



# United States Department of the Interior



## BUREAU OF LAND MANAGEMENT

Phoenix District

Hassayampa Field Office

21605 North 7th Avenue

Phoenix, Arizona 85027

[www.blm.gov/az/](http://www.blm.gov/az/)

In Reply Refer To:

1610 (P010)

AZA-35079

Dear Reader:

Enclosed is the Final Environmental Impact Statement (EIS) entitled: *APS Sun Valley to Morgan 500/230kV Transmission Line Project Final Environmental Impact Statement and Proposed Bradshaw-Harquahala Resource Management Plan Amendment*. This document has been developed in accordance with the National Environmental Policy Act of 1969 and the Federal Land Policy and Management Act of 1976, as amended. The Bureau of Land Management (BLM) prepared this document in consultation with several cooperating agencies, including the United States (U.S.) Air Force - Luke Air Force Base, the U.S. Environmental Protection Agency (EPA), Arizona State Land Department (ASLD), the Maricopa Association of Governments, and the cities of Peoria and Surprise, Arizona. The BLM also took into account public comments received during the scoping effort and in response to the Draft EIS/Draft Resource Management Plan (RMP) Amendment, which was published in November 2012. The Final EIS/Proposed RMP Amendment is open for a 30-day availability period beginning the date the EPA publishes the Notice of Availability (NOA) for the Final EIS/Proposed RMP Amendment in the *Federal Register*.

The Final EIS/Proposed RMP Amendment has been prepared to analyze the potential impacts of granting a right-of-way to Arizona Public Service (APS) for the purpose of constructing and operating a 500/230-kilovolt (kV) overhead transmission line from the Sun Valley Substation to the Morgan Substation. The Proposed Sun Valley to Morgan 500/230-kV Transmission Line Project (Project) would be located on a combination of BLM-managed public lands, Arizona State Trust lands, and private lands in northern Maricopa County, northwest of Phoenix, Arizona. The Project is an approximately 38-mile-long overhead transmission line on monopole structures with a 200-foot right-of-way (ROW) that would head out of the Sun Valley Substation in the northwest portion of the Town of Buckeye to the Morgan Substation in the Town of Peoria, within an area certificated for the Project by the Arizona Corporation Commission (ACC). The BLM-managed public lands within the Project area are managed under the existing Bradshaw-Harquahala RMP. Under the Proposed Action, the RMP would need to be amended to establish a utility corridor and change the Visual Resource Management (VRM) Class designation for BLM-managed public lands that would be crossed by the proposed route.

In addition to the Proposed Action (as described above), the Final EIS/Proposed RMP Amendment analyzed three Action Alternatives including: Alternative 1: Proposed Action with Additional Corridor; Alternative 2: Right-of-Way South of State Route 74; and Alternative 3: Carefree Highway Route. A Sub-Alternative proposed by the ASLD is also being analyzed. Alternative 2, Alternative 3, and the Sub-Alternative routes do not subscribe to the route certificated by the ACC for the Project. This document also analyzed a No Action alternative under which the BLM would not issue a ROW; the Bradshaw-Harquahala RMP would not be amended; and the transmission line would not be constructed as described under the Proposed Action or Action Alternatives. The APS is committed to construction of the transmission line and could pursue other options to develop the Project without using public lands. However, it should be noted that implementation of the Project following a route other than the certificated route (the Proposed Action route) could only occur if the ACC amended the certificate that has been issued for this Project.

The public was provided a 45-day scoping period at the beginning of the EIS/RMP Amendment process to identify potential issues and concerns associated with the Proposed Action. Scoping comments were used to help develop the alternatives to the Proposed Action, to guide the analysis of potential effects from the Project, and to identify potential mitigations for inclusion in the Draft EIS/Draft RMP Amendment. A NOA for the Draft EIS/Draft RMP Amendment was published in the *Federal Register* on November 9, 2012. Publication of the NOA initiated a 90-day formal public and agency comment period. Three public hearings were held in Peoria, Wittmann, and Phoenix, Arizona on December 11, 12, and 13, 2012, respectively. The purpose of these hearings was to provide information on the Project and to collect public comment on the adequacy and accuracy of the analysis in the Draft EIS. Comments were accepted through February 8, 2013, for use in development of this Final EIS.

The BLM has identified the Proposed Action route crossing BLM-managed public lands as the Agency Preferred Alternative route for the proposed transmission line, including best management practices and mitigation measures, with modifications as necessary. Modifications could consist of minor route deviations for micrositing of structures or segments of the line at the time of route engineering to minimize impacts to visual and other sensitive resources, as indicated in the mitigation measures. However, all potential modifications would still allow for the transmission line route to remain within the ACC-certificated route on public lands.

Under the Agency Preferred Alternative, the BLM would approve a 200-foot-wide ROW within the existing designated utility corridor northeast of the Sun Valley Substation. In addition, the BLM would amend the RMP to:

- Designate a 200-foot-wide single-use utility corridor on BLM-managed public lands north of State Route (SR) 74 and eliminate Decision LR-30;
- Designate a multiuse utility corridor on 1,013 acres of BLM-managed public lands south of SR 74 to address potential future BLM management considerations; and,
- Change the existing VRM Class designations of 2,362 acres north of SR 74 and 1,013 acres south of SR 74 from Class III to Class IV to allow for the newly established utility corridors.

The Final EIS/Proposed RMP Amendment is being released to inform the public and interested parties of potential impacts associated with implementing APS's proposal, as well as alternatives identified by the agencies. The Final EIS/Proposed RMP Amendment is not a decision document. Rather, it is a document that will inform the BLM's final decisions on whether to amend the RMP and whether to issue a ROW grant. The BLM will only be issuing decisions on those portions of the APS request that involve a ROW on public lands; however, the Final EIS/Proposed RMP Amendment will also inform other regulatory agencies, from which permits would be required.

Publication of an NOA for a Final EIS does not trigger a formal public comment period. The BLM, however, may choose to review any comments submitted following the publication of the NOA for a Final EIS and use them to inform the agency's records of decision (ROD). Those individuals wishing to submit comments are asked to do so in writing and submit electronically to the Project at [SunValley-Morgan@blm.gov](mailto:SunValley-Morgan@blm.gov). Please include "Sun Valley to Morgan Final EIS/Proposed RMP Amendment" in the subject line of your email message. Comments may also be submitted by mail to: Proposed APS Sun Valley to Morgan Project, Attention: Joe Incardine, BLM National Project Manager, Phoenix District Office, 21605 North 7<sup>th</sup> Avenue, Phoenix, Arizona 85027-2929.

Pursuant to the BLM's planning regulations at 43 CFR 1610.5-2, any person who participated in the land use planning process for the Proposed RMP Amendment and has an interest that is or may be adversely affected by the planning decisions may protest approval of the planning decisions within 30 days from the date the EPA published the NOA in the *Federal Register*. The regulations specify the required elements of a protest. The protest may raise only those issues that were submitted for the record during the land use planning process, and the protest must be in writing and filed with the BLM Director. For further information on filing a protest, please see the accompanying protest regulations (Enclosure). Take care to document all relevant facts and, as much as possible, reference or cite the planning documents or available planning records (e.g. meeting minutes or summaries, correspondence, etc.).

Emailed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct email protests to the attention of Brenda Hudgens-Williams, BLM protest coordinator, at [bhudgens@blm.gov](mailto:bhudgens@blm.gov).

All protests, including the followup letter to emails, must be in writing and mailed to one of the following addresses:

Regular Mail:  
BLM Director (210)  
Attn: Brenda Hudgens-Williams  
P.O. Box 71383  
Washington, D.C. 20024-1383

Overnight Mail:  
BLM Director (210)  
Attn: Brenda Hudgens-Williams  
20 M Street SE, Room 2134 LM  
Washington, D.C. 20003

Before including your address, phone number, email address, or other personal identifying information with your comments, be advised that your entire comment, including your personal identifying information, may be made publicly available at any time. Although you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions. Upon resolution of all land use plan protests, the BLM will issue the APS Sun Valley to Morgan 500/230-kV Transmission Line Project Final Environmental Impact Statement, and Proposed Bradshaw-Harquahala Resource Management Plan Amendment ROD and Approved RMP Amendment.

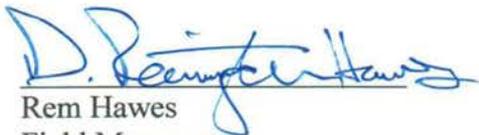
Printed copies of the Final EIS/Proposed RMP Amendment are available for review at the Hassayampa Field Office and the Arizona State Office. The document may also be viewed at public libraries in Maricopa County, Arizona.

- City of Peoria Public Library, 8463 West Monroe Street, Peoria, Arizona 85345
- Sunrise Mountain Public Library, 21109 North 98<sup>th</sup> Avenue, Peoria, Arizona 85382
- Northwest Regional Library, 16089 North Bullard Avenue, Surprise, Arizona 85374
- Phoenix Public Library, Burton Barr Central Library, 1221 North Central Avenue, Phoenix, Arizona 85004

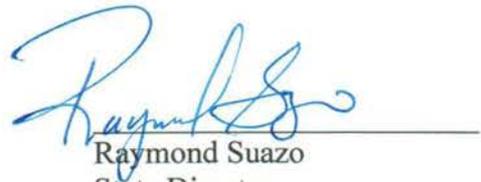
You may also access the document on the Internet at:

<http://www.blm.gov/az/st/en/prog/energy/aps-sunvalley.html>

Sincerely,



Rem Hawes  
Field Manager



Raymond Suazo  
State Director

Enclosure

**Protest Regulations**

[CITE: 43CFR1610.5-2]

**TITLE 43—PUBLIC LANDS: INTERIOR**  
**CHAPTER 11—BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE**  
**INTERIOR**  
**PART 1600—PLANNING, PROGRAMMING, BUDGETING—Table of Contents**  
**Subpart 1610—Resource Management Planning**  
**Sec. 1610.5-2 Protest procedures.**

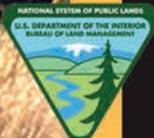
- (a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.
- (1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date of the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.
- (2) The protest shall contain:
- (i) The name, mailing address, telephone number and interest of the person filing the protest;
  - (ii) A statement of the issue or issues being protested;
  - (iii) A statement of the part or parts of the plan or amendment being protested;
  - (iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
  - (v) A concise statement explaining why the State Director's decision is believed to be wrong.
- (3) The Director shall promptly render a decision on the protest
- (b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

# APS Sun Valley to Morgan 500/230kV Transmission Line Project Final Environmental Impact Statement and Proposed Resource Management Plan Amendment

BLM



June 2013



**Final Environmental Impact Statement  
for the Proposed APS Sun Valley to Morgan 500/230kV  
Transmission Line Project and  
Proposed Resource Management Plan Amendment**

Draft

Final

Lead Agency: U.S. Department of the Interior  
Bureau of Land Management  
Hassayampa Field Office

Cooperating Agencies: U.S. Air Force - Luke Air Force Base, U.S.  
Environmental Protection Agency, Arizona State  
Land Department, Maricopa Association of  
Governments, City of Peoria, and the City of  
Surprise

Counties Directly Affected: Maricopa County, Arizona

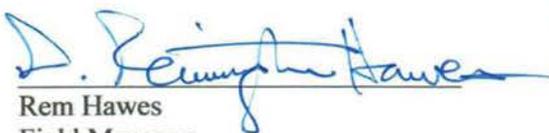
Date FEIS Filed with EPA: Same as date of publication in the *Federal  
Register*

Comments on the FEIS can be Directed to: Joe Incardine  
BLM Phoenix District Office  
Hassayampa Field Office  
21605 North 7<sup>th</sup> Avenue  
Phoenix, Arizona 85027

SunValley-Morgan@blm.gov

Comments must be received by: 30 days after publication in the *Federal Register*

Authorized Officers Responsible for the Environmental Impact Statement:

 Rem Hawes Field Manager	 Raymond Suazo State Director
---	---

# EXECUTIVE SUMMARY

---

## ES.1 PREFACE

This Final Environmental Impact Statement (EIS) reflects revisions to the Draft EIS based on public comments received during the public comment period (see **Section ES.12**). A vertical line in the margin indicates where text additions were made in response to comments. Text additions are indicated with an underline.

## ES.2 INTRODUCTION

The Department of the Interior Bureau of Land Management (BLM) Hassayampa Field Office has received an application from Arizona Public Service (APS or Applicant) to construct, operate, maintain, and decommission a 500 kilovolt (kV)/230kV overhead transmission line from the Sun Valley Substation to the Morgan Substation (Project). The Project would be located on a combination of BLM, State Trust, and private lands in northern Maricopa County, northwest of Phoenix, Arizona. Generally the transmission line would head out of the Sun Valley Substation in the northwest portion of the Town of Buckeye to the Morgan Substation in the Town of Peoria.

APS' proposed Project would be an approximately 38-mile long overhead transmission line on monopole structures within a 200-foot wide right-of-way (ROW) that would be within an area certificated for the Project by the Arizona Corporation Commission (ACC). The Project would require a new ROWs or easement on federal, state, and private lands. The construction ROW would be approximately 200 feet wide, but could be somewhat wider where terrain poses engineering or construction constraints. The permanent and operational ROW width is proposed to be 200 feet wide and would cross approximately seven miles of BLM-managed public lands, north and south of SR 74 in the northeastern part of the Project Area and approximately two miles of public lands in the southwestern portion of the Project Area near the Sun Valley Substation location. Because the ROW over public lands is needed to complete APS' proposed Project, which spans approximately 38 miles on mostly non-public lands, the National Environmental Policy Act of 1969 (NEPA) requires analysis of the entire transmission line route, including impacts to non-public lands. However, any decision issued by the BLM would only affect that portion of the Project occurring on BLM-managed public lands. In addition to the proposed location of the Project, referred to as the Proposed Action route throughout the document, three Action Alternative routes and one Sub-alternative route were also considered.

As part of its responsibilities under NEPA, the BLM must consider a reasonable range of alternatives. The BLM is the lead federal agency responsible for preparation of this EIS. The BLM Arizona State Office and the Hassayampa Field Office have determined that the proposed Project constitutes a major federal action that requires the preparation of an EIS in accordance with NEPA, as amended. This Draft EIS was prepared in accordance with NEPA, and is intended to provide the public and decision makers with an opportunity to review and comment on a complete and objective evaluation of impacts that would occur from the Proposed Action, the Action Alternatives, and the No Action Alternative.

The BLM lands within the Project Area are managed under the existing Bradshaw-Harquahala Resource Management Plan (RMP). Under the Proposed Action, an amendment to the 2010 Bradshaw-Harquahala RMP would be necessary because a utility corridor for the proposed ROW on public land within the certificated route approved by the ACC along SR 74 was not established and high-voltage transmission lines crossing public land are required to be within designated utility corridors under the current RMP. In addition, the Visual Resource Management (VRM) Class designation would need to be amended from VRM Class III to VRM Class IV for those public lands where views would be dominated by the transmission line, and thus would not meet the current VRM objectives.

### **ES.3 SUMMARY OF PROJECT HISTORY**

In order to proceed with the steps to fulfill the identified need for added electric transmission capacity, APS initiated the applicable processes with the ACC. After review of the APS Application for a Certificate of Environmental Compatibility, the ACC Line Siting Committee recommended a route that was “certificated” by the ACC, portions of which were designed to avoid private property interests. This was the route that the ACC directed APS to follow for the Sun Valley to Morgan transmission line project, thus APS filed a ROW Application for Transportation and Utility Systems and Facilities on Federal Lands (SF-299) with the BLM to construct a 500/230kV transmission line within the ACC-certificated route. The route certificated by the ACC and requested by APS in their ROW application was not the original APS preferred route in its entirety, but was a blend of their preferred route and portions of their proposed alternative routes. This route was not in conformance with the BLM’s Phoenix RMP, which was in force at the time the ROW application was submitted; nor was it in conformance with the Bradshaw-Harquahala RMP, which was in force when the BLM rendered a decision on the APS ROW application. The APS ROW application was initially rejected for nonconformance with the RMP; however, the BLM ultimately agreed to consider an RMP amendment (RMPA) and process the ROW application.

### **ES.4 BLM'S PURPOSE AND NEED**

The BLM’s purpose and need for this action is to respond to APS’s application under Title V of the Federal Land Policy and Management Act of 1976 for a ROW grant to construct, operate, maintain, and decommission a transmission line and ancillary facilities in compliance with the Federal Land Policy and Management Act, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to amend the Bradshaw-Harquahala RMP, and whether to approve, deny, approve the APS ROW application with modifications, or select another alternative. The BLM would only be issuing decisions on those portions of the APS request that involve a ROW on public lands.

#### **ES.4.1 Purpose of the Action**

Specifically, the BLM’s purposes are as follows:

- To implement the Federal Land Policy and Management Act and the Bradshaw-Harquahala RMP by providing consistent land-management decisions based on the standards set forth by both authorities.

- To meet public needs for use authorizations such as ROWs, permits, leases, and easements, while avoiding or minimizing adverse impacts to other resource values and locating the uses in conformance with land-use plans.
- To process the ROW application submitted by APS to connect a 500kV/230kV transmission line from the Sun Valley to Morgan Substations in an expeditious manner.

#### **ES.4.2 Need for the Action**

The need for the BLM action is established by the BLM's responsibility under the Federal Land Policy and Management Act to respond to a request for a ROW grant while avoiding or minimizing adverse impacts to other resource values and locating the uses in conformance with land-use plans. The Federal Land Policy and Management Act also requires that the BLM "develop, maintain, and when appropriate, revise land-use plans."

### **ES.5 THE EIS DECISION FRAMEWORK**

The RMP amendment and EIS processes will inform two decisions to be made by the BLM. First, BLM will decide whether or not to amend the Bradshaw-Harquahala RMP, as necessary, for the proposed route on public land north and south of SR 74 to: a) include a single-use, utility corridor on public lands that would support a 500/230kV transmission line between the Sun Valley and Morgan Substations, or b) include a multiuse utility corridor that would contain the requested 200-foot wide ROW; and c) change the VRM Class from VRM Class III to VRM Class IV, as necessary, for the area affected by the corridor. Second, BLM will decide whether or not to approve, deny, or approve the APS ROW application with modifications, or select another alternative.

### **ES.6 PUBLIC INVOLVEMENT**

#### **ES.6.1 Public Scoping**

The BLM has taken a variety of steps to inform the public, special interest groups, and local, state, and federal agencies about the Proposed Action and Action Alternatives for the Project, and to solicit feedback from these interested parties to help shape the Project's scope and alternatives.

The BLM conducted internal agency and public scoping to solicit input and identify the environmental and social concerns and issues associated with the Project. A Notice of Intent was published in the *Federal Register* on April 11, 2011. Publication of the Notice of Intent initiated a 45-day formal public and agency scoping period, during which the BLM solicited comments regarding the Project and its potential impacts. The BLM prepared scoping information materials and provided copies to federal, state, and local agencies; Native American tribes; and members of the general public. Information regarding upcoming meetings and opportunities for comment was published in various local news media. The BLM conducted open house public scoping meetings to disseminate information, answer questions, and solicit comments on April 26, 2011, in Phoenix, Arizona; on April 27, 2011, in Wittmann, Arizona; and on April 28, 2011, in Peoria, Arizona. In addition to the public scoping, on June 8, 2011, an Economic Strategies Workshop was also conducted for this

Project to comply with the BLM's Land Use Planning Handbook during the EIS and Land Use Plan Amendment process. The purpose of the workshop was to identify to BLM, potential management opportunities that further the social and economic goals of area communities. The BLM also provided opportunities for comments to be submitted through the United States mail and via email.

## **ES.6.2 Issues Identified**

In addition to the comments received from the external scoping process, internal scoping identified either similar issues or additional issues covered in this Draft EIS and Draft RMPA. These issues were identified and addressed in data collection methodologies and baseline reports that are included in the Project Record and are incorporated into the appropriate sections of this Draft EIS and Draft RMPA. The nine issues identified from internal and external scoping are summarized below.

### ***Issue 1: Need and Reliability***

The analysis should evaluate the need for increased capacity and reliability of power infrastructure in the Phoenix metropolitan area. Project Area lands were a significant part of the Lake Pleasant Resource Conservation Area. The value of the lands for conservation versus the need for the project needs to be analyzed.

### ***Issue 2: Process, RMP Amendment, and Policy***

The Proposed Action route was approved by the ACC. Should any of the Action Alternative routes be selected, they would need ACC approval. The analysis should consider potential delay of the transmission line construction process due to any additional ACC approval requirements once the NEPA process is completed. The Project components north of SR 74 would require an amendment of the Bradshaw-Harquahala RMP. This process should consider the resource impacts of an amendment of the RMP; the appropriateness of amending the RMP in such a way that would benefit developers; and the flexibility of the RMP to address present and future planning needs.

The analysis should evaluate applicability of the BLM policy of co-locating transportation and utility corridors to the Project. The analysis should discuss applicability of federal and state policies regarding joint use corridors.

### ***Issue 3: Project Design Features, Mitigation Measures, and Alternatives***

Fencing to protect tortoises should be installed and access roads should be designed to minimize impacts to habitat. The distances between the transmission line and surface water in relation to water quality should be considered; for example, the impacts to public drinking water supplies if transmission lines or other components fall into the river or the Central Arizona Project canal. The alternative of constructing the transmission line underground needs to be evaluated, specifically routing under the Luke AFB auxiliary field. The alternative of aligning the transmission line route along the Central Arizona Project canal needs to be evaluated.

The placement of the Project in or near subdivisions should be avoided. The alternative of placing the transmission line in the Westwing Corridor needs to be evaluated. The analysis

needs to include compatibility of routes crossing non-BLM lands with approved land plans south of SR 74.

#### ***Issue 4: Air and Climate***

The Project would involve ground disturbance that may affect air quality in a designated nonattainment area.

#### ***Issue 5: Biological Resources***

The construction and operation of Project components could have an impact on wildlife and their habitats. North of SR 74, the Project could be within sensitive habitat or habitat for special status species. The area is already designated for approved off-road vehicles and grazing. Additional access to this area could lead to further habitat degradation.

The construction and operation of Project components could impact bird and bat habitat. Implementation of the latest guidelines for avian and bat protection will be critical to protection of these species.

The construction of Project components in proximity to the Agua Fria River and associated riparian vegetation could impact these resources.

#### ***Issue 6: Health and Safety***

Electromagnetic fields are thought to contribute to human health concerns. Existing and planned residences would be in proximity to the Proposed Action transmission line route south of SR 74, and thus potentially exposed to electromagnetic fields.

Lightning strikes to electric transmission facilities and other weather events can cause fires. The Project components that would be in proximity to the Thunder Ridge Airpark could impact that facility.

#### ***Issue 7: Recreation***

The Project may impact visual and recreation resources in the Hieroglyphic Mountains Recreation Area, Castle Hot Springs Special Recreation Management Area, and The Boulders Off Highway Vehicle (OHV) Staging Area. The construction disturbance may impact OHV trails. The analysis should evaluate the cost and effectiveness of rehabilitating construction disturbance in OHV areas (de facto creation of new roads/routes that could not be prevented or rehabilitated).

The Project would create access to currently undisturbed lands. The analysis should evaluate protection of recreational resources identified in the Bradshaw-Harquahala RMP. The analysis should evaluate the cumulative impacts of this Project on OHV multiuse trails state-wide in conjunction with renewable energy projects.

#### ***Issue 8: Socioeconomics***

The analysis should evaluate the direct, indirect, and cumulative impacts of the proposed Project on area property values, considering the already weakened housing market. The analysis should assess the impact of the Project on area property values resulting in reduced tax revenues, and this impact on state and local budgets and school funding, preventing economic growth and recovery. The analysis should evaluate compensation for homes taken as a result of the proposed Project.

The analysis should evaluate potential adverse impacts to socioeconomics of the recreation industry in Arizona. The land north of SR 74 (which includes BLM-managed lands) is used by a variety of recreational users, including OHV riders and hikers. Assess the potential for closure of existing trails and access points and the impacts to recreation in the area. The analysis should include potential impacts on the social and non-monetary values associated with recreation, such as community cohesion. This might also include the value of ecosystem services, which are goods and services provided by nature that bring value to human life, but generally lack market prices.

The analysis should evaluate the potential beneficial impacts to socioeconomics through local job creation, income generation, and development of renewable energy generation sites. The analysis should address the potential cumulative impacts from the increased capacity on future projects including renewable energy. The analysis should evaluate the environmental justice aspects of the proposed project.

### ***Issue 9: Scenic/Visual***

The Project would impact scenic views along the SR 74 corridor. The analysis should evaluate the short-term visual impact to travelers on SR 74 versus long-term visual impact to area residents who would view the Project all the time and consider this affecting their quality of life in terms of social considerations. The analysis should consider the quality of the lands north of SR 74 for conservation management by the BLM as opposed to expanded development into BLM lands. The analysis should revisit the major Bradshaw-Harquahala RMP issue of visual vistas associated with the Hieroglyphic Mountains and southern Bradshaws. The analysis should consider precedence for co-locating power lines and roads.

## **ES.7 ALTERNATIVES**

In addition to the Proposed Action and No Action Alternative, three Action Alternative routes and one Sub-alternative route are considered in detail in this EIS: Alternative 1: Proposed Action Route with Additional Corridor; Alternative 2: Route South of SR 74; Alternative 3: Carefree Highway Route; and Sub-alternative: State Trust Land Route Variation. The Action Alternatives have segments outside the ACC-certificated route. Implementation of those routes could only occur if the ACC amended the CEC that has been issued for the Project. The ACC's consideration of amending the CEC would open the entire route decision up for review and consideration, and would not be limited to discrete portions; a process that could conceivably be as lengthy and involved as the consideration of the original ACC application filed by APS. As a result, construction of the 500kV transmission line would be delayed by approximately one to three years (depending on whether the route would be a modification to an existing alternative or a new alternative route), and potentially the 230kV line as well, depending on the length of the ACC amendment process. These alternatives are briefly described below and described more fully in **Chapter 2**.

### **ES.7.1 Proposed Action**

From the Sun Valley Substation, the proposed route follows the Central Arizona Project canal for approximately three miles, portions of which would be within an existing BLM designated utility corridor, to approximately the 275<sup>th</sup> Avenue alignment. The route then turns northwest for approximately two miles following an existing 500kV transmission line.

At the Happy Valley Road alignment, the route turns north for approximately 4.5 miles, then east for approximately five miles paralleling the Lone Mountain Road alignment to the north. The proposed route then turns north following 235<sup>th</sup> Avenue for approximately 3.5 miles then east following the Joy Ranch Road alignment, for approximately seven miles until it approaches SR 74. The proposed route parallels the south side of SR 74 for approximately two miles before crossing and paralleling SR 74 to the north on BLM-managed public land for approximately five miles. The route again crosses SR 74 to parallel the south side of the highway for approximately three miles, crossing the Agua Fria River. The route then turns south for one mile, and turns east for less than one mile following the Cloud Road alignment to connect to the Morgan Substation.

Under the Proposed Action, the Bradshaw-Harquahala RMP would be amended to establish the needed 200-foot wide ROW as a single-use utility corridor on public lands along SR 74 and the VRM Class changed from VRM Class III to VRM Class IV within the transportation corridor on public lands north of SR 74 and within the entire key-shaped block of public lands south of SR 74.

### **ES.7.2 Alternative 1: Proposed Action with Additional Corridor**

Alternative 1 was developed to evaluate the establishment of a multiuse utility corridor as opposed to a single-use utility corridor as described under the Proposed Action. Under this alternative, the route of the proposed transmission line between the Sun Valley and Morgan Substations would be the same as the Proposed Action route. However, a multiuse utility corridor would also be established on BLM-managed public lands that would begin at the centerline of SR 74 and extend 0.5-mile north, and also include the entire key-shaped block of BLM lands south of SR 74. The Bradshaw-Harquahala RMP would also be amended to change the entire area contained within the multiuse utility corridor from VRM Class III to VRM Class IV.

### **ES.7.3 Alternative 2: ROW South of SR 74**

Under Alternative 2, a five-mile long segment that parallels the south side of SR 74 from the 163rd Avenue alignment to just west of the El Mirage Road alignment on private land would replace an approximately five-mile long segment of the Proposed Action north of SR 74 on public lands, likewise being located within a 200-foot wide ROW. Besides this five-mile long segment, all other segments of the Alternative 2 route would remain within the ACC-certificated route and would follow the Proposed Action route. Alternative 2 would also amend the Bradshaw-Harquahala RMP to establish a multiuse utility corridor on the entire block of BLM-managed public lands immediately south of SR 74 and to change the VRM designation from VRM Class III to VRM Class IV in this same entire block area.

### **ES.7.4 Alternative 3: Carefree Highway Route**

Alternative 3 would replace an approximately nine-mile long segment of the Proposed Action route north of SR 74 from the 179<sup>th</sup> Avenue alignment to the Morgan Substation by using the Carefree Highway alignment. The alternative extends south from the Proposed Action route at SR 74 along the 179<sup>th</sup> Avenue alignment and continues south two miles to the Carefree Highway alignment. The route then follows the Carefree Highway alignment east

for about 8 miles to about 99<sup>th</sup> Avenue, where the alignment approaches the existing Salt River Project Navajo 500kV and Western Area Power Administration 230kV transmission line corridor. From that point, Alternative 3 turns northeast and follows the transmission corridor to the Morgan Substation. Aside from this nine-mile long segment, all other segments of the Alternative 3 route would remain within the ACC-certificated route and would follow the Proposed Action route. Under Alternative 3 the Bradshaw-Harquahala RMP would not be amended.

#### **ES.7.5 Sub-alternative: State Trust Land Route Variation**

The Sub-alternative route would replace a four-mile section of the Proposed Action route that would also be common to all Action Alternatives; therefore, it could be combined with any of the Action Alternatives. The Sub-alternative route would begin at the intersection of 235<sup>th</sup> Avenue and the Cloud Road alignment, just north of US 60. From that intersection point, the Sub-alternative would parallel the north side of the Cloud Road alignment, east for three miles to the intersection with 211<sup>th</sup> Avenue. The Sub-alternative would then parallel the west side of 211<sup>th</sup> Avenue for one mile north, where it would rejoin the portion of the Proposed Action route that is common to all Action Alternatives at the Joy Ranch Road alignment. The entire four-mile length of the Sub-alternative route would be outside the ACC-certificated route. This Sub-alternative is being analyzed and presented only for environmental analysis purposes as requested by ASLD and does not affect the BLM's decision-making process as it would not require the BLM issuance of a ROW or an RMPA.

#### **ES.7.6 No Action Alternative**

Under the No Action Alternative the BLM would not issue a ROW, the Bradshaw-Harquahala RMP would not be amended to establish a single- or multiuse utility corridor, or to change the VRM Class; and the transmission line would not be constructed as described under the Proposed Action or Action Alternatives. There would be no Project impacts on the resources of the Project Area as described for the Proposed Action and Action Alternatives. However, APS is committed to construction of the transmission line, and could pursue other options to develop the Project without using public lands. Under this situation, impacts to resources located on lands that are crossed or in the vicinity of the Project could occur. The degree of potential for impacts to resources and the magnitude of those impacts would depend on the route selected.

Under the No Action Alternative, if APS were to pursue other potential routes outside the ACC-certificated route, implementation could only occur if the ACC amended the CEC that has been issued for this Project. Even if any future route would include portions of the previously certificated route, the ACC's consideration of amending the CEC would open the entire route decision up for review and consideration, and would not be limited to discrete portions; a process that could conceivably be as lengthy and involved as the consideration of the original ACC application filed by APS, taking approximately one to three years (depending on whether the route would be a modification to an existing alternative or a new alternative route).

## ES.8 ENVIRONMENTAL SETTING

The Project Area is within the North American Deserts Ecoregion (Level I division) and the Sonoran Basin and Range subdivision (Level III division). The subregion is distinguished by paloverde-cactus vegetation including saguaro, cholla, and agave cacti.

The Project Area is within the Basin and Range Physiographic Province. The climate of the province is characterized by being the driest in the United States. The topography is characterized by mountain ranges that are roughly parallel. The basins between the ranges are relatively flat plains with gentle slopes next to the mountains. The Project Area is in the Sonoran Desert subdivision of the physiographic province. The subdivision is characterized by being approximately 20 percent mountains and 80 percent plains. The mountains vary from hills and buttes up to mountains rising 4,000 feet above sea level. The desert plains mostly lie below 2,000 feet elevation.

The economy of the region has historically been based on irrigated agriculture, livestock grazing, and mining. Today federal and State Trust land includes commercial, recreational, range, and undeveloped lands. Private land includes residential, commercial, and industrial areas. The primary types of residential land adjacent to the Project Area are low- to medium-density suburban and rural areas. Commercial areas are sparse within the Project Area, although some recreational lands include a commercial component. The industrial land is mainly used for manufacturing, landfill, and mining operations.

The potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) is described in detail in **Chapter 3**. A total of 15 resources identified through public and agency scoping and collaboration with the Interdisciplinary Team are brought forward for analysis and described in **Chapter 4**.

## ES.9 ENVIRONMENTAL IMPACTS

Detailed descriptions of the impacts under the Proposed Action, each Action Alternative, and the No Action alternative are provided in **Chapter 4**, along with a discussion of potential mitigation measures, unavoidable adverse impacts, short-term uses versus long-term productivity, and irretrievable and irreversible commitments of resources that would result from implementation of the alternatives. Cumulative impacts to resource values and uses of the Project that would result from implementation of the Action Alternatives are also disclosed in **Chapter 4**. A summary describing the general conclusions of the effects analysis is presented below.

### ES.9.1 Air Quality and Climate Change

Emissions from construction equipment would result from the combustion of fossil fuels (primarily diesel fuel used in compression ignition engines) used to power construction equipment and would comprise the bulk of the total gaseous pollutants (carbon monoxide, volatile organic compound [VOC], nitrogen oxide [NO<sub>x</sub>], sodium oxide, green house gases [GHGs]) emitted from the Project. Exhaust from various types of construction equipment taken into consideration for emissions estimation include bulldozers, graders, cranes, pickup trucks, water trucks, hole diggers, backhoes, dump trucks, drills, pole haul trucks, drum pullers, tensioners, splicing equipment, 2-ton trucks, 5-ton trucks, and boom trucks. The

types of activities that would take place during the construction phase include access road construction, pad preparation, surveying, hole digging, foundation installation, hauling and erecting transmission line structures, conductor stringing (stringing of power lines), clean up, and reclamation.

The majority of the particulate emissions from the Proposed Action or Action Alternatives would be due to fugitive dust emissions caused by ground disturbance activities. Fugitive dust emissions particulate matter equal to or less than 10 microns in diameter (PM<sub>10</sub>) and particulate matter equal to or less than 2.5 microns in diameter (PM<sub>2.5</sub>) would result from earthmoving activities such as road construction, grading, land clearing, excavation, cut and fill operations, track-out emissions, and vehicular traffic over paved and unpaved access roads. Additional fugitive emissions would be generated due to windblown dust (erosion) from areas where the ground is disturbed and exposed to wind effects.

A portion of the Project would be constructed within the designated PM<sub>10</sub> non-attainment area. Due to its PM<sub>10</sub> non-attainment status, the Maricopa County Air Quality Department has instituted stringent fugitive dust control regulations and control measure requirements for earthmoving projects within the county. Therefore, routine watering would be required along with other mitigation measures to minimize fugitive dust emissions impacts.

Given the transient nature of the PM<sub>10</sub> and PM<sub>2.5</sub> emissions, and the fact that, even during peak construction activity, the resulting emissions represent relatively small increases (less than one percent) above the current emission rates in Maricopa County, it is highly unlikely that the Project would cause or contribute to an exceedance or violation of any applicable particulate standard.

Emissions calculations for the construction and operational phases of the Project demonstrate that PM<sub>10</sub>, NO<sub>x</sub>, and VOC emissions would be below de minimis levels for State Implementation Plan Conformity and therefore, the Project would be considered a minor source of air emissions and further analysis under the General Conformity Rule is not necessary. Although the Project would be a minor source for particulate emissions, the applicant-committed particulate control measures would serve to minimize particulate emissions due to ground disturbance activities (the largest contributor to PM<sub>10</sub>/PM<sub>2.5</sub> emissions), thereby ensuring compliance with State Implementation Plan requirements.

There is no established method to assess the impact of GHG emissions and in the absence of any applicable ambient standard or significance levels, a meaningful assessment of the climate change impacts of the GHG emissions cannot be determined. Therefore, the climate change impact analysis is limited to quantification of the GHG emissions.

## **ES.9.2 Cultural Resources**

Nine National Register-eligible cultural resource sites (i.e., historic properties) are known to be within the Proposed Action route. These include three historic sites, four prehistoric sites, and two multi-component sites. Transmission line structure placement would be modified to avoid and span National Register-eligible sites where possible. The physical destruction of or damage to all or part of eligible sites that cannot be avoided would destroy or diminish the characteristics that make them eligible for the National Register. Impacts could potentially be avoided through construction design modification or mitigated through data recovery studies.

Impacts would likely be minor to moderate and long-term. Impacts under any of the Action Alternatives would be similar to the Proposed Action.

No additional direct impacts to National Register-eligible cultural resources from operations, maintenance, and abandonment would be anticipated.

Unless fenced or otherwise protected, National Register-eligible sites within the long-term transmission line ROW could be inadvertently impacted during operation and maintenance of the transmission line facilities. A long-term monitoring program would be implemented to regularly assess and document the condition of sites and to identify and implement measures to reduce any observed or ongoing damage.

Indirect visual impacts to the setting of National Register-eligible cultural resources were evaluated for the Beardsley Canal, the Calderwood Butte Archaeological District, the Morristown Store, the Santa Fe, Prescott, & Phoenix Railway, the Seymour III site, and the Surly site. The introduction of the Proposed Action in these sites' settings would not diminish the characteristics that make them eligible for the National Register.

There would be no direct or indirect construction or operational impacts to known sacred sites or natural features of cultural and/or geographic interest to Indian tribes. However, tribes have expressed concern about effects to prehistoric sites they regard as ancestral. Hohokam sites along the Agua Fria River, some of which may contain human remains, are of particular concern.

### **ES.9.3 Geology and Minerals**

Construction activities for the transmission line could locally alter surface topography if large cut and/or fill earth moving work is needed to install the transmission line structures or construct access roads. The Proposed Action and Action Alternatives would have a negligible impact on the exploration for and development of leasable mineral resources and no impact on development of saleable mineral resources within the Mineral Restriction areas. There would be a negligible impact on the ability to develop and mine a sand and gravel resource that would be crossed under the Proposed Action or Action Alternatives. The Project would not be expected to impact any existing mining activities.

### **ES.9.4 Hazardous Materials and Hazardous and Solid Waste**

All Action Alternatives would involve the use of hazardous materials and generation of solid and hazardous waste during construction and operation of the Project. Certain chemicals and materials that would be used are characterized as hazardous materials. Potential effects from the Project involving hazardous materials would be associated with the release of hazardous materials to the environment due to improper use, storage, or disposal of hazardous materials and/or generating contaminated soil from releases of hazardous materials. Direct effects of such releases could include contamination of vegetation, soil, and water, which could result in indirect effects to human and wildlife populations. These effects have the potential to occur during construction, operation, maintenance, and decommissioning of the Project.

With adherence to applicable laws and regulations as well as applicant-committed environmental protection measures, hazardous materials would be properly handled and all wastes would be properly contained, transported, and disposed of offsite. There should be no

impacts to workers, the general public, surrounding soils, surface water, or groundwater. A variety of safety-related plans and programs would be implemented to ensure safe handling, storage, and use of hazardous materials.

### **ES.9.5 Land Use and Range Resources**

The amount of BLM lands that would be crossed/affected varies by alternative; however, in all cases the amount would be proportionally small compared to the total amount of BLM lands within and adjacent to the Project Area. Because the portion of BLM lands where the land use would be affected by the Proposed Action or any of the Action Alternative routes would be relatively small, overall impacts to BLM-managed land use would be minor, regardless of alternative.

Private and State Trust lands crossed by the ROW under all Action Alternatives are predominantly undeveloped, with much of the State Trust land used as grazing allotments. Addition of the proposed transmission line and associated disturbance (such as a centerline access road) would reduce the acreage available for grazing. Similar to the BLM lands discussed above, the amount of private and State Trust lands crossed/affected varies by alternative; however, in all cases the amount would be proportionally small compared to the total amount of private and State Trust lands within and adjacent to the Project Area. Because the portion of private and State Trust lands where the land use would be affected by the Proposed Action or any of the Action Alternative routes would be relatively small, overall impacts to land use would be minor, regardless of alternative.

Existing ROWs on BLM-managed land that would be crossed by the Proposed Action and Action Alternatives consist of various transmission, distribution, and communication lines; roads, and easements. The crossing of existing BLM ROWs by the proposed ROW under the Proposed Action or any of the Action Alternatives should not affect the management or administration of the existing ROWs. There would be no land use impacts to existing commercial or industrial areas, or utilities under the Proposed Action or any of the Action Alternatives.

Under the Proposed Action and all Action Alternatives one percent or less of the portion of each grazing allotment to be crossed and less than one Animal Unit Month for each grazing allotment would be impacted in the short and long term. Therefore, the Proposed Action would have a negligible effect on grazing allotments. No reduction of any Animal Unit Months should be required. However, during construction activities, animals using the various allotments where activities are occurring would likely be temporarily displaced from the immediate area until construction activities are completed.

### **ES.9.6 Public Health and Safety**

Noise during construction would be associated with the equipment used for the installation activities. The closest residential area, common to all the Action Alternatives, would be residences on West Myers Street, near N. 235<sup>th</sup> Avenue, which are less than 0.25 miles from the ROW. Maximum construction noise levels are expected from use of helicopters during conductor stringing and from heavy equipment used during construction activities on the ROW. It is expected that maximum noise levels at 50 feet from the helicopter would be 105 dBA and from heavy equipment at 50 feet to be in the range of 83 to 85 dBA. Sound levels

are expected to diverge in open air resulting in a 6-dBA decrease for each doubling of distance from the source. The maximum noise levels would be intermittent and temporary, as construction activities proceeded along the ROW, and would be incurred only during daylight (normal working hours; see **Section 2.9.6**).

Electro Magnetic Fields and their effects are essentially equivalent among all Action Alternatives. During normal operation and maintenance of any of the Action Alternatives, the expected range of Electromagnetic fields is between 8 and 20 milliGauss, which also accounts for additive effects of paralleling other 500kV and 230kV lines that may be crossed. Other, smaller (69kV) lines may also be crossed, but would result in Electromagnetic fields less than or similar to the projected range. The expected range of Electromagnetic fields is at least two orders of magnitude less than the recommended exposure limit of 2,000 milliGauss. The Electromagnetic fields would thus be measureable but small, resulting in a minor but long-term impact, similar among all of the Action Alternatives.

Fire danger during construction activities associated with the Project under all Action Alternatives would be associated with equipment operations, personnel actions, and materials handling along the ROW during the construction activities. Construction activity could result in increased potential for fire in the ROW due to such occurrences as equipment or material sparks, workers smoking, or disturbances which cause non-native fire prone vegetation to establish itself. As the construction activities progress along the ROW, that particular section would be exposed to somewhat increased fire risk due to those activities and machinery presence. The increased risk would then subside as the construction activity progresses further down the ROW.

Fire danger during operation of the transmission line would be associated with increased risk due to the physical presence of the transmission line and the conveyance of electrical energy over the electrical conductors. Physical presence of the transmission line may increase the likelihood of lightning strikes in the vicinity of the transmission line and structures, which would lead to a small increased risk of lightning caused fires along the entire route of the Project. Shield wires would be installed near the top of the structures and above the conductors, which would minimize the chance of lightning strikes. Additionally, mechanical malfunction or failure of transmission line components would have an associated risk of increased fire danger in the vicinity of the transmission line ROW. This increased risk would be present during the operational lifetime of the Project.

### **ES.9.7 Paleontology**

The paleontological records search report indicates that there are no known vertebrate fossil localities within one mile of the Project Area and the potential for significant paleontological resources ranges from very low to unknown. The Potential Fossil Yield Classification assessment along with the Paleontological Potential of Rock Units assessment and the literature review suggests potential for significant vertebrate fossils is unlikely for the Project Area. If environmental protection measures and best management practices are implemented, impacts to paleontological resources would be negligible to minor and long-term.

## **ES.9.8 Recreation and Special Designations**

Construction of the transmission line on BLM-managed public lands would affect the recreational experience in the short term through the activity and noise associated with construction activities. Access to portions of the Castle Hot Springs Special Recreation Management Area may be prohibited for short periods of time. The main short-term impact related to OHV recreational use would be decreased OHV trail availability during construction. OHV users would temporarily have decreased access into the Castle Rock Springs Special Recreation Management Area and the Resource Management Zones within it.

Under the Proposed Action the impacted routes represent approximately three percent of two-track trails in the Study Area. The impacted routes would be opened again after construction. The centerline access for construction would be designated an Administrative road, which would be closed to recreational use after completion of construction. The road would be patrolled and the prohibition of recreational use enforced; however, single-track trail users would be permitted to intersect the centerline access road and continue along the single-track routes. As a result, there would be no loss of single-track trails. Under Alternative 2, single-track trails, heavily used OHV recreation resources north of SR 74, and The Boulders Staging Area would not be affected.

Of the 18 Special Recreation Permits identified within or adjacent to the Project Area for commercial and competitive uses such as organized group events and activities, ten could be affected by the construction and/or presence of the transmission line under the Proposed Action and Action Alternatives.

There would not be any effect to lands with special designations under the Proposed Action or any of the Action Alternatives.

## **ES.9.9 Socioeconomics and Environmental Justice**

Project construction costs range from \$101 to \$104 million dollars depending upon the Action Alternative selected. Right-of-way acquisition costs range between an additional \$23 to \$29 million dollars depending upon the Action Alternative selected. The construction of the transmission line would have a beneficial effect on employment, labor income, value added, and output in Maricopa County. These effects would be minor and short-term, and terminate with the completion of the transmission line. Some of these temporary benefits could flow to communities within and adjacent to the Project Area. Although anticipated to be negligible, the economic effects of operating and maintaining the transmission line would be beneficial and long-term.

Economic effects would occur to property taxes as the Project would change land use patterns and potentially affect the property taxes paid on the affected land. Impacts to property values from the Project would occur to property located within 200 feet of the transmission line or to private property adjoining the ROW. Presently there are no residential structures within 200 feet of the transmission line under the Proposed Action, Alternatives 1, 2, or 3; therefore, the effects would be to undeveloped land under these alternatives. Under the Sub-alternative route, four residences appear to be within 200 feet of the transmission line, and 20 to 30 residences may be on properties that would adjoin the ROW. The potential

effects on undeveloped land values range from 0 to 34.0 percent depending on location, available amenities, and current market conditions. The effects to land owners could be adverse, minor, and short-term.

Private land acquired for the Project would change land use patterns and could potentially affect the property taxes paid on this land. The presence of a transmission line could negatively affect the assessed value of the lands crossed. A decrease in assessed valuation could result in a decrease in tax revenue. Offsetting the potential loss of tax revenue would be property taxes paid by APS on the value of installed equipment on the land; however, this net increase in tax revenue would be a relatively small proportion of property tax revenue generated within the county. The net effect on property tax revenue, under current land uses of private properties located within 200 feet of the transmission line is beneficial, minor, and long-term.

State Trust lands would be affected as they would be leased to APS and removed from future development or sale, and impacting to current grazing activities. Indirect socioeconomic impacts to recreation use, ecosystem services, and quality of life issues (i.e. visual, recreation, and health and safety concerns) would also occur from the Project. Impacts could be short-term related to temporarily closing trails and OHV routes and long-term related to the visual impacts to the scenic views and changes in the recreation experience. Due to insufficient data, the magnitude of short- and long-term effects cannot be estimated.

Regarding Environmental Justice, one low-income population was identified at the census tract block group scale within the Project Area. The Project route would cross through approximately 3.3 miles of this tract; the majority of which would be situated on State Trust land. The Environmental Justice issues of concern from the Project involve aesthetic and economic impacts that would affect the Environmental Justice minority population census block group. Analysis found that proportions of the route affecting private developed/occupied property within the EJ community versus outside the EJ community, and proximity of the ROW to private developed/occupied property do not indicate a disproportionate effect.

### **ES.9.10 Soils**

Direct physical impacts would occur to 22 different soil types under the Proposed Action or any of the Action Alternatives and would include compaction and crushing of the topsoil by equipment during salvage, stockpiling, construction, and reclamation activities. Physical effects of soil compaction would be short-term, minor to moderate, and include reduced permeability and porosity, damage to microbiotic crusts, increased bulk density, decreased available water holding capacity, and increased erosion potential. Soil microorganisms such as bacteria and fungi, important in the decomposition of biological materials and the formation and improvement of soil, would be impacted. Natural processes, such as wind and water transport of soil particles from surrounding areas would continually inoculate the site with these microorganisms.

After construction activities, all work areas identified as temporary disturbance would be reclaimed and salvaged topsoil would be re-distributed. With the implementation of topsoil salvage and reuse practices, soil conservation measures, best management practices, and

other proposed operating procedures, impacts to the temporarily disturbed acres of the soil resource would be site-specific, temporary, and moderate.

Long-term operations and maintenance of the transmission line facilities may require access to the route via existing roads, and may result in temporary disturbance; however, this effect would be minor to negligible.

### **ES.9.11 Transportation and Traffic**

The majority of effects to transportation and traffic would occur during the estimated 22-month construction phase of the proposed Project. Under all Action Alternatives, various combinations of local arterial and collector roads would be required for continuous access. The majority of these access routes would utilize existing public streets, highways, private roads, and adjacent gravel/unsurfaced roads. A portion of needed access would require either improvements to existing roads or the development of new roads, with associated ROW approval for all the roads.

In general, all construction access roads developed/improved outside the transmission line ROW would be reclaimed at least back to their original, pre-disturbance condition. Therefore, these access roads would be considered temporary, especially because some of the proposed access roads outside the ROW are already trails and/or two-track unsurfaced roads.

All construction access roads developed/improved inside the transmission line ROW would not be reclaimed and therefore would be considered permanent.

Under the Proposed Action or Action Alternatives there would be a total of approximately 8.5 to 9.5 miles of temporary access roads constructed/improved outside of the ROW, and approximately 38 miles of permanent, access road constructed approximately parallel and/or along the centerline of the ROW.

Construction-related traffic would vary according to the phase of the construction, and would move with the progress of the construction. The Project is expected to generate 21,712 vehicle trips during the 22-month construction period. These trips would all occur on SR 74 and US 60. The greatest increase in traffic would occur during the conducting phase of construction; 32 construction-related vehicle trips per day would occur on SR 74 and US 60 for 80 days. This represents less than a one percent increase in daily traffic on these two roadways, which while measurable, is unlikely to be noticed by other motorists. Therefore, the increase in traffic due to Project construction represents a minor, short-term adverse effect.

### **ES.9.12 Vegetation Resources, Including Noxious and Invasive Weeds, and Special Status Plants**

The Proposed Action and all Action Alternatives contain a very similar amount of (estimated) temporary and permanent disturbance. The two main vegetation types within the ROWs, creosote-white bursage desert scrub and Sonoran paloverde mixed cacti desert scrub, are also similarly distributed. Creosote-white bursage desert scrub occurs mainly west of US 60, where the Proposed Action and Action Alternative routes follow the same alignment, and Sonoran paloverde mixed cacti desert scrub occurs mainly east of US 60. The adverse impacts under all Action Alternatives from disturbance of both desert scrub vegetation types

would be long-term and minor, because the removal of this vegetation would only be measurable on the scale of local communities immediately adjacent to the ROW.

Riparian habitats (Riparian Mesquite Bosque and Riparian Desert Shrubland) within the ROW would be avoided and would not be disturbed by construction activities.

The crushing or removal of special status plant individuals would impact individual plants as well as reduce local population sizes if the species is common. Many salvage-restricted native plants were found throughout or in large parts of the Project Area. Pre-construction surveys would locate special status plant individuals in the construction zone and any that cannot be avoided would be relocated/transplanted in accordance with the Arizona Native Plant Law. However, not all relocated/transplanted individuals are expected to establish after re-planting due to arid conditions and stress. Large numbers of individuals would likely be removed permanently. In addition, suitable habitat for these species would be lost within the ROW as the ground is disturbed. Impacts would be moderate and long-term for most salvage-restricted species, including saguaro, teddybear cholla, straw-topped cholla, tree cholla, Engelmann's hedgehog cactus, California barrel cactus, ocotillo, and yellow-spine prickly pear. Impacts would be moderate because these species are common in the area (particularly within paloverde scrub habitat east of US 60) and local population distributions may be adversely affected due to the number of individuals removed.

Hohokam agave, a Sensitive species that has shown declines, would be adversely affected at the population scale by a loss of individuals. A biological monitor onsite would ensure that Hohokam agave individuals would be avoided. However, river terraces (suitable habitat) may be disturbed under any Action Alternative. If individuals are present, the loss of suitable habitat in the occupied area would be moderate and long-term.

Bigelow's onion, a salvage-restricted species that may occur around the Agua Fria River, would be avoided if possible, or salvaged. Suitable habitat would be disturbed, thus a loss of suitable habitat would occur under all Action Alternatives. These impacts would be long-term and minor, because only habitat in the local area (immediately surrounding the Agua Fria River) would be affected.

The likelihood of invasive and noxious species introduction differs for each invasive and noxious species. In general, invasive and noxious weeds reproduce by seed and are spread rapidly and effectively by animal vectors, vehicles, wind, water, or physical movement (such as Russian thistle). Several invasive and noxious plant species were observed within and adjacent to the Project Area, within roadways, disturbed areas, and in ditches and drainages. If noxious weeds are already present at a site, disturbing the plants would likely facilitate the physical spread of seeds, and disturbing adjacent ground would open up space for new individuals to invade. Thus, any surface-disturbing activity in the vicinity of invasive or noxious plant species increases the potential for further spread and establishment of those species. Impacts from invasive and noxious plant species under any Action Alternative would be short-term and minor, considering mitigation measures.

### **ES.9.13 Visual Resources**

Visual contrast between the proposed Project and the surrounding landscape would vary from none to strong, depending on where the Project would be viewed from. The Proposed Action would comply with the visual components of the Town of Buckeye General Plan and the City of Peoria General Plan, where applicable.

The Proposed Action would meet the BLM VRM class objectives for the portion of the project within the existing BLM-designated utility corridor in the southern portion of the Project Area. The transmission line would dominate the view within an estimated 800 feet of the transmission line, and in these areas on BLM-managed public lands in the vicinity of SR 74 would not meet VRM Class III objectives. The Proposed Action would meet VRM Class objectives on approximately half of the VRM Class III-designated lands north of SR 74 and approximately 75 percent of the Class III-designated lands south of SR 74. However, the RMPA would change the VRM Class from Class III to Class IV and the transmission line would meet VRM Class IV objectives.

The overall long-term impacts under the Proposed Action are as follows:

- Portion of the route common to all Action Alternatives (both on and off BLM-managed public lands) – Minor
- Portion of the route on BLM-managed public lands within the linear KOP - Major
- Portion of the route on all other lands - Minor
- Views from SR 74 – Moderate
- Castle Hot Springs Special Recreation Management Area – Minor to Moderate
- Lake Pleasant Regional Park – Negligible to Minor

In the area where the transmission line would dominate the view on BLM-managed public lands, it would be a very discordant element; however, it would not affect the Scenic Quality rating assigned to the Scenic Quality Rating Unit, and there would be no effect to the Visual Resources Inventory.

### **ES.9.14 Water Resources**

If the estimated short-term, average 48,000 gallons per day (33 gallons per minute) of construction water were sourced from surface water, it would be leased or purchased from an existing municipal or agricultural user. This water would not likely come from one of the washes within or near the Project Area, because they only flow ephemerally and are not reliable water sources. If construction water were sourced from either of the two major streams in the area (the Agua Fria and Hassayampa rivers), it would likely be obtained from reservoirs upstream of the Project Area or from one of the distribution canals such as the Central Arizona Project. Project impacts to volume, timing, and/or extent of surface water flow resulting from this water usage would be negligible because the quantity would be small, the period of use would be temporary, and it would represent an alteration of an existing use rather than a new use.

If the estimated construction water were sourced from groundwater, it would be leased or purchased from an existing well owner. The existing well would likely be situated in the alluvial aquifer of the Phoenix Aquifer Management Area. Due to the small amount of water required, the well owner would not need a grandfathered right or withdrawal permit to pump from the Aquifer Management Area. Further, Project use would not represent a new groundwater withdrawal, and would therefore have a negligible impact on groundwater quantity or levels in the alluvial aquifer.

Construction activities almost always have the potential to locally increase runoff due to vegetation removal, soil compaction, and drainage path modification. The ephemeral washes within or adjacent to the Project Area are naturally subject to very wide fluctuations in discharge that occur on an erratic basis and their channel characteristics have been formed accordingly. If minor changes in runoff characteristics did occur, they would not be likely to have a noticeable effect on channel morphology or these channels' abilities to provide for flood control, energy dissipation, and sediment movement.

Similarly, construction activities generally have the potential to increase turbidity, suspended sediment concentrations, and/or dissolved mineral concentrations, either due to erosion of upland soils or in-stream bed and bank erosion. However, local surface waters are likely naturally high in turbidity because of suspended particulates and likely to contain naturally occurring constituents that are leached from the soils, including minerals and salts. Any increases that may be due to construction activities would likely be negligible or minor due to the limited and dispersed disturbance acreage and the implementation of erosion and runoff control best management practices.

Although construction-related disturbances would occur throughout the ROW, and thus would be done within or proximate to ephemeral drainages, APS does not plan to place transmission line structures, anchors, or other permanent structures within the drainage channels. Instead, all washes would be spanned. This would help to minimize water quality degradation (such as increases in turbidity, suspended sediments, or minerals). It would also help to minimize impacts to riparian vegetation, if any, associated with the drainage channel, which in turn would also help to maintain water quality. Even the widest channel (the Agua Fria River crossing) under all Action Alternatives would be well within the allowable span length. However, given the width of floodplains, some structures may inevitably need to be located within the floodplain.

Although the footprint of permanent structures placed within the floodplain would be small, these structures could possibly impede flood flows or redirect flood flows to areas not currently within a flood hazard area by raising the base flood elevation. However, APS would obtain proper permits for such locations and conduct any necessary assessments including scour analysis and/or potential for flow displacement.

The Proposed Action and other Action Alternatives would each cross more than 500 drainages (both jurisdictional and non-jurisdictional). The number of jurisdictional drainages that could be impacted by each alternative would be similar for the Proposed Action and Action Alternatives. The acreage of disturbance, both short- and long-term, would be relatively similar and would have the same impact potential under all Action Alternatives.

## **ES.9.15 Wildlife Resources, Including Special-Status Wildlife and Migratory Birds**

Direct impacts to small mammals and reptiles would occur during construction activities when individuals are unable to move away from vehicles and other heavy equipment. Mortality would occur when individuals are buried or run over by equipment; many small mammals and reptiles utilize small burrows underground, so these impacts are particularly likely if individuals stay underground within the direct disturbance area instead of moving to adjacent habitat. In general, large mammals would not be directly impacted by construction equipment because they would move away from the disturbance area or could be easily seen and avoided.

The removal of desert scrub habitats for either temporary or permanent uses under any Action Alternative would essentially be a permanent removal of habitat for wildlife and special status species. Sonoran desert vegetation is slow-growing and although annuals would colonize in the short-term following disturbance, a stable, perennial community would not emerge for the long-term. Impacts to wildlife and special status species from desert scrub habitat losses would be minor because only wildlife individuals in the area immediately within and adjacent to the ROW would be adversely affected, and there would be no change to species' distributions.

Riparian areas and desert washes are high-value centers of biodiversity and are used by a wide variety of wildlife, including special status amphibians, birds, and mammals. Riparian areas would be avoided and would not be disturbed by construction activities. Impacts from habitat losses to species that utilize riparian habitats, therefore, would be negligible. Desert washes containing seasonal flows or riparian vegetation would be avoided if possible. The loss of desert wash habitat, if it occurred, would be long-term and moderate for two special status species: crissal thrasher and Lucy's warbler. Habitat capability for these species would be adversely affected by the loss of these areas. Desert washes are mainly present west of the Action Alternative routes (i.e., Hieroglyphic Mountain area), so any disturbance to these areas would be the same under all Action Alternatives.

Smaller mammals and reptiles would be affected by noise if individuals cannot escape by fleeing the construction area or by finding refuge underground. Hearing capabilities in these individuals may be damaged for the short- or long-term and may affect predator detection abilities. These impacts would be minor, as only individuals in the immediate vicinity of construction activities would be affected. Larger mammals such as coyotes or badgers would move away from construction noise, would be displaced for the duration, and may return to the area following construction activities. Other species that may be using the area for foraging would be similarly displaced.

The Proposed Action and Action Alternative routes cross varying amounts of Category II and Category III tortoise habitat. Disturbances and degradation of tortoise habitat would be avoided or minimized during construction. The maximum amount possible of tortoise habitat would be maintained within the footprint of the alternative route in order to ensure the existence of viable populations within suitable habitat. Any disturbance of Category II and Category III tortoise habitat would be compensated at a rate determined by the BLM and APS. BLM's mandate is "no net loss" of desert tortoises or habitat.

Pre-construction surveys would be implemented during the nesting season to locate raptor and other migratory bird nests. If a nest is found, a timing or spatial buffer may be implemented following BLM guidelines. Incidental take of migratory birds is not permitted under BLM policy. Nests would be avoided; however, some nests may be within a larger radius where noise impacts may still be present, but would not cause adverse reproductive effects. In addition, many migratory birds would be present and not nesting in the area; these individuals would simply avoid the noise. Impacts to migratory birds from noise would be short-term and minor, as only individuals in the local area would be affected.

## **ES.10 POTENTIAL MITIGATION MEASURES**

Under the Proposed Action and all Action Alternatives, applicant-committed environmental protection measures and best management practices would be implemented to minimize adverse impacts to sensitive environmental resources (see **Section 2.4.5**).

Under all Action Alternatives, APS would comply with applicable laws, ordinances, regulations, and standards, and would obtain and meet the requirements of all necessary permits. Resource specific laws, ordinances, regulations, and standards are presented in **Chapter 3** and, as applicable to the analysis, **Chapter 4**.

Potential mitigation measures are also proposed for individual resources in **Chapter 4**. Potential mitigation includes additional means, measures, or practices not incorporated into the Proposed Action or Action Alternatives that would further reduce or eliminate impacts. Unavoidable adverse impacts that would persist following implementation of potential mitigation measures are addressed immediately following each potential mitigation measures section in **Chapter 4**.

## **ES.11 AGENCY PREFERRED ALTERNATIVE**

The BLM has identified the Proposed Action route crossing public lands managed by the BLM as the Agency Preferred Alternative route for the proposed transmission line. Under the Agency Preferred Alternative, the BLM would approve a 200-foot wide ROW within the existing designated utility corridor northeast of the Sun Valley Substation. In addition, the BLM would amend the Bradshaw-Harquahala RMP to:

- Designate a single-use 200-foot wide utility corridor on BLM-managed public lands north of SR 74,
- Designate a multiuse utility corridor within the key-shaped piece of BLM-managed public lands south of SR 74, and
- Change the existing VRM Class designations of portions of BLM-managed public lands north and south of SR 74 from VRM Class III to VRM Class IV to allow for the newly established utility corridors.

Upon amendment of the Bradshaw-Harquahala RMP, the BLM would approve a 200-foot wide ROW following the Proposed Action route within the newly designated utility corridors.

The Preferred Alternative will reasonably accomplish the purpose and need for the federal action, while fulfilling the BLM's statutory mission and responsibilities, giving consideration to environmental, economic, and technical factors. This action is responsive to public input for avoiding environmental and economic impacts to lands in the project vicinity.

## **ES.12 AGENCY CONSULTATION AND COORDINATION**

A total of 33 agencies were sent a letter inviting them to participate as a cooperating agency. Six agencies have accepted to participate; the following federal, state, and local agencies have signed on and been consulted during preparation of the EIS as Cooperating Agencies:

- U.S. Environmental Protection Agency
- U.S. Air Force - Luke Air Force Base
- Arizona State Land Department
- Maricopa Association of Governments
- City of Peoria
- City of Surprise

The BLM contacted the following eight American Indian tribes to notify them of the Proposed Action and initiate formal consultation in preparation of the EIS: Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Ak-Chin Indian Community, Tohono O'odham Nation, Yavapai Prescott Tribe, Yavapai Apache Nation, Fort McDowell Yavapai Nation, and the Hopi Tribe. In recognition of the special relationship with the United States government, the BLM will continue to consult with the appropriate tribal governments at an official, executive level (government-to-government) in accordance with the National Historic Preservation Act and other relevant legal authorities. The BLM will provide opportunities for government officials of federally recognized American Indian tribes to comment on and participate in the preparation of the EIS through review of the cultural resource inventory report prepared for this Project and will consider comments, notify consulted tribes of final decisions, and inform them of how their comments were addressed in those decisions. Tribes have expressed concern regarding amending the Bradshaw-Harquahala RMP and impacts to prehistoric sites. BLM conducts formal Section 106 consultation with the SHPO concurrently with tribal consultations.

## **ES.13 DRAFT ENVIRONMENTAL IMPACT STATEMENT DISTRIBUTION AND PUBLIC COMMENTS**

The Draft EIS review period was initiated by publication of the Notice of Availability in the *Federal Register* on November 9, 2012 with the 90-day comment period ending February 8, 2013. A total of 131 CDs and/or hardcopies of the Draft EIS were distributed to interested parties identified in the EIS mailing list.

Three public hearings were held December 10, 11, and 12, 2012 in Peoria, Wittmann, and Phoenix, respectively. The hearings began each evening at 6:00 PM and continued until 8:00 PM. Each public hearing opened with an open-house style arrangement, where attendees could view Project maps and other Project information. During the public hearing portion of the meetings, the BLM provided a brief Project overview prior to hearing oral comments. A

court reporter was present during the public hearing portion of the meeting, who recorded the BLM's presentation as well as all oral comments made by the public.

A total of 1,279 comment letters and emails were received from the public after publication of the Draft EIS. This included one special interest group form letter (i.e., email campaign) and five other email form letters originating from individual interested parties; and the oral comments presented at the Draft EIS public hearings. All comments on the Draft EIS that were received were read and given careful consideration (**Chapter 6**). Text revisions were made as appropriate and are reflected in this Final EIS (see **Section ES.1**).

## **ES.14 NEXT STEPS**

Following the 30-day availability period for the Final EIS and the 60-day Governor's Consistency Review period that run concurrently (required because of the Draft RMPA) the BLM will prepare two Records of Decision (ROD). Two separate decisions will be made, each requiring its own ROD: one decision regarding amendment of the Bradshaw-Harquahala RMP and one decision regarding the transmission line Project ROW. The BLM RODs will be distributed to individuals and organizations identified on the updated Project mailing list and will also be available via the Project website. A Notice of Availability for the RODs will be published in the *Federal Register*. A news release will be made to the same newspapers used for previous Project announcements. The RODs are currently planned for completion in the fall of 2013.

This page intentionally left blank.

# TABLE OF CONTENTS

## VOLUME I

<b>EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>CHAPTER 1 INTRODUCTION, PURPOSE AND NEED .....</b>	<b>1-1</b>
1.1 Introduction .....	1-1
1.1.1 Project Overview.....	1-1
1.1.2 Project History .....	1-2
1.2 Applicant’s Objective.....	1-6
1.3 BLM’s Purpose and Need .....	1-7
1.3.1 Purpose of the BLM Action .....	1-7
1.3.2 Need for the BLM Action.....	1-7
1.4 Lead and Cooperating Agencies .....	1-8
1.5 Regulatory Framework.....	1-8
1.5.1 NEPA and Plan Amendment Process.....	1-8
1.5.2 Relationship to Policies, Plans, and Programs .....	1-10
1.5.3 Applicable Laws and Regulations .....	1-13
1.5.4 Permits Required or Potentially Required.....	1-14
1.6 Tribal Consultation and Coordination .....	1-18
1.7 Scoping and Public Involvement .....	1-19
1.7.1 Federal Register Notice of Intent .....	1-19
1.7.2 Mailings, Posters, and Email Notifications .....	1-19
1.7.3 Media Contacts.....	1-20
1.7.4 Public Scoping Meetings.....	1-20
1.8 Issues Identified During Scoping.....	1-21
1.9 Organization of the EIS .....	1-27
<b>CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES .....</b>	<b>2-1</b>
2.1 Introduction .....	2-1
2.2 Development of Alternatives .....	2-2
2.3 Description of Potential RMPA and ROW Actions.....	2-3
2.3.1 Resource Management Plan Amendment .....	2-3
2.3.2 Issuance of Rights-of-Way.....	2-4
2.4 Proposed Action.....	2-5
2.4.1 Proposed Facilities and Infrastructure .....	2-6
2.4.1.1 Transmission Line Support Structures.....	2-7
2.4.1.2 Transmission Line Hardware .....	2-8
2.4.1.3 Access Roads.....	2-8
2.4.1.4 Temporary Use Areas.....	2-9
2.4.2 Construction.....	2-10
2.4.2.1 Overview.....	2-10
2.4.2.2 Construction Requirements .....	2-10

2.4.2.3	Preconstruction Activities .....	2-13
2.4.2.4	Clearing and Grading .....	2-14
2.4.2.5	Transmission Line Construction .....	2-15
2.4.2.6	Special Construction Techniques .....	2-16
2.4.2.7	Safety Requirements during Construction .....	2-16
2.4.2.8	Cleanup and Site Reclamation .....	2-17
2.4.2.9	Temporary Disturbance Estimates .....	2-18
2.4.3	Operations and Maintenance .....	2-18
2.4.3.1	ROW Safety Requirements .....	2-19
2.4.3.2	Transmission Line Inspections and Maintenance .....	2-19
2.4.3.3	Permanent Access Roads along the ROW .....	2-20
2.4.3.4	Vegetation Management .....	2-20
2.4.3.5	Permanent Disturbance around Structures .....	2-22
2.4.3.6	Emergency Response and Fire Protection .....	2-22
2.4.3.7	Permanent Disturbance Estimates .....	2-23
2.4.4	Termination, Decommissioning, and Reclamation .....	2-23
2.4.4.1	Removal of Conductor and Structures .....	2-23
2.4.4.2	Obliteration of Structure Foundations .....	2-23
2.4.4.3	Reclamation of Roads .....	2-24
2.4.4.4	Stabilization and Revegetation of Disturbed Areas .....	2-24
2.4.5	Applicant-Committed Environmental Protection Measures and Best Management Practices .....	2-24
2.5	Action Alternatives .....	2-25
2.5.1	Alternative 1: Proposed Action with Additional Corridor .....	2-25
2.5.2	Alternative 2: ROW South of SR 74 .....	2-26
2.5.3	Alternative 3: Carefree Highway Route .....	2-28
2.5.4	Sub-alternative: State Trust Land Route Variation .....	2-30
2.6	No Action Alternative .....	2-31
2.7	Alternatives Considered but Eliminated from Detailed Analysis .....	2-31
2.7.1	Cloud Road Route .....	2-32
2.7.1.1	Route Description .....	2-32
2.7.1.2	Route Overview and Screening .....	2-32
2.7.2	Hassayampa-Western SR 74 Route .....	2-33
2.7.2.1	Route Description .....	2-33
2.7.2.2	Route Overview and Screening .....	2-33
2.7.3	Hassayampa-Joy Ranch Road Route .....	2-34
2.7.3.1	Route Description .....	2-34
2.7.3.2	Route Overview and Screening .....	2-34
2.7.4	CAP Complete Route .....	2-35
2.7.4.1	CAP Background Information .....	2-35
2.7.4.2	Route Description .....	2-36
2.7.4.3	Route Overview and Screening .....	2-36
2.7.5	Luke Air Force Base Auxiliary Field #1 Bypass Route .....	2-38
2.7.5.1	Route Description .....	2-38
2.7.5.2	Route Overview and Screening .....	2-39

2.7.6	Vistancia Bypass Route .....	2-41
2.7.6.1	Route Description .....	2-41
2.7.6.2	Route Overview and Screening .....	2-42
2.7.7	Westwing/Navajo Corridor Route.....	2-43
2.7.7.1	Background Information.....	2-43
2.7.7.2	Route Description .....	2-43
2.7.7.3	Route Overview and Screening .....	2-44
2.7.8	Westwing/Grand Avenue-Navajo 500/230kV Separation .....	2-47
2.7.8.1	Route Description .....	2-47
2.7.8.2	Route Overview and Screening .....	2-47
2.7.9	CAP Canal Underwater 500/230kV Route .....	2-49
2.7.9.1	Route Description .....	2-49
2.7.9.2	Route Overview and Screening .....	2-49
2.7.10	Underground a Portion or All of the Project .....	2-50
2.7.10.1	Technology Background Information .....	2-50
2.7.10.2	Route Description .....	2-54
2.7.10.3	Route Overview and Screening .....	2-54
2.7.11	CAP to Grand Avenue .....	2-56
2.7.11.1	Route Description .....	2-56
2.7.11.2	Route Overview and Screening .....	2-57
2.7.12	Wittmann/Circle City Bypass Route .....	2-57
2.7.12.1	Route Description .....	2-58
2.7.12.2	Route Overview and Screening .....	2-58
2.7.13	Summary of Options and Route Screening Results.....	2-59
2.8	Comparison of Alternatives .....	2-69
2.9	Monitoring and Mitigation .....	2-85
2.9.1	Air Quality .....	2-85
2.9.2	Cultural Resources .....	2-87
2.9.3	Geology and Minerals.....	2-87
2.9.4	Hazardous Materials and Hazardous and Solid Waste.....	2-87
2.9.5	Land Use and Range Resources.....	2-88
2.9.6	Public Health and Safety .....	2-88
2.9.7	Paleontology .....	2-89
2.9.8	Recreation and Special Designations .....	2-89
2.9.9	Socioeconomics and Environmental Justice.....	2-90
2.9.10	Soils.....	2-90
2.9.11	Transportation and Traffic.....	2-91
2.9.12	Vegetation Resources, including Noxious and Invasive Weeds and Special Status Plants.....	2-92
2.9.13	Visual Resources.....	2-93
2.9.14	Water Resources .....	2-95
2.9.15	Wildlife Resources, including Special Status Wildlife and Migratory Birds.....	2-95
2.10	Agency Preferred Alternative .....	2-97

<b>CHAPTER 3 AFFECTED ENVIRONMENT .....</b>	<b>3-1</b>
3.1 Introduction.....	3-1
3.1.1 General Setting of Project Area.....	3-1
3.1.2 Resource Values and Uses Brought Forward for Analysis.....	3-1
3.1.3 Analysis Area .....	3-2
3.2 Air Quality and Climate Change .....	3-2
3.2.1 Laws, Ordinances, Regulations, and Standards .....	3-3
3.2.1.1 State and Local Air Quality Regulations.....	3-3
3.2.1.2 Federal Rules.....	3-5
3.2.2 Study Area .....	3-7
3.2.3 Study Area Overview .....	3-8
3.2.4 Existing Air and Climate Quality .....	3-8
3.2.4.1 National Ambient Air Quality Standards.....	3-8
3.2.4.2 Clean Air Act Attainment Status.....	3-11
3.2.5 Climate Change .....	3-12
3.2.5.1 Emission Sources .....	3-13
3.2.5.2 Global Effects.....	3-13
3.2.5.3 Regional Effects.....	3-14
3.2.5.4 Water Supplies.....	3-15
3.2.5.5 Wildfires .....	3-16
3.2.5.6 Species Migration and Extinction .....	3-16
3.2.5.7 Air Pollution.....	3-16
3.2.6 Visibility .....	3-17
3.2.7 Emissions Status.....	3-17
3.2.8 Existing Emissions Intensity of Grid Electricity.....	3-18
3.3 Cultural Resources .....	3-18
3.3.1 Laws, Ordinances, Regulations, and Standards .....	3-18
3.3.2 Region of Influence (Area of Potential Effect) .....	3-20
3.3.3 Cultural History.....	3-21
3.3.4 Inventory Methods.....	3-25
3.3.5 Known Cultural Resources.....	3-26
3.3.5.1 Proposed Action.....	3-26
3.3.5.2 Alternative 1 .....	3-28
3.3.5.3 Alternative 2 .....	3-29
3.3.5.4 Alternative 3.....	3-29
3.3.5.5 State Trust Land Route Variation Sub-alternative.....	3-30
3.3.5.6 Primary Segment Common to All Action Alternatives .....	3-30
3.3.6 Cultural Resources Sensitive to Indirect Visual Impacts .....	3-35
3.3.7 Native American Land Use and Cultural Affiliation.....	3-37
3.4 Geology and Minerals.....	3-38
3.4.1 Laws, Ordinances, Regulations, and Standards .....	3-38
3.4.2 Regional and Local Geology .....	3-39
3.4.3 Geological Hazards.....	3-41
3.4.3.1 Subsidence and Earth Fissures .....	3-41

3.4.4	Mineral Resources .....	3-43
3.5	Hazardous Materials and Hazardous and Solid Waste .....	3-45
3.5.1	Laws, Ordinances, Regulations, and Standards .....	3-46
3.5.2	Study Area Conditions .....	3-47
3.5.2.1	Hazardous Materials Sites .....	3-48
3.5.2.2	Hazardous Waste Disposal Sites .....	3-49
3.6	Land Use and Range Resources .....	3-50
3.6.1	Land Use and Range Resources .....	3-50
3.6.2	Laws, Ordinances, Regulations and Standards .....	3-50
3.6.2.1	Federal .....	3-51
3.6.3	Land Ownership, Planning, and Management .....	3-52
3.6.3.1	Federal Plans .....	3-52
3.6.3.2	State Plans .....	3-54
3.6.3.3	Local Plans .....	3-55
3.6.3.4	Future Planned Land Use .....	3-57
3.6.4	Existing Land Use .....	3-58
3.6.4.1	Residential .....	3-58
3.6.4.2	Commercial .....	3-59
3.6.4.3	Recreation .....	3-59
3.6.4.4	Industrial .....	3-59
3.6.4.5	Utilities .....	3-59
3.6.4.6	Mining .....	3-60
3.6.4.7	Rights-of-Way .....	3-61
3.6.4.8	Air Transportation Facilities .....	3-62
3.6.4.9	Zoning .....	3-62
3.6.5	Range Resources .....	3-63
3.7	Public Health and Safety .....	3-65
3.7.1	Noise .....	3-65
3.7.1.1	Laws, Ordinances, Regulations, and Standards .....	3-65
3.7.1.2	Fundamentals of Acoustics .....	3-67
3.7.1.3	Existing Noise Sources in the Study Area .....	3-69
3.7.1.4	Baseline/Ambient Noise Level .....	3-71
3.7.2	Electromagnetic Fields .....	3-72
3.7.2.1	Laws, Ordinances, Regulations, and Standards .....	3-73
3.7.2.2	Overview of Electromagnetic Fields .....	3-74
3.7.2.3	Electromagnetic Fields Health Overview .....	3-76
3.7.2.4	Health Effects of Electromagnetic Fields .....	3-77
3.7.2.5	Electromagnetic Fields in Context .....	3-80
3.7.2.6	Electromagnetic Fields and Transmission Lines .....	3-81
3.7.2.7	Electromagnetic Fields and the Project .....	3-82
3.7.2.8	Summary .....	3-83
3.7.3	Fire .....	3-83
3.7.3.1	Laws, Ordinances, Regulations, and Standards .....	3-84
3.7.3.2	Fire History and Data .....	3-84
3.7.3.3	Fuel Types .....	3-84

3.7.3.4	Fire Regimes.....	3-85
3.7.3.5	Fire Regime Condition Class .....	3-85
3.7.3.6	Fire Management.....	3-86
3.8	Paleontology.....	3-87
3.8.1	Laws, Ordinances, Regulations, and Standards .....	3-87
3.8.2	Study Area Conditions .....	3-88
3.8.3	Paleontological Potential.....	3-88
3.8.4	Known Paleontological Resources.....	3-90
3.9	Recreation and Special Designations.....	3-91
3.9.1	Laws, Ordinances, Regulations, and Standards .....	3-91
3.9.2	Recreation Overview.....	3-91
3.9.3	Recreation Management.....	3-92
3.9.3.1	Bureau of Land Management.....	3-92
3.9.3.2	Other Entities .....	3-93
3.9.4	Recreational Use.....	3-96
3.9.4.1	OHV Recreation.....	3-96
3.9.4.2	Target Shooting .....	3-99
3.10	Socioeconomics and Environmental Justice .....	3-99
3.10.1	Overview .....	3-99
3.10.2	Applicable Laws, Rules, and Standards.....	3-99
3.10.3	Socioeconomic and Environmental Justice Study Areas .....	3-99
3.10.3.1	Socioeconomics.....	3-99
3.10.3.2	Environmental Justice.....	3-100
3.10.4	Socioeconomic Conditions.....	3-100
3.10.4.1	Populations .....	3-100
3.10.4.2	Employment and Earnings.....	3-101
3.10.4.3	Housing Values.....	3-103
3.10.5	Fiscal Conditions.....	3-104
3.10.5.1	Property Taxes.....	3-105
3.10.5.2	State Trust Land .....	3-106
3.10.5.3	Utility Rates.....	3-106
3.10.6	Recreation Expenditures.....	3-107
3.10.7	Property and Land Values.....	3-108
3.10.7.1	Health and Safety Concerns and Impacts on Property Values.....	3-108
3.10.7.2	Visual Impacts.....	3-108
3.10.7.3	Proximity and Property Values.....	3-109
3.10.8	Nonmarket Values Associated with Health and Safety, Recreation Use, and Natural Amenities .....	3-109
3.10.8.1	Health and Safety Concerns .....	3-110
3.10.8.2	Recreation Use .....	3-110
3.10.8.3	Natural Amenities.....	3-111
3.10.9	Environmental Justice .....	3-112
3.10.9.1	Minority Populations within the HRUs and Nine Communities.....	3-112

3.10.9.2	Low-Income Populations within the HRUs and Nine Communities.....	3-113
3.10.9.3	Environmental Justice Baseline Analysis.....	3-115
3.11	Soils .....	3-118
3.11.1	Laws, Ordinances, Regulations, and Standards .....	3-118
3.11.2	Soil Types Present.....	3-119
3.11.3	Soil Hazards .....	3-123
3.11.3.1	Expansive (Shrink-Swell) Soils .....	3-123
3.11.3.2	Collapsible Soils .....	3-123
3.11.3.3	Hydrocompaction.....	3-124
3.11.3.4	Erosive Soils.....	3-124
3.11.4	Prime and Unique Farmlands .....	3-124
3.12	Transportation and Traffic .....	3-125
3.12.1	Laws, Ordinances, Regulations, and Standards .....	3-126
3.12.2	Study Area Conditions .....	3-126
3.12.2.1	Surface Transportation .....	3-126
3.12.2.2	Air Transportation .....	3-128
3.12.2.3	Rail Transportation .....	3-129
3.13	Vegetation Resources, Including Noxious and Invasive Weeds and Special Status Plants.....	3-129
3.13.1	Laws, Ordinances, Regulations, and Standards .....	3-129
3.13.2	Vegetation Communities.....	3-130
3.13.2.1	Creosotebush-White Bursage Desert Scrub.....	3-131
3.13.2.2	Sonoran Palo Verde-Mixed Cacti Desert Scrub.....	3-131
3.13.2.3	Sonora-Mojave Mixed Salt Desert Scrub.....	3-131
3.13.2.4	Barren Land and Open Water.....	3-132
3.13.2.5	North American Warm Desert Riparian .....	3-132
3.13.2.6	Apacherian-Chihuahuan Mesquite Upland Scrub.....	3-133
3.13.3	Special-Status Species .....	3-133
3.13.4	Invasive and Noxious Plant Species.....	3-135
3.14	Visual Resources .....	3-136
3.14.1	Laws, Ordinances, Rules, and Standards.....	3-136
3.14.2	Visual Resource Inventory .....	3-137
3.14.3	Visual Resource Management Objectives .....	3-138
3.14.4	Visual Resources Inventory and Management within the Study Area.....	3-139
3.14.5	Description of Visual Resources, Sensitive Viewers, and Key Observation Points .....	3-140
3.14.5.1	Selection of Key Observation Points .....	3-140
3.14.5.2	Format for Description of Visual Resources .....	3-140
3.14.5.3	Project Area Overview .....	3-140
3.14.5.4	Portion Common to All Action Alternatives .....	3-141
3.14.5.5	Portion Common to the Proposed Action, Alternatives 1, 2, and 3.....	3-143

3.14.5.6	Portion Common to the Proposed Action, Alternative 1, and Alternative 2 .....	3-146
3.14.5.7	Proposed Action and Alternative 1 .....	3-147
3.14.5.8	Alternative 2 .....	3-153
3.14.5.9	Alternative 3 .....	3-155
3.14.5.10	State Trust Land Route Variation Sub-alternative .....	3-158
3.15	Water Resources .....	3-160
3.15.1	Surface Water Resources .....	3-160
3.15.1.1	Laws, Ordinances, Regulations, and Standards .....	3-160
3.15.1.2	Climate .....	3-163
3.15.1.3	Surface Water Conditions .....	3-163
3.15.1.4	Surface Water Flow and Runoff .....	3-167
3.15.1.5	Surface Water Quality .....	3-168
3.15.1.6	Surface Water Use .....	3-168
3.15.2	Groundwater Resources .....	3-169
3.15.2.1	Laws, Ordinances, Regulations, and Standards .....	3-169
3.15.2.2	Groundwater Conditions .....	3-175
3.15.2.3	Groundwater Use .....	3-177
3.16	Wildlife Resources, Including Special-Status Wildlife and Migratory Birds .....	3-178
3.16.1	Laws, Ordinances, Regulations, and Standards .....	3-178
3.16.2	Field Reconnaissance .....	3-179
3.16.3	General Wildlife .....	3-180
3.16.4	Threatened, Endangered, and Special-status Species .....	3-183
3.16.4.1	Southwestern Willow Flycatcher .....	3-189
3.16.4.2	Sonoran Desert Tortoise .....	3-190
3.16.4.3	Bald Eagle .....	3-191
3.16.4.4	Golden Eagle .....	3-191
3.16.4.5	Other Special Status Species .....	3-192
3.16.5	Wildlife Linkages .....	3-193
<b>CHAPTER 4 ENVIRONMENTAL CONSEQUENCES .....</b>		<b>4-1</b>
4.1	Introduction .....	4-1
4.1.1	Impact Assessment .....	4-1
4.1.1.1	Effects/Impacts .....	4-1
4.1.1.2	Direct Effects .....	4-1
4.1.1.3	Indirect Effects .....	4-1
4.1.1.4	Mitigation for Impacts .....	4-2
4.1.1.5	Cumulative Effects .....	4-2
4.1.1.6	Significance .....	4-2
4.1.1.7	Indicators .....	4-3
4.1.2	Environmental Effect Categories .....	4-3
4.1.3	Bradshaw-Harquahala Proposed RMPA .....	4-3
4.2	Air Quality and Climate Change .....	4-4
4.2.1	Indicators and Methods .....	4-4
4.2.2	SIP Conformity .....	4-5

4.2.3	Direct and Indirect Effects by Alternative .....	4-6
4.2.3.1	Impacts Common to All Action Alternatives .....	4-6
4.2.3.2	Proposed Action .....	4-10
4.2.3.3	Alternative 1: Proposed Action with Additional Corridor .....	4-14
4.2.3.4	Alternative 2: ROW South of SR 74.....	4-16
4.2.3.5	Alternative 3: Carefree Highway Route.....	4-18
4.2.3.6	State Trust Land Route Variation Sub-alternative .....	4-20
4.2.3.7	No Action Alternative .....	4-21
4.2.4	Mitigation and Residual Effects.....	4-22
4.2.5	Unavoidable Adverse Impacts .....	4-24
4.3	Cultural Resources.....	4-24
4.3.1	Indicators and Methods .....	4-24
4.3.2	Direct and Indirect Effects by Alternative .....	4-25
4.3.2.1	Proposed Action .....	4-25
4.3.2.2	Alternative 1: Proposed Action with Additional Corridor .....	4-29
4.3.2.3	Alternative 2: ROW South of SR 74.....	4-29
4.3.2.4	Alternative 3: Carefree Highway Route.....	4-29
4.3.2.5	State Trust Land Route Variation Sub-alternative .....	4-30
4.3.2.6	No Action Alternative .....	4-31
4.3.3	Mitigation and Residual Effects.....	4-31
4.3.4	Unavoidable Adverse Impacts .....	4-32
4.4	Geology and Minerals .....	4-33
4.4.1	Indicators and Methods .....	4-33
4.4.2	Direct and Indirect Effects by Alternative .....	4-33
4.4.2.1	Impacts Common to All Action Alternatives .....	4-33
4.4.2.2	Proposed Action .....	4-34
4.4.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-35
4.4.2.4	Alternative 2: ROW South of SR 74.....	4-36
4.4.2.5	Alternative 3: Carefree Highway Route.....	4-36
4.4.2.6	State Trust Land Route Variation Sub-alternative .....	4-36
4.4.2.7	No Action Alternative .....	4-37
4.4.3	Mitigation and Residual Effects.....	4-37
4.4.4	Unavoidable Adverse Impacts .....	4-37
4.5	Hazardous Materials and Hazardous and Solid Waste .....	4-37
4.5.1	Indicators and Methods .....	4-37
4.5.2	Direct and Indirect Effects by Alternative .....	4-38
4.5.2.1	Impacts Common to All Action Alternatives .....	4-38
4.5.2.2	Proposed Action .....	4-40
4.5.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-41
4.5.2.4	Alternative 2: ROW South of SR 74.....	4-42
4.5.2.5	Alternative 3: Carefree Highway Route.....	4-42
4.5.2.6	State Trust Land Route Variation Sub-alternative .....	4-42
4.5.2.7	No Action Alternative .....	4-42
4.5.3	Mitigation and Residual Effects.....	4-42
4.5.4	Unavoidable Adverse Impacts .....	4-43

4.6	Land Use and Range Resources.....	4-43
4.6.1	Indicators and Methods.....	4-43
4.6.2	Direct and Indirect Effects by Alternative .....	4-44
4.6.2.1	Impacts Common to All Alternatives .....	4-52
4.6.2.2	Proposed Action.....	4-56
4.6.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-59
4.6.2.4	Alternative 2: ROW South of SR 74 .....	4-60
4.6.2.5	Alternative 3: Carefree Highway Route.....	4-62
4.6.2.6	State Trust Land Route Variation Sub-alternative.....	4-63
4.6.2.7	No Action Alternative .....	4-64
4.6.3	Mitigation and Residual Effects.....	4-64
4.6.4	Unavoidable Adverse Impacts.....	4-65
4.7	Public Health and Safety (Noise, Electromagnetic Fields, and Fire).....	4-65
4.7.1	Indicators and Methods.....	4-65
4.7.1.1	Noise.....	4-65
4.7.1.2	Electromagnetic Fields.....	4-65
4.7.1.3	Fire.....	4-65
4.7.2	Direct and Indirect Effects by Alternative .....	4-66
4.7.2.1	Impacts Common to All Action Alternatives .....	4-66
4.7.2.2	Proposed Action.....	4-68
4.7.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-69
4.7.2.4	Alternative 2: ROW South of SR 74 .....	4-70
4.7.2.5	Alternative 3: Carefree Highway Route.....	4-70
4.7.2.6	State Trust Land Route Variation Sub-alternative.....	4-71
4.7.2.7	No Action Alternative .....	4-72
4.7.3	Mitigation and Residual Effects.....	4-72
4.7.3.1	General.....	4-72
4.7.3.2	Noise.....	4-73
4.7.3.3	Fire.....	4-73
4.7.4	Unavoidable Adverse Impacts.....	4-74
4.7.4.1	Noise.....	4-74
4.7.4.2	Fire.....	4-74
4.8	Paleontology.....	4-74
4.8.1	Indicators and Methods.....	4-74
4.8.2	Direct and Indirect Effects by Alternative .....	4-75
4.8.2.1	Impacts Common to All Action Alternatives .....	4-75
4.8.2.2	Proposed Action.....	4-75
4.8.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-75
4.8.2.4	Alternative 2: ROW South of SR 74 .....	4-76
4.8.2.5	Alternative 3: Carefree Highway Route.....	4-76
4.8.2.6	State Trust Land Route Variation Sub-alternative.....	4-76
4.8.2.7	No Action Alternative .....	4-76
4.8.3	Mitigation and Residual Effects.....	4-77
4.8.4	Unavoidable Adverse Impacts.....	4-77
4.9	Recreation and Special Designations.....	4-77

4.9.1	Indicators and Methods .....	4-77
4.9.2	Direct and Indirect Effects by Alternative .....	4-77
4.9.2.1	Impacts Common to All Action Alternatives .....	4-77
4.9.2.2	Proposed Action .....	4-80
4.9.2.3	Alternative 1: Proposed Action with Additional Corridor .....	4-85
4.9.2.4	Alternative 2: ROW South of SR 74.....	4-85
4.9.2.5	Alternative 3: Carefree Highway Route.....	4-87
4.9.2.6	Sub-alternative: State Trust Land Route Variation .....	4-89
4.9.2.7	No Action Alternative .....	4-89
4.9.3	Mitigation and Residual Effects.....	4-89
4.9.4	Unavoidable Adverse Impacts .....	4-90
4.10	Socioeconomics and Environmental Justice .....	4-90
4.10.1	Indicators and Methods .....	4-90
4.10.1.1	Indicators .....	4-91
4.10.1.2	Methods.....	4-92
4.10.2	Direct and Indirect Effects by Alternative .....	4-95
4.10.2.1	Effects Common to All Action Alternatives.....	4-95
4.10.2.2	Socioeconomics .....	4-95
4.10.2.3	Environmental Justice.....	4-120
4.10.2.4	No Action Alternative .....	4-124
4.10.3	Mitigation and Residual Effects.....	4-125
4.10.4	Unavoidable Adverse Impacts .....	4-125
4.11	Soils .....	4-126
4.11.1	Indicators and Methods .....	4-126
4.11.2	Direct and Indirect Effects by Alternative .....	4-126
4.11.2.1	Impacts Common to All Action Alternatives .....	4-126
4.11.2.2	Proposed Action .....	4-128
4.11.2.3	Alternative 1: Proposed Action with Additional Corridor ...	4-128
4.11.2.4	Alternative 2: ROW South of SR 74.....	4-129
4.11.2.5	Alternative 3: Carefree Highway Route.....	4-129
4.11.2.6	State Trust Land Route Variation Sub-alternative .....	4-130
4.11.2.7	No Action Alternative .....	4-130
4.11.3	Mitigation and Residual Effects.....	4-130
4.11.4	Unavoidable Adverse Impacts .....	4-132
4.12	Transportation and Traffic .....	4-132
4.12.1	Indicators and Methods .....	4-132
4.12.2	Direct and Indirect Effects by Alternative .....	4-133
4.12.2.1	Impacts Common to All Action Alternatives .....	4-133
4.12.2.2	Proposed Action .....	4-135
4.12.2.3	Alternative 1: Proposed Action with Additional Corridor ...	4-137
4.12.2.4	Alternative 2: ROW South of SR 74.....	4-137
4.12.2.5	Alternative 3: Carefree Highway Route.....	4-137
4.12.2.6	State Trust Lands Route Variation Sub-alternative.....	4-138
4.12.2.7	No Action Alternative .....	4-138
4.12.3	Mitigation and Residual Effects.....	4-138

4.12.4	Unavoidable Adverse Impacts.....	4-138
4.13	Vegetation Resources, including Noxious and Invasive Weeds and Special Status Plants .....	4-139
4.13.1	Indicators and Methods.....	4-139
4.13.1.1	Indicators .....	4-139
4.13.1.2	Impact Levels.....	4-139
4.13.2	Direct and Indirect Effects by Alternative .....	4-141
4.13.2.1	Impacts Common to All Action Alternatives .....	4-141
4.13.2.2	Proposed Action.....	4-144
4.13.2.3	Alternative 1: Proposed Action with Additional Corridor ....	4-144
4.13.2.4	Alternative 2: ROW South of SR 74 .....	4-145
4.13.2.5	Alternative 3: Carefree Highway Route.....	4-145
4.13.2.6	State Trust Land Route Variation Sub-alternative.....	4-145
4.13.2.7	No Action Alternative .....	4-145
4.13.3	Mitigation and Residual Effects.....	4-146
4.13.3.1	Vegetation Communities.....	4-146
4.13.3.2	Special Status BLM, USFWS Listed Species, and Arizona Native Plant Law .....	4-147
4.13.3.3	Invasive and Noxious Plants.....	4-147
4.13.4	Unavoidable Adverse Impacts.....	4-147
4.14	Visual Resources.....	4-148
4.14.1	Indicators and Methods.....	4-148
4.14.1.1	Indicators .....	4-148
4.14.1.2	Methods .....	4-148
4.14.2	Direct and Indirect Effects by Alternative .....	4-152
4.14.2.1	Impacts Common to All Action Alternatives .....	4-152
4.14.2.2	Proposed Action.....	4-157
4.14.2.3	Alternative 1: Proposed Action with Additional Corridor ....	4-168
4.14.2.4	Alternative 2: ROW South of SR 74 .....	4-168
4.14.2.5	Alternative 3: Carefree Highway Route.....	4-173
4.14.2.6	State Trust Land Route Variation Sub-alternative.....	4-176
4.14.2.7	No Action Alternative .....	4-179
4.14.3	Comparison of Alternatives .....	4-179
4.14.4	Mitigation and Residual Effects.....	4-179
4.14.4.1	Micrositing.....	4-179
4.14.4.2	Structure Type .....	4-180
4.14.4.3	Color .....	4-186
4.14.5	Unavoidable Adverse Impacts.....	4-186
4.15	Water Resources.....	4-186
4.15.1	Indicators and Methods.....	4-186
4.15.1.1	Indicators .....	4-186
4.15.1.2	Methods .....	4-187
4.15.2	Direct and Indirect Effects by Alternative .....	4-187
4.15.2.1	Impacts Common to All Action Alternatives .....	4-187
4.15.2.2	Proposed Action.....	4-191

4.15.2.3	Alternative 1: Proposed Action with Additional Corridor ...	4-192
4.15.2.4	Alternative 2: ROW South of SR 74.....	4-193
4.15.2.5	Alternative 3: Carefree Highway Route.....	4-194
4.15.2.6	State Trust Land Route Variation Sub-alternative .....	4-195
4.15.2.7	No Action Alternative .....	4-196
4.15.3	Mitigation and Residual Effects.....	4-197
4.15.4	Unavoidable Adverse Impacts .....	4-197
4.16	Wildlife Resources, including Special Status Wildlife and Migratory Birds	4-197
4.16.1	Indicators and Methods .....	4-197
4.16.1.1	Indicators .....	4-197
4.16.1.2	Impact Levels .....	4-197
4.16.2	Direct and Indirect Effects by Alternative .....	4-198
4.16.2.1	Impacts Common to All Action Alternatives .....	4-198
4.16.2.2	Proposed Action .....	4-205
4.16.2.3	Alternative 1: Proposed Action with Additional Corridor ...	4-206
4.16.2.4	Alternative 2: ROW South of SR 74.....	4-206
4.16.2.5	Alternative 3: Carefree Highway Route.....	4-207
4.16.2.6	State Trust Land Route Variation Sub-alternative .....	4-207
4.16.2.7	No Action Alternative .....	4-208
4.16.3	Mitigation and Residual Effects.....	4-208
4.16.3.1	Mitigation specific to Sonoran Desert Tortoise .....	4-209
4.16.4	Unavoidable Adverse Impacts .....	4-210
4.17	Irreversible and Irrecoverable Commitment of Resources .....	4-211
4.17.1	Air Quality and Climate Change.....	4-211
4.17.2	Cultural Resources .....	4-211
4.17.3	Geology and Minerals.....	4-211
4.17.4	Hazardous Materials and Hazardous and Solid Waste.....	4-212
4.17.5	Land Use and Range Resources.....	4-212
4.17.6	Public Health and Safety (Including Noise, Electromagnetic Fields, and Fire).....	4-212
4.17.7	Paleontology .....	4-212
4.17.8	Recreation and Special Designations .....	4-213
4.17.9	Socioeconomics and Environmental Justice.....	4-213
4.17.10	Soils.....	4-213
4.17.11	Transportation and Traffic.....	4-213
4.17.12	Vegetation Resources, Including Noxious and Invasive Weeds and Special Status Plants.....	4-214
4.17.13	Visual Resources.....	4-214
4.17.14	Water Resources .....	4-214
4.17.15	Wildlife Resources, Including Special Status Wildlife and Migratory Birds.....	4-214
4.18	Relationship of Short-term Uses and Long-term Productivity of Resource	4-215
4.18.1	Air Quality and Climate Change.....	4-215
4.18.2	Cultural Resources .....	4-215
4.18.3	Geology and Minerals.....	4-216

4.18.4	Hazardous Materials and Hazardous and Solid Waste .....	4-216
4.18.5	Land Use and Range Resources .....	4-216
4.18.6	Public Health and Safety (Including Noise, Electromagnetic Fields, and Fire) .....	4-216
4.18.7	Paleontology .....	4-217
4.18.8	Recreation and Special Designations .....	4-217
4.18.9	Socioeconomics and Environmental Justice .....	4-217
4.18.10	Soils .....	4-217
4.18.11	Transportation and Traffic .....	4-218
4.18.12	Vegetation Resources, Including Noxious and Invasive Weeds and Special Status Plants .....	4-218
4.18.13	Visual Resources .....	4-218
4.18.14	Water Resources .....	4-218
4.18.15	Wildlife Resources, Including Special Status Wildlife and Migratory Birds.....	4-218
4.19	Cumulative Impacts .....	4-219
4.19.1	Cumulative Impacts Area .....	4-219
4.19.2	Past, Present, and Reasonably Foreseeable Actions .....	4-223
4.19.3	Air Quality and Climate Change .....	4-224
4.19.4	Cultural Resources.....	4-226
4.19.5	Geology and Minerals .....	4-228
4.19.6	Hazardous Materials and Hazardous and Solid Waste .....	4-229
4.19.7	Land Use and Range Resources .....	4-229
4.19.7.1	Land Use.....	4-229
4.19.7.2	Range Resources .....	4-232
4.19.8	Public Health and Safety (Including Noise, Electromagnetic Fields, and Fire) .....	4-233
4.19.8.1	Noise.....	4-233
4.19.8.2	EMFs .....	4-234
4.19.8.3	Fire.....	4-234
4.19.9	Paleontology .....	4-235
4.19.10	Recreation and Special Designations .....	4-236
4.19.11	Socioeconomics and Environmental Justice .....	4-237
4.19.12	Soils .....	4-239
4.19.13	Transportation and Traffic .....	4-240
4.19.14	Vegetation Resources, Including Noxious and Invasive Weeds and Special Status Plants .....	4-243
4.19.15	Visual Resources .....	4-244
4.19.15.1	Visual Resources Focus Area.....	4-244
4.19.16	Water Resources .....	4-248
4.19.16.1	Surface Water .....	4-249
4.19.16.2	Wetlands .....	4-249
4.19.17	Wildlife Resources, Including Special Status Wildlife and Migratory Birds.....	4-249

<b>CHAPTER 5 CONSULTATION AND COORDINATION .....</b>	<b>5-1</b>
5.1 Introduction .....	5-1
5.2 Public Involvement.....	5-1
5.2.1 Public Scoping Period.....	5-1
5.2.2 Scoping Meetings .....	5-3
5.2.3 Scoping Responses.....	5-5
5.2.3.1 Scoping Period .....	5-5
5.2.3.2 Comment by Issue.....	5-5
5.2.3.3 Scoping Report.....	5-5
5.2.4 Project Status/Update Newsletter .....	5-6
5.2.5 Draft EIS Distribution .....	5-6
5.3 Agency Coordination/Consulation.....	5-7
5.4 Tribal Consultation and Coordination .....	5-8
5.5 Distribution of the Final EIS.....	5-10
5.6 Record of Decision.....	5-10
5.7 List of Preparers and Reviewers .....	5-11
5.8 Third Party Contractor - JBR Environmental Consultants .....	5-12
<b>CHAPTER 6 DEIS COMMENTS AND RESPONSES .....</b>	<b>6-1</b>
6.1 Introduction .....	6-1
6.2 Response to Comments.....	6-1
<b>CHAPTER 7 REFERENCES, ACRONYMS, ABBREVIATIONS, GLOSSARY, AND INDEX .....</b>	<b>7-1</b>
7.1 References.....	7-1
7.2 Acronyms and Abbreviations.....	7-32
7.3 Glossary.....	7-42
7.4 Index .....	7-54

## LIST OF TABLES

Table 1.5-1	Decisions to be Made.....	1-9
Table 1.5-2	Federal Laws, Statutes, Regulations, and Executive Orders with which the Proposed Action and All Action Alternatives Must Conform .....	1-13
Table 1.5-3	Summary of Potentially Required Local, State, or Federal Permits, Licenses, or Authorizations.....	1-16
Table 1.7-1	Formal Scoping Meeting Dates, Times, Locations, and Attendees.....	1-21
Table 1.8-1	Number of Scoping Comments Received by Issue .....	1-22
Table 1.8-2	Summary of Issues from Scoping .....	1-23
Table 1.9-1	Organization of the Final EIS and Proposed RMPA.....	1-27
Table 2.4-1	Design Characteristics of the Transmission Line .....	2-6
Table 2.4-2	Construction Schedule .....	2-10
Table 2.4-3	Typical Transmission Line Construction Personnel and Equipment.....	2-11
Table 2.4-4	Proposed Action Temporary Disturbance Estimates.....	2-18
Table 2.4-5	Minimum Safe Clearance Zone at the Time of Maintenance .....	2-22
Table 2.4-6	NERC Arcing/Flashover Conditions Clearance 2 Distances .....	2-22
Table 2.4-7	Proposed Action Permanent Disturbance Estimates.....	2-23
Table 2.5-1	Alternative 2 Temporary Disturbance Estimates .....	2-27
Table 2.5-2	Alternative 2 Permanent Disturbance Estimates .....	2-27
Table 2.5-3	Alternative 3 Temporary Disturbance Estimates .....	2-29
Table 2.5-4	Alternative 3 Permanent Disturbance Estimates.....	2-29
Table 2.7-1	Summary of Options and Route Screening Results for Eliminated Alternatives.....	2-60
Table 2.8-1	Comparison Summary of Components and Impacts from Proposed Action and Action Alternatives .....	2-71
Table 3.2-1	Meteorological Conditions Near the Project Area.....	3-7
Table 3.2-2	National Ambient Air Quality Standards .....	3-10
Table 3.2-3	Summary of Monitoring Network Data at Selected Sites.....	3-18
Table 3.3-1	Known Cultural Resource Sites along the Proposed Action and Action Alternative Routes, including the Sub-alternative.....	3-31
Table 3.3-2	Cultural Resources Potentially Sensitive to Visual Impacts .....	3-36
Table 3.4-1	Study Area Geologic Unit Symbol, Description, and Age.....	3-40
Table 3.6-1	Surface Management and Ownership within the Study Area .....	3-52
Table 3.6-2	Planned Residential Developments within the Study Area.....	3-57
Table 3.6-3	ROWs Crossed by the Proposed Action and Action Alternatives..	3-61
Table 3.6-4	BLM and State Trust Land Grazing Allotments within the Study Area .....	3-64
Table 3.7-1	Sound Pressure Levels of Typical Noise Sources and Noise Environments .....	3-69

Table 3.7-2	Proximity of Project Alternatives and Anticipated Dominant Existing Ambient Noise Sources to Identified Residential Communities in Study Area .....	3-70
Table 3.7-3	Sample Long-term Measurements from Previous Ambient Sound Surveys .....	3-72
Table 3.7-4	IEEE Magnetic Field Exposure Levels for the General Public .....	3-73
Table 3.7-5	Summary of ICNIRP EMF Exposure Limits .....	3-74
Table 3.7-6	Example EMF Sources .....	3-81
Table 3.7-7	Comparison of APS Projected EMFs to ICNIRP Limits .....	3-82
Table 3.9-1	Visitation Statistics for The Boulders Staging Area .....	3-97
Table 3.9-2	Preliminary Route Designations within the Study Area .....	3-98
Table 3.10-1	Population and Population Growth .....	3-101
Table 3.10-2	Employment and Earnings by Industry Sector for 2001 and 2009 .....	3-102
Table 3.10-3	Number Employed and Unemployment Rate .....	3-103
Table 3.10-4	Housing Values 2000 and 2005-2009 .....	3-104
Table 3.10-5	Average Property Tax Rate Calculations (Percent) .....	3-105
Table 3.10-6	Private Land Characteristics .....	3-106
Table 3.10-7	Minority Representation by Race and Ethnicity – 2010 .....	3-112
Table 3.10-8	Poverty and Household Income (2005-2009) .....	3-114
Table 3.10-9	Poverty Thresholds for 2009 by Size of Family and Number of Related Children Under 18 Years .....	3-115
Table 3.10-10	Minority and Low-Income Percentages in the Three-Mile Study Area .....	3-117
Table 3.11-1	Total Acreage of Each Soil Type Within 0.5-mile of All Action Alternative Routes .....	3-119
Table 3.11-2	Reclamation Suitability and Erosion Potential .....	3-121
Table 3.12-1	Regional Highways Annual Average Daily Traffic within the Study Area .....	3-127
Table 3.13-1	Vegetation Communities and Land Cover (in acres) .....	3-130
Table 3.13-2	Special Status Plant Species .....	3-133
Table 3.15-1	Waters of the U.S. within the Study Area .....	3-167
Table 3.15-2	Surface Water Points of Diversions and POU's within a 1-Mile Radius of the Proposed Action and Action Alternative Routes ...	3-170
Table 3.16-1	Special Status Wildlife Species .....	3-183
Table 3.16-2	AGFD Southwestern Willow Flycatcher Survey Results .....	3-190
Table 3.16-3	Acres of Desert Tortoise Habitat by Category within the Study Area .....	3-191
Table 4.1-1	Summary of Terms Used to Describe Effects in the EIS .....	4-3
Table 4.2-1	Commuter Vehicle Distribution .....	4-8
Table 4.2-2	Maximum Monthly Construction Emission Rates - Proposed Action .....	4-9
Table 4.2-3	Total Construction Related GHG Emissions (as CO <sub>2</sub> e) - Proposed Action .....	4-10
Table 4.2-4	Wind Erosion Emissions (TONS/YR) - Proposed Action .....	4-14

Table 4.2-5	Operational Phase Vehicular Emissions (TONS/YR) - Proposed Action .....	4-14
Table 4.2-6	Maximum Monthly Construction Emission Rates – Alternative 1 ..	4-15
Table 4.2-7	Maximum Monthly Construction Emission Rates – Alternative 2 ..	4-17
Table 4.2-8	Wind Erosion Emissions (TONS/YR) – Alternative 2 .....	4-17
Table 4.2-9	Maximum Monthly Construction Emission Rates – Alternative 3 ..	4-19
Table 4.2-10	Wind Erosion Emissions (TONS/YR) – Alternative 3 .....	4-19
Table 4.2-11	Maximum Monthly Construction Emission Rates – State Trust Land Route Variation Sub-Alternative .....	4-21
Table 4.3-1	Visual Impacts.....	4-28
Table 4.3-2	Known Cultural Resource Sites along Potential Alignment Shift...	4-32
Table 4.5-1	Possible Hazardous Materials Used in the Project.....	4-39
Table 4.6-1	Description of Land Use and Range Resources Effects Levels ....	4-44
Table 4.6-2	Surface Management Crossed by the Action Alternatives (miles).	4-45
Table 4.6-3	Jurisdiction Crossed by the Action Alternatives (miles).....	4-45
Table 4.6-4	Existing and Future Land Use Crossed by the Action Alternatives (miles).....	4-46
Table 4.6-5	BLM Rights-of-Way Crossed by the Action Alternatives .....	4-47
Table 4.6-6	Grazing Allotments Crossed by the Action Alternatives (miles)....	4-48
Table 4.6-7	AUMs on Grazing Allotments Crossed by the Action Alternatives.	4-49
Table 4.6-8	AUMs Removed from Production in the Short Term by the Action Alternatives .....	4-50
Table 4.6-9	AUMs Removed from Production in the Long Term by the Action Alternatives .....	4-51
Table 4.6-10	Acres of Grazing Allotments Removed from Production in the Short Term .....	4-54
Table 4.6-11	Acres of Grazing Allotments Removed from Production in the Long Term.....	4-55
Table 4.9-1	Description of Recreation and Special Designations Effects Levels.....	4-78
Table 4.10-1	Construction Cost Estimates .....	4-96
Table 4.10-2	Economic Impacts of Construction: 2013-2016.....	4-97
Table 4.10-3	Private Property that would be Affected by the Proposed Action ..	4-98
Table 4.10-4	Planned Development Acreages Potentially Affected by the Proposed Action by Land Use Type.....	4-100
Table 4.10-5	Estimated Annual Property Tax Revenues from Project Lands by Jurisdiction .....	4-101
Table 4.10-6	State Trust Land Characteristics .....	4-102
Table 4.10-7	Economic Impacts of Construction: 2013-2016.....	4-108
Table 4.10-8	Private Property that would be Affected by Alternative 2 .....	4-109
Table 4.10-9	Saddleback Heights Planned Development Acreages Potentially Affected by the Alternative 2 by Land Use Type .....	4-109
Table 4.10-10	Private Property that would be Affected by Alternative 3 .....	4-112
Table 4.10-11	Planned Development Acreages Potentially Affected by Alternative 3 by Land Use Type .....	4-114

Table 4.10-12	Economic Impacts of Construction, State Trust Lands Route Variation Sub-alternative: 2013-2016 .....	4-117
Table 4.10-13	Comparison of Mileage of ROW Crossing or Adjoining Private Property Within and Outside the Environmental Justice Community.....	4-122
Table 4.12-1	Description of Transportation and Traffic Effects Levels.....	4-132
Table 4.12-2	Effect of Construction Traffic on Existing Annual Average Daily Traffic.....	4-135
Table 4.13-1	Description of Effect Magnitude Criteria with regard to Vegetation Resources .....	4-139
Table 4.14-1	Degree of Contrast Criteria.....	4-149
Table 4.14-2	Summary of Terms Used to Describe Visual Effects .....	4-150
Table 4.14-3	Comparison of Visual Resource Impacts by Alternative .....	4-181
Table 4.16-1	Description of Effect Magnitude Criteria with regard to Wildlife Resources.....	4-198
Table 4.16-2	Summary of Impacts to Special Status Species .....	4-200
Table 4.19-1	Cumulative Impacts Areas by Resource and Rationale .....	4-219
Table 4.19-2	Land Ownership by CIA.....	4-222
Table 4.19-3	Potential Quantifiable Permanent Disturbance from Reasonably Foreseeable Projects within the Two-Mile CIA .....	4-223
Table 4.19-4	Existing Quantifiable Land Uses in Two-Mile CIA.....	4-226
Table 4.19-5	Planned Residential Developments within the CIA .....	4-231
Table 4.19-6	Regional Highways Annual Average Daily Traffic within the CIA	4-240
Table 5.2-1	Scoping Legal Notice and News Release Distribution .....	5-1
Table 5.2-2	Formal Scoping Meeting Dates, Times, Locations, and Attendees.....	5-4
Table 5.2-3	Number of Scoping Comments Received by Source .....	5-5
Table 5.2-4	Number of Scoping Comments Received by Issue.....	5-5
Table 5.4-1	Native American Tribe/Tribal Organizations Consulted .....	5-9
Table 5.7-1	Interdisciplinary Team and Specialists.....	5-11
Table 5.8-1	Third Party Contractor – JBR Environmental Consultants .....	5-12
Table 6.2-1	Public Comments and BLM Response .....	6-5

## VOLUME II

### LIST OF APPENDICES

- APPENDIX 2A Best Management Practices
- APPENDIX 2B Description of APS' Transmission Vegetation Management Program
- APPENDIX 3A Literature Review for Transmission Line and Housing Value Studies
- APPENDIX 4A Visual Contrast Rating Forms
- APPENDIX 4B Past, Present, and Reasonably Foreseeable Projects, Developments, Disturbances, and Activities
- APPENDIX 6A List of Interested Parties that Signed Form Letters

### LIST OF FIGURES

- Figure 1.1-1 Project Location Map
- Figure 2.4-1a Proposed Action Route
- Figure 2.4-1b Proposed Action - RMP Amendments
- Figure 2.4-2 Typical 500/230 kV Tangent Pole
- Figure 2.4-3 Typical 500/230 kV Line Angle Poles
- Figure 2.4-4 Typical 500/230 kV H-Frame Structures
- Figure 2.4-5 Double Circuit 500/230 kV Tangent Lattice Poles
- Figure 2.4-6 Basic Wire Handling Equipment
- Figure 2.5-1a Action Alternatives
- Figure 2.5-1b Alternative 1 - RMP Amendments
- Figure 2.5-1c Alternative 2 - RMP Amendments
- Figure 2.7-1 Cloud Road Route, Hassayampa-Western SR 74 Route, Hassayampa-Joy Ranch Road Route, CAP Complete Route - Considered but Eliminated from Detailed Analysis
- Figure 2.7-2 CAP Widths
- Figure 2.7-3 LAFB Auxiliary Field #1 Bypass Route, Options A, B, and C Considered but Eliminated from Detailed Analysis
- Figure 2.7-4 Vistancia Bypass Route, Options A, B, and C Considered but Eliminated from Detailed Analysis

Figure 2.7-5	Westwing/Navajo Corridor Route and CAP to Grand Avenue Route Considered but Eliminated from Detailed Analysis
Figure 2.7-6	Westwing Area Crossings and Constraints
Figure 2.7-7	Trilby Wash Area Crossings and Constraints
Figure 2.7-8	McMicken Area Crossings and Constraints
Figure 2.7-9	Morgan Area Crossings and Constraints
Figure 2.7-10	Westwing/Grand Avenue-Navajo 500/230kV Separation Route, Options A, B, and C, and Wittmann/Circle City Bypass Route Considered but Eliminated from Detailed Analysis
Figure 2.7-11	HPFF Cable Cross Section
Figure 2.7-12	Typical XLPE Vault Installation
Figure 2.7-13	XLPE Cable Cross Section
Figure 2.7-14	Typical Overhead to Underground Transition Station
Figure 2.10-1	Preferred Alternative - RMP Amendments
Figure 3.2-1	Non-attainment and Attainment with Maintenance Plan Areas
Figure 3.2-2	PM10 Non-attainment Area
Figure 3.2-3	Recommended 8-Hour Ozone Non-attainment Area
Figure 3.2-4	Arizona Class I Areas
Figure 3.4-1	Geologic Map of the Study Area
Figure 3.4-2	Mineral Restrictions
Figure 3.4-3	Mineral Data and Mine Sites
Figure 3.5-1	Hazardous Material Sites
Figure 3.6-1	Jurisdiction
Figure 3.6-2	Future Planned Land Use
Figure 3.6-3	Existing Land Use
Figure 3.6-4	Livestock Grazing
Figure 3.7-1	Fire History
Figure 3.7-2	Vegetation Condition Classes
Figure 3.9-1	Recreation Opportunity Spectrum
Figure 3.9-2	Special Designations and Special Recreation Management Areas
Figure 3.9-3	Route Designations
Figure 3.10-1	Environmental Justice and Communities

Figure 3.11-1	Soil Units
Figure 3.11-2	Soil Hazards
Figure 3.12-1	Transportation and Traffic
Figure 3.13-1	Vegetation Communities
Figure 3.14-1	Scenic Quality Ratings
Figure 3.14-2	Viewer Sensitivity
Figure 3.14-3	VRI Classification
Figure 3.14-4	KOPs and VRM Classes
Figure 3.14-5	Existing Conditions from Key Observation Point 5
Figure 3.14-6	Existing Conditions from Key Observation Point 6
Figure 3.14-7	Existing Conditions from Key Observation Point 8
Figure 3.15-1	Surface Water Resources
Figure 3.15-2	Groundwater Resources
Figure 3.16-1	Special Status Species Potential Suitable Habitat
Figure 4.9-1	Proposed Access Roads, Upgrade Locations, and OHV Single-track Trails
Figure 4.14-1a	Existing Conditions from Key Observation Point 1
Figure 4.14-1b	Simulation Common to All Alternatives from Key Observation Point 1
Figure 4.14-2a	Existing Conditions from Key Observation Point 2
Figure 4.14-2b	Simulation Common to All Alternatives from Key Observation Point 2
Figure 4.14-3a	Existing Conditions from Key Observation Point 3
Figure 4.14-3b	Simulation Common to All Alternatives from Key Observation Point 3
Figure 4.14-4a	Existing Conditions from Key Observation Point 4
Figure 4.14-4b	Simulation Common to All Alternatives from Key Observation Point 4
Figure 4.14-5a	Existing Conditions from Key Observation Point 7
Figure 4.14-5b	Simulation Common to All Alternatives from Key Observation Point 7
Figure 4.14-5c	Simulation of Sub-Alternative from Key Observation Point 7
Figure 4.14-6	Viewshed Analysis Proposed Action - Visual Resources Focus Area
Figure 4.14-7a	Existing Conditions from Key Observation Point 17b
Figure 4.14-7b	Simulation of Proposed Action from Key Observation Point 17b
Figure 4.14-8	Easternmost Crossing Viewshed - Visual Resources Focus Area

- Figure 4.14-9a Existing Conditions from Key Observation Point 17c
- Figure 4.14-9b Simulation of Proposed Action from Key Observation Point 17c
- Figure 4.14-10a Existing Conditions from Key Observation Point 18b
- Figure 4.14-10b Simulation of Proposed Action from Key Observation Point 18b
- Figure 4.14-11 Westernmost Crossing Viewshed - Visual Resources Focus Area
- Figure 4.14-12a Existing Conditions from Key Observation Point 18c
- Figure 4.14-12b Simulation of Proposed Action from Key Observation Point 18c
- Figure 4.14-13 Proposed Action - Area of Viewshed Dominance
- Figure 4.14-14a Existing Conditions from Key Observation Point 10
- Figure 4.14-14b Simulation of Proposed Action and Alternative 2 from Key Observation Point 10
- Figure 4.14-15a Existing Conditions from Key Observation Point 12
- Figure 4.14-15b Simulation of Proposed Action from Key Observation Point 12
- Figure 4.14-16a Existing Conditions from Key Observation Point 13
- Figure 4.14-16b Simulation of Proposed Action from Key Observation Point 13
- Figure 4.14-16c Simulation of Alternative 2 from Key Observation Point 13
- Figure 4.14-17a Existing Conditions from Key Observation Point 20
- Figure 4.14-17b Simulation of Proposed Action and Alternative 2 from Key Observation Point 20
- Figure 4.14-18a Existing Conditions from Key Observation Point 11
- Figure 4.14-18b Simulation of Proposed Action from Key Observation Point 11
- Figure 4.14-18c Simulation of Alternative 2 from Key Observation Point 11
- Figure 4.14-19a Existing Conditions from Key Observation Point 19
- Figure 4.14-19b Simulation of Proposed Action and Alternative 2 from Key Observation Point 19
- Figure 4.14-20a Existing Conditions from Key Observation Point 16
- Figure 4.14-20b Simulation of Proposed Action and Alternative 2 from Key Observation Point 16
- Figure 4.14-21 Viewshed Analysis Alternative 2 - Visual Resources Focus Area
- Figure 4.14-22 Alternative 2 - Area of Viewshed Dominance
- Figure 4.14-23a Existing Conditions from Key Observation Point 17d
- Figure 4.14-23b Simulation of Alternative 2 from Key Observation Point 17d

Figure 4.14-24a	Existing Conditions from Key Observation Point 18d
Figure 4.14-24b	Simulation of Alternative 2 from Key Observation Point 18d
Figure 4.14-25	Viewshed Analysis Alternative 3 - Visual Resources Focus Area
Figure 4.14-26a	Existing Conditions from Key Observation Point 9
Figure 4.14-26b	Simulation of Alternative 3 from Key Observation Point 9
Figure 4.14-27a	Existing Conditions from Key Observation Point 14
Figure 4.14-27b	Simulation of Alternative 3 from Key Observation Point 14
Figure 4.14-28a	Existing Conditions from Key Observation Point 15
Figure 4.14-28b	Simulation of Alternative 3 from Key Observation Point 15
Figure 4.14-29a	Existing Conditions from Key Observation Point 21
Figure 4.14-29b	Simulation of Sub-Alternative from Key Observation Point 21
Figure 4.14-30a	Existing Conditions from Key Observation Point 22
Figure 4.14-30b	Simulation of Sub-Alternative from Key Observation Point 22
Figure 4.19-1	Air Quality Cumulative Impacts Area
Figure 4.19-2	2-Mile Buffer Cumulative Impacts Area
Figure 4.19-3	Range Resources Cumulative Impacts Area
Figure 4.19-4	Socioeconomics and Environmental Justice Cumulative Impacts Area
Figure 4.19-5	Visual Resources Cumulative Impacts Area

## TABLE OF CONTENTS – VOLUME II

### APPENDICES

- APPENDIX 2A Best Management Practices
- APPENDIX 2B Description of APS' Transmission Vegetation Management Program
- APPENDIX 3A Literature Review for Transmission Line and Housing Value Studies
- APPENDIX 4A Visual Contrast Rating Forms
- APPENDIX 4B Past, Present, and Reasonably Foreseeable Projects, Developments, Disturbances, and Activities
- APPENDIX 6A List of Interested Parties that Signed Form Letters

### LIST OF FIGURES

- Figure 1.1-1 Project Location Map
- Figure 2.4-1a Proposed Action Route
- Figure 2.4-1b Proposed Action - RMP Amendments
- Figure 2.4-2 Typical 500/230 kV Tangent Pole
- Figure 2.4-3 Typical 500/230 kV Line Angle Poles
- Figure 2.4-4 Typical 500/230 kV H-Frame Structures
- Figure 2.4-5 Double Circuit 500/230 kV Tangent Lattice Poles
- Figure 2.4-6 Basic Wire Handling Equipment
- Figure 2.5-1a Action Alternatives
- Figure 2.5-1b Alternative 1 - RMP Amendments
- Figure 2.5-1c Alternative 2 - RMP Amendments
- Figure 2.7-1 Cloud Road Route, Hassayampa-Western SR 74 Route, Hassayampa-Joy Ranch Road Route, CAP Complete Route - Considered but Eliminated from Detailed Analysis
- Figure 2.7-2 CAP Widths
- Figure 2.7-3 LAFB Auxiliary Field #1 Bypass Route, Options A, B, and C Considered but Eliminated from Detailed Analysis
- Figure 2.7-4 Vistancia Bypass Route, Options A, B, and C Considered but Eliminated from Detailed Analysis
- Figure 2.7-5 Westwing/Navajo Corridor Route and CAP to Grand Avenue Route Considered but Eliminated from Detailed Analysis
- Figure 2.7-6 Westwing Area Crossings and Constraints
- Figure 2.7-7 Trilby Wash Area Crossings and Constraints
- Figure 2.7-8 McMicken Area Crossings and Constraints

Figure 2.7-9	Morgan Area Crossings and Constraints
Figure 2.7-10	Westwing/Grand Avenue-Navajo 500/230kV Separation Route, Options A, B, and C, and Wittmann/Circle City Bypass Route Considered but Eliminated from Detailed Analysis
Figure 2.7-11	HPFF Cable Cross Section
Figure 2.7-12	Typical XLPE Vault Installation
Figure 2.7-13	XLPE Cable Cross Section
Figure 2.7-14	Typical Overhead to Underground Transition Station
Figure 2.10-1	Preferred Alternative - RMP Amendments
Figure 3.2-1	Non-attainment and Attainment with Maintenance Plan Areas
Figure 3.2-2	PM10 Non-attainment Area
Figure 3.2-3	Recommended 8-Hour Ozone Non-attainment Area
Figure 3.2-4	Arizona Class I Areas
Figure 3.4-1	Geologic Map of the Study Area
Figure 3.4-2	Mineral Restrictions
Figure 3.4-3	Mineral Data and Mine Sites
Figure 3.5-1	Hazardous Material Sites
Figure 3.6-1	Jurisdiction
Figure 3.6-2	Future Planned Land Use
Figure 3.6-3	Existing Land Use
Figure 3.6-4	Livestock Grazing
Figure 3.7-1	Fire History
Figure 3.7-2	Vegetation Condition Classes
Figure 3.9-1	Recreation Opportunity Spectrum
Figure 3.9-2	Special Designations and Special Recreation Management Areas
Figure 3.9-3	Route Designations
Figure 3.10-1	Environmental Justice and Communities
Figure 3.11-1	Soil Units
Figure 3.11-2	Soil Hazards
Figure 3.12-1	Transportation and Traffic
Figure 3.13-1	Vegetation Communities
Figure 3.14-1	Scenic Quality Ratings
Figure 3.14-2	Viewer Sensitivity
Figure 3.14-3	VRI Classification
Figure 3.14-4	KOPs and VRM Classes
Figure 3.14-5	Existing Conditions from Key Observation Point 5
Figure 3.14-6	Existing Conditions from Key Observation Point 6
Figure 3.14-7	Existing Conditions from Key Observation Point 8
Figure 3.15-1	Surface Water Resources
Figure 3.15-2	Groundwater Resources
Figure 3.16-1	Special Status Species Potential Suitable Habitat

Figure 4.9-1	Proposed Access Roads, Upgrade Locations, and OHV Single-track Trails
Figure 4.14-1a	Existing Conditions from Key Observation Point 1
Figure 4.14-1b	Simulation Common to All Alternatives from Key Observation Point 1
Figure 4.14-2a	Existing Conditions from Key Observation Point 2
Figure 4.14-2b	Simulation Common to All Alternatives from Key Observation Point 2
Figure 4.14-3a	Existing Conditions from Key Observation Point 3
Figure 4.14-3b	Simulation Common to All Alternatives from Key Observation Point 3
Figure 4.14-4a	Existing Conditions from Key Observation Point 4
Figure 4.14-4b	Simulation Common to All Alternatives from Key Observation Point 4
Figure 4.14-5a	Existing Conditions from Key Observation Point 7
Figure 4.14-5b	Simulation Common to All Alternatives from Key Observation Point 7
Figure 4.14-5c	Simulation of Sub-Alternative from Key Observation Point 7
Figure 4.14-6	Viewshed Analysis Proposed Action - Visual Resources Focus Area
Figure 4.14-7a	Existing Conditions from Key Observation Point 17b
Figure 4.14-7b	Simulation of Proposed Action from Key Observation Point 17b
Figure 4.14-8	Easternmost Crossing Viewshed - Visual Resources Focus Area
Figure 4.14-9a	Existing Conditions from Key Observation Point 17c
Figure 4.14-9b	Simulation of Proposed Action from Key Observation Point 17c
Figure 4.14-10a	Existing Conditions from Key Observation Point 18b
Figure 4.14-10b	Simulation of Proposed Action from Key Observation Point 18b
Figure 4.14-11	Westernmost Crossing Viewshed - Visual Resources Focus Area
Figure 4.14-12a	Existing Conditions from Key Observation Point 18c
Figure 4.14-12b	Simulation of Proposed Action from Key Observation Point 18c
Figure 4.14-13	Proposed Action - Area of Viewshed Dominance
Figure 4.14-14a	Existing Conditions from Key Observation Point 10
Figure 4.14-14b	Simulation of Proposed Action and Alternative 2 from Key Observation Point 10
Figure 4.14-15a	Existing Conditions from Key Observation Point 12
Figure 4.14-15b	Simulation of Proposed Action from Key Observation Point 12
Figure 4.14-16a	Existing Conditions from Key Observation Point 13
Figure 4.14-16b	Simulation of Proposed Action from Key Observation Point 13
Figure 4.14-16c	Simulation of Alternative 2 from Key Observation Point 13
Figure 4.14-17a	Existing Conditions from Key Observation Point 20
Figure 4.14-17b	Simulation of Proposed Action and Alternative 2 from Key Observation Point 20
Figure 4.14-18a	Existing Conditions from Key Observation Point 11
Figure 4.14-18b	Simulation of Proposed Action from Key Observation Point 11
Figure 4.14-18c	Simulation of Alternative 2 from Key Observation Point 11
Figure 4.14-19a	Existing Conditions from Key Observation Point 19

Figure 4.14-19b	Simulation of Proposed Action and Alternative 2 from Key Observation Point 19
Figure 4.14-20a	Existing Conditions from Key Observation Point 16
Figure 4.14-20b	Simulation of Proposed Action and Alternative 2 from Key Observation Point 16
Figure 4.14-21	Viewshed Analysis Alternative 2 - Visual Resources Focus Area
Figure 4.14-22	Alternative 2 - Area of Viewshed Dominance
Figure 4.14-23a	Existing Conditions from Key Observation Point 17d
Figure 4.14-23b	Simulation of Alternative 2 from Key Observation Point 17d
Figure 4.14-24a	Existing Conditions from Key Observation Point 18d
Figure 4.14-24b	Simulation of Alternative 2 from Key Observation Point 18d
Figure 4.14-25	Viewshed Analysis Alternative 3 - Visual Resources Focus Area
Figure 4.14-26a	Existing Conditions from Key Observation Point 9
Figure 4.14-26b	Simulation of Alternative 3 from Key Observation Point 9
Figure 4.14-27a	Existing Conditions from Key Observation Point 14
Figure 4.14-27b	Simulation of Alternative 3 from Key Observation Point 14
Figure 4.14-28a	Existing Conditions from Key Observation Point 15
Figure 4.14-28b	Simulation of Alternative 3 from Key Observation Point 15
Figure 4.14-29a	Existing Conditions from Key Observation Point 21
Figure 4.14-29b	Simulation of Sub-Alternative from Key Observation Point 21
Figure 4.14-30a	Existing Conditions from Key Observation Point 22
Figure 4.14-30b	Simulation of Sub-Alternative from Key Observation Point 22
Figure 4.19-1	Air Quality Cumulative Impacts Area
Figure 4.19-2	2-Mile Buffer Cumulative Impacts Area
Figure 4.19-3	Range Resources Cumulative Impacts Area
Figure 4.19-4	Socioeconomics and Environmental Justice Cumulative Impacts Area
Figure 4.19-5	Visual Resources Cumulative Impacts Area