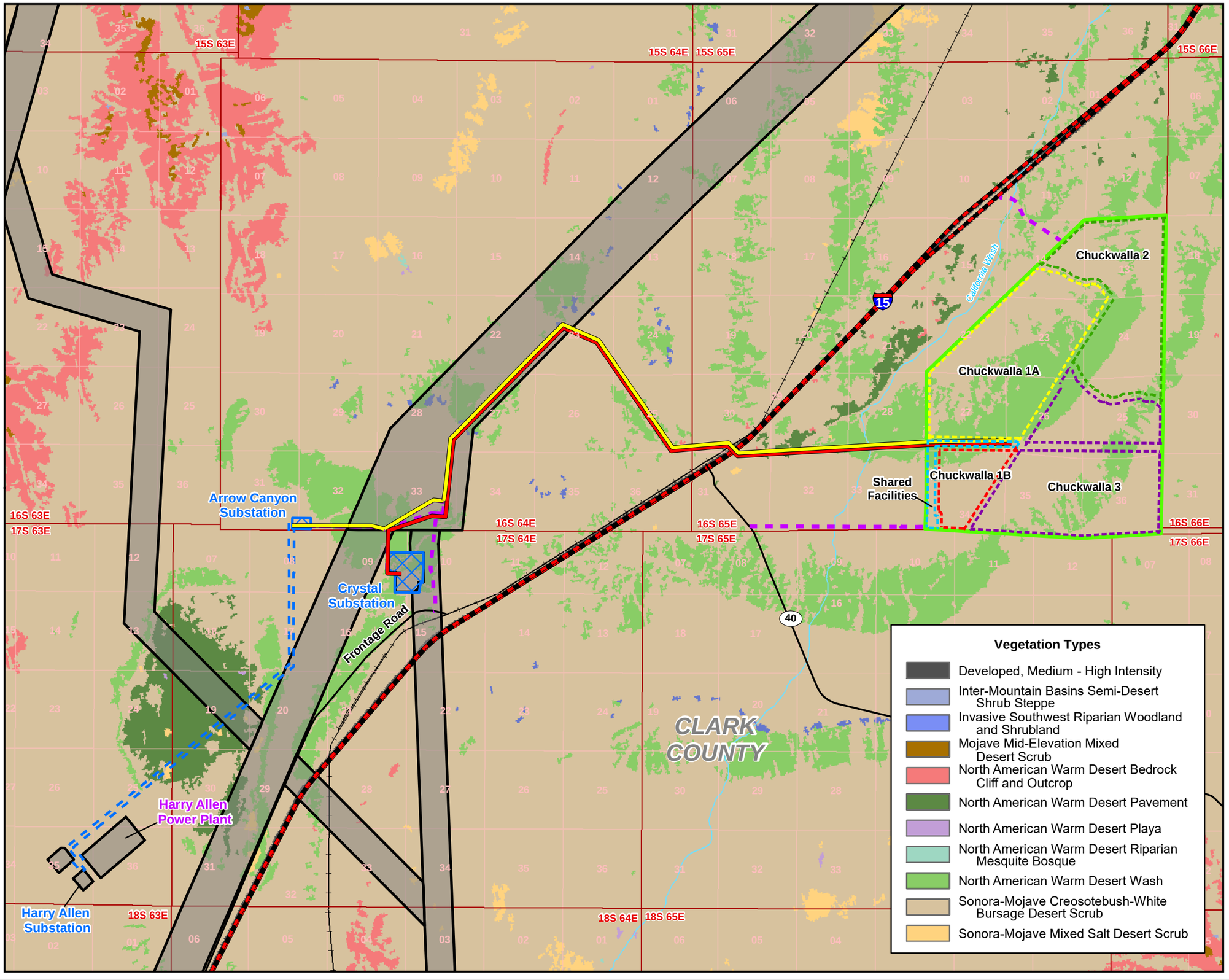

Legend

Project Components

- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Access Road
- Chuckwalla Solar Lease Area
- Approved ROW Arrow Canyon - Harry Allen
- Chuckwalla 1A
- Chuckwalla 1B
- Chuckwalla 2
- Chuckwalla 3
- Shared Facilities

General Features

- Interstate
- Major Highway
- Railroad
- Stream / River
- Existing Substation
- Designated Utility Corridor
- Township
- Section

Vegetation Types

- Developed, Medium - High Intensity
- Inter-Mountain Basins Semi-Desert Shrub Steppe
- Invasive Southwest Riparian Woodland and Shrubland
- Mojave Mid-Elevation Mixed Desert Scrub
- North American Warm Desert Bedrock Cliff and Outcrop
- North American Warm Desert Pavement
- North American Warm Desert Playa
- North American Warm Desert Riparian Mesquite Bosque
- North American Warm Desert Wash
- Sonora-Mojave Creosotebush-White Bursage Desert Scrub
- Sonora-Mojave Mixed Salt Desert Scrub

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Chuckwalla Solar Projects

Figure 3-2
Vegetation Communities

Map Extent: Clark County, Nevada

Date: 10-12-21 | Author: rnc

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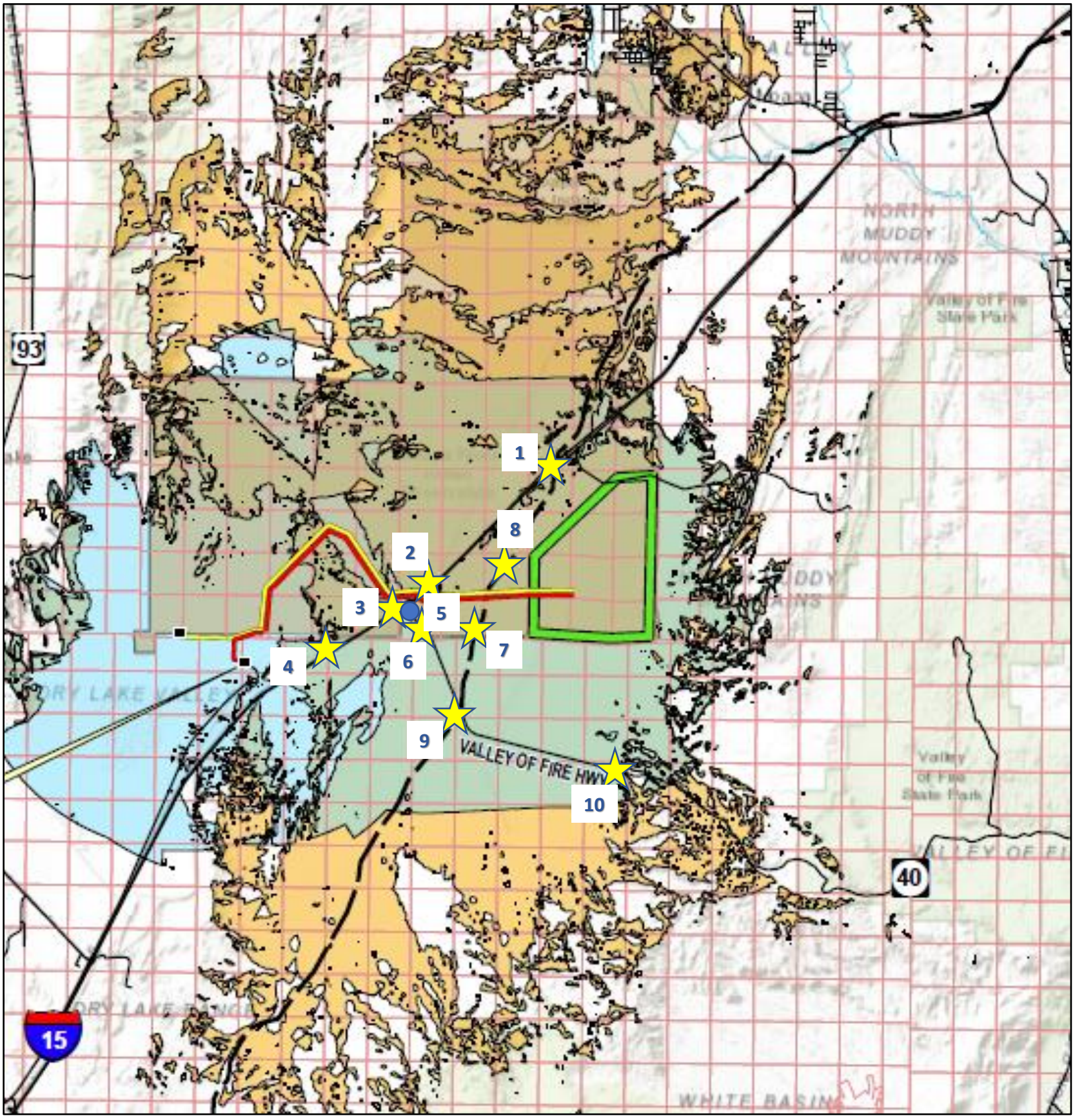


1 On I-15 where it intersects with OSNHT
2 On I-15 north of Proposed Gen-tie Crossing
3 On I-15 south of Proposed Gen-tie Crossing
4 On I-15 near Reservation Boundary
5 Moapa Travel Center
6 On Valley of Fire Highway near Reservation Boundary
7 On OSNHT where it intersects with Site Access Road
8 Representative of OSNHT where it is closest to Site
9 On Valley of Fire Highway where it intersects with OSNHT
10 On Valley of Fire Highway where Topo does not Block View of Site

Stationary Simulation Location

Linear Simulation Location

CHUCKWALLA SOLAR PROJECTS

Figure 3-3
Visibility Analysis and KOP Locations

Figure 4a CHUCKWALLA SOLAR PROJECT

SOUTHBOUND I-15 AND OSNHT LOOKING SOUTHEAST - EXISTING VIEW

KOP# 1

10/7/21

Figure 4b CHUCKWALLA SOLAR PROJECT

SOUTHBOUND I-15 AND OSNHT LOOKING SOUTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 1

10/7/21

Figure 5a CHUCKWALLA SOLAR PROJECT

SOUTHBOUND I-15 LOOKING SOUTHWEST - EXISTING VIEW

KOP# 2 10/7/21

Figure 5b CHUCKWALLA SOLAR PROJECT

SOUTHBOUND I-15 LOOKING SOUTHWEST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 2

10/7/21

Figure 6a CHUCKWALLA SOLAR PROJECT

NORTHBOUND I-15 LOOKING NORTHEAST - EXISTING VIEW

KOP# 3

10/7/21

Figure 6b CHUCKWALLA SOLAR PROJECT

NORTHBOUND I-15 LOOKING NORTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 3

10/7/21

Figure 7a CHUCKWALLA SOLAR PROJECT

MOAPA PAIUTE TRAVEL PLAZA - LOOKING EAST - EXISTING VIEW

KOP# 4

10/7/21

Figure 7b CHUCKWALLA SOLAR PROJECT

MOAPA PAIUTE TRAVEL PLAZA - LOOKING EAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 4

10/7/21

Figure 8a CHUCKWALLA SOLAR PROJECT

NORTHBOUND I-15 LOOKING NORTHEAST - EXISTING VIEW

KOP# 5

10/7/21

Figure 8b CHUCKWALLA SOLAR PROJECT

NORTHBOUND I-15 LOOKING NORTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 5

10/7/21

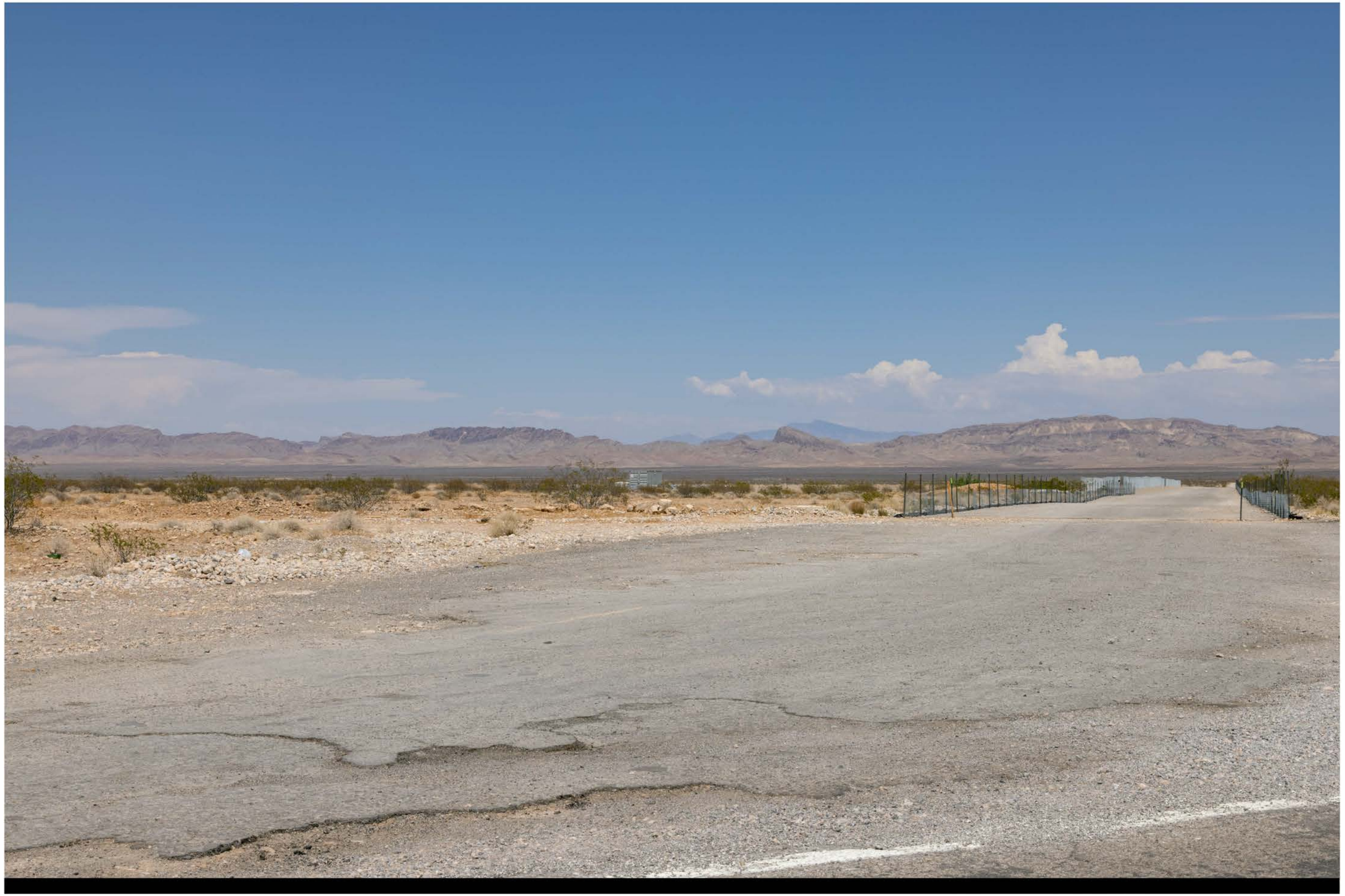


Figure 9a CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY & PROPOSED ACCESS ROAD - LOOKING NORTHEAST - EXISTING VIEW

KOP# 6

10/7/21

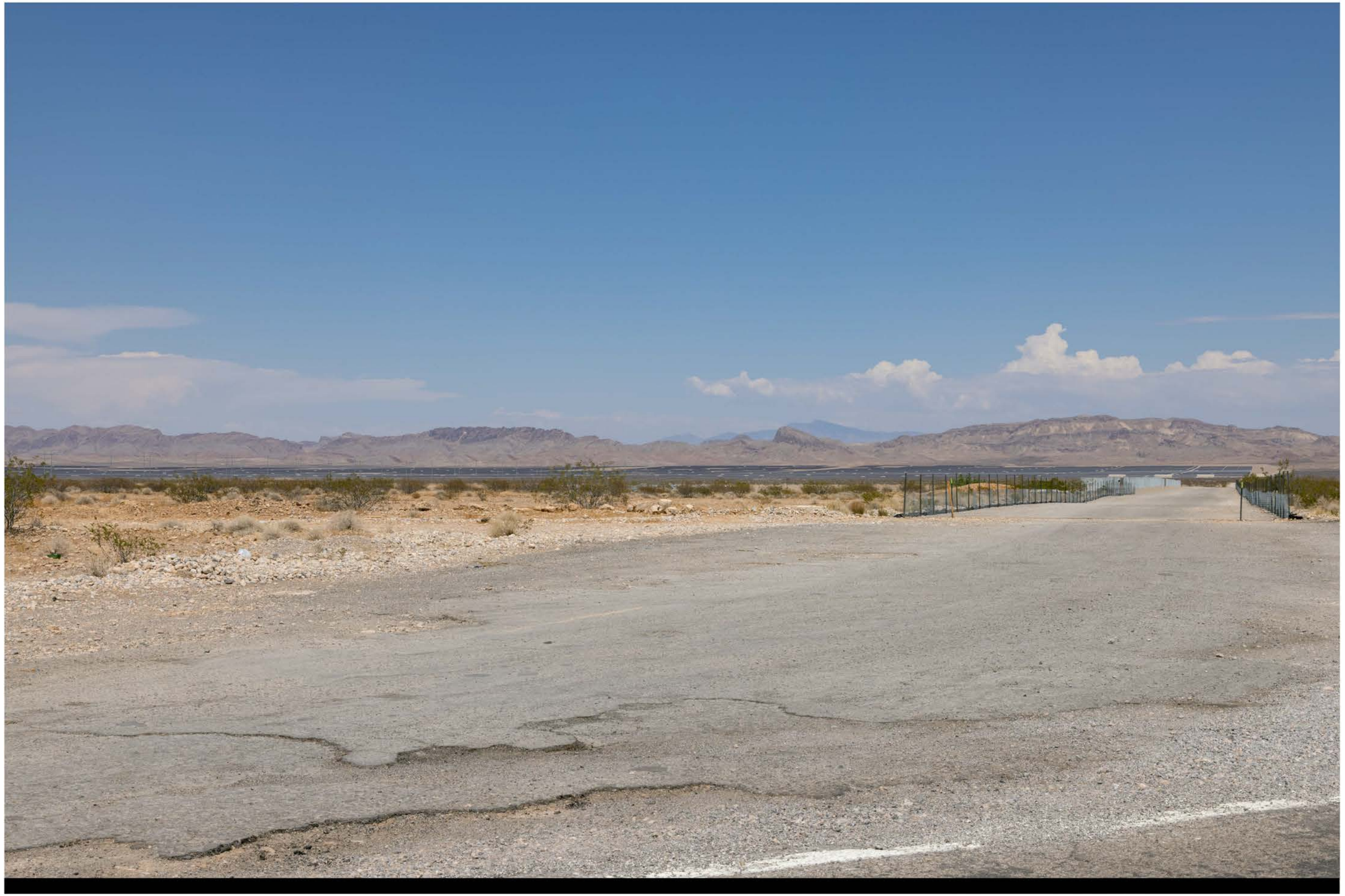


Figure 9b CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY & PROPOSED ACCESS ROAD - LOOKING NORTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 6

10/7/21

Figure 10a CHUCKWALLA SOLAR PROJECT

ACCESS ROAD AND OSNHT - LOOKING NORTHEAST - EXISTING VIEW

KOP# 7

10/7/21

Figure 10b CHUCKWALLA SOLAR PROJECT

ACCESS ROAD AND OSNHT - LOOKING NORTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 7

10/7/21

Figure 11a CHUCKWALLA SOLAR PROJECT

REPRESENTATIVE VIEW FROM OSNHT TOWARD PROJECTS - EXISTING VIEW

KOP# 8 10/11/21

Figure 11b CHUCKWALLA SOLAR PROJECT

REPRESENTATIVE VIEW FROM OSNHT TOWARD PROJECTS - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 8

10/11/21

Figure 12a CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY - LOOKING NORTHEAST - EXISTING VIEW

KOP# 9

10/7/21

Figure 12b CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY - LOOKING NORTHEAST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 9

10/7/21

Figure 13a CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY - LOOKING NORTHWEST - EXISTING VIEW

KOP# 10

10/7/21

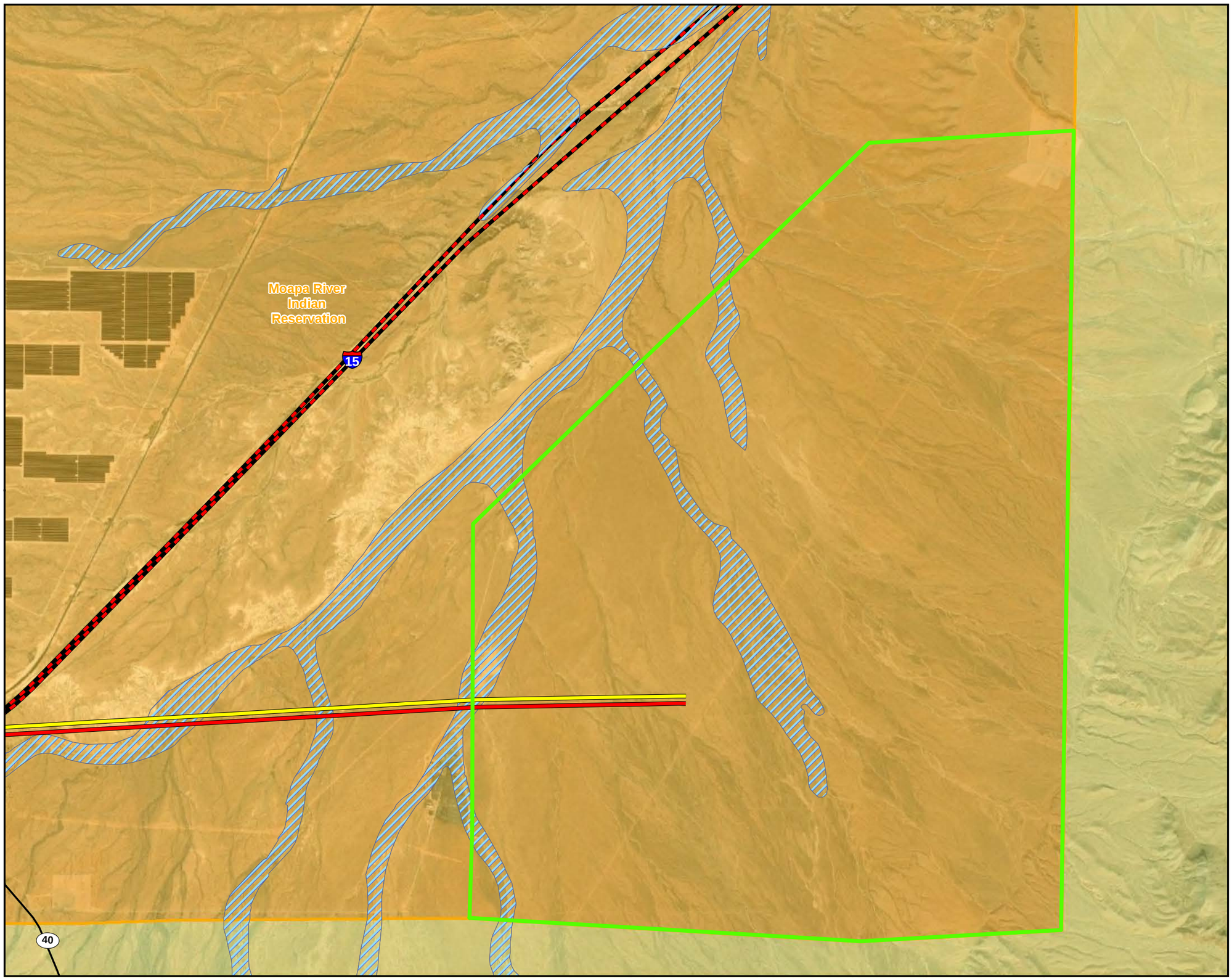
Figure 13b CHUCKWALLA SOLAR PROJECT

VALLEY OF FIRE HIGHWAY - LOOKING NORTHWEST - SIMULATION

THIS RENDERING IS BASED ON CURRENT INFORMATION AS OF THIS DATE AND IS SUBJECT TO CHANGE.

KOP# 10

10/7/21



Legend

Project Components

- Gen-Tie Route to Arrow Canyon Substation
- Gen-Tie Route to Crystal Substation
- Chuckwalla Solar Lease Area

General Features

- Photo Point
- Interstate
- Major Highway
- Railroad

FEMA Floodplain

- 100 Year Flood Plain
- Area of Minimal Flood Hazard (No Hatching)

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land

0 0.5 1

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

Chuckwalla Solar Project

Figure 3-14
FEMA Floodplain

Map Extent: Clark County, Nevada

Date: 01-13-22		Author: rnc

G:\MXD's/Project Location_011322.mxd

Photo 17
Photo 14
Photo 11
Photo 10
Photo 9
Photo 15
Photo 8
Photo 16
Photo 7
Photo 6
Photo 5
Photo 12
Photo 13
Photo 4
Photo 3
Photo 1
Photo 2
Moapa River Indian Reservation
15
40
California Wash

Legend

Project Components

- Gen-Tie
- Lease Area

General Features

- Photo Point
- Interstate
- Major Highway
- Railroad

Hydrology

- Mapped Ephemeral Wash with Potential Downstream Connectivity
- Mapped Ephemeral Wash with no Potential Downstream Connectivity

Land Jurisdiction

- Bureau of Land Management Land
- Indian Land

0 0.5 1
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

Chuckwalla Solar Projects

FIGURE 3-15
Ephemeral Drainage Features
Lease Area

Map Extent: Clark County, Nevada

Date: 01-06-21		Author: rnc

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