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Transcript Exhibit(s)

Docket #(s): L-000044-15-0318-00171

LS Case No. 171

Exhibit #: Sun 1-2

Volume 1 of 7

Arizona Corporation Commission
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To: Docket Control

Date: November 25, 2015

Re: SunZia Transmission LLC
L-00000YY-15-0318-00171, LS Case No. 171
October 19 through November 19, 2015
Volumes I through XIII, Concluded

STATUS OF ORIGINAL EXHIBITS

FILED WITH DOCKET CONTROL

Please see attached transcript index pages for all exhibits referenced during the above-mentioned hearing and filed with ACC Docket Control today.

Please note, no exhibits were withdrawn.

Per Procedural Order dated 09-11-15, Paragraph 17, we are including exhibits that were not offered or not admitted for filing.

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*For description of Exhibit RED-16, please see attached letter provided by Redington NRCD. This exhibit was not described on the transcript index.

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*For description of Exhibits WIN-6C, 6D, 11A, and 11B, please see attached letter provided by Winkelman NRCD. These exhibits were not described on the transcript index.

EXHIBITS NOT UTILIZED / NUMBER SKIPPED
Not given to the reporter

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Copy to: via email to all parties

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION

LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF SUNZIA TRANSMISSION LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360, ET SEQ., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE SUNZIA SOUTHWEST TRANSMISSION PROJECT, WHICH INCLUDES THE CONSTRUCTION OF TWO NEW 500KV TRANSMISSION LINES AND ASSOCIATED FACILITIES ORIGINATING AT A NEW SUBSTATION (SUNZIA EAST) IN LINCOLN COUNTY, NEW MEXICO, AND TERMINATING AT THE PINAL CENTRAL SUBSTATION IN PINAL COUNTY, ARIZONA. THE ARIZONA PORTION OF THE PROJECT IS LOCATED WITHIN GRAHAM, GREENLEE, COCHISE, PINAL, AND PIMA COUNTIES.	DOCKET NO. L-00000YY-15-0318-00171 CASE NO. 171

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October 19 through November 19, 2015

COASH & COASH, INC.
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By: Colette E. Ross
Certified Reporter
Certificate No. 50658

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November 24, 2015

Via email: ***mh@coashandcoash.com***

Marta Hetzer
Coash & Coash, Inc.
1802 North 7th Street
Phoenix, Arizona 85006

Re: *Missing Exhibits – Winkelman NRCD and Redington NRCD*
Sunzia Line Siting Committee Hearing

Dear Marta:

In response to your recent request regarding missing exhibits not submitted at the hearing on behalf of Winkelman NRCD and Redington NRCD, this letter will confirm that we have provided you with the exhibits filed with the ACC Docket Control and served on all other parties, but not made available to the Court Reporter.

Missing exhibits on behalf of Winkelman NRCD.

Exhibit 6C, Winkelman Natural Resource Conservation District Land Management Plan, Policy 1 Major Corridors Policy.

Exhibit 6D, Winkelman Natural Resource Conservation District Land Management Plan, Policy 2 Customs and Culture.

Exhibit 11A, Memorandum of Understanding Between Winkelman Natural Resource Conservation District and Safford District (4 pages).

Exhibit 11B, Memorandum of Understanding for Coordinated Resource Management in Arizona (10 pages).

MARGRAVE CELMINS
A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

Missing Exhibit on behalf of Redington NRCD

Exhibit 16, Various maps showing Pipeline Road Erosion issues, 6 maps.

Very truly yours,

MARGRAVE CELMINS, P.C.

Lat J. Celmins

LJC/ka

Case No. 171

Application for a Certificate of Environmental Compatibility

SunZia Southwest

TRANSMISSION PROJECT

New Mexico State Line to Pinal Central Substation

Prepared for

Arizona Power Plant and Transmission Line Siting Committee

Submitted by

SunZia

SunZia Transmission LLC

September 2015

BEFORE THE
ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF SUNZIA TRANSMISSION LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360, ET SEQ., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE SUNZIA SOUTHWEST TRANSMISSION PROJECT, WHICH INCLUDES THE CONSTRUCTION OF TWO NEW 500 KV TRANSMISSION LINES AND ASSOCIATED FACILITIES ORIGINATING AT A NEW SUBSTATION (SUNZIA EAST) IN LINCOLN COUNTY, NEW MEXICO, AND TERMINATING AT THE PINAL CENTRAL SUBSTATION IN PINAL COUNTY, ARIZONA. THE ARIZONA PORTION OF THE PROJECT IS LOCATED WITHIN GRAHAM, GREENLEE, COCHISE, PINAL, AND PIMA COUNTIES.	DOCKET NO. L-00000_-15-00_____ Case No. __ **NOTICE OF FILING APPLICATION**

As required by A.R.S. Section 40-360.0, SunZia Transmission, LLC, files its Application for a Certificate of Environmental Compatibility ("Application") for the SunZia Southwest Transmission Project, which includes the construction of two new 500kV transmission lines and associated facilities.

Pursuant to A.R.S. Sections 40-360 through 40-360.14 and A.A.C. R14-3-201 through R14-3-200, enclosed are 25 copies of the Application. The filing fee required by A.R.S. Section 40-360.09 is also enclosed.

Communications concerning the Application should be addressed to:

Albert H. Acken
Samuel L. Lofland
Ryley Carlock & Applewhite
One North Central Avenue
Suite 1200
Phoenix, AZ 85004-4417
Telephone: (602) 258-7701

And

///

2015 SEP 2 PM 4 17
AZ CORP COMMISSION
DOCKET CONTROL

Lawrence V. Robertson, Jr.
Of Counsel, MungerChadwick, PLC
P.O. Box 1448
Tubac, AZ 85646-1448
Telephone: (520) 398-0411

RESPECTFULLY SUBMITTED this 2nd day of September, 2015.

RYLEY CARLOCK & APPLEWHITE

By: ______________________

Albert H. Acken
Samuel L. Lofland
Ryley Carlock & Applewhite
One North Central Avenue, Suite 1200
Phoenix, Arizona 85004-4417

MUNGERCHADWICK, PLC

By: ______________ FOR (with permission

Lawrence V. Robertson, Jr.
Of Counsel
P.O. Box 1448
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ORIGINAL and 25 copies filed
this 2nd day of September, 2015,
with:

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

COPY of the foregoing was hand-delivered
this 2nd day of September, 2015, to:

Chairman Thomas Chenal
Arizona Power Plant and Transmission Line Siting Committee
Attorney General's Office
1275 W. Washington Street
Phoenix, AZ 85007

Janice M. Alward
Chief Counsel, Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

By: ______________________

BEFORE THE
POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

In the matter of the Application of SunZia Transmission LLC, in conformance with the requirements of Arizona Revised Statutes 40-360, et seq., for a Certificate of Environmental Compatibility authorizing the SunZia Southwest Transmission Project, which includes the construction of two new 500 kV transmission lines and associated facilities originating at a new substation (SunZia East) in Lincoln County, New Mexico, and terminating at the Pinal Central Substation in Pinal County, Arizona. The Arizona portion of the project would be located within Greenlee, Graham, Cochise, Pima, and Pinal counties in Arizona.

APPLICATION FOR
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

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LIST OF ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
ACC	Arizona Corporation Commission
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CEC	Certificate of Environmental Compatibility
DC	Direct Current
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
kV	Kilovolt
MOA	Memorandum of Agreement
MW	Megawatts
NEPA	National Environmental Policy Act
NOA	Notice of Availability
PAR	Preferred Alternative Route
ROD	Record of Decision
SCIP	San Carlos Irrigation Project
SWPG	Southwestern Power Group II, LLC
SRP	Salt River Project
SWAT	Southwest Area Transmission Subregional Planning Group
SWTC	Southwest Transmission Cooperative
TEP	Tucson Electric Power Company
WECC	Western Electricity Coordinating Council

Executive Summary

EXECUTIVE SUMMARY

SunZia Transmission, LLC (SunZia) is seeking a Certificate of Environmental Compatibility (CEC) from the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) for authority to construct the proposed SunZia Southwest Transmission Project (Project) in Arizona. The Arizona portion of the Project comprises the construction of two new 500-kilovolt (kV) transmission lines and associated facilities. The Project is needed to increase transfer capability and reliability, thereby relieving existing transmission congestion and allowing additional electricity to be generated and transported to western power markets and load centers in Arizona and the Desert Southwest. The Project will be colocated with areas of undeveloped renewable resource potential to provide a path for energy delivery to help meet growing demand for electricity in the western United States, including Arizona. The Project will also assist Arizona load-serving utilities by providing additional energy delivery options and to meet state renewable portfolio standards and new federal mandates while addressing transmission needs that have been identified at local, regional, and national levels.

PROJECT OVERVIEW

The Project includes two new, single-circuit 500 kV transmission lines. The length of the Proposed Route within Arizona, described in this CEC Application, is approximately 199 miles. The Proposed Route enters Arizona in Greenlee County, approximately three miles north of the Cochise County line, and terminates at the existing Pinal Central Substation in Pinal County, Arizona (Figure ES-1). The Proposed Route crosses lands administered by the Arizona State Land Department (ASLD), Bureau of Reclamation (BOR), and Bureau of Land Management (BLM), and private lands (Exhibit A-1). The Proposed Route will be located within the planning areas of Greenlee County, Graham County, Cochise County, Pinal County, Pima County, City of Coolidge, and the City of Eloy.

The Project will require new rights-of-way on federal, state, and private lands for the transmission lines and related associated facilities; the typical right-of-way width will be up to 200 feet for each of the two transmission lines within a single 2,500 foot-wide corridor. Typically there will be a 50-foot wide separation between the two transmission line rights-of-way. However, in some locations, the separation of the transmission line rights-of-way could be up to 1,000 feet to accommodate physical constraints such as terrain features, or to avoid sensitive environmental resources and to preserve critical habitat, existing land uses, and important cultural resources. Based on a typical span of 1,400 feet between transmission line structures, three to four transmission line structures per mile will be required for each of the two lines, with typical structure heights of 135 feet, typically ranging from 100 to 170 feet in certain conditions. Project design features and details, including typical structure diagrams anticipated for the Project, are provided in Exhibit G.

The Project will include construction of the Willow-500 kV Substation, located on ASLD land in Graham County, Arizona. The location of the proposed Willow-500 kV Substation is approximately 3 miles north of the Cochise County line and approximately 1 mile east of US Highway 191. The Pinal Central Substation, at the Project's western terminus, was approved by the ACC in 2005 (Decision No. 68093) and constructed by Salt River Project (SRP). The Pinal Central Substation is located approximately 7.5 miles east of Interstate 10 on privately owned land within the City of Coolidge. SunZia's 500 kV transmission lines will terminate inside the existing Pinal Central Substation. These substations will provide Arizona's utilities and load centers with access to the energy, including renewable energy, transmitted by the SunZia Project.

At least one of the two 500 kV transmission lines will be constructed and operated as an alternating current (AC) facility. The other transmission line could be either an AC or direct current (DC) facility. If one of the lines is constructed as a DC facility, then the Project will include construction of a new DC converter station, which will be located within the requested 2500 foot corridor and within 1 mile east of the Pinal Central Substation.

PROJECT NEED AND BENEFITS

The SunZia Project benefits Arizona by providing needed increases in energy and power transfer capability and improved transmission reliability. Consequently, the Project will: (1) reduce existing transmission congestion; (2) support the development and transmission of renewable energy resources, such as solar and wind energy, currently located within areas of undeveloped renewable resource potential; (3) provide power to help meet future electricity demand in Arizona; (4) provide a strategic option for Arizona, and its utilities, to comply with increasingly burdensome federal air quality standards; and (5) provide needed jobs and state and local revenues.

The SunZia Project will enable the delivery of renewable energy essential for achieving compliance with existing and pending federal standards. By 2025, Arizona's Renewable Energy Standard and Tariff requires regulated electric utilities to generate 15 percent of total energy from renewable energy technologies, and beginning in 2025, a significant reduction in carbon dioxide (CO_2) emissions from electricity generating units is required by the U.S. Environmental Protection Agency's Clean Power Plan. To meet the Clean Power Plan emission reduction requirement in Arizona, utilities will likely need to reduce reliance on high-emitting coal-fired power plants and obtain power from zero-emitting renewable sources. In addition, a pending regulation affecting Arizona utilities is the Environmental Protection Agency's (EPA) final revised ozone standard, expected to be promulgated in October 2015. This new federal rule will likely further limit the development of new, and major modifications of existing, fossil fuel power plants in Arizona.

The Project will also provide needed jobs and revenue in Arizona. The Project will provide significant employment opportunities during its anticipated construction period (over 2500 jobs in Arizona); tax benefits through property, state, and local taxes; and significant revenue to ASLD.

PROJECT HISTORY

SunZia originated from regional transmission planning efforts.

The Southwest Area Transmission Subregional Planning Group (SWAT) is an organization within the Western Electricity Coordinating Council (WECC) that promotes coordinated regional planning of the transmission grid in Arizona, New Mexico, southern Nevada, and southern California. SWAT includes transmission owners and customers, environmental and conservation interests, independent and merchant transmission and generation project owners, governmental organizations like the Arizona Corporation Commission (Commission), and other stakeholders. In 2006, SWAT identified the need for significant transmission expansion between southern New Mexico and southern Arizona to serve growing electrical loads, increase system power transfer limits and import capability requirements, and provide service for the growing demand for renewable energy resources, particularly from remote renewable energy zones that have limited or no access to transmission infrastructure. The Project was conceptualized as a result of SWAT's findings. Since 2006, the Project has been included in SWAT's collaborative planning process.

Additionally, SunZia submits annual updates to its Ten Year Plan each January with the Arizona Corporation Commission, and is an active participant in the Commission's Biennial Transmission Assessment process.

SunZia is an independent transmission project owned by multiple parties.

SRP, Tucson Electric Power Company (TEP), Tri-State Generation and Transmission Association, and Shell Wind Energy are minority owners, while Southwestern Power Group II, LLC (SWPG), a wholly owned subsidiary of MMR Group, is the significant majority owner of the Project. SWPG serves as the project manager.

SunZia has been the subject of a nearly six-year, comprehensive environmental study process that included impact analyses, significant public involvement, and detailed reviews of alternative routes and mitigation planning.

During the summer of 2008, SWPG, acting on behalf of all the Project owners, conducted an analysis of numerous possible alternative transmission alignments. Siting criteria included maximizing the use of existing linear infrastructure features (including high voltage transmission lines, pipelines, roads, existing but unused rights-of-way, canal easements, etc.), while avoiding or minimizing areas within which construction and operation of electric transmission infrastructure will result in a significant incompatible use of the land. In September 2008, SunZia filed a SF-299 right-of-way application with the BLM, requesting a 1,000 foot right-of-way across federal lands in Arizona and New Mexico. SunZia's requested route at that time was approximately 460 miles long.

BLM became the lead federal agency to prepare an Environmental Impact Statement (EIS) in order to comply with the National Environmental Policy Act (NEPA) and other federal laws and regulations.

During the EIS study and review process, which commenced in 2009, 14 cooperating federal and state agencies joined the effort, thereby affording the BLM the benefit of each agency's particular special expertise and guidance. Arizona cooperating agencies included the ASLD, the Arizona Game and Fish Department (AGFD), and the Arizona Department of Transportation (ADOT). These cooperating agencies actively participated during the NEPA process.

To issue a right-of-way under the Federal Land Policy and Management Act, the BLM identified and selected the Arizona portion of the Project after coordination, consultation, and input from these Arizona state agencies. The Arizona portion of the BLM Preferred Alternanertive Route (PAR) is the Proposed Route that SunZia requests in this CEC Application.

Significant and comprehensive public and stakeholder involvement was carried out during the NEPA process. For example, BLM conducted a series of public scoping meetings in Arizona during the June 2009–June 2010 timeframe; over 200 people attended the meetings that were held in Eloy, Oracle, Safford, Willcox, and Tucson, and approximately 1,000 written comments were provided to the BLM. Additionally, during, before, and after this time period, Project representatives met with local stakeholders, municipalities, and boards of supervisors in Pinal, Pima, Graham, Cochise, and Greenlee counties to inform them of general project planning activities and seek their input.

BLM issued a Draft EIS in May 2012 and invited public comment. Another round of public meetings was conducted in Safford, Benson, Tucson, San Manuel, and Eloy, and the BLM received over 900 written comments for its review and consideration.

In June 2013, the BLM issued the Final EIS for the Project and invited public comment. The BLM's PAR in the Final EIS is 515 miles long. The Arizona portion of the PAR is 199 miles. Of that length, 131 miles cross land managed by ASLD, 50 miles cross lands managed by BLM, and 18 miles cross private land.

In its role as a cooperating agency and primary landowner in Arizona during the EIS process, the ASLD provided guidance to BLM that included the identification, evaluation, analysis, and comparison of numerous alternative transmission line route segments leading to the final route selection of the PAR, which is the same as the Proposed Route.

After issuance of the Final EIS, the BLM issued its Record of Decision (ROD) in January 2015, concluding the federal environmental review of the Project that was initiated in May 2009. To date, the Project has undergone almost six years of engineering analysis, environmental review, and system performance evaluations for a range of alternatives, including the Proposed Route. The Arizona portion of the Proposed Route was selected after coordination, consultation, and input among the ASLD, AGFD, ADOT, and the BLM.

PROPOSED PROJECT ROUTE

The SunZia Proposed Route is a total of 199 miles within Arizona, and is parallel to approximately 117 miles of existing utility corridors (as shown in Figure 1 of the Application). The Proposed Route crosses the New Mexico-Arizona state line from Hidalgo County, New Mexico into Greenlee County, Arizona, approximately three miles north of the Cochise County line. The Proposed Route proceeds east to west for approximately 37 miles from the state line into Graham County and south of the Hot Well Dunes Recreation Area, and continues through the San Simon Valley to the proposed Willow-500 kV Substation, located approximately three miles north of the Cochise County line.

The Proposed Route proceeds southwest from the proposed Willow-500 kV Substation, parallel to two 345 kV transmission lines operated by TEP for approximately 47 miles, and crosses two pipelines and US Route 191. The route crosses the TEP 345 kV lines approximately 1 mile west of the San Pedro River and turns northwest and continues through the northeast corner of Pima

County into Pinal County, of which approximately 12 miles will be parallel to an existing pipeline corridor. The route then turns and heads west approximately 2 miles west of San Manuel. The route crosses SR 77 (approximately 2 miles north of the community of Oracle), and parallels a 115 kV transmission line for approximately 10 miles to the southwest, to a point adjacent to the Oracle Junction Substation. The route then proceeds parallel to the Arizona Public Service Company's Cholla-Saguaro 500 kV transmission line and an SWTC 115 kV transmission line for approximately 14 miles and crosses SR 79. The route proceeds northwest, then north, for approximately 19 miles, of which approximately 16 miles are parallel to and east of TEP's Pinal Central-Tortolita 500 kV transmission line (Case 165, Decision No. 73282). The route then turns northwest, then west, continuing to parallel the Pinal Central-Tortolita 500 kV line and a pipeline corridor for 6 miles. As the Proposed Route then heads west, it crosses the Central Arizona Project canal and SR 87 before it proceeds to the Pinal Central Substation located on the southeast corner of SR 287 and Eleven Mile Corner Road, parallel to the Pinal Central-Tortolita 500 kV line for an additional 12 miles.

CONCLUSION

In this Application, SunZia is seeking a CEC for the 199-mile Proposed Route that: (1) maximizes the use of existing utility corridors and infrastructure, (2) minimizes impacts to sensitive environmental resources, (3) minimizes impacts at river crossings, (4) minimizes impacts to residential and commercial land uses, and (5) represents an alignment selected with the input, contributions, and special expertise in Arizona provided by the public, Ft. Huachuca, San Carlos Irrigation Project/Bureau of Indian Affairs (SCIP/BIA), ASLD, AGFD and ADOT. The Proposed Route was selected as the result of a comprehensive EIS process that took approximately 6 years to complete. Upon receiving an Order of the Commission confirming the Siting Committee's issuance of a CEC for the Project, SunZia can move forward with right-of-way acquisition, final engineering and design, and completion of a Plan of Development that provides detailed construction and operation procedures for the Project.

Current planning indicates construction starting mid-2018, with the first 500 kV transmission facility and related infrastructure being placed into operation by 2021.

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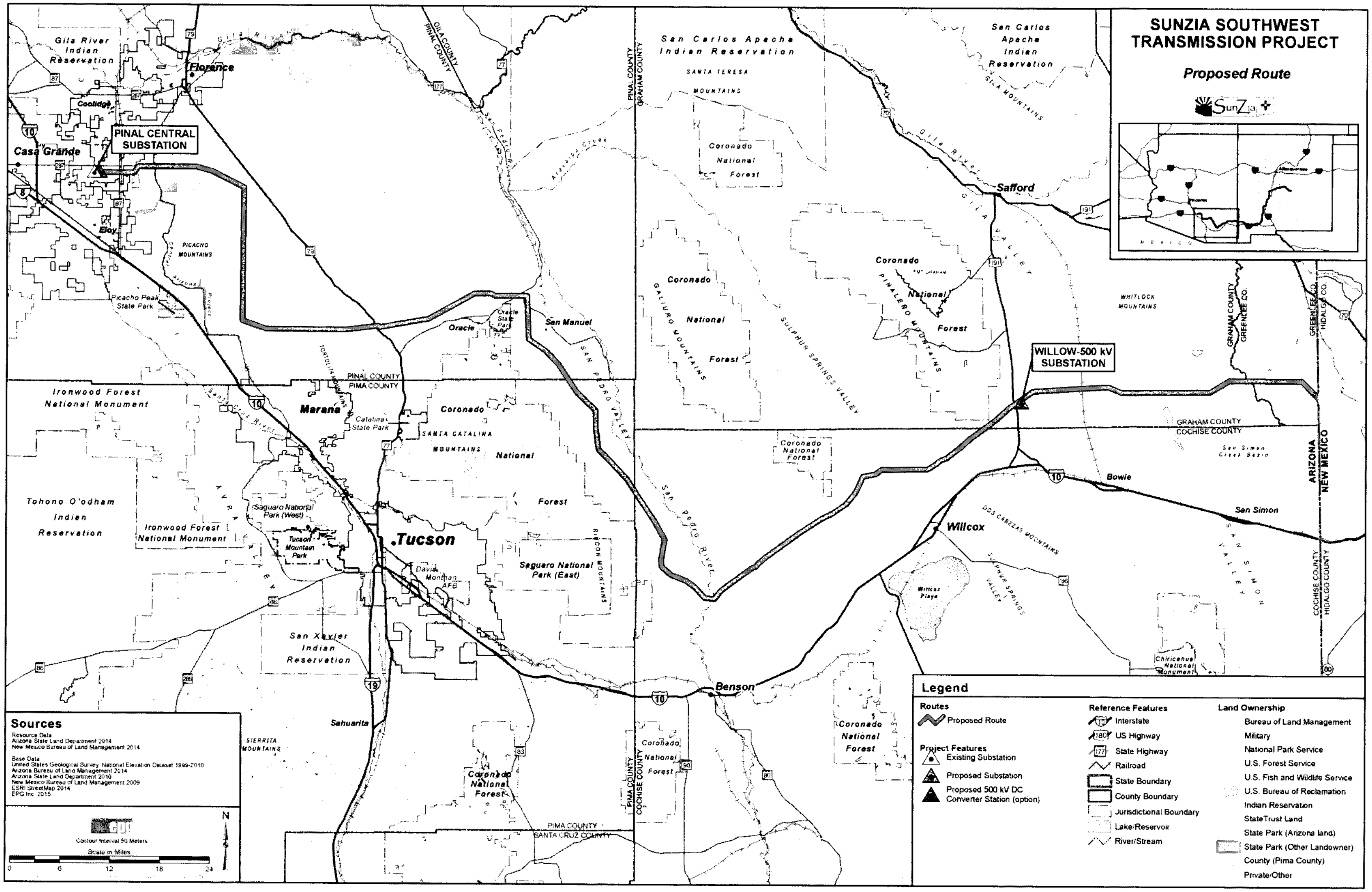

Figure ES-1. Proposed Route

Application

APPLICATION FOR A
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

(Pursuant to A.R.S. §§ 40-360.03 and 40-360.06)

1. ***Name and address of Applicant:***

   SunZia Transmission, LLC
   3610 N. 44th Street, Suite 250
   Phoenix, AZ 85018

2. ***Name, address and telephone number of a representative of Applicant who has access to technical knowledge and background information concerning this application, and who will be available to answer questions or furnish additional information:***

   Tom Wray
   Project Manager
   SunZia Transmission LLC
   3610 N. 44th Street, Suite 250
   Phoenix, AZ 85018
   Phone: 602-808-2004

3. ***Dates on which Applicant filed a Ten Year Plan in compliance with A.R.S. § 40-360.02, in which the facilities for which this application is made were described:***

   - January 29, 2009
   - January 28, 2010
   - January 18, 2011
   - January 4, 2012
   - January 16, 2013
   - January 2, 2014
   - January 30, 2015

4. ***Description of the proposed facilities:***

   a. ***Description of electric generating plant:***

   The Project does not include an electrical generating plant.

b. Description of the proposed transmission line:

i. Nominal voltage for which the lines are designed; description of geographical points between which the transmission line will run, the straight-line distance between such points and the length of the transmission line:

(1) Nominal voltage for which the lines are designated:

500 kilovolt (kV) alternating current (AC) or direct current (DC); single circuit. At least one of the two 500 kV transmission lines will be constructed and operated as an AC facility; the other transmission line will be either an AC or DC facility.

(2) Description of proposed structures:

The transmission line will be constructed using primarily Guyed "V" galvanized steel lattice structures. The typical structure height will be 135 feet, ranging between 100 and 170 feet in certain conditions, with a typical span between structures of 1,400 feet. Similar structure types will be used for either the AC or DC transmission lines, except that each DC structure will contain only two sets of bundled conductors, versus three sets for an AC structure. In addition, the guyed structures will be vertical for the DC transmission line, compared to V-shaped towers for the AC transmission line. The structures will have a dulled gray metal finish, and conductors will have a non-specular finish in order to reduce visibility.

Exhibit G contains conceptual illustrations of2 proposed structures that maybe used for the Project. Specific tower configurations will be determined during the design phase.

(3) Description of proposed substations:

The proposed 500 kV transmission lines will interconnect the proposed SunZia East Substation at the eastern terminus in New Mexico, and the Pinal Central Substation as its western terminus in Arizona. The SunZia East Substation will be located in Lincoln County, New Mexico.

The existing Pinal Central Substation is located within the City of Coolidge in Pinal County, Arizona, near US Route 287 and US Route 87. Pinal Central was constructed and placed in service in 2014 and is operated by Salt River Project. Construction of the Pinal Central Substation was authorized by the Arizona Power Plant and Transmission Line Siting Committee and the Arizona Corporation Commission on August 25, 2005, in Decision No. 68093 (Siting Case No. 126). Equipment and facilities required for interconnection of SunZia will be installed within the fenced area of the existing substation.

The Arizona portion of the Project includes the proposed Willow-500 kV Substation, which will be located in Graham County, Arizona, near US Route 191 and the existing TEP Company Springerville-Vail 345 kV transmission line(s). The Willow-500 kV Substation will be constructed on lands managed by the Arizona State Land Department (ASLD). The Willow-500 kV Substation parcel will include a secure, fenced area containing high voltage electrical equipment, plus sufficient area surrounding the substation components for placement of transmission structures entering and exiting the substation, and to provide setbacks as needed to buffer neighboring lands. The maximum height of structures in the substation will be approximately 170 feet. The substation yards will be open air and include equipment such as transformers, circuit breakers, disconnect switches, lightning/surge arrestors, reactors, capacitors, bus (conductor) structures, and a microwave antenna. Typically, substation components will be surrounded by an eight-foot-high chain-link fence topped with barbed wire.

A separate DC converter station will be required if the 500 kV DC option was utilized, to convert the flow of electricity from DC to AC, and thereby allow the DC line to deliver energy to the Pinal Central Substation. If needed, the converter station will be constructed within a fenced parcel of up to 45 acres, located within a 2,500-foot wide corridor, within 1 mile east of the Pinal Central Substation (see Exhibit G-3). The location of the siting area and a typical converter station arrangement is shown in the schematic drawing (Exhibit G-3). The converter station will have the necessary equipment for the conversion of DC to AC voltages and filtering equipment. The typical facilities needed for the conversion will be thyristor valves, smoothing reactors, converter transformation (all contained within the converter building), capacitors for reactive compensation, and specific harmonic filtering for the AC termination into the Pinal Central substation. The interconnection between the Pinal Central Substation and the converter station will require two 500 kV AC transmission lines. The parcel will include the secure, fenced area containing the electrical equipment, plus sufficient area surrounding the substation components for placement of transmission structures entering and exiting the station, and provide setbacks to buffer neighboring lands. The maximum height of transmission structures in the converter station will be approximately 170 feet.

(4) Purpose for constructing said transmission line and substations:

The SunZia Project benefits Arizona by providing needed increases in energy and power transfer capability and improved transmission reliability. Consequently, the Project will (1) reduce existing transmission congestion; (2) support the development and transmission of renewable energy resources, such as solar and wind energy, currently located within areas of undeveloped renewable resource potential; (3) provide power to help meet future electricity demand in Arizona; (4) provide a strategic option for Arizona, and its utilities, to comply with increasingly burdensome federal air quality standards; and (5) provide needed jobs and state and local revenues.

The need for additional transmission infrastructure to increase transfer capability, improve reliability, and address existing congestion has been identified in federal, regional, and state processes. SunZia will contribute to improved system reliability with additional transmission lines and substation connections increasing transmission capacity where congestion exists and providing access where limited transmission currently restricts delivery to customers.

Moreover, the Project will facilitate renewable resource development and the distribution of power to load centers throughout Arizona and the Desert Southwest.

For example, the Western Governors' Association's Western Renewable Energy Zone study identified 10,500 MW of solar potential in southeast Arizona and southwest New Mexico and 11,300 MW of potential wind resources near the SunZia Project's eastern terminus.

The SunZia Project will enable the delivery of renewable energy essential for achieving compliance with existing and pending federal standards. By 2025, Arizona's Renewable Energy Standard and Tariff requires regulated electric utilities to generate 15 percent of total energy from renewable energy technologies, and beginning in 2025, a significant reduction in carbon dioxide (CO_2) emissions from electricity generating units is required by the U.S. Environmental Protection Agency's Clean Power Plan. To meet the Clean Power Plan emission reduction requirement in Arizona, utilities will likely need to reduce reliance on high-emitting coal-fired power plants and obtain power from zero-emitting renewable sources. In addition, a pending regulation affecting Arizona utilities is EPA's final revised ozone standard, expected to be promulgated in October 2015. This new federal rule will likely further limit the development of new and major modifications of existing fossil fuel power plants in Arizona.

The Project benefits also include property, state, and local taxes paid by the SunZia Project and generation facilities that will utilize SunZia's new transmission capacity. During a three-year construction period, SunZia will provide significant employment opportunities, including over 2,500 jobs in Arizona; sales and property tax revenues; and significant revenue to the ASLD from right-of-way lease payments[a].

ii) *General Location*

(1) Description of the geographic points between which the transmission lines will run:

The transmission line route enters Arizona in Greenlee County in Section 14, Township 11 South, Range 32 East of Pinal County, Arizona, approximately 3 miles north of Cochise County.

The project will terminate at the existing Pinal Central Substation located in Section 18, Township 6 South, Range 8 East of Pinal County, Arizona, just south of the intersection of State Route 287 and Eleven Mile Corner Road.

The Proposed Route crosses private land and lands administered by the ASLD, Bureau of Land Management (BLM), and Bureau of Reclamation (BOR). The Proposed Route crosses lands located within the planning areas of Greenlee County, Graham County, Cochise County, Pinal County, Pima County, the City of Coolidge, and the City of Eloy.

[a] According to "The SunZia Southwest Transmission Project Economic Impact Analysis," prepared by the University of Arizona and New Mexico State University (2011, revised January 2012), attached Appendix G1 to the SunZia Southwest Final Environmental Impact Statement, included herewith at Exhibit B-1, the Project will provide: approximately \$13.29 to \$17.04 million in Arizona State sales tax for the construction of the transmission line and substation portions within the state of Arizona, and approximately \$9.13 to \$11.02 million in Arizona local sales tax for the construction of the transmission line and substation portions within the state of Arizona.

(2) Straight-line distance between such geographic points:

The straight-line distance from the Arizona state line in Greenlee County to the Pinal Central Substation located in Pinal County is approximately 149 miles.

(3) Length of the transmission line route:

The length of the Proposed Route is approximately 199 miles.

iii) Detailed Dimensions:

(1) Nominal width of right-of-way requested:

SunZia Transmission LLC is requesting approval of a typical right-of-way width of up to 200 feet for each of the two transmission lines within a single 2,500 foot-wide corridor. Typically there will be a 50 foot-wide separation between the two transmission line rights-of-way; however, in some locations, the separation of the transmission line rights-of-way could be up to 1,000 feet to accommodate physical constraints such as terrain features or avoid sensitive environmental resources, and to preserve critical habitat, existing land uses, and important cultural resources.

(2) Nominal length of span:

The nominal length of span between transmission structures is approximately 1,400 to 1,700 feet.

(3) Typical height of structures above ground:

The typical structure height will be 135 feet, ranging between 100 and 170 feet based on span length and terrain conditions.

(4) Maximum height of supporting structures:

Proposed structures vary in height, with none anticipated to exceed 199 feet, in order to remain below the threshold at which the structure may affect navigable airspace based on Federal Aviation Administration regulations.

(5) Minimum height of conductor above ground:

The minimum conductor height above ground for the AC transmission line will be 30 to 35 feet, at 176 degrees Fahrenheit conductor operating temperature, based on National Electric Safety Code (NESC) and Applicant's design standards. The exact height of each structure will be governed by topography and safety requirements for conductor clearance to grounded surfaces. The AC transmission line configuration requires three sets of bundled conductors.

If the 500 kV DC transmission line is constructed, it will use the same type of conductor as the AC transmission line, except that each DC structure will contain only two sets of bundled conductors. Minimum conductor height above ground for the DC transmission line will be 38 feet, based on NESC standards. The exact height of each structure will be governed by topography and safety requirements for conductor clearance to grounded surfaces. The AC transmission line configuration requires three sets of bundled conductors.

iv) Estimated costs of proposed transmission lines and substation:

ESTIMATED COSTS OF PROPOSED TRANSMISSION LINES AND SUBSTATION		
Project Components[1]	**Initial Cost[2]**	**Annual Cost[2]**
Transmission Construction	$720,000,000	0
Substation Construction	$90,000,000	0
Right-of-Way Acquisition	$25,000,000	$867,000
Total	$835,000,000	$867,000
1 Two 500 kV AC Transmission lines 2 Costs in 2015 U.S. Dollars		

v) Description of the proposed route and substation locations:

In this application, SunZia proposes the route identified in Figure ES-1 and Exhibit A (Proposed Route), which was studied in detail and identified as the BLM Preferred Alternative Route (PAR) in the Record of Decision (ROD) for the Final Environmental Impact Statement (EIS). The description of the Proposed Route for this Application is provided below.

The Proposed Route is a total of 199 miles in length within Arizona, and will be parallel to approximately 117 miles of existing or designated utility corridors. The Proposed Route crosses the New Mexico-Arizona state line from Hidalgo County, New Mexico into Greenlee County, Arizona, approximately three miles north of the Cochise County line. The Proposed Route proceeds east to west for approximately 37 miles from the state line into Graham County and south of the Hot Well Dunes Recreation Area, and continues through the San Simon Valley to the proposed Willow-500 kV Substation, located approximately 3 miles north of the Cochise County line and 1 mile east of US Highway 191 in Graham County, Arizona.

The Proposed Route proceeds southwest from the proposed Willow-500 kV Substation, parallel to two 345 kV transmission lines operated by Tucson Electric Power (TEP) for approximately 47 miles, and crosses two pipelines and US Route 191. The route crosses the TEP 345 kV lines approximately 1 mile west of the San Pedro River and turns northwest and continues through the northeast corner of Pima County into Pinal, of which approximately 12 miles will be parallel to an existing pipeline corridor. The route then turns and heads west approximately 2 miles west of San Manuel. The route crosses SR 77 (approximately 2 miles north of the community of Oracle), and parallels a 115 kV transmission line for approximately 10 miles to the southwest, to a point adjacent to the Oracle Junction Substation. The route then proceeds parallel to the Arizona public Service (APS) Cholla-Saguaro 500 kV transmission line and a SWTC 115 kV transmission line for approximately 14 miles and crosses SR 79. The route proceeds northwest, then north and parallel to the TEP Pinal Central-Tortolita 500 kV transmission line for approximately 16 miles (Case 165, Decision No. 73282). The Proposed Route then turns northwest, then west, continuing to parallel the Pinal Central-Tortolita 500 kV line and a pipeline corridor for approximately 6 miles. As the Proposed Route then heads west, it crosses a Central Arizona Project canal and SR 87 before it proceeds to the Pinal Central Substation, located on the southeast corner of SR 287 and Eleven Mile Corner Road, parallel to the Pinal Central-Tortolita 500 kV line for an additional 12 miles. If one of the lines is constructed as a DC facility, then the Project will include construction of a new DC converter station, which will be located within the requested 2500 foot corridor and within 1 mile east of the Pinal Central Substation.

Numerous alternatives to the Proposed Route were identified during the development of the EIS. The analysis and comparison of alternative routes were documented in the Final EIS. The description of alternatives and rationale for selection of the PAR, and thus Applicant's decision to select the same as the Proposed Route, are included in Section 7 and Exhibit B-1 of this Application.

vi) Land Ownership:

Land ownership corresponding to SunZia's Proposed Route is indicated in the following table and the map in Exhibit A-1.

LAND OWNERSHIP					
	Bureau of Land Management	**Bureau of Reclamation[2]**	**Arizona State Trust Land**	**Private**	**Total**
Miles[1]	49.8	0.4	130.6	17.7	198.5
Percent	25.1%	0.2%	65.8%	8.9%	100.0%
	[1] Based on approximate location of the proposed transmission line corridor centerline [2] Central Arizona Project canal crossing in Pinal County				

5. ***Jurisdictions:***

   a) ***Areas of jurisdiction (as defined in A.R.S. Section 40-360) affected by this route:***

   The areas of jurisdiction corresponding to SunZia's Proposed Route are indicated in the following table.

JURISDICTION							
	Greenlee County	**Graham County**	**Cochise County**	**Pima County**	**Pinal County**	**City of Coolidge[2]**	**Total**
Miles[1]	9.6	33.1	57.8	16.2	81.8	<0.1	198.5
Percent	4.8	16.7	29.1	8.2	41.2	<0.1	100
	1.Based on approximate location of the proposed transmission line corridor centerline 2.Pinal Central Substation is located in the recently annexed portion of City of Coolidge						

b) ***Designation of proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of affected areas of jurisdiction:***

The Project is not contrary to zoning ordinances or master plans of any affected areas of jurisdiction.

6. ***Description of the environmental studies Applicant has performed:***

The following is a list of environmental studies performed by the Applicant or other agencies and organizations on the Project.

- ***Draft EIS (May 2012)***
- ***Final EIS and Appendices (June 2013), EXHIBIT B-1***

This Final Environmental Impact Statement and Proposed Resource Management Plan Amendments (EIS) document was prepared to analyze and disclose the potential effects of the proposed SunZia Southwest Transmission Project. The BLM served as the lead federal agency for preparing the EIS, and published its notice of intent to prepare the EIS in the Federal Register on May 29, 2009.

In accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality NEPA regulations, the Department of the Interior's NEPA regulations, and other applicable authorities, the BLM analyzed the environmental impacts of the proposed Project and a reasonable range of alternatives. The Notice of Availability (NOA) of the Draft EIS was published in the Federal Register on May 29, 2012, and the Final EIS NOA was published on June 14, 2013. The ROD, published by the BLM on January 23, 2015, approved the issuance of a right-of-way grant under certain terms and conditions for the construction, operation, and maintenance of the proposed SunZia Project facilities on federal lands administered by the BLM.

Fourteen cooperating agencies participated in the preparation of the EIS, including the ASLD; Arizona Game and Fish Department (AGFD); Arizona Department of Transportation (ADOT); Department of the Army, Fort Huachuca; Bureau of Indian Affairs; U.S. Army Corps of Engineers; Department of the Army, Fort Bliss; Department of the Army, White Sands Missile Range; U.S. Air Force, Holloman Air Force Base; U.S. Fish and Wildlife Service; U.S. National Park Service; Department of Defense Siting Clearinghouse, Office of the Deputy Under Secretary (Installations and Environment); New Mexico State Land Office; and New Mexico Spaceport Authority.

- ***EIS Appendices***
  - Appendix A: Opportunities and Constraints Analysis
  - Appendix B: Biological Resources
    - B1 Biological Technical Report (Addendum)

  - B2 Analysis of Potential Avian Collisions with Transmission Lines at Four Locations on the Rio Grande in New Mexico
  - B3 Estimated Distribution of Special-status Species
- Appendix C: Cultural Resources
- Appendix D: Visual Resources
  - D1 Scenic Quality Rating Units
  - D2 Contrast Rating Worksheets
  - D3 Visual Resource Inventory Tables
  - D4 Viewing Locations
  - D5 Key Observation Points and Simulation Locations
  - D6 Simulations
- Appendix E: Land Use Data
- Appendix F: Climate and Air Quality
- Appendix G: Social and Economic Resources
  - G1 SunZia Economic Impact Assessment and Supplement: Impacts of Potential Renewable Generation Facilities
  - G2 Social and Economic Resources
- Appendix H: Resource Impact Analysis Data
- Appendix I: Analysis of Access Conditions and Potential Ground Disturbance
- Appendix J: Comments on the Draft EIS
- Appendix K: SunZia Project Preliminary EMF and Corona Effects Study
- Appendix L: National Scenic and Historic Trails Assessment
- Appendix M: Draft Programmatic Agreement
- Map Volume

• Biological and Conference Opinion and Conference Report, United States Fish and Wildlife (November 2013)

- Approved Programmatic Agreement (December 2014)

In addition to these studies, other studies were conducted for the New Mexico portion of the Project. For a complete list, see the Final EIS.

The BLM also conducted an Environmental Assessment for a portion of the line in New Mexico prior to issuance of the ROD. However, because it involved only resources in New Mexico, and only a portion of the Project in New Mexico, it is neither discussed herein nor included in Exhibit B.

This Application also includes Exhibits A through J, which provide descriptions of the environmental studies conducted for the Project.

7. ***Rationale for selection of Proposed Route:***

The Proposed Route as described in this Application has been found by SunZia and its environmental consultant, EPG, to be within the range of impacts deemed "environmentally compatible" in past Arizona siting decisions. A comprehensive 6-year study of alternatives was conducted that resulted in the identification of the Proposed Route as described in this Application. Summarily, the rationale for the selection of the Proposed Route follows.

In comparison with other alternatives evaluated in previous studies, the Proposed Route was selected because it will:

- maximize use of existing utility corridors
- minimize impacts to sensitive resources
- minimize impacts at river crossings
- minimize impacts to residential and commercial uses

A major portion of the Proposed Route will be constructed along established utility corridors where existing access is available. Approximately 59 percent (117 miles) of the Proposed Route will be parallel to existing utility corridors, including approximately 74 miles parallel to existing transmission lines (see Figure 1). Through the use of existing utility corridors, impacts are reduced. The consolidation with existing transmission lines and other linear facilities is environmentally compatible because impacts to land uses as well as visual, biological, and cultural resources are minimized.

Alternatives Considered, in Previous Studies, But Not Selected as the Proposed Route

Previous studies included a regional opportunities and constraints analysis, which resulted in the identification of potential alternative transmission line corridors for the SunZia Southwest Transmission Project (see Appendix A of the EIS, Exhibit B-1). The initial set of alternatives were evaluated and refined during the scoping process, which included information from the public, BLM, and cooperating agencies in this process (AGFD, ADOT, and ASLD). This resulted in approximately 700 miles of alternatives in Arizona, including the Proposed Route, that were studied in detail through the EIS process (as shown in Figure 2). These alternative routes included the Safford/Sulphur Springs Valley, East of the San Pedro River, and Tucson alternatives.

The Safford/Sulphur Springs Valley Alternatives would cross Aravaipa Creek and require construction through areas where there is less existing access or other development. The construction of new transmission lines through relatively undeveloped areas would cause greater impacts to land uses and visual, cultural, and biological resources than the Proposed Route. The Safford alternatives would impact developed areas near Safford and would be closer to Mt. Graham. A new utility corridor through the Sulphur Springs Valley would also impact grasslands and previously undisturbed and undeveloped lands.

The East San Pedro River Alternatives would require new rights-of-way in the Cascabel area, cross the Muleshoe Ranch Cooperative Management Area, and cross an Area of Critical Environmental Concern.

The Tucson Alternatives would cross Cienega Creek Preserve, conflict with use in the Pima County recreation areas in the Santa Cruz and Rillito river corridors, and displace approximately 216 residences, and disproportionately affect environmental justice populations. These alternatives are also located in proximity to historic districts and trails within the Tucson metropolitan area.

Ultimately, the Applicant chose to only apply for a Certificate of Environmental Compatibility with respect to the Proposed Route, as opposed to including an alternative identified and analyzed in previous studies, because the Safford/Sulpher Springs Valley, East of the San Pedro, and Tucson alternatives have, relative to the Proposed Route: (1) fewer colocation opportunities; (2) greater impacts to the environment; (3) greater impacts to environmental justice populations; and (4) greater disparities with existing land uses.

Conclusion

The foregoing information, and information set forth in attached exhibits A-J, satisfy the content and format requirements of Arizona Administrative Code R14-3-219. Additionally, the Proposed Route for the 500 kV SunZia Southwest Transmission Project is suitable when judged in light of the decision making factors set forth in Arizona Revised Statutes 40-360.06. Accordingly, the Applicant hereby requests that the Committee render a decision granting Applicant a Certificate of Environmental Compatibility for the proposed Project.

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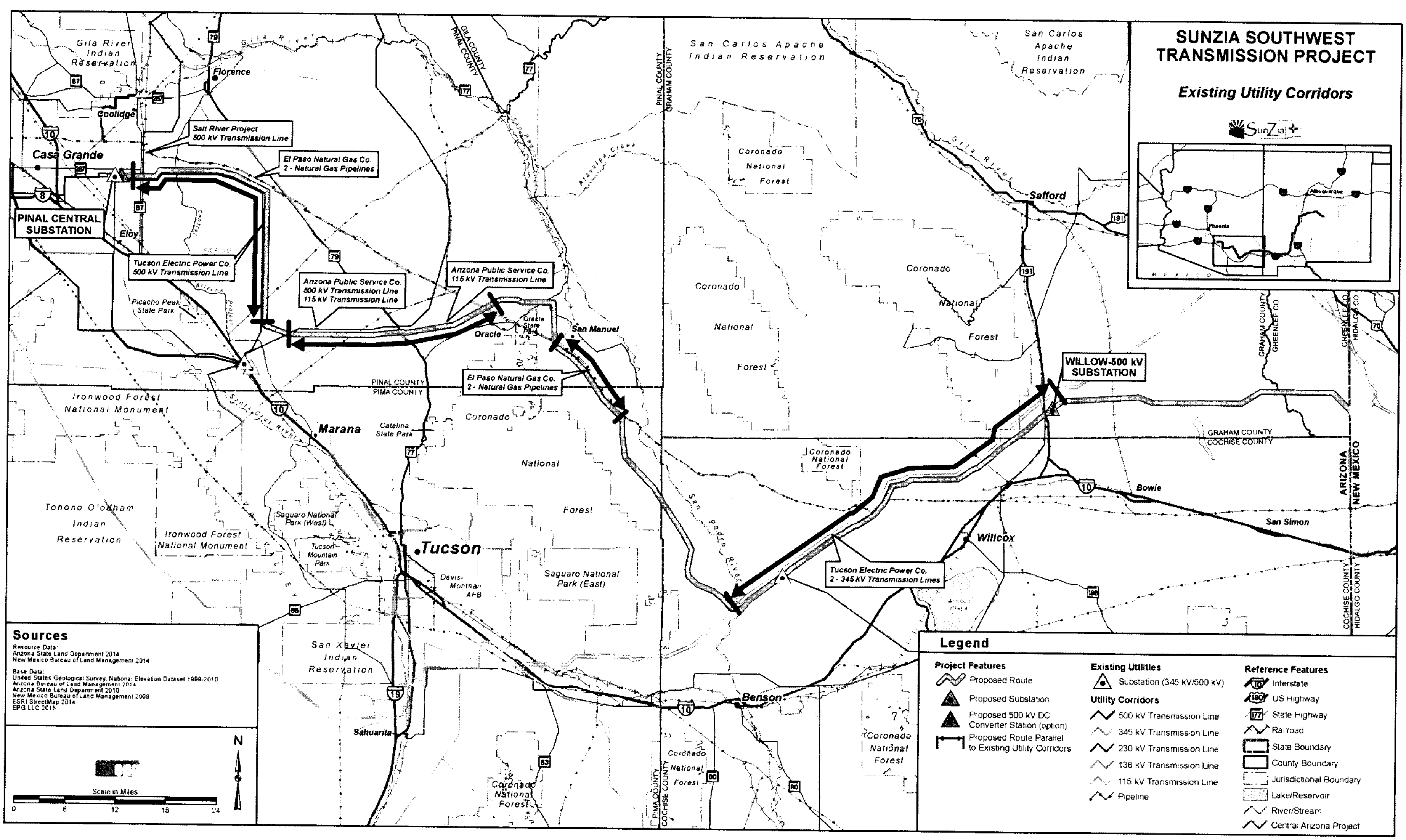

Figure 1. Existing Utility Corridors

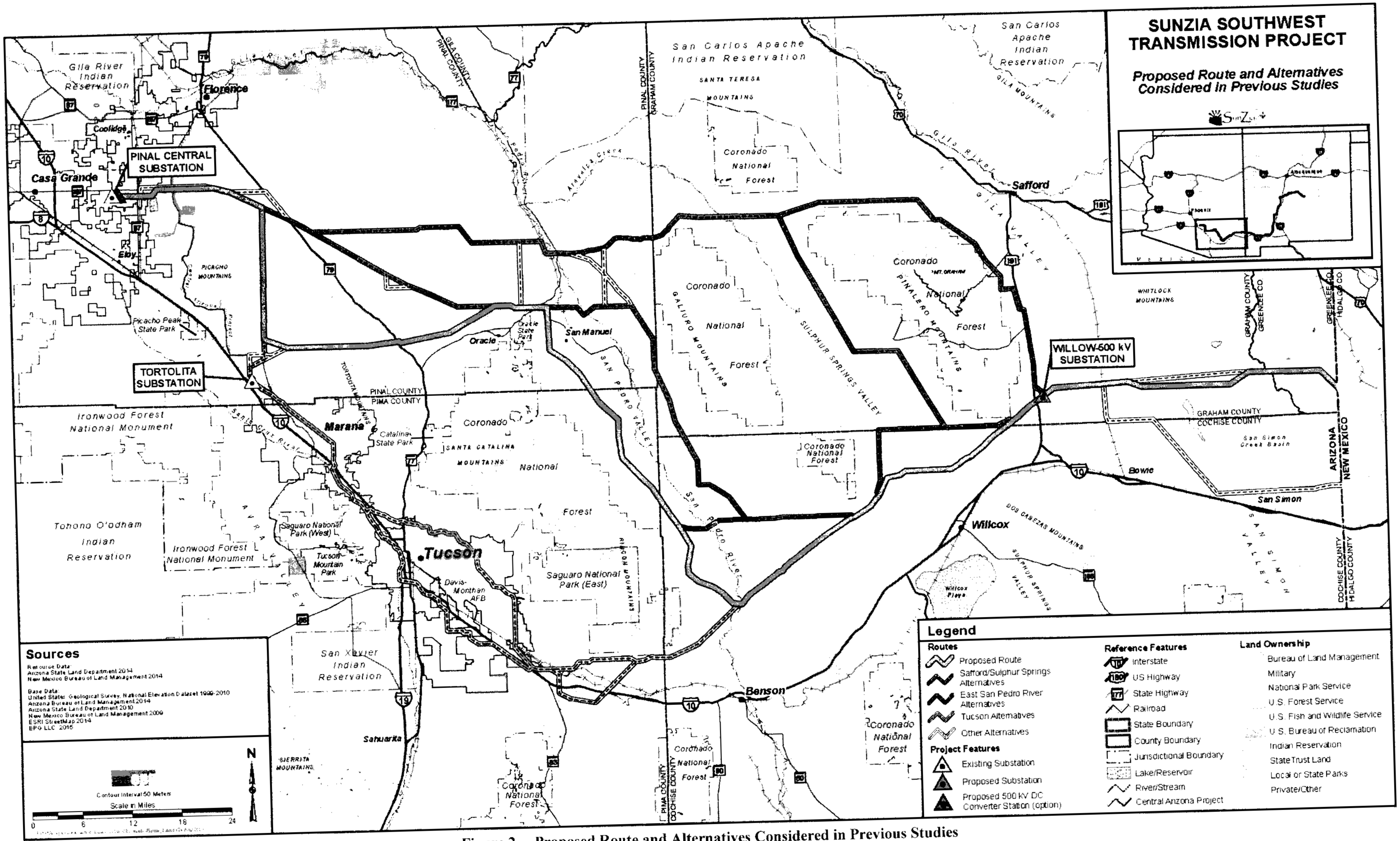

Figure 2. Proposed Route and Alternatives Considered in Previous Studies

Exhibits A

EXHIBIT A – LOCATION AND LAND USE MAPS

Pursuant to the ACC Rules of Practice and Procedure R14-3-219, applications for CECs shall include information required as exhibits. Exhibit A(3, 4) reads as follows:

*"Where commercially available** a topographic map, 1:250,000 scale, showing any proposed transmission line route of more than 50 miles in length and the adjacent area. For routes of less than 50 miles in length, use a scale of 1:62,500. If application is made for alternative transmission line routes, all routes may be shown on the same map, if practicable, designated by applicant's order of preference."*

*"Where commercially available,** a topographic map, 1:62,500 scale, of each proposed transmission line route of more than 50 miles in length showing that portion of the route within two miles of any subdivided area. The general land use plan within the area shall be shown on a 1:62,500 map required for Exhibit A-3, and for the map required by this Exhibit A-4, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of on an overlay."*

Exhibit A-1: Land Ownership and Jurisdiction

Exhibit A-2: Existing Land Use

Exhibit A-3: Future Land Use

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Exhibits B

EXHIBIT B – ENVIRONMENTAL REPORT

As stated in Arizona Corporation Commission Rules of Practice and Procedure R-14-3-219:

"Attach any environmental studies which applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as part of this exhibit."

EXHIBIT B-1: FINAL ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED RESOURCE MANAGEMENT PLAN AMENDMENTS, SCOPING REPORT, RECORD OF DECISION, AND PRELIMINARY PLAN OF DEVELOPMENT

These documents can be found on DVDs attached (inside back cover of this binder).

Final Environmental Impact Statement and Proposed Resource Management Plan

Appendix J: Comments on the Draft EIS

Appendix K: SunZia Project Preliminary EMF and Corona Effects Study

Appendix L: National Scenic and Historic Trails Assessment

Appendix M: Draft Programmatic Agreement

Map Volume

Scoping Report

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Section 2: Decisions to Be Made

Section 3: Project Background and Proponent Purpose and Need

Section 4: Scoping and Environmental Impact Statement Process

Section 5: Cooperating Agencies and Tribal Consultation

Section 6: Comments Received and Analysis

Section 7: Issues that Will Be Addressed

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Appendix A: Notice of Intent

Appendix B: BLM Project Website

Appendix C: Scoping Packet

Appendix D: Newspaper Scoping Notices (Initial)

Appendix E: Extension News Release

Appendix F: Study Area Expansion

Appendix G: Display Ads – Additional Scoping

Appendix H: Scoping Meeting Materials

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DEIS Contributions 7/28/10

DEIS Contributions 9/27/10

Record of Decision

Summary

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Section 2: Decision

Section 3: Alternatives Considered in the Final EIS

Section 4: Compliance with Resource Management Plans and Other Laws

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Appendix A: Exhibit A of the Right-of-Way Grant, Legal Descriptions

Appendix B: Programmatic Agreement

Appendix C: Biological Opinion

Appendix D: Finding of No New Significant Impact for the Environmental Assessment for the SunZia Southwest Transmission Project Mitigation Proposal

Appendix E: Mitigation Measures

Preliminary Plan of Development

Section 1: Introduction

Section 2: Project Management

Section 3: Project Components

Section 4: Project Construction

Section 5: Operation and Maintenance of Project

Section 6: Mitigation of Environmental Concerns

Appendix A: Construction Considerations

Appendix B: Biological Considerations

Appendix C: Cultural and Paleontological Considerations

Appendix D: Other Special Resource Considerations and Mitigation Measures

Appendix E: Stormwater Pollution and Prevention Plan Methodology

Appendix F: Right-of-Way Preparation, Reclamation, and Monitoring Framework Plan

EXHIBIT B-2 – SUMMARY OF PREVIOUS ENVIRONMENTAL STUDIES

Introduction

SunZia Transmission, LLC (Applicant, or SunZia) submitted an application for right-of-way to construct, operate, and maintain the proposed SunZia Southwest Transmission Project (Project) on public land administered by the Bureau of Land Management (BLM) in 2009. The Proposed Project included two 500-kilovolt (kV) transmission lines located on federal, state, and private lands between central New Mexico and central Arizona. As required under the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations pursuant to NEPA, an environmental impact statement (EIS) was prepared to analyze and disclose the potential effects of the (Project). The Draft Environmental Impact Statement and Proposed Resource Management Plan Amendments (EIS/RMPA) document was issued in May 2012, the Final EIS/RMPA was issued in June 2013, and the Record of Decision was issued on January 23, 2015.

The BLM served as the lead federal agency for the preparation of the EIS, and published its notice of intent to prepare the EIS in the Federal Register on May 29, 2009. Fourteen cooperating agencies participated in the preparation of the EIS, including the Arizona State Land Department (ASLD); Arizona Game and Fish Department (AGFD); Arizona Department of Transportation (ADOT); Department of the Army, Fort Huachuca; U.S. Army Corps of Engineers; Department of the Army, Fort Bliss; Department of the Army, White Sands Missile Range (WSMR); U.S. Air Force, Holloman Air Force Base (AFB); U.S. Fish and Wildlife Service; U.S. National Park Service; Department of Defense (DOD) Siting Clearinghouse, Office of the Deputy Under Secretary (Installations and Environment); New Mexico State Land Office (NMSLO); New Mexico Spaceport Authority; and Bureau of Indian Affairs (BIA).

Alternatives

An opportunities and constraints analysis was conducted to identify initial transmission line corridor siting options (see Appendix A of the Final EIS). Opportunities for new transmission lines and substation sites generally included locations consisting of, or in proximity to, existing or planned linear facilities, previously disturbed corridors, or corridors designated for future use as utility corridors or in conjunction with industrial use(s). Typically, these opportunities include existing transmission lines, major transportation corridors (interstate and state highways), pipeline corridors, railroads, and canals. These corridors provide potential access for construction and maintenance of transmission lines and substations. Existing linear corridors generally minimize ground disturbance, as well as impacts to biological, cultural, soil erosion, land use, and visual resources.

As a result of the opportunity and constraints analysis, a range of alternative routes were identified and analyzed in the Draft EIS, including the Proposed Route. For study purposes and comparison of alternatives, alternative routes were organized into three route groups or segments that correspond to areas between the proposed SunZia East Substation located in New Mexico and the existing Pinal Central Substation located in Arizona. The Arizona portion of the Project included alternatives between the proposed Midpoint Substation site located in New Mexico and the proposed Willow-500 kV Substation site located in Arizona (Route Group 3); and alternatives between the proposed Willow-500 kV Substation site and the existing Pinal Central Substation site (Route Group 4). Each route group was composed of individual subroutes that were formed by a series of interconnected segments.

The Proposed Route was modified in response to comments received on the Draft EIS and input from cooperating agencies.

Three alternative routes were studied that connect the Midpoint Substation site to the Willow-500 kV Substation site, where the Project enters Arizona. These alternatives ranged from 123 miles to 129 miles in length, and are displayed on Figure 2 of the Application. The Proposed Route and other alternatives studied in this route group cross portions of Luna, Grant, and Hidalgo counties in New Mexico, and portions of Greenlee, Graham, and Cochise counties in Arizona.

Eight alternative routes connecting the Willow-500 kV Substation site to the Pinal Central Substation site, ranging from 133 miles to 173 miles in length were studied. The alternatives in this route group cross portions of Graham, Cochise, Pima, and Pinal counties in Arizona. They are displayed on Figure 2 of the Application.

Proposed Route

The Proposed Route proceeds southwest from the proposed Willow-500 kV Substation, parallel to two 345 kV transmission lines operated by Tucson Electric Power (TEP) for approximately 47 miles, and crosses two pipelines and US Route 191. The route crosses the TEP 345 kV lines approximately 1 mile west of the San Pedro River and turns northwest and continues through the northeast corner of Pima County into Pinal, of which approximately 12 miles are parallel to an existing pipeline corridor. The route then turns and heads west approximately 2 miles west of San Manuel. The route crosses SR 77 (approximately 2 miles north of the community of Oracle), and parallels an existing 115 kV transmission line for approximately 10 miles to the southwest, to a point adjacent to the Oracle Junction Substation. The route then proceeds parallel to the Arizona Public Service (APS) Cholla-Saguaro 500 kV transmission line and a SWTC 115 kV transmission line for approximately 14 miles and crosses SR 79. The route proceeds northwest, then north, for approximately 19 miles, of which approximately 16 miles are parallel to and east of TEP's Pinal Central-Tortolita 500 kV transmission line (Case 165, Decision No. 73282). The route then turns northwest, then west, continuing to parallel the Pinal Central-Tortolita 500 kV line and a pipeline corridor for 6 miles. As the Proposed Route then heads west, it crosses the Central Arizona Project canal and SR 87 before it proceeds to the Pinal Central Substation located on the southeast corner of SR 287 and Eleven Mile Corner Road, parallel to the Pinal Central-Tortolita 500 kV line for an additional 12 miles.

This route was selected as the Proposed Route, and is the only alternative being sought in this Application, because it would:

- maximize use of existing utility corridors and infrastructure; a major portion, approximately 59% (117 miles) of the Proposed Route in Arizona would be constructed along established utility corridors where existing access is available;
- minimize impacts to sensitive resources;
- minimize impacts at river crossings; and
- minimize impacts to residential and commercial uses.

Affected Environment and Environmental impacts

The following is a summary of the results of the previous environmental studies.

Climate and Air Quality

Emissions of air pollutants would occur during construction of the transmission lines and substations and, to a lesser extent, during Project operations. Emissions would be transient as construction progresses, so emissions would not occur in one area for a long duration, thereby limiting their impact.

With the exception of 24-hour PM_{10}, climate and air quality impacts resulting from construction and operation of any of the alternative subroutes, including the Proposed Route, were predicted to be within regulatory limits (below the applicable National and Arizona, and/or Ambient Air Quality Standards). Because of high background concentrations of PM_{10} within the West Pinal County PM_{10} nonattainment area, maximum total 24-hour PM_{10} impacts could potentially exceed PM_{10} standards temporarily for the Proposed Route and any other Arizona alternatives during construction related activities. However, mitigation would be effective in reducing significant impacts.

Earth Resources

Potential impacts to the Project could result from geological hazards, and impacts to mineral and soil resources could result from the Project. Geological hazards include potential ground rupture from Quaternary faults, destabilization of the land surface by fissures, and flooding.

Potential impacts to mineral resources include the restriction of access to locatable, leasable, and salable mineral resources; while potential impacts to soil resources include accelerated rates of erosion by water or wind, and the conversion of designated Prime or Unique Farmland soils to nonagricultural uses. No significant impacts to mineral and soil resources are expected. Mitigation measures, including best management practices (BMP) to control erosion, would minimize the effects of soil erosion during construction and operation of the Project. Site-specific design of roads and structures using standard and selective mitigation measures would minimize restrictions to mineral development.

Paleontological Resources

The loss of scientifically significant fossils and their contextual data is the primary concern regarding impacts to paleontological resources. Impacts could occur if unique paleontological resources were to be destroyed. Mitigation of impacts to paleontological resources includes preconstruction surveys, personnel education, monitoring ground disturbance for fossils, preparation and curation of any discovered fossils, and deposition of collected fossils in a paleontological repository. With the use of these mitigation measures, impacts to paleontological resources are not likely to be significant.

Water Resources

Impacts to surface water could result from placement of structures, construction of access roads, or temporary work areas. Direct impacts to perennial surface water features could include sedimentation from fugitive dust deposition or access road construction, removal of riparian vegetation, bank alteration, accidental contamination associated with spills of environmentally harmful material, damage to wetlands, or the introduction of invasive species. BMPs and mitigation measures would be effective in minimizing impacts to surface water resources, and no significant impacts are expected to result from the construction and operation of the Project.

Potential impacts to groundwater resources could include accidental contamination during construction or accidental spills of environmentally harmful liquids that could percolate into shallow groundwater. The Project would not impede the flow or depth of groundwater. Mitigation measures would be effective to limit the potential for contamination during construction and operation.

Biological Resources

Direct impacts to vegetation include removal of plants during construction of new or modified access and spur roads and at structure and substation sites. Vegetation removal for structure foundations and at substation sites would be permanent. Indirect impacts associated with vegetation removal may include erosion, reduction of soil water retention, invasive plant colonization, loss of wildlife habitat, and habitat fragmentation.

Mitigation measures would be applied to reduce, avoid, or otherwise provide compensation for impacts to sensitive vegetation. Where vegetation is disturbed or cleared, vegetation loss would be minimized by (1) reducing the area to the extent practicable, (2) plant salvage and revegetation in areas of temporary disturbance, and (3) closure and restoration of any access roads not required for Project maintenance or access. Closure of temporary access roads and the limiting of access through gating or other means would reduce indirect impacts to vegetation caused by recreational travel, including off-road vehicle travel beyond the Project right-of-way. Tree-cutting would be conducted to comply with National Electric Safety Code and an appropriate level of safety, but would be minimized to the extent possible.

Linear features such as access roads could fragment wildlife habitat, adversely affecting species that are reluctant to cross areas of open ground due to threat of predation. Related to this are edge effects, which may reduce the effective size of habitat blocks for those species, limiting connectivity and dispersal between blocks.

The following impacts to wildlife and special-status species, other than those listed under the Endangered Species Act (ESA), may occur with construction and operation of the Proposed Route:

- Any ground-disturbing activities would remove habitat for wildlife, and any wildlife present would be at risk of harm from construction activities.
- Noise and human presence during construction and maintenance activities may cause wildlife to avoid the vicinity of construction activities.
- Transmission lines lead to increased bird–power line collision risk along the Proposed Route, particularly for larger birds such as Sandhill Cranes and waterfowl and in locations with high levels of bird use such as the San Pedro River and near Picacho Reservoir. Results of avian impact studies predicted that while potentially fatal collisions of Sandhill Cranes and other large birds are likely to occur, a substantial effect at the population level is unlikely for any species.
- The Chihuahua Scurfpea may be impacted by ground disturbance in the San Simon Valley, Arizona.
- Road construction and habitat loss may impact the Sonoran Desert Tortoise from the San Pedro River Valley to the vicinity of the Tortolita Substation, and near the Picacho Mountains.
- Habitat for the Tucson Shovel-nosed Snake may be impacted near the Tortolita Substation and Picacho Mountains.

Selective mitigation measures addressing the reduction of ground disturbance, noxious weed and erosion control, and restoration of vegetation would help reduce effects to wildlife. A posted reasonable construction speed limit could minimize potential collision risk to wildlife in road areas, and construction activities may be constrained during certain seasons to address needs of special-status species at specified locations. Debris and trash would be properly contained and regularly removed from the Project to an appropriate landfill site. Construction excavations would be fenced or covered to preclude injury or trapping of wildlife or livestock.

Mitigation measures to reduce the collision risk for large birds include methods to improve visibility, such as the use of bird diverters on groundwires and guywires. Since the transmission line would span most aquatic habitats, there should be no significant impacts to aquatic and shorebird nesting habitat. The Project would have a minimal effect on prey and forage availability for these species. Timing of construction to avoid avian nesting or breeding times would help minimize impacts to birds.

Section 7 of the Endangered Species Act

Consultation with the U.S. Fish and Wildlife Service (USFWS) is required under Section 7 of the ESA, when a project that is carried out, funded, or authorized by a federal agency may affect species listed under the ESA. The BLM requested early input from the USFWS to identify ESA-listed species and other sensitive biological resources, and received comments on September 14, 2009. Published lists of ESA-listed species created by the USFWS for all counties crossed by the study corridor were reviewed by the BLM, and other information reviewed included BLM records, USFWS documents, other agency reports, primary literature, and regional references. This information was used in the early development of alternative routes for the Project, and updated to include current status of affected species. As part of formal consultation under Section 7 of the ESA, the BLM submitted a Biological Assessment (BA) to the USFWS to address species with the potential to occur in the area of the BLM preferred alternative for the Project. The USFWS reviewed the BA and issued a Biological Opinion (BO) to complete Section 7 consultation.

The USFWS concluded in the BO that the following ESA-listed species may be adversely affected by the Project:

- Lesser Long-nosed Bat
  - Loss of forage plants (agaves and saguaros)
- Yellow-billed Cuckoo (Western Distinct Population Segment) and proposed critical habitat
  - Loss of potentially suitable nesting habitat to vegetation management
  - Disturbance during construction
- Southwestern Willow Flycatcher and designated critical habitat
  - Loss of potentially suitable nesting habitat to vegetation management
  - Disturbance during construction

The applicant has committed to mitigation measures to avoid, minimize, and offset impacts to these species. Loss of forage plants for nectar-feeding bats would be minimized through salvage and replacement of saguaros and agaves that would be affected by construction or vegetation management. Impacts to habitat for the Yellow-billed Cuckoo and Southwestern Willow Flycatcher have been minimized through selection of a crossing location on the San Pedro River in a location with little or no suitable nesting habitat for these species. Impacts would further be minimized by spanning the river and floodplain to minimize the need for vegetation management, and by providing compensatory mitigation to replace any habitat affected by temporary or permanent ground disturbance.

Wildland Fire Ecology and Management

The operation of 500 kV transmission lines generally presents a very low risk of fire ignition, as the scale of the structures minimizes the risk of vegetation contact. However, unforeseen events do have the potential to occur. Transmission structures may fail or be accidentally damaged as a result of human activity such as vehicle or aircraft collisions and vandalism, or from severe weather, geological hazards, and other natural events. However, 500 kV conductors and structures are of sufficient size to be resistant to physical damage.

A Fire Protection Plan would be implemented during Project construction to reduce the risk of fires and increase fire safety. A Fire Marshal would be responsible for ensuring compliance with all mitigation measures for fire safety, as well as coordination and communication with agencies and emergency responders.

Cultural Resource

The anticipated impacts to cultural and historic resources result from a loss of integrity on prehistoric and historic sites. Four types of impacts that could affect archaeological sites during and after construction of the proposed Project are:

- direct and permanent ground disturbance during construction
- direct and permanent visual and auditory intrusions
- indirect and temporary visual intrusions during construction
- indirect and permanent disturbances due to changes in public accessibility

Intensive pedestrian inventories of the Proposed Route, associated access roads, substations, and associated ancillary facilities will be conducted. All cultural and historic resources identified during the inventory will be evaluated for eligibility to the National Register of Historic Places (NRHP).

The Project would cross Butterfield, Gila, Zuniga, Southern Pacific Mail, and General Cooke's Wagon Road/Mormon Battalion trails. Potential impacts to National Scenic and Historic Trails have been documented in the Final EIS (also see Appendix L of the Final EIS).

Direct impacts to significant cultural resources can be effectively minimized, if not eliminated, through mitigation planning and implementation. In designated areas, structures would be placed to avoid and or span sensitive cultural resource sites or features. Cultural resources would continue to be considered during all phases of Project implementation, in accordance with the executed agreement. This would involve intensive surveys to inventory and evaluate cultural resources within the selected corridor and any appurtenant impact zones beyond the corridor, such as access roads and construction equipment yards. This would also require a Historic Properties Treatment Plan to ensure proper data recovery and recordation prior to construction in the sensitive areas identified in the plan. Monitoring of construction activities will be required to ensure that cultural sites that are to be avoided during construction remain undisturbed.

<u>Tribal Consultation and Section 106 of the National Historic Preservation Act</u>

The BLM, along with any other federal agency that may be issuing permits or licenses for the Project, had a responsibility under Section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on properties listed in or eligible for the NRHP. Tribal consultation is required under the NHPA and other laws. Tribes are potential consulting parties for the Section 106 process, and any tribe that "requests in writing shall be one" (§800.3[f][2]). Invitations for government-to-government and Section 106 consultation were sent to 29 tribes in May of 2009 and April of 2012. Although there were no written requests to be consulting parties, Arizona tribes that participated in general Project consultation and the Section 106 process include: Tohono O'odham Nation, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Ak-Chin Indian Community, San Carlos Apache, and White Mountain Apache.

Consultation with appropriate land management agencies, tribes, and State Historic Preservation Offices is ongoing. A Programmatic Agreement, which establishes a project-specific procedure for complying with the NHPA, including procedures to follow during the execution of the Project, has been executed by all requested parties.

Visual Resources

Changes to views from sensitive public viewing locations and modifications that would alter the landscape character (scenery) of natural lands were the primary factors considered for identifying and characterizing impacts related to visual resources. Impacts to scenery and views from residential, travel routes, and recreation areas were assessed. Additionally, compliance with visual resource management objectives and adherence with resource management plans for federal lands were also assessed. Standard and selective mitigation measures and Best Management Practices (BMPs) would reduce impacts to scenery and viewers.

Visual impacts that may occur with construction and operation of the Proposed Route include the following:

- Moderate-High impacts to Class A landscapes are anticipated at the San Pedro River Crossing. Moderate-High impacts are anticipated where the Project would cross Class B lands where modifications to the landscape introduce strong contrast to scenery (e.g. new access roads over rolling hills and no existing structures). Moderate to Low-Moderate impacts would occur on Class B lands where modifications to the landscape are moderate as a result of project construction. Low-Moderate to Low impacts are anticipated for Class B and C landscapes where modifications to the landscape as a result of project construction are minimal.
- Limited areas of Moderate-High impacts are anticipated for residences north of Willcox, north of Eloy (near the Pinal Central Substation), and dispersed residences south of San Manuel and west of Oracle. Moderate to Low impacts were identified for residences associated with the following communities: Cascabel, Redington, San Manuel, and Oracle (including Saddlebrooke Ranch), and Eloy.
- High impacts to recreation viewers associated with the Arizona National Scenic Trail are expected to occur. Moderate and Moderate-high impacts are anticipated for Hot Wells Dune OHV Recreation Area and the recreation area access road, respectively. Recreation viewers would also have moderate-high impacts associated with the Buehman Canyon Trail and the A7 Ranch. Moderate to Low impacts are anticipated for Oracle State Park and associated trails.
- High impacts would occur for viewers along Pima County designated Scenic route Redington Road. Moderate-high impacts are anticipated for Cascabel Road, SR 77, Muleshoe Ranch Road, Black Hills Mine Road/Catalina Ridge, Webb Road, North Redington Road, and Park Link Drive.

Mitigation measures and BMPs would be applied to reduce visual impacts where effective and feasible. These measures would include site-specific structure placement, access road and laydown area reclamation, or other methods to minimize visual contrast in the landscape setting.

Existing Land Use and Recreation Resources

The Project would be constructed across lands owned by federal, state, private, or other entities. Approximately 25 percent of the Proposed Route would cross public lands managed by the BLM (50 miles); state lands in Arizona comprise approximately 66 percent (131 miles) of the route; and the remaining 9 percent (18 miles) would cross private or other land owners. Right-of-way would be acquired on these lands that are generally used for grazing, farming, recreation, and open space. BLM and state lands are primarily used for grazing or recreation in open space areas. Residential uses are located on private lands in rural areas and near small cities and towns within the study area.

In the Arizona portion of the study area, population centers include San Simon, Willcox, Benson, San Manuel, Oracle, Coolidge, and Eloy. Farming is concentrated in the Sulphur Springs Valley, and San Pedro River Valley, and in Pinal County. Davis-Monthan AFB, Fort Huachuca, the Western Army National Guard Aviation Training Site, and other military installations conduct training and testing operations in air space within the study area.

A major interstate utility corridor that contains transmission lines, communication facilities, and pipelines is located generally along I-10 through southeastern Arizona, and a pipeline corridor crosses the San Pedro River Valley between Cochise and Pinal counties. Approximately 74 miles of the route would be parallel to existing transmission lines, and an additional 18 miles would be parallel to existing pipelines.

The Proposed Route would cross portions of various irrigation and drainage canals and related facilities within agricultural areas in Arizona. The Central Arizona Water Conservation District manages the Central Arizona Project facilities on federal lands administered by the Bureau of Reclamation (BOR) in Arizona. The San Carlos Irrigation and Drainage District administers the San Carlos Irrigation Project facilities (under BIA jurisdiction), also in Arizona. Where necessary to construct transmission facilities across canals or other conveyance systems, the transmission Project would be constructed to allow conductors to span these facilities, resulting in low or minimal impacts. An encroachment permit would be required by the BOR or BIA to cross these facilities in accordance with the NEPA and other federal regulations.

The Proposed Route could cross private and public conservation easements within Arizona, particularly near the San Pedro River. Existing conservation easements, to the extent practicable, would be avoided by the Proposed Route. However, some specific conservation easement crossings may not be identified until the final right-of-way acquisition begins. Negotiations with the particular land owner/easement manager would address specific requirements of the conservation easement.

In general, land use impacts are minimized where linear utilities are constructed within established or designated corridors. The alignment of the Proposed Route was sited to maximize the use of established utility corridors, and to avoid conflicts with incompatible land uses such as wilderness, national parks and monuments, special management areas, wildlife refuges and other conservation areas, densely populated areas, and military installations. Impacts to land uses would occur along portions of the route that cross irrigated agricultural lands, residential subdivisions, and areas used for industrial or military testing and training. Mitigation measures and BMPs would be effective in avoiding or minimizing direct impacts with land uses in most conditions. There would be no direct displacement of residential, business, or industrial structures. There would be a minimal loss of grazing land.

General Land Use Summary

The Proposed route runs primarily through vacant undeveloped land in Greenlee, Graham, and Cochise counties. Link C110 crosses two large rural residential properties and continues south, and crosses the San Pedro River with Links C261 and C201, avoiding impacts to residential, commercial, and industrial uses. Along Link C260 (milepost 3), the Proposed Route passes adjacent to the Red Horse 2 Wind Farm. The remainder of the Proposed Route crosses vacant undeveloped land until it approaches the Pinal Central Substation, where the route crosses a residential property, and Links C880 and C880a pass within 0.5 miles of a rural residence and agriculture areas; the route does not directly affect any residential dwellings.

Based on results of the land use analysis, significant impacts are not expected; however, potential impacts to agricultural operations were identified for the Proposed Route. Mitigation measures such as modified tower designs and siting for avoidance of sensitive features would be applied to reduce the amount of land occupied by structures in these areas for links C110, C880, and C880a. There would be few other impacts to land uses throughout the study corridor, because a major portion of the preferred alternative would be constructed along established utility corridors or other linear features, where existing access is available. Approximately 59 percent (117 miles) of the route is parallel to existing utility corridors, including 74 miles parallel to existing transmission lines in Arizona.

Residential

Residential land uses throughout the study corridor are primarily described as low, medium, and high density single-family residential, multi-family residential (e.g., apartment complex), rural residential, and mobile home parks. Residences are found scattered throughout the Project study corridor, with concentrations near towns and cities such as Willcox, Oracle, San Manuel, Eloy, and Coolidge.

Commercial

Commercial land uses throughout the study corridor include restaurants, gas stations, banks, grocery stores, motels and hotels, and other businesses. Concentrations of commercial use mainly occur in populated areas (e.g., Willcox, Oracle, San Manuel, Eloy, and Coolidge) and along major transportation corridors (I-10, SR 77, and SR 79).

Industrial

Industrial land uses include warehouse businesses, manufacturing companies, storage facilities, and other uses. Industrial uses occur near populated areas such as Willcox, Oracle, San Manuel, Eloy, and Coolidge.

Public/Quasi Public

Public/Quasi-Public land uses include places of worship (such as churches), community centers, and libraries. Public/quasi-public uses occur near populated areas such as Willcox, Oracle, San Manuel, Eloy, and Coolidge.

School/Educational Facilities

Schools and educational facilities include preschools, primary schools, secondary schools, and colleges. Schools/educational facilities are typically located near population centers such as Willcox, Oracle, San Manuel, Eloy, and Coolidge.

Grazing/Multi-Use/Vacant

The majority of the Proposed Route crosses BLM and State Trust land that is vacant and undeveloped or used for ranching and grazing. There is very little farmland along the Proposed Route from the Arizona State line to the Proposed Willow Substation. Link C110 crosses irrigated farmland north of Willcox, in Cochise County. A large majority of the land Cochise County is Rural Zoning, which was established to preserve the character of designated rural areas in the County. These designations were also established to preserve the agricultural character of areas that were capable of resource production, and to preserve the rural environment of outlying unincorporated areas.

Further, Links C880 and C880a cross, and Link C850 is adjacent to, irrigated farmland. Link C680 is adjacent to a small agricultural operation. Links C450 and C441 cross State Trust lands leased to Pima County for grazing.

Impacts to grazing would include the removal of approximately 174 acres of BLM land within the Safford Field Office area, which is 0.01 percent of available grazing land. Impacts to Arizona state grazing lands would include the removal of approximately 12 acres (0.00002 percent) from state land in Graham County, 334 acres (0.0003 percent) from state lands in Cochise County; 37 acres (0.00008 percent) from state lands in Graham County; 97 acres (0.0001 percent) from state lands in Pima County; and 303 acres (0.0003 percent) from state lands in Pinal County. The total amount of grazing lands removed for the Proposed Route is approximately 783 acres, or less than 0.0002 percent of available grazing lands.

Parks and Recreation

State parks within the study corridor include Oracle State Park south of Link C661 along SR 77. Recreation land uses within the study corridor include federal, state, and local recreational trails and designated OHV areas, as well as BLM Special Resource Management Areas (SRMAs) designated for multiple recreational activities such as rock climbing and bouldering.

Only dispersed recreation occurs along the Proposed Route. The closest recreational facilities to the Proposed Route up to the Willow Substation are limited to existing educational facilities, primarily in Greenlee County, which are open for the public's use when school is not in session, according to the Greenlee County Comprehensive Plan 2003. The Hot Well Dunes Recreation Area is located approximately 0.75 miles north of Link B160d (milepost 11) in Graham County.

There are dispersed recreational opportunities along the San Pedro River, including hiking, bicycling, equestrian, fishing, birding, and other wildlife watching activities. Formal recreational opportunities are located in the Willcox and Benson communities. Willcox, located approximately 7 miles south of the Proposed Route, has a sports park with a rodeo/fairground arena and athletic fields; and two municipal parks. The City of Benson, located approximately 11 miles south of the Proposed Route, has a community pool and three public parks.

In the northern portion of the study corridor, the rural communities of San Manuel, Oro Valley, Picacho, and Eloy each contain small community parks allowing for a variety of recreational uses. Pinal County has community parks, including the Pinal County Fairgrounds located adjacent to the proposed Pinal Central Substation. There are dispersed recreational opportunities, located approximately 11 miles southwest of the Proposed Route near the Santa Cruz River on BLM land in south-central Pinal County, that include hiking, bicycling, and equestrian activities.

Existing designated and dispersed recreation opportunities will remain available for recreation uses, where currently allowed by land-managing agencies or entities. Where the Project crosses existing roads or trails, permanent access to and along these features for recreation use would not be affected.

Transportation and Access

Transportation land uses include minor roads (county highways, city streets); major roads (interstates, state highways), railroads, and trails. Though transportation land uses occur throughout the study area, the main features are I-10, SR 79, SR 77, and the Union Pacific Railroad (UPRR).

The closest interstate to the Proposed Route is I-10, which runs east and west through the communities of Bowie, San Simon, Willcox, Benson, and Casa Grande, Arizona. Other major roadways include US Route 191 and SRs 77, 79, and 87, all under ADOT jurisdiction. US Route 191 and SRs 77 and 79 are alternate primary routes that run north and south in the study area. The UPRR parallels I-10 through the study corridor. The Arizona Eastern Railroad, which runs from the Bowie townsite north into Safford, is crossed by the Proposed Route approximately 15 miles north of Bowie. Scenic roads/highways within the study corridor include Pinal Pioneer Parkway (SR 79) crossed by Link C680, Redington Rd crossed by Link C441, and Cascabel Rd crossed by Link C261 near mile post 6 adjacent to the San Pedro River.

There are several private airstrips, used for agricultural purposes and to access private land, within the study corridor from the Arizona state line to the proposed Willow-500 kV Substation. The Coolidge and Eloy Municipal Airports are located near Links C850 and C880a outside of the study corridor. The Cochise County Airport is also located approximately three miles west of

Willcox and eight miles southeast of Link C212. San Manuel Airport is approximately three miles north of San Manuel, approximately one mile east of Link C450.

Military Installations

The Proposed route crosses the northern portion of the Buffalo Soldier Electronic Testing Range along Links C201, C261, C260, and C212. This facility, which is headquartered at Fort Huachuca near Sierra Vista approximately 38 miles south of the Proposed Route, conducts noise tests for electronic combat and electronic warfare equipment (see Section 3.10.3.7 of the FEIS). These tests are performed under a variety of circumstances and configurations. The current infrastructure within the Electronic Proving Ground study area, such as power lines, cell phone towers, radio stations, and other “emitters,” have been measured and taken into account to form a “zero point” for testing purposes. The testing program could be potentially affected by the operation of new transmission lines; however, the effects have not been described or quantified, and any impacts could be included in the “zero point” in a manner that likely would not impede future testing.

The Army National Guard trains helicopter pilots near the Tortolita Substation and in the vicinity of the Picacho Mountains. The training area includes approximately 3,600 square miles of low-level training areas, including military training flights between 1,000 and 10,000 feet above mean sea level. The Army National Guard uses a site referred to as Square Field, which is located within the study corridor, for emergency training exercises. Square Field is located on private land approximately two miles east of link C820.

Energy Facilities, Utility Corridors, and Communication Sites

The Proposed route is parallel to existing utility corridors for approximately 117 miles. The Oracle Junction Substation is adjacent to Link C680. Links C260 and C261 are adjacent to the Winchester Substation. Communication facilities, such as microwave stations, radio towers, and cellular/digital towers, are located within the study corridor along Links C450, C441, and C260.

Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics

The Proposed Route would not cross wilderness areas or Wilderness Study Areas, and therefore no direct impacts would occur. Impacts to lands with wilderness characteristics inventory units on BLM Lands for the Proposed Route are not expected. Indirect or cumulative impacts may occur to air quality, earth, water, visual, or other resources, but would not be significant.

Social and Economic Conditions

There would be no substantial impacts to population or housing as a result of construction or operation of the Project. More than 1,300 jobs could be created (in job years) in Arizona during the two- to three-year construction period. In addition, the Project could generate revenue from increased local spending, and more than 1,400 indirect jobs could be created to supply related goods and services. During operations, over 40 direct and 50 indirect jobs could be created.

The Project would generate revenues from income taxes and property taxes. In Arizona, between \$18 million and \$19 million would be generated by income taxes, and between \$6 million and

$13 million would be generated in property tax revenues during construction. During operations, annual income tax revenues would be between $300,000 and $700,000, and property tax revenues would range between $10 million and $25 million.

Environmental Justice Conditions

Executive Order 12898 (U.S. Department of Housing and Urban Development 1994) requires federal agencies to address high and disproportionate environmental impacts on minority and low-income populations. The results of the analysis for this Project indicated that no significant impacts to environmental justice populations are expected as a result of the construction or operation of the Proposed Route.

Health and Safety/Hazardous Materials

An analysis was conducted to evaluate potential impacts from electrical and magnetic fields, audible noise, radio and television interference, environmental contamination, and hazardous materials related to construction, operation, and decommissioning of the proposed Project.

The study results indicated that electric field levels anticipated to occur at the Project right-of-way are projected to be below the reference levels for general public exposure, based on the International Commission on Non-Ionizing Radiation Protection. The maximum potential magnetic field levels within the right-of way would also be under the reference levels for general public exposure.

Audible noise may result from equipment and vehicles used during Project construction. Where construction would occur near populated areas, noise might be audible and result in temporary impacts and possibly considered only as a nuisance. During operation of the transmission lines and substations, audible noise levels would not exceed the Environmental Protection Agency recommended levels of 55 dBA at the right-of-way limits.

Projected levels of radio and television interference, resulting at the right-of-way limits for the Project, would be below the recommended levels established by the Radio Noise Design Guide and Federal Communication Commission.

Construction and operations activities would comply with all applicable federal, state, and local regulations regarding the use of hazardous substances. BMPs would be applied to ensure that applicable federal, state, and local laws are obeyed. Further, the Project owner and construction team would coordinate with land management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials.

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Exhibits C

EXHIBIT C – AREAS OF BIOLOGICAL WEALTH

As stated in Arizona Corporation Commission Rules of Practice and Procedure R-14-3-219:

"Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state effects, if any, the proposed facilities will have thereon."

BIOLOGICAL WEALTH

Introduction

This Exhibit provides information on the legal framework that provides protections to specific areas important to biological resources, and any rare or endangered species that may be present in the area affected by the Proposed Facilities.

Regulatory Background

Federal Laws and Policies

Federal legislation and policy applicable to biological resources within the SunZia Southwest Transmission Project area of influence includes the:

- National Environmental Policy Act (42 USC § 4321, et seq., 40 CFR § 1500.1, et seq.)
- Endangered Species Act of 1973 (16 USC 460 et seq.), as amended
- Migratory Bird Treaty Act (16 USC 703 et seq.)
- Executive Order 13186 (Migratory Birds)
- Bald and Golden Eagle Protection Act (16 USC 668)
- Sikes Act (16 USC §670g, et seq.)
- Fish and Wildlife Coordination Act (16 USC §662, et seq.)
- State and Tribal Wildlife Grants Program
- Federal Land Policy Management Act (43 USC §1701)
- Federal Water Pollution Control Act Amendments of 1972 ([Clean Water Act] 33 USC §1251 et seq.)
- Executive Order 13112 (Invasive Species)
- Bureau of Land Management Policy 6840 (Special Status Species Management)

The *National Environmental Policy Act* requires the federal government to assess the environmental impacts of major federal actions, which include actions undertaken (1) on federal land, (2) by a federal agency, (3) with federal funds, or (4) where the federal government will be issuing a permit.

The *Endangered Species Act* (ESA) authorizes the U.S. Fish and Wildlife Service (USFWS) to protect plant and wildlife species determined to be in danger of extinction, and the habitats on which these species depend. The ESA requires federal agencies to ensure that they do not carry out, fund, or authorize actions likely to jeopardize the continued existence of a listed species. Critical habitat, which includes areas essential to the conservation and recovery of listed species, may be designated and receives additional protection from federal actions.

The *Migratory Bird Treaty Act* (MBTA) protects more than 1,000 migratory bird species by making it illegal to "take", possess, import, export, transport, sell, purchase, barter, or offer for sale, any migratory bird, or the parts, nests, or eggs of such a bird. Each year, the USFWS Migratory Bird Program compiles proposed and final regulations to authorize migratory bird hunting seasons, which are typically managed by state game and fish agencies. All native birds occurring within the Project area are protected under the MBTA, except members of the families Phasianidae (turkeys and grouse) and Odontophoridae (New World quail) (USFWS 2013a).

Executive Order 13186 requires all federal agencies with substantial land management responsibilities to develop and implement Memoranda of Understanding (MOU) with the USFWS to provide for the conservation and management of migratory birds and their habitat. The Bureau of Land Management (BLM) and USFWS signed an *MOU to Promote the Conservation of Migratory Birds* in 2010.

The *Bald and Golden Eagle Protection Act* (BGEPA) prohibits any form of possession or take of Bald Eagles, Golden Eagles, or their eggs, feathers, or any other parts. Certain exceptions for Native American cultural uses apply (1994 Memorandum [59 FR 22953, April 29, 1994]).

The *Sikes Act* requires federal land management agencies to coordinate with state wildlife agencies in the development of comprehensive plans for wildlife conservation on public lands. Where not in conflict with other land uses, these plans may permit hunting and fishing to occur on federal land in accordance with state regulations, may allow cooperative habitat improvement, and may regulate off-highway vehicle (OHV) use. The Sikes Act also requires that the Department of Defense develop conservation plans for military reservations with significant natural resources.

The *Fish and Wildlife Coordination Act* of March 10, 1934, authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with Federal and State agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The Act also directs the Bureau of Fisheries to use impounded waters for fish-culture stations and migratory-bird resting and nesting areas and requires consultation with the Bureau of Fisheries prior to the construction of any new dams to provide for fish migration. In addition, this Act authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and the acceptance by the Federal agencies of funds or lands for related purposes provided that land donations received the consent of the State in which they are located.

The *State and Tribal Wildlife Grants Program* provides federal funding for state conservation actions, in part for proactive work to reduce the need to list species under the ESA. States that receive the funding develop a State Wildlife Action Plan, which assesses Species of Greatest Conservation Need within that state. These may include species already listed under the ESA, species with ranges restricted to that state or region, or those where the state is an important component of the species' range. Conditions of the state's habitat elements are also assessed.

The *Federal Land Policy Management Act* requires in part that the public lands be managed in a manner "that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use; and that federal land management agencies provide meaningful public involvement with state and local agencies on land use decisions".

The *Federal Water Pollution Control Act Amendments of 1972* stipulated broad national objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Section 402 of the 1972 amendments established the National Pollutant Discharge Elimination System (NPDES) to authorize EPA issuance of discharge permits. Section 403 stipulated guidelines for EPA to issue permits for discharges into the territorial sea, the contiguous zone, and ocean waters further offshore. The Section 404 Amendments authorized the Corps of Engineers to issue permits for the discharge of dredged or fill material into navigable waters at specified locations.

Executive Order 13112 requires that federal agencies prevent the introduction and spread of invasive species, detect and respond rapidly to control such species, monitor invasive species populations, and restore native species and habitat conditions in ecosystems that have been invaded. In addition, the order requires that a federal agency "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species."

The *Bureau of Land Management Manual 6840* (Special Status Species Management) describes the agency's policy for special-status species occurring on lands administered by the agency. In addition to requirements for federal agencies regarding species listed under the ESA, the BLM gives additional consideration to those proposed or candidates for ESA listing. Each BLM State Office also creates a list of sensitive species for which BLM land is of particular conservation value.

State Laws

The State of Arizona has no threatened and endangered species laws. Wildlife in Arizona is managed by the Arizona Game and Fish Department (AGFD), and applicable laws relating to State wildlife resources are contained in Chapter 17 of the Arizona Revised Statutes. The AGFD Commission provides some protection for species of vulnerable conservation status through regulation of hunting seasons, bag limits, or complete prohibition of take.

The AGFD created a list of Wildlife Species of Concern (WSC) in 1996, which included all species listed under the ESA occurring in Arizona at the time, as well as a number of other species. Although the list does not grant statutory protection to species not listed under the ESA, special consideration is granted in land use planning and take of those species is strongly limited or prohibited.

The *Arizona Native Plant Law* (Arizona Revised Statute [ARS] § 3-901 to 907) is administered by the Arizona Department of Agriculture (ADA). The law lists plants protected under the law. The ADA defines four categories of protected native plants over which it exercises jurisdiction within the State. These categories are: Highly Safeguarded, Salvage Restricted, Salvage Assessed, and Harvest Restricted. The Highly Safeguarded category is the highest category of protection provided for native plants in Arizona, and includes all ESA-listed and candidate species. Permits applicable to highly safeguarded native plants may be issued only for collection for scientific purposes or for the noncommercial salvage of highly safeguarded native plants whose existence is threatened by intended destruction, or by their location or by a change in land usage, and if the permit may enhance the survival of the affected species (ARS 3-906 C).

Three additional categories allow plants to be moved or harvested, subject to compliance with other applicable ADA regulations. All categories of ADA-listed plants require a permit from the agency, and tags and seals are required prior to moving Highly Safeguarded and Salvage Restricted plants. ADA jurisdiction includes all lands within the state, but since native plants occurring on private lands are the property of the landowner, their removal requires only that the ADA be notified prior to their removal. Highly Safeguarded plant species are included in this review of sensitive resources within the study area. The remaining three categories of protected native plants are not included since they are not considered to be in jeopardy and regulatory permitting and compensation measures are in place for these categories.

Regional Plans

Pima County developed the Sonoran Desert Conservation Plan (SDCP) to balance the rapid urban expansion that was taking place with the preservation of a network of large areas with high conservation value. The SDCP also provided a framework for a Multi-Species Conservation Plan (MSCP) to support an incidental take permit for 10 species listed under the ESA. The MSCP and incidental take permit application has been submitted to the USFWS and is under review. An additional 46 Priority Vulnerable Species were identified as part of the SDCP.

The Maeveen Marie Behan Conservation Lands System (CLS) is a component of the SDCP, used to identify the biological values of lands in Pima County, support fee acquisition or leasing of lands, and provide for management of those lands. The CLS classifies lands as Biological Core Management Areas, Important Riparian Areas, and Multiple Use Management Areas. The Pima Prospers 2015 Comprehensive Plan Update provides objectives and policies for management of lands in the CLS.

Methods

Areas of biological wealth discussed in Exhibit C include any areas known to be managed specifically or primarily for the conservation of biological resources, areas identified as high priorities for future conservation actions, and other areas that were identified during the NEPA process for the Project as having significant value to biological resources. Areas are discussed that fall in the eight-mile study corridor for the Project

Special-status plant and wildlife species that potentially occur within the Project study area are listed in Table C-1. Table C-1 includes species listed as endangered or threatened under the ESA and those that are proposed or are candidates for ESA listing. Designated and proposed critical habitat for ESA-listed species is shown on Figure C-1. Also included are: species protected under the BGEPA, BLM Sensitive Species (BLMS), plant species that the ADA has designated as highly safeguarded (HS), Pima County Priority Vulnerable Species (PPVS), and WSC. Species with a potential for occurrence in the vicinity of the Project and their associated potential impacts are discussed in detail later in this section.

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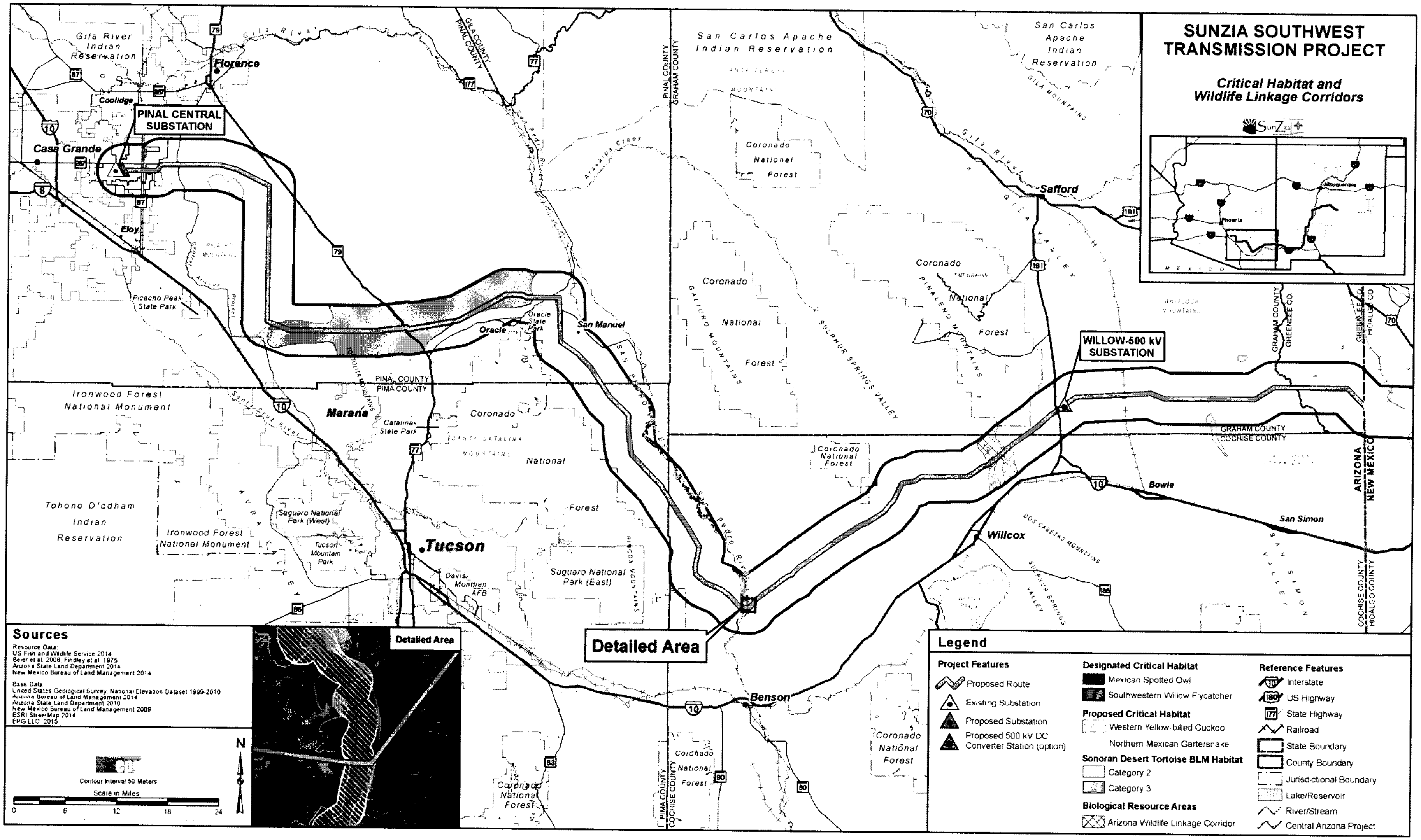

Figure C-1. Critical Habitat and Wildlife Linkage Corridors

The information provided in Table C-1 includes the results of a literature search, review of previous studies conducted in the Project area, including studies conducted during the NEPA process, data from the USFWS Information for Planning and Conservation website, AGFD Heritage Data Management System (HDMS) Online Environmental Review Tool HabiMap, Pima County SDCP, and the current BLM sensitive species list.

While complete surveys for sensitive species have not been conducted Project-wide, surveys conducted during the NEPA process have provided the information presented here. Surveys and habitat assessments have been conducted at a number of locations along the Proposed Route:

- San Simon Valley
  - High-intensity surveys for the Chihuahua Scurfpea
- Sulphur Springs Valley
  - Habitat assessments for the Chihuahua Scurfpea
  - Reconnaissance surveys for the Arizona Striped Whiptail
  - Review of conditions along existing transmission lines in consideration of measures to reduce bird mortality risk
- San Pedro River
  - Habitat assessments in designated or proposed critical habitat for the Southwestern Willow Flycatcher, Yellow-billed Cuckoo, and Northern Mexican Gartersnake
- Buehman Canyon
  - Review of existing riparian habitat conditions
- San Pedro River Valley to vicinity of Picacho Mountains
  - Reconnaissance surveys for the presence of forage plants for the Lesser Long-nosed Bat
- Vicinity of Picacho Mountains
  - Surveys for the Tucson Shovel-nosed Snake
- Picacho Reservoir and CAP
  - Review of habitat conditions for the Southwestern Willow Flycatcher and Yellow-billed Cuckoo where the Proposed Route approaches Picacho Reservoir

Of the 160 special-status mammal, bird, reptile, amphibian, fish, invertebrate, and plant species evaluated, 69 have potential for occurrence within the Project area. This includes 14 mammals, 35 birds, eight reptiles, one amphibian, one fish, one invertebrate, and three plants. Ten of the species are listed under the ESA as threatened or endangered, or are a candidate for listing.

Inventory and Effects of the Proposed Facilities

Standard and selective mitigation measures that would reduce the impacts of the Project on biological resources were developed during the NEPA process and are recorded as required components of the Project Description in the ROD (Exhibit B-1). Measures that require complete avoidance of sensitive locations or seasons would be highly effective in preventing related impacts from occurring. Measures that prescribe construction practices and design features, such as surveys for sensitive species, design to minimize ground disturbance, implementation of measures to reduce the risk of bird collision, and reclamation of temporarily disturbed areas, would minimize impacts to biological resources but would not completely prevent those impacts from occurring.

Areas of Biological Wealth

This section discusses geographic areas that are identified and may be managed for the benefit of biological resources. Publicly and privately owned conservation properties are addressed, as are areas with indefinite geographical boundaries such as wildlife corridors and Important Bird Areas that may be high priorities for future conservation actions. Some areas identified within the eight-mile study corridor, but not crossed by the Project, are also discussed.

Areas Managed or Identified for Biological Resource Conservation

Pima County Conservation Lands System

Pima County's CLS identifies lands that would be crossed by the Proposed Route as Biological Core Management Areas, Important Riparian Areas, and Multiple Use Management Areas. The Proposed Route would cross three ranches that are components of the CLS, although these three ranches are adjacent to one another and were acquired to provide a large, contiguous area of conservation lands. The Proposed Route would only cross State Trust lands leased by Pima County in the CLS, and would not cross any Pima County fee lands.

The A7 Ranch consists of approximately 46,898 acres of private, State Trust, Pima County, and other conservation easement lands. The property is a working ranch under a grazing lease from the ASLD that supports a variety of native wildlife, including four PPVS identified in the Pima County SDCP: the Lowland Leopard Frog (*Lithobates yavapaiensis*), Canyon Spotted Whiptail (*Aspidoscelis burti*), Bell's Vireo (*Vireo bellii*), and Mexican Long-tongued Bat (*Choeronycteris mexicana*). Suitable habitat is present on the A7 Ranch for Sonoran Desert Tortoises. The A7 Ranch contains important riparian and grassland habitats that provide connectivity between the Buehman Canyon area and the San Pedro River corridor (Pima County 2011). Link C441 of the Proposed Route would cross a portion of the A7 Ranch, and would result in ground disturbance and construction activities that would put wildlife at risk of disturbance and physical harm.

The Six Bar Ranch, located three miles northwest of the A7 Ranch, consists of approximately 12,300 acres of State Trust and Pima County lands. Resources and management of the Six Bar Ranch are similar to the A7 Ranch (Pima County 2011). Link C450 would cross a small portion of the Six Bar Ranch, adjacent to an existing natural gas pipeline. Potential effects are similar to those discussed for the A7 Ranch. The Proposed Route would also cross the M Diamond Ranch, which is located between the A7 Ranch and Six Bar Ranch and was added to the CLS in 2013.

The Project would cause temporary and permanent loss of habitat for wildlife present on the A7 Ranch, Six Bar Ranch, and M Diamond Ranch, but the mitigation measures that address potential impacts to riparian habitat, vegetation removal, and the effects of Project-induced erosion would effectively mitigate these potential impacts (Selective Mitigation Measures 1, 2, 3, 5, 8, and 14).

Bingham Ranch and Cienega

The Bingham Ranch, located in the San Pedro River Valley approximately two miles north of Redington, Arizona, was purchased in 1989 by the Pima County Regional Flood Control District to preserve Bingham Cienega, a spring-fed marsh on the property. A population of the Huachuca Water-umbel is present in the cienega. Other resources on this 285-acre parcel include wetlands, sacaton grassland, mesquite bosque, and riparian forest habitats (University of Arizona [UA] 2008). TNC manages the property under an agreement with the Pima County Regional Flood Control District.

The Proposed Route does not cross the Bingham Ranch, and this conservation area would not be affected by the Project.

Buehman Canyon Preserve

The Nature Conservancy's Buehman Canyon Preserve protects perennial portions of a stream in a mountain canyon on the east side of the Santa Catalina Mountains. Buehman Canyon is a tributary of the San Pedro River. The riparian woodlands in Buehman Canyon contribute to the overall value of the San Pedro River Valley to migratory birds. The Proposed Route does not cross the Buehman Canyon Preserve, but would span a dry portion of Buehman Canyon between the Preserve and the boundary of the A7 Ranch, which protects a lower portion of the stream. Mitigation measures would address potential impacts on Buehman Canyon (Selective Mitigation Measures 1, 2, 3, 5, 8, and 14).

Three Links Farm

The Three Links Farm, located approximately 15 miles north of Benson, Arizona, was recently purchased by TNC to place 2,209 acres (approximately six river miles) of San Pedro River deciduous riparian habitat under the protection of a conservation lease agreement. The lands have since been subdivided into five parcels that are privately owned and carry conservation easements. The San Pedro River riparian corridor supports important fish habitat and is an important avian migratory corridor. The ESA-listed Yellow-billed Cuckoo, Gray Hawk (*Buteo plagiatus*), and many other avian species use this reach of the San Pedro River. The American Beaver (*Castor canadensis*) was reintroduced to the San Pedro River and is now present on the property. The Proposed Route would not cross the Three Links Farm, but would span the San Pedro River 0.37 miles upstream from the boundary of the Three Links Farm. Mitigation measures that address the collision risk for birds, and potential impacts to riparian habitat, vegetation removal, and the effects of Project-induced erosion would effectively mitigate these potential impacts at this crossing (Selective Mitigation Measures 1, 2, 3, 5, 7, 8, and 14).

Wildlife Linkages

Galiuro–Pinaleño–Dos Cabezas Linkage

The Galiuro–Pinaleño Linkage contains two principal strands, and the Pinaleño–Dos Cabezas Linkage contains three. The linkage strand between the Galiuro and Pinaleño mountains crosses the grasslands of the northern Sulphur Springs Valley. In addition to the Pronghorn, other species that were used in developing the linkage model (both strands) and that may potentially be affected by the Project include Black Bear (*Ursus americanus*), Bobcat (*Felis rufus*), Mountain Lion (*Puma concolor*), and Mule Deer (*Odocoileus hemionus*). Two species that were modeled but are not known to be present in the area are the Jaguar and the Mexican Gray Wolf. Link C110 crosses strands of the Galiuro – Pinaleño – Dos Cabezas Linkage.

The Proposed Route would cross a short portion of the Galiuro – Pinaleño – Dos Cabezas Linkage (Figure C-1), where construction of the Project could result in avoidance of construction areas by wildlife and a temporary change in movement patterns. However, large transmission lines are typically assumed to be permeable to wildlife movement after the completion of construction, and the species modeled for this linkage are not known to strongly avoid linear utilities.

Ironwood–Picacho Linkage

The Ironwood–Picacho Linkage was described by Beier et al. (2006). Maintenance of this linkage would retain wildlife movement potential between BLM-administered wildland blocks in the Picacho Mountains, Ironwood Forest National Monument, Silverbell Mountains, and between the latter and the Durham-Coronado Plains wildland block to the northeast. Function of the linkage is reduced by existing linear features including I-10 and other roads, Union Pacific railroad right of way (ROW) and the Central Arizona Project (CAP). Urban and agricultural development in the area may also adversely affect the linkage. Ten wildlife species, including the Sonoran Desert Tortoise and the Tucson Shovel-nosed Snake, were selected for inclusion in the linkage model (Beier et al. 2006).

The Proposed Route would not cross the Ironwood–Picacho Linkage design (Figure C-1).

Other Areas of Biological Wealth

Sulphur Springs Valley

The Sulphur Springs Valley contains large areas of intact grasslands, but much of the valley near and south of Willcox has also been converted to agricultural uses. Additionally, fire suppression and other factors have facilitated Mesquite invasion of large areas of grassland, reducing the area's value for wildlife species such as Pronghorn and grassland birds.

The Bonita Grasslands Restoration Project was initiated by the AGFD in partnership with private land owners on an aggregation of Arizona State Trust Lands and private lands in the northern Sulphur Springs Valley. This partnership intends to restore 20,000 acres of grassland habitat over the next 10 to 15 years, which will support an existing Pronghorn population and restore connectivity between the Bonita and Southern Greasewood Pronghorn herds. These populations have been the subject of intensive, active habitat management and monitoring. Populations have varied widely but declined overall since monitoring began in response to ongoing habitat degradation, development in the northern Sulphur Springs Valley, and other factors. Grassland habitat is also important for Scaled Quail (*Callipepla squamata*), Botteri's Sparrow (*Aimophila botterii*), Cassin's Sparrow (*A. cassinii*), and other Chihuahuan grassland bird assemblages and general wildlife (AGFD 2010a).

The Proposed Route does not cross any areas currently subject to grassland improvement treatments. However, the reduction of woody vegetation such as Mesquite within the Project's right-of-way would be a potential benefit to wildlife by improving grassland condition.

Picacho Reservoir Area

Picacho Reservoir was originally constructed in 1889-1890 as part of the Florence Canal. The San Carlos Irrigation Project was initiated in 1924, incorporating the Florence Canal and the Reservoir. Picacho Reservoir is an approximately 50-acre site that serves as a water holding area and recharge site for diverted Gila River waters used by the Gila River Reservation and adjacent agricultural developments in the region. The Reservoir functions in regulating flows within the Florence–Casa Grande and Casa Grande Canals and provides a water storage reserve for the system (GRIC 2003). It is seasonally or completely dry in most years, but is filled when the Gila River system and San Carlos Reservoir contain a surplus of water. When water is present, the site becomes highly attractive to waterfowl and shorebirds. The endangered Yuma Clapper Rail is occasionally recorded at Picacho Reservoir (AGFD 2006a; Todd 1986), and the site is identified as potential Southwestern Willow Flycatcher habitat in need of surveys. The Yuma Clapper Rail and Southwestern Willow Flycatcher may only be present during very wet years.

Picacho Reservoir has also been proposed as critical habitat for the Yellow-billed Cuckoo (USFWS 2014a). Link C880 passes within 0.25 miles of the northwestern edge of the Reservoir.

In addition, irrigation systems that serve the surrounding farmland provide temporary and permanent sources of water. The CAP canal and other canals are regularly used by waterfowl in winter, and temporary pools may form in adjacent washes against the upstream side of the canal banks where natural flow patterns have been blocked. These areas can support dense xeroriparian vegetation and relatively high densities of wildlife year-round.

The Proposed Route would not cross Picacho Reservoir, but would cross the CAP and smaller canals. Any location with permanent water and bird activity can present a relatively high risk of bird collision with transmission lines. However, this area has been identified as a potential site for the placement of bird diverters on conductors, groundwires, and guywires (Selective Mitigation Measure 15), which would minimize avian collision potential.

Lower San Pedro River

The Lower San Pedro River Important Bird Area (IBA), identified by the National Audubon Society, consists of 6,938 acres of riparian habitat along nearly 59 miles of the river from the "Narrows" (north of Cascabel, Arizona) downstream (north) to the junction with the Gila River at Hayden, Arizona (Figure C-1). This reach of the river contains significant segments of cottonwood-willow gallery forest interspersed among mesquite bosques. Important special-status species that use the river area include the Southwestern Willow Flycatcher and the Western Yellow-billed Cuckoo, and the largest populations of nesting Gray Hawks and Mississippi Kites (*Ictinia mississippiensis*) in Arizona. The entire San Pedro River corridor in Arizona is an important movement corridor for avian and other wildlife species. The Lower San Pedro River is designated as a globally significant IBA (ibid).

In recognition of the regional and national significance of the San Pedro River, the USFWS conducted a scoping period from June to August 2012 for the Lower San Pedro River Collaborative Conservation Initiative, which would include a network of lands owned by private individuals, nongovernmental organizations, and governmental agencies. This initiative would provide an opportunity for cooperative management of new or existing conservation efforts, mitigation lands, and conservation easements. Some of these lands may be managed or acquired by the USFWS as a proposed National Wildlife Refuge (NWR). Scoping was conducted for an area two miles on either side of the San Pedro River, from "The Narrows" United States Geologic Survey (USGS) gauging station north of Benson to the confluence with the Gila River. However, consideration of other ongoing regional conservation planning efforts has delayed the development of alternatives by the USFWS.

The Proposed Route would cross the San Pedro River in an ephemeral reach, but may still create a collision risk for migratory birds, particularly at night or in poor weather. The Proposed Route would follow approximately parallel to the San Pedro River, no closer than approximately two miles. Construction of the Project would result in temporary and permanent habitat loss in this area, but would not directly affect riparian vegetation away from the river crossing location. Selective Mitigation Measures 7, 12, and 15 would minimize effects to avian resources at the river crossing.

Special-status Species

Table C-1 lists each special-status species reviewed, and provides a rationale for whether each species may be present in the Project area. Detailed discussions of individual species that may be present are provided following the table.

Impacts to ESA-listed species were assessed in detail during Section 7 consultation for the Project. The BLM provided a Biological Assessment (BA) and additional communications reflecting new information on ESA-listed species to the USFWS to support Section 7 consultation. This section incorporates terms and conditions provided in the Biological Opinion (BO) issued by the USFWS, for each ESA-listed species that may be affected by the Project. These terms and conditions were also incorporated as requirements in the ROD. The ROD and BO are provided in Exhibit B-1.

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Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
MAMMALS			
Allen's Lappet-browed Bat *Idionycteris phyllotis*	Ponderosa pine, piñon-juniper woodland, and riparian woodlands. Roosts in caves and mines. Forages for insects gleaned from surfaces or in flight over water.	BLMS; PPVS	Yes
California Leaf-nosed Bat *Macrotis californicus*	Sonoran and Mohave desertscrub. Roosts in caves, mines, and rock shelters. Forages for large flying insects on the ground.	BLMS; PPVS; WSC	Yes
Lesser Long-nosed Bat *Leptonycteris curasoae yerbabuenae*	Desertscrub up into oak transition. Roosts in mines, caves, and crevices; feeds on saguaro and agave nectar, pollen, and fruit. No designated Critical Habitat.	E; WSC	Yes
Arizona Myotis *Myotis occultus*	Mixed coniferous forests and riparian woodlands. Roosts in snags during the day, hibernates in mines though the winter. Forages over water for flying insects.	BLMS	Project area outside known distribution.
Cave Myotis *Myotis velifer*	Roosts primarily in mines or caves in desertscrub. Requires a permanent water source within a few miles of roost; may also utilize bridges or buildings for roosts.	BLMS	Yes
Greater Western Mastiff Bat *Eumops perotis californicus*	Sonoran desertscrub adjacent to cliffs. Roosts in rock crevices; requires a 10-foot vertical drop to launch flight. Forages for flying insects at high altitudes.	BLMS	Yes
Western Yellow Bat *Lasiurus xanthinus*	Associated primarily with palm trees, although they will use riparian gallery forests. Forages for flying insects.	PPVS; WSC	Yes
Western Red Bat *Lasiurus blossevillii*	Riparian gallery forests. Roosts in trees, occasionally leafy shrubs. Forages for insects in open areas.	PPVS; WSC	Yes
Mexican Long-tongued Bat *Choeronycteris mexicana*	Semidesert grasslands and mixed conifer woodlands. Roosts in caves, rock shelters, and mines. Forages for nectar, pollen, and fruit of columnar cacti.	BLMS; PPVS; WSC	Yes
Spotted Bat *Euderma maculatum*	Occupies a variety of habitats, from desertscrub to ponderosa pine forest. Roosts in rock crevices and cracks in cliff faces, often near water. Forages for flying insects.	BLMS; WSC	Yes
Pale Townsend's Big-eared Bat *Corynorhinus townsendii pallescens*	Desertscrub, piñon-juniper woodland, and other woodlands. Roosts in buildings, caves, and mines. Hibernates in caves and lava tubes. Captures insects in flight.	BLMS; PPVS	Yes
Black-tailed Prairie Dog *Cynomys ludovicianus*	Semidesert grasslands in dry, flat, open plains. Formerly extirpated from Arizona, but colonies have been reintroduced in Las Cienegas National Conservation Area.	BLMS; WSC	Project area outside known distribution.
Jaguar *Panthera onca*	Occurs throughout a wide range of habitats up to subalpine conifer forest. Critical habitat designated outside of Project area.	E; WSC	Yes
New Mexico Meadow Jumping Mouse *Zapus hudsonius luteus*	Riparian scrub (willows and alder thickets) and persistent emergent wetlands. Critical habitat proposed outside of Project area.	E; WSC	Project area outside known distribution.
Mesquite Mouse *Peromyscus merriami*	Mesquite bosques and desertscrub communities in low-growing shrubs (associated with Mesquite (*Prosopis* spp.).	PPVS	Yes

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Arizona Shrew *Sorex arizonae*	Wooded, rocky slopes with dense ground cover in the Huachuca, Santa Rita, and Chiricahua mountains, between approximately 5,100 and 9,200 feet in elevation.	PPVS; WSC	Project area outside known distribution.
Ocelot *Leopardus pardalis*	Dense thorny chaparral with high prey populations. No designated critical habitat.	E; WSC	Yes
Banner-tailed Kangaroo Rat *Dipodomys spectabilis*	Semidesert grasslands with scattered shrubs; often associated with hard soils and high gravel content.	BLMS	Yes
Sonoran Pronghorn *Antilocapra americana sonoriensis*	Sonoran desertscrub.	E; WSC	Project area outside known distribution.
Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*	High elevation, montane coniferous forests with high humidity and a closed canopy. Endemic to Pinaleño Mountains outside of Project area.	E; WSC	Project area outside known distribution.
Mexican Gray Wolf *Canis lupus baileyi*	Very wide range of habitat and elevation preferences, but requires the presence of large mammals and other prey species.	E (NEP)	Project area outside known distribution.
BIRDS			
Great Egret *Ardea alba*	Wetland habitats including marshes, drainage ditches, and ponds. Nests within the Project area.	WSC	Yes
American Bittern *Botaurus lentiginosus*	Freshwater habitats with dense emergent vegetation. Winters within the Project area.	WSC	Yes
Least Bittern *Ixobrychus exilis*	Marshy wetlands with dense, tall emergent vegetation. Nests within the Project area.	WSC	Yes
California Black Rail *Laterallus jamaicensis*	Year-round resident in marshes along Colorado River.	BLMS	Project area outside known distribution.
Yuma Clapper Rail *Rallus longirostris yumanensis*	Fresh and brackish water marshes. May nest within the Project area. No designated critical habitat.	E; WSC	Yes
Masked Bobwhite *Colinus virginianus ridgwayi*	Savanna grasslands within Sonoran desertscrub. Prefers areas with dense cover and forbs for forage.	E; WSC	Project area outside known distribution.
Rose-throated Becard *Pachyramphus aglaiae*	Riparian woodlands in southern Arizona.	WSC	Project area outside known distribution.
Yellow-billed Cuckoo (Western DPS) *Coccyzus americanus*	Mature, native riparian woodlands. May nest within the Project area. Critical habitat proposed within Project area.	T; WSC	Yes
Gray Catbird *Dumetella carolinensis*	Dense, high-elevation riparian woodlands.	WSC	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name ***Scientific Name***	**Habitat**	**Status**	**Potential for Occurrence**
Black-bellied Whistling-duck *Dendrocygna autumnalis*	Wetland and riparian areas. May nest in Project area.	WSC	Yes
Bald Eagle *Haliaeetus leucocephalus*	Undisturbed foraging/nesting areas. Commonly found adjacent to lakes, reservoirs, and perennial rivers. Winters within Project area.	BGEPA: BLMS;WSC	Yes
Golden Eagle *Aquila chrysaetos*	Inhabits open, mountainous, or hilly terrain. Nests within Project area.	BGEPA; BLMS	Yes
Common Black-Hawk *Buteogallus anthracinus*	Gallery forest habitats with tall trees along shallow permanent streams and rivers with clear water. Nests within Project area.	WSC	Yes
Ferruginous Hawk *Buteo regalis*	Healthy, arid grasslands and adjacent agriculture fields. Winters within Project area.	BLMS; WSC	Yes
Gray Hawk *Buteo plagiatus*	Riparian deciduous forest and adjacent open lands. Nests within Project area.	WSC	Yes
Swainson's Hawk *Buteo swainsoni*	Semidesert grasslands. May nest within Project area.	PPVS	Yes
Osprey *Pandion haliaetus*	Lakes, rivers, and estuaries. Perches in trees, poles, and towers. Migrates through the Project area.	WSC	Yes
Violet-crowned Hummingbird *Amazilia violiceps*	Riparian areas in the "Sky Islands" of southeastern Arizona.	WSC	Yes
Northern Aplomado Falcon *Falco femoralis septentrionalis*	Grassland and savanna habitats.	E (NEP); WSC	Project area outside known distribution.
American Peregrine Falcon *Falco peregrinus anatum*	Areas of topographic relief such as cliffs and canyons, usually near water. May nest within Project area.	BLMS; WSC	Yes
Northern Goshawk *Accipiter gentilis atricapillus*	Old-growth coniferous or mixed coniferous-deciduous woodlands.	BLMS; WSC	No suitable habitat in Project area.
Black-capped Gnatcatcher *Polioptila nigriceps*	Riparian and xeroriparian thickets in foothills near the border with Mexico.	WSC	Project area outside known distribution.
Crested Caracara *Caracara cheriway*	Sonoran desertscrub, occasionally forages in agricultural fields and often scavenges along roadways.	WSC	Yes
Pinyon Jay *Gymnorhinus cyanocephalus*	Healthy piñon-juniper woodlands.	BLMS	No suitable habitat in Project area.
Mississippi Kite *Ictinia mississippiensis*	Riparian woodlands and adjacent open lands. Nests within the Project area.	WSC	Yes

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Tropical Kingbird *Tyrannus melacholicus*	Lowland riparian woodlands and urban areas. Nests within the Project area.	WSC	Yes
Thick-billed Kingbird *Tyrannus crassirostris*	Lowland riparian woodlands. May nest within the Project area.	WSC	Yes
Belted Kingfisher *Megaceryle alcyon*	Sheltered, open water. Winters within the Project area.	WSC	Yes
Western Burrowing Owl *Athene cunicularia hypugaea*	Open desertscrub, grasslands, agricultural fields, golf courses, and airports. Nests within the Project area.	BLMS; PPVS	Yes
Cactus Ferruginous Pygmy-owl *Glaucidium brasilianum cactorum*	Ironwood and saguaro forest, or along riparian corridors. Nests within the Project area.	BLMS; WSC	Yes
Mexican Spotted Owl *Strix occidentalis lucida*	Dense coniferous forest and steep-walled canyons. May occur within Project area. Critical habitat designated outside of Project area.	T; WSC	Yes
Sprague's Pipit *Anthus spragueii*	Open, healthy grasslands. May winter within Project area.	C; WSC	Yes
Arizona Botteri's Sparrow *Peucaea botterii arizonae*	Semidesert grasslands in tall-grass patches, especially Sacaton. May occur within Project area.	BLMS	Yes
Arizona Grasshopper Sparrow *Ammodramus savannarum ammolegus*	Semidesert grasslands with scattered shrubs. May occur within Project area.	BLMS	Yes
Baird's Sparrow *Ammodramus bairdii*	Uninterrupted arid grasslands.	WSC	Yes
Rufous-winged Sparrow *Peucaea carpalis*	Semidesert grasslands with scattered Mesquite trees (*Prosopis* spp.). Nests within the Project area.	PPVS	Yes
California Least Tern *Sterna antillarum browni*	Open beaches free of vegetation.	E	Project area outside known distribution.
Le Conte's Thrasher *Toxostoma lecontei*	Sparsely vegetated low-elevation Sonoran Desert. May nest within the Project area.	BLMS	Yes
Elegant Trogon *Trogon elegans*	Riparian habitats in extreme southeastern Arizona.	WSC	Yes
Abert's Towhee *Melozone aberti*	Dense riparian thickets and mesquite woodlands. May occur adjacent to agricultural fields as well. Nests within the Project area.	PPVS	Yes
Bell's Vireo *Vireo bellii*	Dense riparian thickets and mesquite bosques. Nests within the Project area.	PPVS	Yes

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Gilded Flicker *Colaptes chrysoides*	Sonoran Desert upland; favors Saguaro forests. Nests within Project area.	BLMS	Yes
Buff-breasted Flycatcher *Empidonax fulvifrons*	Dry, open pine forests with bushy understories in the Huachuca Mountains.	WSC	Project area outside known distribution.
Desert Purple Martin *Progne subis hesperia*	Sonoran desertscrub in the presence of saguaros. Nests within Project area.	BLMS	Yes
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Dense riparian thickets. May nest within Project area. Critical habitat designated in Project area.	E; WSC	Yes
	REPTILES		
Sonoran Desert Tortoise *Gopherus morafkai*	Rocky bajadas, mountain slopes, desert wash banks, and canyons in desertscrub and semidesert grasslands. Requires moderately firm soils for burrow.	C; BLMS; WSC	Yes
New Mexican Ridge-nosed Rattlesnake *Crotalus willardi obscurus*	Occurs in the bottoms of steep, rocky canyons with intermittent streams within montane woodlands. Critical habitat designated outside of Project area.	T; WSC	Project area outside known distribution.
Northern Mexican Gartersnake *Thamnophis eques megalops*	Riparian obligate inhabiting densely vegetated permanent bodies of water. Critical habitat proposed in Project area.	T; PPVS; WSC	Yes
Organ Pipe Shovel-nosed Snake *Chionactus palarostris organica*	Sonoran desertscrub adjacent to gravelly washes on rocky bajadas.	PPVS	Project area outside known distribution.
Tucson Shovel-nosed Snake *Chionactis occipitalis klauberi*	Sonoran desertscrub with sandy soils and sparse vegetation.	PPVS	Yes
Western Ground Snake *Sonora semiannulata*	Desertscrub, semidesert grassland, and chaparral in steep rocky canyons, gentle bajadas, foothills, and low valleys.	PPVS	Yes
Massasauga *Sistrurus catenatus*	Semidesert grassland in extreme southeastern Cochise County.	WSC	Project area outside known distribution.
Desert Ornate Box Turtle *Terrapene ornata luteola*	Low valleys, plains, and gentle bajadas within semidesert grassland and Chihuahuan desertscrub.	BLMS; PPVS	Yes
Sonora Mud Turtle *Kinosternon sonoriense sonoriense*	Rocky streams, creeks, rivers, ponds, cattle tanks, and ditches within Sonoran desertscrub through woodlands.	BLMS	Yes
Sonoyta Mud Turtle *Kinosternon sonoriense longifemorale*	Found only in a small spring in western Pima County outside of Project area.	C; BLMS	Project area outside known distribution.
Slevin's Bunchgrass Lizard *Sceloporus slevini*	Open, sunny areas with abundant bunchgrass within mixed woodlands, as well as wet grasslands in valley bottoms.	BLMS	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Arizona Striped Whiptail *Aspidoscelis arizonae*	Sandy flatlands within semidesert grassland and Chihuahuan desertscrub.	BLMS	Yes
Red-backed Whiptail Lizard *Aspidoscelis xanthonota*	Sonoran desertscrub in canyon bottoms and on rocky slopes usually adjacent to springs or other sources of water.	PPVS	Project area outside known distribution.
Canyon Spotted Whiptail *Aspidoscelis burti*	Canyons and drainages within mountainous terrain in semidesert grassland and Madrean evergreen woodland. Also occupies riparian corridors in desertscrub.	PPVS	Yes
AMPHIBIANS			
Arizona Treefrog (Huachuca/Canelo Hills DPS) *Hyla wrightorum*	Ponderosa pine and mixed conifer woodlands. Occupies montane streams, wet meadows, cienegas, roadside ditches, and livestock tanks.	C	Project area outside known distribution.
Western Narrow-mouthed Toad *Gastrophryne olivacea*	Valley bottoms in Sonoran desertscrub.	BLMS; WSC	Project area outside known distribution.
Lowland Burrowing Treefrog *Smilisca fodiens*	Valley bottoms in Sonoran desertscrub, often occurs where Mesquite is common.	BLMS; WSC	Project area outside known distribution.
Chiricahua Leopard Frog *Lithobates chiricahuensis*	Headwater streams, cienegas, and springs, as well as manmade waters such as stock tanks. Critical habitat designated outside of Project area.	T; WSC	Project area outside known distribution.
Lowland Leopard Frog *Lithobates yavapaiensis*	Large rivers, streams, cienegas, and manmade structures such as cattle tanks, canals, and ditches within piñon-juniper woodlands.	BLMS; PPVS; WSC	Yes
Northern Leopard Frog *Lithobates pipiens*	Currently limited to wildlife tanks and a single lake.	BLMS; WSC	Project area outside known distribution.
Plains Leopard Frog *Lithobates blairi*	Currently limited to stock tanks and other manmade waters.	BLMS; WSC	Project area outside known distribution.
Barking Frog *Hylactophryne augusti*	Occupies rock crevices in large outcrops and cliffs in Madrean evergreen woodlands.	WSC	Project area outside known distribution.
Sonora Tiger Salamander *Ambystoma tigrinum stebbinsi*	Grasslands of San Rafael Valley and adjacent foothills.	E; WSC	Project area outside known distribution.
Sonoran Green Toad *Anaxyrus retiformis*	Valleys in Sonoran desertscrub and semi-desert grasslands. Occupies places where water accumulates.	BLMS	Project area outside known distribution.
FISH			
Yaqui Catfish *Ictalurus pricei*	Large rivers with slow to medium currents over a sand/rock bottom. Reintroduced population exists in Rio Yaqui. Critical habitat designated outside of Project area.	T; WSC	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Yaqui Chub *Gila purpurea*	Streams with aquatic vegetation. Populations limited to the Rio Yaqui watershed outside of Project area. Critical habitat designated outside of Project area.	E; WSC	Project area outside known distribution.
Gila Chub *Gila intermedia*	Smaller headwater streams, cienegas, and springs or marshes. Critical habitat designated outside of Project area.	E; WSC	Project area outside known distribution.
Headwater Chub *Gila nigra*	Cool to warm water in deep pools adjacent to swift riffles and runs.	C	Project area outside known distribution.
Roundtail Chub *Gila robusta*	Cool to warm water streams and rivers.	C; WSC	Project area outside known distribution.
Beautiful Shiner *Cyprinella Formosa*	Pools of small streams with sand, gravel and rock bottoms in San Bernardino National Wildlife Refuge. Critical habitat designated outside of Project area.	T; WSC	Project area outside known distribution.
Desert Sucker *Catostomus clarki*	Rapids and flowing pools of streams and rivers over bottoms of gravel.	BLMS; PPVS	Project area outside known distribution.
Razorback Sucker *Xyrauchen texanus*	Historically inhabited the San Pedro, presently, natural populations exist only in the Colorado River system. Critical habitat designated outside of Project area.	E; WSC	Project area outside known distribution.
Sonora Sucker *Catostomus insignis*	Occupies a variety of habitats ranging from warm water rivers to trout streams.	BLMS; PPVS	Project area outside known distribution.
Longfin Dace *Agosia chrysogaster*	Occupies a variety of habitats ranging from hot low-desert streams to high-elevation clear brooks.	BLMS; PPVS	Yes
Speckled Dace *Rhinichthys osculus*	Rocky riffles, runs, and pools of headwaters, creeks, and rivers. Rarely occupies lakes.	BLMS	Project area outside known distribution.
Loach Minnow *Tiaroga cobitis*	Turbulent, rocky riffles of mainstream rivers and tributaries. Critical habitat designated outside Project area.	E; WSC	Project area outside known distribution.
Gila Topminnow *Poeciliopsis occidentalis*	Shallow, warm water in moderate currents with dense aquatic vegetation and algae mats. No critical habitat.	E; WSC	Project area outside known distribution.
Apache Trout *Oncorhynchus apache*	Cool, clear high-elevation streams and rivers.	T; WSC	Project area outside known distribution.
Gila Trout *Oncorhynchus gilae*	Moderate to high-gradient perennial mountain streams above approximately 5,400 feet in elevation.	T; WSC	Project area outside known distribution.
Desert Pupfish *Cyprinodon macularius*	Shallow waters of springs, small streams and marshes. Reestablished population in Aravaipa Creek. Critical habitat designated outside of Project area.	E; WSC	Project area outside known distribution.
Mexican Stoneroller *Campostoma ornatum*	Small to medium-sized creeks in Chihuahuan desertscrub. Found in Rucker Canyon in the Chiricahua Mountains.	WSC	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Spikedace *Meda fulgida*	Occupies mid-water habitats of runs, pools, and swirling eddies. Found in Aravaipa Creek. Critical habitat designated outside Project area.	E; WSC	Project area outside known distribution.
Woundfin *Plagopterus argentissimus*	Non-essential Experimental Population in Gila River drainage.	E (NEP); WSC	Project area outside known distribution.
INVERTEBRATES			
Arizona Cave Amphipod *Stygobromus arizonensis*	Caves. Known only from the Huachuca and Chiricahua mountains.	BLMS	Project area outside known distribution.
Bylas Springsnail *Pyrgulopsis arizonae*	Thermal springs on the north side of the Gila River between Bylas and Pima.	BLMS	Project area outside known distribution.
Huachuca Springsnail *Pyrgulopsis thompsoni*	Springs in border mountain ranges in Arizona into northern Sonora, Mexico.	C	Project area outside known distribution.
San Bernardino Springsnail *Pyrgulopsis bernardina*	Known only from two springs in the Yaqui River watershed.	T	Project area outside known distribution.
Arkenstone Cave Pseudoscorpion *Albiorix anophthalmus*	Occupies cave interiors under small pieces of broken limestone rock. Lives its life in complete darkness.	PPVS	Project area outside known distribution.
Gila Tryonia *Tryonia gilae*	Occurs in a single spring on the north side of the Gila River near Bylas.	BLMS	Project area outside known distribution.
Hydrobiid Spring Snails *Pyrgulopsis* spp.	Freshwater springs and their outflows.	BLMS	Project area outside known distribution.
Succineid Snails *Succineidae* family	Springs, streams, rivers, floodplains and irrigation canals.	BLMS	Project area outside known distribution.
Talus Snails *Sonorella* spp.	Coarse, broken volcanic or limestone rock generally on north-facing or trending slopes. 11 species known in Pima County, 1 species within Project area.	PPVS	Yes
Clark Peak Talussnail *Sonorella christenseni*	High-elevation rocky areas in the Pinaleño Mountains outside of Project area.	BLMS	Project area outside known distribution.
PLANTS			
Parish's Indian Mallow *Abutilon parishii*	Steep rocky slopes and canyon bottoms in desertscrub or semi-desert grassland habitats	BLMS	Yes
Acuña Cactus *Echinomastus erectocentrus* var. *acunensis*	Low granite hills and gravel ridges in Sonoran desertscrub. Isolated populations near the Gila River in Pinal County.	E; HS; PPVS	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	Habitat	Status	Potential for Occurrence
Needle-spined Pineapple Cactus *Echinomastus erectocentrus* var. *erectocentrus*	Hills, alluvial fans, and in valley rock bottoms on limestone soils within Sonoran desertscrub. Found in Cienega Creek Natural Preserve and Colossal Cave Mountain Park.	PPVS	Project area outside known distribution.
Palmer's Bajalily *Triteleiopsis palmeri*	Low-elevation sandy desert flats and dunes.	BLMS	Project area outside known distribution.
Santa Catalina Mountain Sage *Salvia amissa*	Understory plant of shady floodplain terraces on alluvial soils. Only known extant population in the Galiuro Mountains.	BLMS	Project area outside known distribution.
Sonoran Maiden Fern *Thelypteris puberula* var. *sonorensis*	Moist soils of shaded riverbanks in mesic canyons. Occupies seeps and wet meadows.	BLMS	Project area outside known distribution.
Arizona Cliffrose *Purshia subintegra*	Limestone lake bed deposits of the Verde Valley Formation in Sonoran desertscrub at approximately 4,000 feet in elevation.	E; HS	Project area outside known distribution.
Arizona Hedgehog Cactus *Echinocereus triglochidiatus* var. *arizonicus*	Among boulders in oak woodlands and chaparral between 3,450 and 4,600 feet in elevation.	E; HS	Project area outside known distribution.
Patagonia Mountain Leatherpetal *Graptopetalum bartramii*	Rocky outcrops in canyons within Madrean evergreen woodland.	BLMS	Project area outside known distribution.
Chiricahua Mountain Dock *Rumex orthoneurus*	High elevation wetlands with moist organic soil.	HS	No suitable habitat in Project area.
California Flannelbush *Fremontodendron californicum*	Well-drained rocky slopes in chaparral or oak-pine woodland; not recorded within 30 miles of the Study Area.	BLMS	Project area outside known distribution.
Canelo Hills Ladies'-tresses *Spiranthes delitescens*	Wetland meadows associated with sedges and grasses from approximately 4,000 to 5,000 feet in elevation.	E; HS	Project area outside known distribution.
Catalina Beardtongue *Penstemon discolor*	Bedrock cracks on thin soil accumulations in chaparral or pine-oak woodlands between approximately 4,400 and 7,200 feet in elevation.	HS	No suitable habitat in Project area.
Chihuahua Scurfpea *Pediomelum pentaphyllum*	Bare areas in desertscrub and desert grasslands in sandy soils at approximately 3,600 to 4,500 feet in elevation.	BLMS	Yes
Lace-leaved Rockdaisy *Perityle ambrosiifolia*	Crevices in rocky habitat near seeps or flowing water.	BLMS	Project area outside known distribution.
Cochise Pincushion Cactus *Coryphantha [Escobaria] robbinsiorum*	Limestone substrate in desertscrub and semidesert grassland in southeastern Cochise County, Arizona.	T; HS	Project area outside known distribution.
Countess Dalhousie's Spleenwort *Asplenium dalhousiae*	Moist soils among rocks in Madrean oak woodland; occurs within the Mule Mountains.	BLMS	Project area outside known distribution.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	**Habitat**	**Status**	**Potential for Occurrence**
Greater Yellow Lady's Slipper *Cypripedium parviflorum* var. *pubescens*	High-elevation riparian woodlands and wet meadows with moist soils. Apache, Graham, and Greenlee counties are the extreme southwestern limit of its range.	HS	Project area outside known distribution.
Fish Creek Fleabane *Erigeron piscaticus*	Alluvial soils in shady canyon bottoms between approximately 2,250 and 3,500 feet in elevation.	BLMS	Project area outside known distribution.
Lemmon's Fleabane *Erigeron lemmonii*	Shaded ledges on vertical cliffs. Confirmed only from the Huachuca Mountains.	HS	Project area outside known distribution.
Gentry's Indigobush *Dalea tentaculoides*	Canyon bottoms, flood terraces, and nearby hillsides in the Pajarito and Baboquivari mountains in Arizona.	BLMS; HS; PPVS	Project area outside known distribution.
Whisk Fern *Psilotum nudum*	A tropical species occupying mesic woods, thickets, swamps, and rocky slopes.	HS	No suitable habitat in Project area.
Cochise Sedge *Carex ultra*	Saturated soils near perennial seeps, streams, and springs.	BLMS	No suitable habitat in Project area.
Rutter's False Goldenaster *Heterotheca rutteri*	Grasslands between 4,000 and 5,000 feet in elevation.	BLMS	Project area outside known distribution.
Huachuca Mountain Milkvetch *Astragalus hypoxylus*	Open, rocky hillsides of piñon-juniper woodlands in the Huachuca and Patagonia mountains of southern Arizona.	BLMS	Project area outside known distribution.
Huachuca Water-umbel *Lilaeopsis schaffneriana* var. *recurva*	Shallow water or saturated soils at springs, seeps, or edges of streams between 4,000 and 6,500 feet in elevation.	E; HS	No suitable habitat in Project area.
Huachuca Mountain Ragwort *Senecio multidentatus*	High-elevation rocky slopes in the Huachuca, Chiricahua, and Santa Rita mountains.	HS	Project area outside known distribution.
Kearney's Blue-star *Amsonia kearneyana*	Known only from west-facing drainages of the Baboquivari Mountains between 3,600 and 3,800 feet in elevation.	E; HS	Project area outside known distribution.
Goodding's Onion *Allium gooddingii*	Moist, shaded canyon bottoms in mature coniferous forests between approximately 7,000 and 11,000 feet in elevation.	HS	No suitable habitat in Project area.
Harrison's Barberry *Berberis harrisoniana*	Deep, rocky, shaded canyons in southwestern Arizona.	BLMS	Project area outside known distribution.
Murphey's Century Plant *Agave murpheyi*	Hilly slopes or alluvial terraces adjacent to major drainages. Populations are associated with prehistoric agave cultivation and are restricted to central Arizona.	BLMS; HS	Project area outside known distribution.
Smallflower Century Plant *Agave parviflora*	Semidesert grasslands and open oak woodlands in southern Pima and Santa Cruz counties.	HS	Project area outside known distribution.
Trelease's Century Plant *Agave schottii* var. *treleasei*	High-elevation desertscrub, grassland, and juniper-oak woodlands. Known only from the southern and western slopes of the Santa Catalina Mountains.	HS	No suitable habitat in Project area.

Table C-1. Special-status Species that May Occur in the Vicinity of the Project in Arizona.

Common Name *Scientific Name*	**Habitat**	**Status**	**Potential for Occurrence**
Santa Rita Mountain Yellowshow *Amoreuxia gonzalezii*	Rocky limestone hillsides in desertscrub communities.	HS	Project area outside known distribution.
Saguaro (crested form) *Carnegiea gigantea*	Sonoran Desert at low to mid-elevations. Crested Saguaros are a very small portion of the population and may be illegally harvested.	HS	Yes
Nichol's Turk's Head Cactus *Echinocactus horizonthalonius* var. *nicholii*	Sonoran desertscrub on limestone substrate. Known only from the Waterman and Vekol mountains in southern Arizona and Sierra El Viejo Mountains in Mexico.	E; HS	Project area outside known distribution.
Pima Pineapple Cactus *Coryphantha scheeri* var. *robustispina*	Sonoran desertscrub or semidesert grassland on flat areas below 4,000 feet in elevation.	E; HS	Project area outside known distribution.
Texas Crested Coralroot *Hexalectris warnockii*	Leaf litter and fallen logs in Madrean evergreen and mixed oak woodlands. Only known from the Chiricahua, Huachuca, and Mule Mountains.	BLMS; HS	Project area outside known distribution.
San Pedro River Wild Buckwheat *Eriogonum terrenatum*	Gravelly and clay soils in the Pantano and Saint David formations.	BLMS	Project area outside known distribution.
Tumamoc Globeberry *Tumamoca macdougalii*	Along arroyos and sandy washes in Sonoran desertscrub below 3,000 feet	BLMS; PPVS	Project area outside known distribution.
Wright's Marsh Thistle *Cirsium wrightii*	Wet, alkaline soils in seeps, marshes, and streams between approximately 3,450 and 8,500 feet in elevation. Believed to be extirpated from Arizona.	C	Project area outside known distribution.

BGEPA: Bald and Golden Eagle Protection Act
BLMS: BLM Sensitive species
C: Candidate (ESA)
E: Endangered (ESA)
HS: ADA Highly Safeguarded
NEP: Non-essential Experimental Population
PPVS: Pima County Priority Vulnerable Species
T: Threatened (ESA)
WSC: Wildlife of Special Concern in Arizona

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Mammal Species Accounts

Allen's Lappet-browed Bat (*Idionycteris phyllotis*)

The Allen's Lappet-browed Bat is BLMS and a PPVS.

Allen's Lappet-browed Bats occupy ponderosa pine forests, piñon-juniper woodlands, thornscrub, and riparian woodlands dominated by species of Cottonwood (*Populus* spp.), Sycamore, and Willow (*Salix* spp.). They often roost in caves and abandoned mine shafts, but may use trees (AGFD 2001a). In the early summer, females gather in maternity colonies and young are born between mid- and late-June. They are highly sensitive while roosting, and any disturbance may result in abandonment (AGFD 2001a). Allen's Lappet-browed Bats feed primarily on soft-bodied insects such as Lepidopterans, although soldier beetles, dung beetles, leaf beetles, roaches, and flying ants are also prey species (AGFD 2001a). Prey is gleaned from vegetation surfaces or captured in flight over water and other open spaces.

Allen's Lappet-browed Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains adjacent to the Project area, and may forage in any open areas adjacent to the mountains in the Project area.

California Leaf-nosed Bat (*Macrotis californicus*)

The California Leaf-nosed Bat is BLMS, a PPVS, and a WSC.

California Leaf-nosed Bats inhabit desertscrub communities below approximately 4,000 feet in elevation (AGFD 2014a). They commonly roost in mines, caves, and rock shelters, with ample areas of ceiling and flying space. This species is not known to migrate or hibernate in the winter, although they may use multiple roost sites within a year (AGFD 2014a). In early summer (May through June), females gather in maternity colonies to give birth to their young; males join them in late summer or fall. The California Leaf-nosed Bat forages for insects while hovering close to the ground or by gleaning them from vegetation (AGFD 2014a). Prey species include grasshoppers, moths, butterflies, dragonflies, and larvae. California Leaf-nosed Bats are sensitive to human disturbance at roost sites and may abandon it if disturbed; this poses a problem as suitable roost sites are decreasing due to destruction or modification of open mines and caves (AGFD 2014a).

California Leaf-nosed Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area.

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*)

The Lesser Long-nosed Bat is listed as endangered under the ESA, and is a WSC.

Lesser Long-nosed Bats occupy Sonoran desertscrub and semidesert grasslands in southwestern Arizona following a long distance migration from Mexico. They roost in mines, caves, abandoned buildings, and rock crevices (AGFD 2011a). Maternity colonies of up to tens of thousands of individuals are formed upon arrival to Arizona, usually in April, and offspring are born in May (USFWS 2015). Lesser Long-nosed Bats are herbivorous, feeding on nectar and pollen from flowers of columnar cacti in early summer, and flowers of agaves in late summer and early fall (USFWS 2015). The species is a strong flier; when food sources are limited, they may forage over large distances (USFWS 2015). Threats to the species include: disturbance at roost sites, destruction of roosts, and fragmentation and loss of foraging habitat by harvest and overgrazing (USFWS 2015).

Lesser Long-nosed Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area; there are no known unsurveyed mines or caves within 0.25 miles of the proposed Project, therefore no roost sites are anticipated to be present. The species may forage in any open areas with appropriate plant species near the Project area.

Some forage plants used by Lesser Long-nosed Bats would be removed or trimmed during the construction phase, and as required over the life of the Project during routine vegetation maintenance. Saguaros and agaves would be avoided during construction, would be salvaged and planted outside the right-of-way, and augmented with salvaged or nursery stock as necessary to achieve a goal of no net loss of agaves and saguaros. Larger saguaros (more than 15 feet high) do not have a high transplant survival rate, and their removal would be avoided, when possible.

The USFWS included the following measures in the Terms and Conditions of the BO:

- The BLM shall ensure that agave and saguaro salvage would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants within five years of initiation of monitoring following completion of initial restoration activities.
- The BLM shall submit an annual summary report to our office [the USFWS], by January 1 each year, documenting implementation of RPM 1 [agave and saguaro salvage and replacement].

The USFWS included the following measure as a recommendation in the BO:

- We [USFWS] recommend that the BLM work with us, Arizona Game and Fish Department (AGFD), and New Mexico Department of Game and Fish (NMDGF) to implement recovery actions for Lesser Long-nosed Bat.

Cave Myotis (*Myotis velifer*)

The Cave Myotis is BLMS.

Cave Myotis inhabit desertscrub communities between approximately 300 and 5,000 feet in elevation. They roost in caves, tunnels, mineshafts, under bridges, and sometimes in abandoned buildings. Colonies are often composed of 2,000 to 5,000 individuals, and maternity colonies may be as large as 15,000 individuals (AGFD 2002a). The Cave Myotis migrates long distances between their summer and winter ranges. Offspring are born in early summer after females have congregated in maternity colonies (AGFD 2002a). They feed opportunistically on any small, flying insects. Threats to the species include: human disturbance at roost sites, habitat destruction by development, as well as pesticide use eliminating insect (prey) populations (AGFD 2002a).

Cave Myotis may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area.

Greater Western Mastiff Bat (*Eumops perotis californicus*)

The Greater Western Mastiff Bat is BLMS.

The Greater Western Mastiff Bat occupies Sonoran desertscrub communities near cliffs and rocky canyons between approximately 240 and 8,500 feet in elevation. Roost sites are usually rock crevices one to 10 feet deep and above a vertical drop of at least 10 feet (AGFD 2014b). Due to the size and shape of the species, ground launching is difficult; therefore, they utilize the vertical drop to launch flight (AGFD 2014b). Mating occurs in early spring, and maternity colonies gather between June and August to give birth (AGFD 2014b). The species forages for insects in air hundreds of feet above the ground. Prey species include moths, crickets, grasshoppers, dragonflies, beetles, bees, wasps, ants, and sawflies. Greater Western Mastiff Bats are sensitive to human disturbance at roost sites and may abandon a site when disturbed. Cliff destruction also threatens the species by further limiting the available options for roost sites.

Greater Western Mastiff Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area.

Western Yellow Bat (*Lasiurus xanthinus*)

The Western Yellow Bat is a PPVS and WSC.

The Western Yellow Bat occupies deciduous riparian woodlands and palm oases; palm inhabitants tend to be in rural areas (AGFD 2011b). They roost solitarily in Hackberry (*Celtis reticulata*), Cottonwood, Sycamore, Arizona White Oak (*Quercus arizonica*) and palm trees (AGFD 2011b, BISON-M 2014a). Offspring are born in June and July, with the peak occurring in mid-June (CWHR 2008). Whether females gather in maternity colonies to give birth is unknown (CWHR 2008). Their diet consists of hymenopterans, dipterans, lepidopterans, and coleopterans (AGFD 2011b). Habitat destruction through riparian habitat loss is a key threat to the species, although they appear to be expanding their range in the American Southwest, which may be related to palm tree usage (AGFD 2011b, CWHR 2008).

The Western Yellow Bat may occur in riparian habitats along the San Pedro River and small tributaries, and could also be present in ornamental palm and other trees near the Pinal Central Substation.

Western Red Bat (*Lasiurus blossevillii*)

The Western Red Bat is a PPVS and WSC.

The Western Red Bat occupies broad-leaf riparian woodlands between approximately 1,900 and 7,200 feet in elevation. This species roosts in dense foliage of riparian trees such as Cottonwood and Sycamore, as well as orchard trees or occasionally leafy shrubs. The majority of Western Red Bats migrate between a summer and winter range, although some individuals may only migrate altitudinally (CWHR 1990). Mating occurs between August and October; females give birth to a litter of 1-5 offspring between early May and late June (AGFD 2011c). The Western Red Bat forages for insects while in flight, and has been known to use rural street lights as a source for hunting (AGFD 2011c). Prey species include lepidopterans, orthopterans (crickets and grasshoppers), coleopterans, and hemipterans (cicadas) (CWHR 1990). The consistent loss of gallery riparian woodland has contributed to the decline of the species in the American Southwest (AGFD 2011c).

Western Red Bats may occur in suitable riparian habitats along the San Pedro River and its tributaries.

Mexican Long-tongued Bat (*Choeronycteris mexicana*)

The Mexican Long-tongued Bat is BLMS, a PPVS, and WSC.

Mexican Long-tongued Bats occupy semidesert grasslands up into oak-conifer woodlands, and occasionally Sycamore dominated woodlands. Roosts are located in dim to well-lit caves, mines, rock crevices, and soil dens (AGFD 2006b). Southern Arizona is the northern limit of the species' range, and most are only present during the summer months in sexually segregated colonies. Offspring are born in June and July, and may fly two to three weeks after birth (AGFD 2006b). Diet consists of pollen, nectar, insects, and occasionally fruit of columnar cacti; these bats are also known to visit hummingbird feeders in the winter (AGFD 2006b, BISON-M 2014b). The primary diet component is agave nectar. Threats to the species include: disturbance at roost sites and destruction of forage habitat (AGFD 2006b).

Mexican Long-tongued Bats forage throughout the Project area, and may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area.

Spotted Bat (*Euderma maculatum*)

The Spotted Bat is BLMS and a WSC.

The Spotted Bat occupies a variety of habitats ranging from desertscrub to mixed coniferous forests. Roost sites are often in crevices and cracks of cliff faces; in addition, the occasional mine and abandoned building may be used (CWHR 2000). Little is known about the reproduction of this species; limited observations report offspring being born form late May into early July (AGFD 2003a, BISON-M 2014c). The Spotted Bat preys on moths while in flight, although other flying insects may be taken (BISON-M 2014c). Threats to the species include disturbance at roost sites and pesticide use (AGFD 2003a).

Spotted Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains adjacent to the Project area and may forage throughout the Project area.

Pale Townsend's Big-eared Bat (*Corynorhinus townsendii pallescens*)

The Pale Townsend's Big-eared Bat is BLMS and a PPVS.

The Townsend's Big-eared Bat occupies desertscrub communities inside the study corridor, but may occur up to mixed coniferous forests in other areas of its distribution. Roosts are located in caves, mines, and abandoned buildings where they can hang from ceilings; rock crevices are not used by this species, unlike others in the Southwest (AGFD 2003b). Mating takes place in fall before winter hibernation (AGFD 2003b). Maternity colonies begin to gather in late April, and offspring are born in May and June (AGFD 2003b). Their diet consists of Lepidopterans (moths and butterflies), Neuropterans (lacewings and mantidflies), Coleopterans (beetles), Dipterans (flies), and Hymenopterans (wasps, bees, and ants). Moths are the primary prey taken by the species (AGFD 2003b). Townsend's Big-eared Bats are highly sensitive to human disturbance at roost sites and may abandon a site at the slightest provocation (AGFD 2003b). Other threats include habitat destruction through mine closures and vandalism.

Pale Townsend's Big-eared Bats may roost in suitable locations in the Pinaleño, Winchester, Rincon, and Santa Catalina mountains within foraging range of the Project area.

Jaguar (*Panthera onca*)

The Jaguar is listed as endangered under the ESA, and is a WSC. Critical habitat is designated outside of the Project area.

The Jaguar is the largest felid in the Americas. Its current range encompasses the southern end of the United States, most of Central America, and northern Argentina, representing approximately 46 percent of the species' former range (Sanderson et al. 2002). Jaguars in Central and South America utilize warm Neotropical areas including: rainforests, coastal plains, savannas, wetlands, montane canyons, and woodlands. Jaguars dispersing into the United States have been recorded in Madrean evergreen woodlands, semidesert grasslands, desertscrub, and pine-oak woodlands (McCain and Childs 2008, Ortega-Huerta and Medley 1999). Individuals within each habitat type have large home ranges that are based on prey availability, topography, and density; those in productive tropical habitats use smaller home ranges (Seymour 1989). In addition, females frequently avoid fragmented habitat, whereas males do not (Jaguar Recovery Team and USFWS 2012). Males are known to engage in long-distance dispersals to avoid other home ranges, accounting for the occasional individual reported markedly outside typical breeding ranges. Jaguars may breed year-round, although those present at the northern and southern extremities of their range may engage in a breeding season (Seymour 1989). Litter size ranges from one to four cubs; however, a common litter consists of two (Seymour 1989). Diet consists primarily of large mammals such as White-tailed Deer (*Odocoileus virginianus*), Mule Deer , and Javelina (*Pecari tajacu)*, although small- to medium-sized mammals, birds, and reptiles may be taken as well (Jaguar Recovery team and USFWS 2012). The primary threats to Jaguars are intentional take by humans for sport, fur trade, or predator control, and habitat destruction/fragmentation.

Jaguars have not been observed recently in the Project area, but the dispersal potential of the species and suitability of habitat in the Sky Islands of Southeast Arizona has led to it being considered potential Jaguar habitat. Critical habitat is designated south of I-10, outside of the Project area. The Project would not affect the Jaguar, unless the species should substantially expand its range northward in the future.

Ocelot (*Leopardus pardalis*)

The Ocelot is listed as endangered under the ESA, and is a WSC. No designated critical habitat exists for the species.

The Ocelot's current range begins in the coastal plains of the lower Rio Grande Valley of south Texas, extends south through Central America and into northern Argentina. Preferred habitat consists of high shrub cover, and greater than 95 percent canopy cover; habitats with less than 75 percent cover are avoided (Harveson et al. 2004, Haines et al. 2006a) except at night (Murray and Gardner 1997).

Following decades of apparent absence, Ocelots were recently confirmed to occur in Arizona and nearby Sonora, Mexico. A camera trap sighting in Cochise County was followed by the discovery of a road-killed Ocelot near Globe, Gila County (USFWS 2010). Cameras have also detected Ocelots in the Sierra Azul of Sonora, Mexico, less than 30 miles from Arizona (Sky Island Alliance 2009). The discovery of an Ocelot in Gila County would have required the individual to cross through the Project area if the Ocelot was of wild origin dispersing from Mexico. The most likely dispersal route and most suitable Ocelot habitat in the region is the San

Pedro River Valley, although some of the recent records indicate that Ocelots will readily move through upland and possibly montane habitat in Arizona as well.

Ocelots may breed year-round, but may restrict breeding in the northern portions of its distribution to give birth outside of winter. A typical litter is one to four kittens, most often two (Murray and Gardner 1997). Diet consists of small mammals, birds, reptiles, and the occasional medium-sized mammal (USFWS 1990). Ocelots are threatened by road mortality, habitat fragmentation and loss, and urbanization in riparian areas (Haines et al 2005, Haines et al. 2006b).

Ocelots are not known to occur in the Project area, although the potential exists for individuals to cross through or reside in the area.

Banner-tailed Kangaroo Rat (*Dipodomys spectabilis*)

The Banner-tailed Kangaroo Rat is BLMS.

Banner-tailed Kangaroo Rats occupy semidesert grassland and desertscrub communities with scattered shrubs such as Creosote Bush. They build mounds up to three feet tall and 12 feet wide that contain an underground network of burrows where they store food and avoid extreme temperatures (Reid 2006). Banner-tailed Kangaroo Rats are nocturnal, coming out at night to forage for seeds, most often from Mesquite trees, their primary diet component. Unlike most mammals, the Banner-tailed Kangaroo Rat does not drink free water but uses the moisture in seeds to fulfill its water requirement (Phillips and Comus 2000). The species may breed year-round and may produce two to three litters per year (Reid 2006). A threat to the species is habitat loss through human development.

Banner-tailed Kangaroo Rats may occur within most of the Project area.

Mesquite Mouse (*Peromyscus merriami*)

The Mesquite Mouse is a PPVS.

The Mesquite Mouse inhabits mesquite bosques and desertscrub communities with prevalent Mesquite trees. The species is nocturnal, and utilizes the dense cover of vegetation and litter to avoid extreme temperatures (Linzey et al. 2008). Their diet consists of seeds, small fruits, and insects gathered at night (Linzey et al. 2008). Breeding occurs year-round, although few young are born in the summer months (Reid 2006). Due to the specialized nature of their habitat, the species is threatened by habitat loss (Linzey et al. 2008).

The Mesquite Mouse may occur where the Project crosses through the northeast corner of Pima County.

Bird Species Accounts

Great Egret (*Ardea alba*)

The Great Egret is a WSC.

The Great Egret utilizes freshwater wetlands such as lakes, ponds, marshes, human-made impoundments, rivers, and canals. Nests are usually built in woody vegetation at the highest point around occupied freshwater wetlands (Mccrimmon et al. 2011). Nesting occurs between April and June, and young are usually fledged by the end of July (Mccrimmon et al. 2011). Great Egrets are opportunistic feeders, preying on: fish, amphibians, reptiles, crustaceans, and insects (Mccrimmon et al. 2011). The greatest threat to the species is degradation or loss of habitat due to human activities.

Great Egrets may nest within the San Pedro River and its tributary streams within the Project area.

American Bittern (*Botaurus lentiginosus*)

The American Bittern is a WSC.

The American Bittern occupies freshwater wetlands with tall, emergent vegetation. The species migrates between a summer nesting habitat in northern North America and a wintering range in the southern United States and Central America. Pair formation begins upon arrival in their summer range, eggs are laid between April and June, and hatchlings may be present in nests until early August (Lowther et al. 2009). American Bitterns forage along shorelines or marsh fringes for insects, amphibians, fish, small mammals, and crayfish (Lowther et al. 2009). Threats to the species include wetland habitat loss, human disturbance, and environmental contaminants (Lowther et al. 2009).

American Bitterns may winter along the San Pedro River and its tributary streams within the Project area.

Least Bittern (*Ixobrychus exilis*)

The Least Bittern is a WSC.

The Least Bittern occupies freshwater marshes with tall emergent vegetation interspersed with clumps of woody vegetation and open water. Typical plant species include Cattail (*Typha* spp.), Sedge (*Carex* spp.), Bulrush (*Scirpus* spp.), Arrowhead (*Sagittaria* spp.), and Flatsedge (*Cyperus* spp.). The species migrates between eastern Unites States and Central America between summer nesting and winter habitats, although some may remain residents year-round (Poole et al. 2009). Pair formation and nesting begin in mid-May, and hatchlings may be present in the nest until early August (Poole et al. 2009). The Least Bittern's diet consists of small fish and insects found in marshes (Poole et al 2009). The primary threat to the species is destruction of wetland habitat.

Least Bitterns may nest along the San Pedro River and its tributary streams within the Project area.

Yuma Clapper Rail (*Rallus longirostris yumanensis*)

The Yuma Clapper Rail is listed as endangered under the ESA and is a WSC.

Yuma Clapper Rails occupy freshwater wetland marshes along rivers, backwaters, and in irrigation drainages, and is the only subspecies of Clapper Rail found in freshwater (USFWS 2006). Common emergent plant species include: Southern Cattail (*Typha domingensis*), California Bulrush (*Schoenoplectus californicus*), Chairmaker's Bulrush (*Schoenoplectus americanus*), and sedges (*Cyperaceae*; Rush et al. 2012). Yuma Clapper Rails begin to nest in late April, and have young in the nest until early August when they fledge (Rush et al. 2012). Nests are constructed in clumps of vegetation above ground, high enough to avoid tidal floods, but low enough to be concealed (Rush et al. 2012). The species feeds opportunistically, preying on crustaceans, slugs, minnows, aquatic insects, and small vertebrates (Rush et al. 2012). Yuma Clapper Rails are threatened by habitat degradation/loss through urbanization and by selenium accumulation (USFWS 2006).

Yuma Clapper Rails have been recorded nesting at Picacho Reservoir inside the Project area between 1995 and 1998 (USFWS 2006). The reservoir dried in 2002 and has had varying water levels since. Although no Yuma Clapper Rails have been recorded at Picacho Reservoir for several years, if suitable habitat in the form of permanent water and marsh vegetation is allowed to develop during Project construction, the transmission line could create a small collision risk for the species.

Yellow-billed Cuckoo Western DPS (*Coccyzus americanus*)

The Yellow-billed Cuckoo is listed as threatened under the ESA, and is a WSC. Critical Habitat is proposed in the Project area (Figure C-1).

Yellow-billed Cuckoos inhabit desert riparian woodlands composed of Willow, Fremont Cottonwood (*Populus fremontii*), and dense Mesquite; primarily nesting in Willows and foraging in Cottonwoods (LCRMSCP 2008). In a study conducted along the Colorado River, Yellow-billed Cuckoos showed a preference for recently planted (within five years) nesting habitat over older growth (McNeil et al. 2013). Yellow-billed Cuckoos require relatively large tracts of uninterrupted riparian woodland, often larger than 100 acres (Laymon and Halterman 1989). Within these habitats, adequate shade and moisture are necessary for the survival of eggs (LCRMSCP 2008). Breeding is correlated with food supply or periods of substantial rainfall and usually occurs between June and late July, although it may extend into August (LCRMSCP

2008). The breeding cycle only requires 17 days from egg-laying to fledging of young. Their diet consists primarily of large invertebrates, such as caterpillars, katydids, cicadas, grasshoppers, and crickets, although small frogs, arboreal lizards, and eggs of other birds may be taken as well (Hughes 2015). The primary threat to the species is habitat fragmentation and loss by anthropogenic modifications of riparian areas through the alteration of hydrologic processes and non-native species invasion (Hughes 2015).

Yellow-billed Cuckoos may nest along the San Pedro River and its tributary streams within the Project area. The Proposed Route would cross proposed critical habitat for the species on the San Pedro River, and would be located near proposed critical habitat for the species in Picacho Reservoir. Vegetation management (trimming or topping large Mesquite trees) may be required at the San Pedro River crossing, but ground-disturbing activities would not take place within suitable habitat for the species.

Black-bellied Whistling-duck (*Dendrocygna autumnalis*)

The Black-bellied Whistling Duck is a WSC.

Black-bellied Whistling-ducks occupy freshwater ponds and lakes, often with upland species of Mesquite, Willow, and Mimosa trees. The species is partially migratory; therefore, many individuals occupy the same area year-round (James and Thompson 2001). The southern United States is the northernmost extent of their range. Black-bellied Whistling-ducks utilize cavities within upland tree species as nest locations, and rarely nest on the ground. Diet consists of various forbs, grains, and seeds, including: Bermuda Grass (*Cynodon dactylon*), sorghum (*Sorghum* spp.), rice (*Oryza* spp.), and millet (*Panicum* spp.); they are known to forage in adjacent agricultural fields at night (James and Thompson 2001). Nest locations are the limiting factor affecting the species, although the population appears to be expanding its range (James and Thompson 2001).

The Black-bellied Whistling-duck may nest in tree cavities along the San Pedro River and its tributary streams within the Project area.

Bald Eagle (*Haliaeetus leucocephalus*)

The Bald Eagle is protected under the BGEPA, BLMS, and is a WSC.

Bald Eagles occur at lakes, reservoirs, and along perennial rivers that support fish prey for the species. Large riparian trees, typically Cottonwood, Sycamore and/or Willow, and cliffs are important habitat elements used for nesting and perching. In Arizona, most nesting habitats of the Bald Eagle are in low-elevation desert riparian corridors, although some are in piñon-juniper or ponderosa pine woodlands (Corman and Wise-Gervais 2005, Hunt 1998).

Bald Eagles are opportunistic feeders, but fish make up the majority of their diet. Water birds can also be an important food source. Bald Eagles also consume mammals, shellfish, and carrion (Hunt 1998, Hunt et al. 1992, Wheeler 2003).

The Bald Eagle breeds on seacoasts, along rivers, in swamps, and on large lakes from central Alaska across central Canada to Labrador, and south to Baja California, central Arizona, central Texas, and across the Gulf States to southern Florida. It is present locally in the interior of North America (AOU 1998). Approximately 200 to 250 Bald Eagles winter in Arizona, primarily in the Flagstaff and Colorado River regions (AGFD 1996, Phillips et al. 1964). Bald Eagles nest in large live trees or snags or on cliffs near seacoasts, rivers, swamps, or large lakes (AOU 1998, Ehrlich et al. 1988). Nests have been found up to 5,900 feet from water, but the average distance to water is 660 feet (Hunt et al. 1992). Habitat surrounding Bald Eagle nest sites varies from desertscrub to riparian or pine and nests are found both in canyons and in open country (Hunt 1998, Hunt et al. 1992, Wheeler 2003).

Increasing human population and increasing recreational use of breeding and wintering grounds may threaten Bald Eagles. Of 13 documented fatalities of breeding Bald Eagles in Arizona between 1987 and 1993, five were the result of shooting (Driscoll et al. 1999). Breeding eagles may be disturbed by human activities, such as recreation near nest sites along rivers (Rubink 1982). Bald Eagles may also be affected by the loss of riparian habitat that provides potential nesting and perching locations.

River impoundments have inundated large reaches of riparian vegetation, livestock grazing has inhibited the regeneration of riparian tree species, and consumption of water for human use has lowered water tables and dewatered riparian areas (Hunt et al. 1992, Rubink 1982). River impoundments may benefit Bald Eagles by creating habitat for prey, including aquatic birds and introduced sport fish.

Small numbers of Bald Eagles may be present within the Project area in winter along the San Pedro River and its small tributaries, as well as open areas surrounding the river. Bald Eagles may also be present in many parts of the Project area in winter.

Golden Eagle (*Aquila chrysaetos*)

The Golden Eagle is protected under the BGEPA and is BLMS.

Golden eagles are relatively common in the western United States and can be found in a variety of habitats, but prefer open ground or low hills where visibility is good for hunting (Ehrlich et al. 1988, Glinski 1998a). They nest on cliffs, large or small trees, and sometimes on electrical transmission line structures (Glinski 1998a). The Golden Eagle feeds primarily on mammals, preferring rabbits and ground squirrels, but also will feed on snakes, birds, and large insects when mammals are unavailable (Ehrlich et al. 1988, Terres 1980, Glinski 1998a). Golden Eagles are threatened by habitat loss, poisoning (from consuming carrion of poisoned animals), human disturbance (during nesting and occasionally from shooting), and highway deaths when the birds are attracted to road kills (AGFD 2002b).

The Golden Eagle may nest in suitable locations in the Project area.

Common Black-hawk (*Buteogallus anthracinus*)

The Common Black-hawk is a WSC.

Typical habitat for the species is along creeks and rivers that support mature gallery forest, or tropical deciduous forest south of the United States (AOU 1998, Schnell 1998, Terres 1980). The Common Black-hawk feeds on a variety of riparian associated species, including primarily fish and frogs, but also will take reptiles, small mammals, birds, crabs, and other invertebrates (Schnell 1998, Terres 1980). The hawks will perch and hunt from rocks at streamside, or low limbs over streams, or forage while walking along shores. The birds arrive in the southwestern United States in mid-March (Schnell 1998, Terres 1980). Nests are usually constructed by the female with materials provided by the male. Nest trees selected are usually broad-leaved riparian species, but ponderosa and Douglas fir are occasionally used. Common Black-hawks may rebuild nests of other raptor species (Schnell 1998). Two eggs are typically laid in mid-April, and hatch at the end of May. The male hunts and brings prey to the nest once the eggs have hatched (Schnell 1998). Threats to the Common Black-hawk include degradation or loss of riparian habitat.

The Common Black-hawk may nest along the San Pedro River and its small tributaries in the Project area.

Ferruginous Hawk (*Buteo regalis*)

The Ferruginous Hawk is BLMS and is a WSC.

Typical habitats for Ferruginous Hawks are open grasslands, prairies, deserts, and open piñon-juniper woodland. Use of an area tends to be reduced by increased shrubby vegetation (Bechard and Schmutz 1995, Glinski 1998b). Ferruginous Hawks feed almost exclusively on small mammals, including prairie dogs, ground squirrels, jackrabbits and cottontails, but they will also eat snakes, lizards, large insects, and occasionally bats (Ehrlich et al. 1988, Terres 1980). Nests are usually placed in large trees, but they may also nest on cliffs, banks, buttes, slopes, or clay or rock pinnacles (Ehrlich et al. 1992, Mikesic 2008, Terres 1980). Nests are very large and are constructed of coarse materials, primarily large sticks (Glinski 1998b). Nesting normally occurs in March, with three to four white eggs laid between March and May. Threats to the Ferruginous Hawk include habitat alteration, fragmentation, or loss; collisions with transmission lines and vehicles on highways; shooting and trapping of birds; and pesticides (AGFD 2001b, Ehrlich et al. 1992, Terres 1980).

The Ferruginous Hawk may winter in the Project area in suitable habitat.

Gray Hawk (*Buteo plagiatus*)

The Gray Hawk is a WSC.

Throughout most of their range, Gray Hawks inhabit upland tropical deciduous forests, but at the northern extent of their range, in Arizona, they tend to use broad-leaf riparian deciduous forest (Glinski 1998c). Reptiles, particularly lizards, make up a large portion of the diet of the Gray Hawk, but they also take snakes, nestling and adult birds, small mammals, insects, and occasionally fish (Bibles et al. 2002, Ehrlich et al. 1988, Glinski 1998c, Terres 1980). Gray Hawks arrive in Arizona in March and construct nests in the upper canopy of medium to large trees along riparian corridors (Glinski 1998c). They lay two or three eggs, with usually only one nestling surviving to fledge in Arizona (Glinski 1998c, Terres 1980). Primary threats to the Gray Hawk in Arizona are alteration or loss of broad-leaf riparian habitat (AGFD 2000a).

The Gray Hawk may nest along the San Pedro River and its small tributaries in the Project area.

Swainson's Hawk (*Buteo swainsoni*)

The Swainson's Hawk is a PPVS.

Swainson's Hawks may use savannas, open pine-oak woodlands, agricultural habitats, and semidesert grassland interspersed with desertscrub (Glinski and Hall 1998, Ehrlich et al. 1988). What these habitats often have in common is the presence of scattered trees (AOU 1998). Swainson's Hawks feed on small mammals, birds, snakes, lizards, frogs and toads, insects; particularly crickets and grasshoppers, and occasionally on bats (Ehrlich et al. 1988, Glinski and Hall 1998, Terres 1980). Most Swainson's Hawks return to Arizona to breed in April, and they usually return to the area used in previous years (Glinski and Hall 1998, Terres 1980). Large nests of large sticks and twigs with a grass lining are usually placed in tall trees, but the birds may occasionally nest on cliffs, rocky pinnacles, or even on the ground (Ehrlich et al. 1988, Terres 1980). Both the male and female of a pair cooperate in nest construction (Glinski and Hall 1998). Clutch size is two or three eggs (Ehrlich et al. 1988, Glinski and Hall 1998, Terres 1980). Habitat loss due to urban development adversely impacts the species (AZGFD 2001c). At least one threat to this species is the shooting of birds perched along roadsides, but they are also susceptible to pesticides on their wintering grounds in Argentina (AGFD 2001c, Ehrlich et al. 1992, Glinski and Hall 1998).

The Swainson's Hawk may nest in suitable habitat in the Project area.

Osprey (*Pandion haliaetus*)

The Osprey is a WSC.

Ospreys occupy habitats at lakes, rivers, estuaries, large open marsh areas, and along seacoasts (AOU 1998, Dodd and Vahle 1998). Important habitat elements are an adequate fish prey base and suitable large snags for perching, roosting, and nesting. Ospreys will nest singly or in colonies (Terres 1980). In Arizona, typical nesting sites contain more than one snag, which are used for territory defense, transfer of prey, and courting (Dodd and Vahle 1998). Ospreys will also nest on telephone poles, buildings, rock pinnacles, and artificial platforms erected for their use (Terres 1980). Ospreys are almost exclusively piscivorous, and only rarely take small rodents, birds, snakes, frogs, or carrion (Dodd and Vahle 1998, Terres 1980). Breeding occurs from April through September (AGFD 2002c). The large stick nests are typically constructed atop dead snags, or on a large adjacent limb, mostly in dead ponderosa pine trees. The nests may incorporate a variety of debris from the area in the vicinity of the nest, and are normally lined with grasses or pine needles (Dodd and Vahle 1998, Terres 1980). Historically, eggshell thinning from DDT was a serious threat to the species. This problem has abated to a great extent in the United States, but still exists for the species elsewhere. Other threats include habitat loss from logging, human recreational disturbance at nests, and harassment (AGFD 2002c, Dodd and Vahle 1998).

Migrating birds could be present in the Project area in early fall and spring along the San Pedro River (Dodd and Vahle 1998), or incidentally anywhere in the Project area.

Violet-crowned Hummingbird (*Amazilia violiceps*)

The Violet-crowned Hummingbird is a WSC.

In the southwestern United States, the Violet-crowned Hummingbird occurs almost exclusively in riparian woodlands dominated by Arizona Sycamore (*Platanus wrightii*), Fremont cottonwood, and Willows. All nests are built in Sycamore trees between approximately 23 and 40 feet off the ground (Wethington 2002). A variety of floral nectars and arthropods compose its diet (Wethington 2002). The Violet Crowned Hummingbird resides primarily in Mexico year-round, but does venture north to southern Arizona and New Mexico.

The Violet-crowned Hummingbird may occur incidentally in the Project area.

American Peregrine Falcon (*Falco peregrinus anatum*)

The American Peregrine Falcon is BLMS and a WSC.

The Peregrine Falcon inhabits open country where prey is abundant (Ehrlich et al. 1988, Glinski 1998d). Their diet includes primarily birds, including Rock Doves (*Columba livia*), many aquatic bird species, game birds, and passerines. Rodents, bats, and occasionally flying insects are also consumed (Glinski 1998d, Terres 1980, White et al. 2002). Peregrine Falcons commonly hunt cooperatively as a pair (Glinski 1998d). Peregrine Falcons do not construct their own nests, but modify old nests of raptors and corvids. In Arizona, nests are primarily on cliff ledges, but elsewhere nests in trees are used (Glinski 1998d, Terres 1980). The nest is not much more than a scrape in the substrate present on ledges (Glinski 1998d). The birds lay three to four eggs between March and June. Historically, the primary threat to Peregrine Falcons has been from pesticides, which accumulate in the birds and cause failure of nesting efforts resulting from eggshell thinning (AGFD 2002d). Rock climbing near eyries can disturb nesting Peregrine Falcons. Disturbance of nesting birds and take of individual animals are current recognized threats to the birds in New Mexico (NMDGF 2008).

Due to the wide range of the species and widespread suitable foraging habitat in the region, Peregrine Falcons are anticipated to potentially occur nearly anywhere within the Project area.

Crested Caracara (*Caracara cheriway*)

The Crested Caracara is a WSC.

The Crested Caracara occurs in a variety of habitats where open to semi-open areas with low-profile vegetation with scattered trees suitable for nesting are present. Areas that contain perches, including trees and fence posts, that provide a good view near nest sites are preferred (Morrison 1996). Caracaras are mostly restricted to Sonoran desertscrub habitat in southern Arizona, are commonly associated with a water source, and seldom occur outside of low-elevation desertscrub habitat in valleys (Corman and Wise-Gervais 2005, Levy 1998).

Crested Caracaras are considered opportunistic feeders, feeding primarily on carrion, but they commonly feed on any animal materials either live or dead, including small mammals, reptiles, and invertebrates (AGFD 2003c, Ehrlich et al. 1988, Levy 1998). They apparently nest primarily in Saguaros in Arizona, placing the nest in low crotches of the plants generally above the tops of surrounding vegetation, and are thus usually well hidden (Levy 1998). Nests are constructed of finer desert vegetation, and are thus distinct from the stick nests of raptors and corvids that commonly occur in similar nesting situations (Levy 1998).

In the United States, threats include road mortality of birds scavenging carrion, conversion of habitat to agriculture or residential uses, and illegal shooting and trapping. Poisoning for mammalian predator control is still somewhat of an issue for birds that feed at carrion, but the species is apparently secure within its range in Arizona (AGFD 2003c).

Crested Caracaras may occur in suitable habitat in the Project area.

Mississippi Kite (*Ictinia mississippiensis*)

The Mississippi Kite is a WSC.

The breeding habitat for the Mississippi Kite is open forest or grasslands with scattered trees. In Arizona, most breeding has occurred along lowland riparian deciduous forest as found along the

San Pedro River, which contains scattered live Cottonwoods with a snag component used during foraging. Understory vegetation is an important element in Mississippi Kite habitat as it supports populations of cicadas, which are a major food source for the birds. The birds also feed on other insects, frogs, toads, small snakes, birds, and small mammals including bats, and a variety of road-killed animals (Glinski 1998e, Parker 1999). In Arizona, Mississippi Kites nest primarily in the tops of Cottonwood trees. The birds produce two white eggs in early June, which hatch in the first week of July, but the young do not generally fledge until late August (Glinski 1998e). Degradation or loss of riparian nesting and foraging habitat are the greatest threats to the species. Pesticide poisoning accumulated from insect prey and harassment by humans may also adversely affect the species (AGFD 2003d).

The Mississippi Kite may nest along the San Pedro River and its small tributaries in the Project area.

Tropical Kingbird (*Tryannus melacholicus*)

The Tropical Kingbird is a WSC.

The Tropical Kingbird is typically a resident of riparian woodlands in Arizona, apparently preferring the periphery of such woodlands. They use high perches to watch for predators and for foraging in these areas (Corman and Wise-Gervais 2005). The diet of the Tropical Kingbird consists primarily of insects and berries (Ehrlich et al. 1988, Terres 1980). Tropical Kingbirds nest high in trees in May or June, producing two to four eggs, with the young fledging in about 18 days (Corman and Wise-Gervais 2005, Terres 1980).

Tropical Kingbirds may nests along the San Pedro River and its small tributaries in the Project area.

Thick-billed Kingbird (*Tyrannus crassirostris*)

The Thick-billed Kingbird is a WSC.

The Thick-billed Kingbird is a resident of broad-leaf riparian gallery forests, especially those with Sycamores, and tropical deciduous forest (south of the United States) (AOU 1998, Ehrlich et al. 1988, Terres 1980). The birds feed in typical flycatcher fashion by aerial hawking for insects, and glean other invertebrates off vegetation (Ehrlich et al. 1988, Lowther 2002). The species is an uncommon, dispersed breeder in the southwestern United States (Lowther 2002). They build an untidy cup nest in the tops of broad-leaved riparian trees. The nests are so loosely constructed that twigs protrude from the structure, and the eggs are usually visible from below (Ehrlich et al. 1988, Terres 1980). Three to four eggs are laid (Ehrlich et al. 1988, Lowther 2002, Terres 1980). The greatest threat to the Thick-billed Kingbird is degradation or loss of gallery riparian forest habitat from groundwater pumping, water diversion, overgrazing, and wood cutting (AGFD 2001d).

The Thick-billed Kingbird may winter along the San Pedro River and its small tributaries in the Project area.

Belted Kingfisher (*Megaceryle alcyon*)

The Belted Kingfisher is a WSC.

Belted Kingfishers inhabit areas where perennial waters that support an adequate fish prey base are present. Waters need to be clear enough to allow successful fishing by the birds. Water sources used include ponds, marshes, lakes, streams, and rivers, and in migration and winter they may use irrigation canals, earthen livestock tanks, and areas with dependable effluent discharge (Corman and Wise-Gervais 2005). The Belted Kingfishers are primarily piscivorous, but they also take amphibians, reptiles, rodents, young birds, crayfish, and other invertebrates (Corman and Wise-Gervais 2005, Ehrlich et al. 1988, Terres 1980). The Belted Kingfisher typically digs a horizontal burrow in an embankment near their fishing grounds, but may also nest in tree cavities. Burrows are typically three to seven feet deep, and may take up to three weeks to construct. Six to seven glossy white eggs are normally laid, with the young volant at about four weeks (Kelly et al. 2009, Terres 1980). Belted Kingfishers are sensitive to human disturbance, particularly while nesting (AZGFD 2007).

The Belted Kingfisher may winter along the San Pedro River and Picacho Reservoir in the Project area.

Western Burrowing Owl (*Athene cunicularia hypugaea*)

The Western Burrowing Owl is BLMS, and a PPVS.

Burrowing Owls inhabit open areas in deserts, grasslands, and agricultural and range lands. They use well-drained areas with gentle slopes and sparse vegetation, and may occupy areas near human habitation such as golf courses and airports (Dechant et al. 2003, Ehrlich et al. 1988, Terres 1980). Burrowing Owls often select burrows where surrounding vegetation is kept short by grazing, dry conditions, or burning (Dechant et al. 2003, Hjertaas et al. 1995). In Arizona, Burrowing Owls prefer grasslands, creosote bush/bursage desertscrub communities, and agricultural lands (deVos 1998). Burrowing Owls are semi-colonial and usually occupy burrows excavated by small mammals, often at the edges of active colonies of Prairie Dogs (*Cynomys* spp.) or Ground Squirrels (*Spermophilus* spp.). In areas that lack colonial burrowing rodents, Burrowing Owls will use excavations made by other mammals such as badgers (*Taxidea taxus*), skunks, foxes, and coyotes. They may also use natural cavities in rocks. In addition to the nest burrow, these owls may also use several satellite burrows. Satellite burrows may serve as protection from predators and parasites (Dechant et al. 2003). Occasionally Burrowing Owls may excavate their own burrows.

Burrowing Owls are opportunistic feeders, preying on a variety of arthropods and small vertebrates (Dechant et al. 2003, Hjertaas et al. 1995). They may forage during the day or night, but tend to forage closer to the nest during the day. Foraging habitat is variable, depending on prey availability and abundance. Migratory Burrowing Owls arrive on their breeding grounds in March or April (Dechant et al. 2003, Hjertaas et al. 1995). The owls may line their burrow with dry grass, weeds, feathers, or livestock dung (Ehrlich et al. 1988).

Widespread declines in the range and abundance of Burrowing Owls have been attributed to habitat loss and fragmentation and to control and extermination of colonial burrowing mammals (Dechant et al. 2003, Hjertaas et al. 1995). Potential nesting habitat for Burrowing Owls has also been reduced through conversion of land to agricultural and urban uses (Hjertaas et al. 1995). However, in Arizona, some agriculture areas have become a source of important habitat for the species. In addition to removing potential nest sites, habitat fragmentation may increase the density of predators such as foxes and coyotes, and make it more difficult for unpaired burrowing owls to find mates (Haug et al. 1993). Increased urbanization may result in an increase in predation by domestic dogs (Haug et al. 1993). Pesticides may harm burrowing owls through direct toxicity, secondary toxicity from ingesting poisoned prey, and reduction in the abundance of prey (Dechant et al. 2003).

Burrowing Owls may nest in the Project area in suitable habitat.

Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum*)

The Cactus Ferruginous Pygmy-owl is BLMS and a WSC.

Pygmy-owls are cavity-nesters, usually using nest cavities excavated and abandoned by woodpeckers. Most recent nests have been in cavities in Saguaros, but historically these birds also used cavities in Cottonwood, Willow, and Mesquite (Cartron and Finch 2000). Nests have also been recorded in cavities in Velvet Ash (*Fraxinus velutina*) and Eucalyptus (*Eucalyptus* sp.). Nest sites may be reused in subsequent years (Terres 1980). Cactus Ferruginous Pygmy-owls will feed on a wide variety of prey items, including birds, small mammals, reptiles, insects (including caterpillars), and scorpions (Cartron and Finch 2000, Terres 1980). They typically hunt from a perch. They are most active at night, but they are also active at dawn and dusk, and occasionally during the day (Terres 1980). The nesting season for Cactus Ferruginous Pygmy-owls in Arizona generally lasts from April to June (Cartron and Finch 2000). The incubation period is between 22 and 30 days, and the chicks fledge 21 to 30 days after hatching. Young birds will disperse from the nesting area approximately eight weeks after fledging. The primary threat to Cactus Ferruginous Pygmy-owls in Arizona is the loss of suitable habitat. Main causes of habitat loss are cutting of riparian woodlands, livestock grazing, groundwater pumping, and urban development (Cartron and Finch 2000).

Suitable nesting habitat for the species is present within the Project area from the vicinity of the flanks of the Picacho Mountains east to the limits of Saguaro habitat along the west and north flanks of the Tortolita Mountains, and southeast to Marana and the northern fringe of Tucson along the mountain base. Additional habitat is present in the San Pedro Valley through the full extent of the study area from south to north.

The Cactus Ferruginous Pygmy-owl may nest in the Project area. Although none have been recorded recently from the Project area, protocol-based surveys are infrequently performed since the species was delisted under the ESA.

Mexican Spotted Owl (*Strix occidentalis lucida*)

The Mexican Spotted Owl is listed as threatened under the ESA, and a WSC. Critical habitat is designated outside of the Project area.

Mexican Spotted Owls occur in disjunct locations associated with "Sky Islands" (isolated forested mountain ranges) and forested canyons in southwestern United States (USFWS 2013b). The species shows a preference for mature forest, however, unlike other Spotted Owls, they are more tolerant of arid forests and less dependent on old-growth stands (Ganey and Balda 1989). In general, Mexican Spotted Owls occur between an elevation range of 3,700 and 9,600 feet in mixed conifer-oak vegetation communities, riparian woodlands, and in deep canyons (Ganey et al. 2003, USFWS 1995). Nests are not built by Mexican Spotted Owls; they rely on existing structures such as raptor nests, caves, tree cavities, and debris platforms in trees (USFWS 2012). Courtship rituals begin in March, eggs are laid in late March or early April and hatch in early May, and the young owlets fledge by mid-June (USFWS 2012). Diet primarily consists of small mammals such as woodrats, deer mice, pocket gophers, and voles, but varies by location; bats, birds, reptiles, and arthropods may also be consumed (USFWS 2012). Primary threats to the species include habitat loss through uniform-age silvicultural practices and stand-replacing fires (USFWS 2012).

Mexican Spotted Owls inhabit the Santa Catalina and Winchester Mountains in the Project area. Suitable nesting habitat does not exist at the location the Project crosses the mountains, however, juvenile Mexican Spotted Owls are known to disperse long distances and through atypical habitat types following fledging (USFWS 2012). The BA for the Project stated that the Project would have no effect on the Mexican Spotted Owl, as no suitable habitat for the species is present in the Project area.

Sprague's Pipit (*Anthus spragueii*)

The Sprague's Pipit is a candidate for listing under the ESA, and is a WSC.

The Sprague's Pipit is endemic to the North American prairie. It migrates annually between a summer breeding range in northern United States and southern Canada and a wintering range in southern United States and northern Mexico. Preferred habitat at both winter and summer ranges is well-drained, open grasslands with high grass cover (greater than 80 percent), short grass height (between four and 12 inches), and little (less than five percent) shrub cover (Macías-Duarte 2009, USFWS 2014b). Nonnative grasslands are used when preferred vegetation structure is present, suggesting species composition may not influence preference as much as structure (USFWS 2014b). Sprague's Pipits may also use fallow agricultural fields to nest in, as well as during fall migration, although this is less common than grasslands (Fisher and Davis 2011, Robbins and Dale 1999). In southeastern Arizona, Sprague's Pipits may use semidesert grasslands, shortgrass prairie, and Sonoran and Chihuahuan desertscrub (Phillips and Amadon 1952, Garcia-Salas et al. 1995). Nest building begins after arrival to summer breeding range, and clutches of four to five eggs are laid in May; fledglings leave the nest approximately 25 to 30 days later (Robbins and Dale 1999). Diet consists primarily of arthropods in summer, but they do consume grass and forb seeds (AGFD 2001e, Ehrlich et al. 1988, Robbins and Dale 1999, Terres 1980). The greatest threat to Sprague's Pipit is direct loss of habitat, primarily through conversion to agriculture.

Suitable wintering habitat is present within the Project area along the San Simon River, in the Sulphur Springs Valley, and on Allen Flat east of the San Pedro River (Gori and Enquist 2003). Sprague's Pipits may winter within the Project area, but do not nest in the Project area.

Arizona Botteri's Sparrow (*Peucaea botterii arizonae*)

The Arizona Botteri's Sparrow is BLMS.

In southern Arizona, the species prefers taller grassland habitats, commonly occurring in swales and floodplain bottoms where Giant Sacaton (*Sporobolus wrightii*) is present. They forage on low, grassy hillsides adjacent to these habitats. They also occur up into the lower reaches of open oak woodland (Corman and Wise-Gervais 2005, Webb and Bock 1996). The birds feed primarily on grasshoppers and other arthropods, but also consume some grass and forb seeds (Ehrlich et al. 1988, Webb and Bock 1996). They construct their nest within or at the base of moderately tall bunch clumps of bunch-grasses. They produce two to four unmarked bluish-white eggs per clutch (Ehrlich et al. 1988, Webb and Bock 1996). The greatest threat to the species is from degradation of loss of habitat resulting from conversion of lands for livestock grazing, agriculture and development (Corman and Wise-Gervais 2005, Webb and Bock 1996).

The Arizona Botteri's Sparrow may occur in the Project area in suitable habitat.

Arizona Grasshopper Sparrow (*Ammodramus savannarum ammolegus*)

The Arizona Grasshopper Sparrow is BLMS.

The Arizona Grasshopper Sparrow inhabits grasslands and prairies that are moderately open and have patches of bare ground, with little shrub cover. They feed on a variety of invertebrates, but primarily insects, and have a preference for grasshoppers. They also feed on seeds, which make up a large portion of their diet in fall. Nests are built by the female on the ground and are well hidden, with adjacent grasses forming a dome over the nest (Vickery 1996). Clutches of four to five brown-spotted creamy-white eggs are laid between April and August (Ehrlich et al. 1988, Terres 1980). Habitat degradation, fragmentation, and loss are the primary recognized threats to the Grasshopper Sparrow in North America. Grazing on grasslands in the southwest tends to exclude Grasshopper Sparrows (Vickery 1996).

Arizona Grasshopper Sparrow may occur in Sulphur Springs Valley and San Simon Valley in the Project area.

Baird's Sparrow (*Ammodramus bairdii*)

The Baird's Sparrow is a WSC.

Baird's Sparrows winter in southern Arizona and occupy dense grasslands with a sparse shrub component.

Baird's Sparrows occupy shortgrass prairie habitats, other grasslands, and weedy fields (Ehrlich et al. 1988, NGS 2002). When the birds are present in the Southwest during winter, they are found in grasslands dominated by bunchgrasses (particularly *Bouteloua* spp. and *Eragrostis* spp.), among scattered Velvet Mesquite or other woody vegetation (Green et al. 2002). The diet of Baird's Sparrows includes insects, spiders and grass and forb seeds (Ehrlich et al. 1988; Green et al. 2002). Threats to the Baird's Sparrow are primarily from degradation or loss of grassland habitats within its breeding range. Causes include conversion of land for human use, habitat invasion by non-native plant species, and alteration of habitat by encroachment of shrubs due to fire suppression.

The Baird's Sparrow may winter in and/or migrate through the Project area.

Rufous-winged Sparrow (*Peucaea carpalis*)

The Rufous-winged Sparrow is a PPVS.

These sparrows are found in flat or gently sloping Sonoran desertscrub and Sinaloan thornscrub with scattered spiny trees and shrubs. Grasses are essential habitat components, and species of Mesquite, Hackberry, Cholla, and Paloverde are usually present as well (Pima County 2004). Territories commonly encompass some wash habitat. These birds are also found at higher elevations in oak savannahs (Pima County 2004). Rufous-winged Sparrows feed primarily on arthropods, but supplement their diet seasonally with seeds of forbs and grasses (Ehrlich et al. 1988, Lowther et al. 1999). They forage by pecking on the ground, but will glean foods from low vegetation (Lowther et al. 1999). They construct their cup-shaped nest in the fork of branches of low shrubs, trees, or cholla cacti (Lowther et al. 1999). They lay two to four pale green to pale bluish-white eggs (Ehrlich et al. 1988, Lowther et al. 1999). The primary threats to the Rufous-winged Sparrow are degradation and loss of habitat from overgrazing and urban development (Lowther et al. 1999).

The Rufous-winged Sparrow may nest in the Project area in suitable habitat.

Le Conte's Thrasher (*Toxostoma lecontei*)

The Le Conte's Thrasher is BLMS.

Le Conte's Thrashers inhabit some of the driest deserts in the southwestern United States, where vegetation is usually sparse and there is seldom any available surface water. Vegetation commonly includes saltbush (*Atriplex* spp.) species or scattered Creosote Bush, and an important element of their habitat is the presence of at least a few taller plants for nesting, such as chollas or yuccas. Like other thrashers, they forage on the ground among leaf litter for arthropods and some plant seeds, commonly digging shallow pits to expose these items. They also eat bird eggs and rarely take small lizards or snakes. They construct a double-lined, cup-shaped nest in chollas or other tall, dense vegetation in their habitat (Ehrlich et al. 1988, Sheppard 1996). Threats to Le Conte's Thrashers include habitat loss from development, unregulated OHV use, shooting, and pesticides (Sheppard 1996).

Le Conte's Thrashers may nest in suitable habitat in the Project area.

Elegant Trogon (*Trogon elegans*)

The Elegant Trogon is a WSC.

The Elegant Trogon breeds in Arizona primarily in riparian woodland canyons bordered by pine-oak forest and Madrean evergreen woodland (Kunzmann et al. 1998). The species feeds on a variety of fruits and insects. Elegant Trogons are a cavity-nesting bird; occupying holes created by other birds or formed naturally in either live or dead trees (Kunzmann et al. 1998). Threats to the species include habitat degradation or loss and disturbance of birds during the nesting season by birders.

Elegant Trogons do not normally occur within the Project area, but there are infrequent records of the species in the "Sky Islands" of southeastern Arizona. The species could potentially occur inmontane canyons crossed by the Proposed Route.

Abert's Towhee (*Melozone aberti*)

The Abert's Towhee is a PPVS.

Abert's Towhees inhabit riparian or xeroriparian habitats with species of Cottonwood, Willow, Mesquite, or Paloverde trees containing a dense understory component. They will also use dense stands of exotic Tamarisk (Tweit and Finch 1994). Abert's Towhees forage primarily on the ground among leaf litter for insects and seeds. Habitat degradation and loss are the principle threats to the species (Tweit and Finch 1994).

Abert's Towhees may nest along the San Pedro River and its small tributaries in the Project area.

Bell's Vireo (*Vireo bellii*)

The Bell's Vireo is a PPVS.

Bell's Vireos inhabit dense, often thorny, shrubby vegetation along arroyos, streams, or woodland edges. In the southwest, the species commonly inhabits such areas that include a Mesquite component (Corman and Wise-Gervais 2005). Bell's Vireos eat primarily larger insects such as grasshoppers, beetles, bees, wasps, larvae of Lepidoptera, and a few spiders, which they glean from the ground or by hovering at ground level. They also occasionally take snails and wild fruit (Brown 1993, Terres 1980). Their hanging cup nests are placed at the fork of slender tree branches and are constructed of plant parts, leaves, and bark, and are lined with fine grasses, small feathers, or horsehair (Brown 1993, Terres 1980). Eggs are brown-spotted white; and four are typically laid between April and July (Ehrlich et al. 1988, Terres 1980). Populations of the Bell's Vireo have shown some recent declines in portions of their range, but for the most part the species is stable. Primary threats to Bell's Vireo are habitat loss from flood control measures and damming of rivers, and parasitism by Brown-headed Cowbirds (Corman and Wise-Gervais 2005).

The Bell's Vireo may nest in suitable habitat along the San Pedro River and its small tributaries.

Gilded Flicker (*Colaptes chrysoides*)

The Gilded Flicker is BLMS.

Gilded Flickers inhabit low desert areas of the Southwest, primarily occurring in Saguaro forests where they excavate their nests. They begin nest cavities in Saguaros very early in the season so that damaged plant tissue will callus over prior to the birds nesting. They also occur along riparian drainages, where they may occasionally nest in Cottonwoods or other riparian trees (Corman and Wise-Gervais 2005, Moore 1995). A small clutch of three to five eggs are laid (Corman and Wise-Gervais 2005). Gilded Flickers feed primarily on invertebrates that they glean from the ground, but they also consume some fruits and seeds. Loss of Saguaro desert habitat from development adversely affects the species. Gilded Flickers do not do well in urban areas, even in the presence of Saguaros. Habitat loss in the Sonoran Desert resulting from invasive grass-fueled wildfires is a major ongoing threat to this species (Corman and Wise-Gervais 2005).

Gilded Flickers may nest in Saguaro forests and riparian areas in the Project area.

Desert Purple Martin (*Progne subis hesperia*)

The Desert Purple Martin is BLMS.

The Desert Purple Martin nests in large columnar cacti, particularly saguaros. The species is a strict insectivore, primarily taking its food in flight; but at times may skim insects off of water, glean them off vegetation, or go to the ground to pick up prey (Brown 1997). Four to five white eggs are laid between March and July (Brown 1997, Ehrlich et al. 1988, Terres 1980). Loss of columnar cacti, particularly in Mexico where large areas of Sonoran Desert are being converted to grassland to support the livestock industry adversely affects the species. Pesticides could impact birds wintering in South America (Brown 1997).

Desert Purple Martins may nest in Saguaro forest habitat in the Project area.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The Southwestern Willow Flycatcher is listed as endangered under the ESA, and is a WSC. Critical habitat is designated in the Project area (Figure C-1).

The Southwestern Willow Flycatcher is a Neotropical migrant that winters in Central and South America, and nests in southwestern United States. Historical nesting accounts exist in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northern Mexico (USFWS 2002). Migration occurs between the months of April and June, as well as between July and September (USFWS 2014c). Nesting habitat varies widely among breeding locations, but all occur alongside rivers, streams, and other wetlands that have at least intermittent flows during breeding season (USFWS 2014c). Predominant plant species in nesting locations include: Gooddings Willow (*Salix gooddingii*), Coyote Willow (*S. exigua*), Geyer's Willow (*S. geyeriana*), Arroyo Willow (*S. lasiolepis*), Red Willow (*S. laevigata*), Boxelder (*Acer negundo*), Tamarisk (*Tamarix ramosissima*), and Russian Olive (*Elaeagnus angustifolia*) (USFWS 2014c). In general, Southwestern Willow Flycatchers do not nest in areas without Willows or Tamarisk. They begin to build nests in late May, eggs are laid in June and July, and chicks are usually fledged by mid-August (USFWS 2002). Diet consists of flying and ground-dwelling invertebrates of both terrestrial and aquatic origin (USFWS 2014c). Primary threats to the Southwestern Willow Flycatcher include: habitat loss by anthropogenic means and brood parasitism by brown-headed cowbirds.

Southwestern Willow Flycatchers may occur along the San Pedro River and Picacho Reservoir within the Project area, however, no suitable nesting habitat presently exists at either location. The area crossed by the Project along San Pedro River is dominated by a mesquite bosque with small numbers of individual species of Willow, Saltcedar, and Cottonwood (Exhibit B-2: Biological Assessment). Picacho Reservoir may potentially host suitable nesting habitat following intermittent flooding and growth of the Saltcedar-dominated vegetation.

The USFWS included the following statement in the BO, acknowledging SunZia's commitment to provide compensatory mitigation for impacts to Southwestern Willow Flycatcher designated critical habitat:

- Acquisition and protection of habitat to fully offset temporary and permanent disturbance that would take place within designated critical habitat is a committed conservation measure and would be a condition of the BLM right-of-way grant and Notice to Proceed.

Reptile Species Accounts

Sonoran Desert Tortoise (*Gopherus morafkai*)

The Sonoran Desert Tortoise is a candidate for listing under the ESA, is BLMS, and a WSC.

Sonoran Desert Tortoises occupy primarily Sonoran desertscrub vegetation communities on rocky foothills east of the Colorado River, between the approximate elevation range of 500 and 5,300 feet. Adequate shelter from extreme temperatures is essential for the survival of the species (AGFD 2010b). Shelter types include: rock structures, vegetation, burrows excavated in firm, but loose, soil, and caliche caves in incised wash banks (Averill-Murray et al. 2002). Caliche caves in incised washes are preferentially sought out in the absence of rocky slopes or boulders (Riedle et al. 2008). Sonoran Desert Tortoises may occasionally occupy valley-bottom habitat away from rocky areas as dispersal corridors (Averill-Murray et al. 2002). Mating occurs at the beginning of the monsoon season, later than that of the Mojave Desert Tortoise, and hatchlings may emerge in late summer or over winter until the next spring (AGFD 2010b). Sonoran Desert Tortoises are herbivorous, and consume herbaceous parts of annual and perennial grasses and shrubs, as well as flowers and fruit (Van Devender et al. 2002). Primary threats to Sonoran Desert Tortoises are landscape-scale threats such as fire and vegetation changes driven by invasive plants, and fragmentation from impenetrable dispersal barriers such as canals, railroads, and freeways (USFWS 2013c). Other threats can include removal of individuals for pets, and intentional and accidental direct take by construction activities or vehicle collisions (Boarman 2002).

Suitable habitat exists in the Project area west of the San Pedro River crossing. Sonoran Desert Tortoises are likely to occur in this area. The BLM also defined some areas that contain important Sonoran Desert Tortoise habitat. A portion of this habitat would be crossed by the Proposed Route (Figure C-1).

SunZia provided the following committed conservation measure for the Sonoran Desert Tortoise in the BA:

- Conservation measures for the Sonoran Desert Tortoise would be as described in the standards and policies published by the BLM (1988, 2012). These measures specify methods for preconstruction clearance surveys, construction monitoring, and compensation for lost Sonoran Desert Tortoise habitat on BLM-administered lands.

Northern Mexican Gartersnake (*Thamnophis eques megalops*)

The Northern Mexican Gartersnake is listed as threatened under the ESA, a PPVS, and a WSC. Critical habitat is proposed in the Project area (Figure C-1).

The Northern Mexican Gartersnake is a riparian obligate species that occupies three different general habitat types: small isolated wetlands, large river-riparian woodlands, and streamside gallery forests (USFWS 2014d). The subspecies appears to be most active between the months of May and September (USFWS 2014d). Mating occurs in April and May, and offspring are born between June and August (USFWS 2014d). Diet consists primarily of native amphibians and fishes captured along vegetated bank-lines or in water; nonnative species are also taken. The primary threats to the Northern Mexican Gartersnake are predation by and competition with nonnative species such as the American Bullfrog (*Lithobates catesbeianus*) and riparian habitat degradation and loss (USFWS 2014d).

The Northern Mexican Gartersnake is not known to be present in the portion of the San Pedro River that would be crossed by the Project. No permanent water is present in this location. However, the entire river corridor has been proposed as critical habitat to provide protections for suitable habitat present in perennial segments of the river as well as to protect habitat that may be important for movement of the species between segments of suitable habitat. The Project would fully span the San Pedro River floodplain at this location, and would not affect the values that would be protected by the proposed critical habitat rule.

Tucson Shovel-nosed Snake (*Chionactis occipitalis klauberi*)

The Tucson Shovel-nosed Snake is a PPVS.

The Tucson Shovel-nosed Snake inhabits areas of sandy soils, typically associated with Creosote Bush and Mesquite species and is mostly limited to valley floors below 2,200 feet elevation (CBD 2004). Little is known about their ecology due to its cryptic nature. They are active above the surface from late spring through midsummer (Rosen 2003). Diet consists of roaches, scorpions, insect larvae, ants, spiders, and reptile eggs (Brennan and Holycross 2009). Habitat loss is the single greatest threat to the Tucson Shovel-nosed Snake.

Suitable habitat exists within the Project area west of the Tortolita Mountains. Although no recently confirmed individuals exist, they may occur in the Project area.

Western Ground Snake (*Sonora semiannulata*)

The Western Ground Snake is a PPVS.

The Western Ground Snake inhabits semidesert grassland, desertscrub, chaparral, and mesquite thickets. They occur in plains, valleys, and foothill habitats, but mostly near mountains with higher slopes and poorly drained soils (Degenhardt et al. 1996, Brennan 2012). Vegetation can vary from sparse creosote bush to dense riparian communities, but drainageways, floodplains, streambeds, and terraces appear to be important elements of their habitat (Pima County 2004). They feed on a wide variety of arthropods and take a few small lizards. The species is oviparous, laying three to six eggs in June or July (Brennan and Holycross 2009, Degenhardt et al. 1996). Degradation and loss of habitat are the primary threats to the species.

The Western Ground Snake occurs within the Project area.

Desert Ornate Box Turtle (*Terrapene ornata luteola*)

The Desert Ornate Box Turtle is BLMS and a PPVS.

The Desert Ornate Box Turtle occurs primarily within semidesert grassland and Chihuahuan desertscrub communities. They generally do not occur in steep or rocky terrain, but prefer shallower slopes and valley bottoms where deeper, friable soils suitable for construction of burrows are present (Degenhardt et al. 1996, Stebbins 2003). Some populations modify existing rodent burrows, particularly those of Kangaroo Rrats (*Dipodomys* spp.), but Box Turtles are capable of excavating their own burrows (Brennan and Holycross 2009, Degenhardt et al. 1996, Stebbins 2003). They are not dependent on free water, obtaining needed moisture primarily from their diet, but they are often found near water and are apparently good swimmers. The Desert Ornate Box Turtle is an opportunistic omnivore, with a preference for animal foods (Degenhardt et al. 1996, Stebbins 2003). They lay one to eight eggs in shallow nests in friable, well-draining soils (Brennan and Holycross 2009, Stebbins 2003). The primary recognized threats to the Ornate Box Turtle (*Terrapene o. ornata*) are degradation and loss of grassland habitat, population declines from removal for the pet trade, and road mortality (Redder et al. 2006). These threats likely affect the Desert Ornate Box Turtle as well.

The Desert Ornate Box Turtle occurs in semidesert grassland and riparian areas in the Project area.

Sonora Mud Turtle (*Kinosternon sonoriense sonoriense*)

The Sonora Mud Turtle is BLMS.

The Sonoran Mud Turtle normally occupies shallow, clear, perennial waters of streams, ponds, springs, and irrigation ditches, but is known from ephemeral drainages in southern Arizona. Aquatic habitats usually have rocky or sandy bottoms and support aquatic vegetation. Sonoran Mud Turtles occupy habitats from Sonoran desertscrub up to montane coniferous forest at about 6,500 feet elevation (Brennan and Holycross 2009, Degenhardt et al. 1996). Unlike the Yellow Mud Turtle, the Sonoran Mud Turtle does not usually range far from its aquatic habitat, but can travel overland between bodies of water (Brennan and Holycross 2009). Sonoran Mud Turtles are primarily carnivorous, but will consume vegetation when animal foods are not readily available. They forage while walking on the bottoms of their aquatic habitat, feeding primarily on a variety of invertebrates, but also taking fish and amphibian adults or larvae. The Sonoran Mud Turtle is threatened by habitat degradation, accumulated pesticide poisoning, and predation by nonnative species (Rosen 2008, Schwalbe and Rosen 1988).

The Sonoran Mud Turtle may occur along the San Pedro River and its tributaries in suitable habitat.

Arizona Striped Whiptail (*Aspidoscelis arizonae*)

The Arizona Striped Whiptail is BLMS.

Arizona Striped Whiptails are restricted to semiarid grasslands, generally dominated by Alkali Sacaton (*Sporobolus airoides*) and Saltgrass (*Distichlis spicata*) (Rosen et al. 1998). Whiptails are diurnal lizards, and are active during high temperatures. Reproduction takes place from May to early July when oviposition begins, and young hatch during August (Lowe and Goldberg 1970). Clutch size is generally one to three eggs (Sullivan 2009). Adults enter hibernation in September, followed by juveniles slightly later in autumn (Lowe and Goldberg 1970). As with all small whiptail species, the Arizona Striped Whiptail is primarily insectivorous. In its restricted range, human land use has been the primary apparent cause of decline of the Arizona Striped Whiptail.

The Arizona Striped Whiptail may occur in the Project area in suitable habitat in the Sulphur Springs Valley, although the species has not been recorded from the immediate vicinity of the Project (Sullivan et al. 2005). Reconnaissance surveys conducted for the Project in this area and in the San Simon Valley near another historic location did not observe any Arizona Striped Whiptails.

Canyon Spotted Whiptail (*Aspidoscelis burti*)

The Canyon Spotted Whiptail is a PPVS.

The Canyon Spotted Whiptail primarily occupies semidesert grasslands and Madrean evergreen woodland communities, but will utilize drainages extending into desertscrub communities. Canyons and drainages are favored areas within these communities (Brennan 2012). The species will spend late fall and all of winter belowground. Mating occurs in spring, and eggs are laid in the summer (Brennan 2012). Diet consists of small invertebrates such as ants, termites, beetles, caterpillars, and spiders. The Canyon Spotted Whiptail is threatened by the loss of habitat.

Canyon Spotted Whiptails may occur in suitable habitat near the Winchester, Rincon, and Santa Catalina mountains.

Amphibian Species Accounts

Lowland Leopard Frog (*Lithobates yavapaiensis*)

The Lowland Leopard Frog is BLMS, a PPVS, and a WSC.

The Lowland Leopard Frog occurs from Sonoran desertscrub up to Great Basin conifer woodland and the lower portions of Madrean evergreen woodland. They are generally limited to elevations below 5,500 feet (Brennan and Holycross 2009, Degenhardt et al. 1996, Stebbins 2003). They usually stay close to water, and normally occur in permanent or semi-permanent aquatic habitats (Brennan and Holycross 2009, Stebbins 2003). They may occur in most freshwater aquatic habitats, including permanent pools of foothill streams, overflow ponds and side channels of major rivers, permanent springs, and permanent stock tanks. They can also tolerate brief drying of water sources by taking shelter in rodent burrows. The Lowland Leopard Frog feeds primarily on invertebrates, but takes some small vertebrates (Brennan and Holycross 2009, Degenhardt et al. 1996). The Lowland Leopard Frog normally breeds between January and June, and again between September and early November. Eggs are laid in masses (Brennan and Holycross 2009, Stebbins 2003). Lowland Leopard Frogs are threatened by the fungal infection Chytridiomycosis, riparian habitat loss and degradation, and predation by nonnative species.

The Lowland Leopard Frog may occur within the Project area along the San Pedro River and its tributaries. Although the Project does not cross the San Pedro River or any tributaries in locations with permanent water, Lowland Leopard Frogs will use temporary pools and stream corridors for dispersal during the summer monsoon season.

Fish Species Accounts

Longfin Dace (*Agosia chrysogaster*)

The Longfin Dace is BLMS, and a PPVS.

The Longfin Dace can tolerate a wide range of habitats, from sand-bottomed desert streams to cool, clear creeks in the lower mountains (Minckley 1973). These fish can tolerate shallow pools less than seven inches deep, prefer moderate stream velocities around 1.1 feet per second, and are found at elevations between 1,360 and 6,740 feet (AGFD 2006c). They have the ability to move into new areas in response to flooding, and they can begin reproducing within a few days (AGFD 2006c). They often persist at the downstream edges of intermittent flows where they take temporary refuge in algal mats or detritus (Sublette et al. 1990). Longfin Dace typically feed on filamentous algae, zooplankton, aquatic insects, and detritus (Lee et al. 1980, Minckley 1973, Sublette et al. 1990). The species spawns from December through at least July. Nests may be tightly clustered, and young normally hatch in less than four days (Minckley 1973). Primary threats to the Longfin Dace include flood control and irrigation projects that alter the flow or quality of water. Other threats are predation by and competition from nonnative fish and crayfish (AGFD 2006c).

Longfin Dace occur within Buehman Canyon near the Project area, and are present in the San Pedro River in a permanent section of the river on the Three Links Farm downstream from the location that would be crossed by the Project. The Project does not cross the San Pedro River or Buehman Canyon in locations with permanent water.

Invertebrate Species Accounts

Talus Snails (*Sonorella* spp.)

Species of *Sonorella* occur within the Madrean Archipelago and adjacent regions. Most species of *Sonorella* are colored pinkish-buff, and have shoulder bands that are medium to dark brown. They inhabit talus, bedrock crevices, boulder piles, and cave entrances, generally on north-facing slopes of hills or rocky canyons (Pima County 2004). Many species are only known from limestone substrates. Their range is typically limited to small areas, and their mobility is considered highly limited. Ecology of the genus is poorly known, but they are likely primarily detrital feeders (Pima County 2004). Threats to Talus Snails are limited to habitat degradation or loss.

Of the 11 species known to occur in Pima County, *S. sabinoenis buehmanensis* is the only one known to occur in the Project area. It is located in Buehman Canyon.

Plant Species Accounts

Parish's Indian Mallow (*Abutilon parishii*)

The Parish's Indian Mallow is BLMS.

The Parish's Indian Mallow occurs among rocks and boulders on steep slopes and in canyon bottoms from desertscrub habitats up to semi-desert grassland between approximately 2,477 and 4,856 feet elevation (ANPS 2000). Plants typically occur on south-facing slopes and are fully exposed (AGFD 2000b). Because of its habit of growing in steep, rocky terrain, the species is not considered to be subject to significant impacts from grazing. Loss of habitat and plants could occur from any ground disturbing activities where plants are present. Invasive plant species, particularly Buffelgrass (*Pennisetum ciliare*) may compete with the plants for resources, crowding plants out of habitat, and increase fire potential, which could extirpate resident populations (AGFD 2000b).

The Parish's Indian Mallow is known to occur within the study area in Pinal and Pima counties in areas of suitable habitat. Since most Project alternatives avoid rocky canyon habitats, the potential for this species occurring in the Project area of influence is low.

Chihuahua Scurfpea (*Pediomelum pentaphyllum*)

The Chihuahua Scurfpea is BLMS.

The Chihuahua Scurfpea inhabits semidesert grassland and desertscrub communities dominated by Honey Mesquite, Fourwing Salbush (*Atriplex canescens*), Sand Sagebrush (*Artemisia filifolia*), and Creosote Bush in loose, sandy soils (Alexander 2015). The plant most often occurs in ephemeral drainages or in well-developed sand dunes (Alexander 2015). Potential threats to this species include degradation or loss of habitat associated with ground-disturbing activities, which may include energy development and grazing. It is not known whether this species is tolerant of competition from invasive plant species, but considering the species appears to occur in open areas, incursion of invasive plant species can be anticipated to have a detrimental effect.

Intensive surveys completed by BLM and EPG biologists identified Chihuahua Scurfpea in the San Simon Valley within the Project right-of-way.

Saguaro-Crested Form (*Carnegiea gigantea*)

The Crested Saguaro is Highly Safeguarded.

The crested form may occur anywhere Saguaro cacti occur in the Sonoran Desert. Although crested Saguaros are always uncommon, locally higher numbers may be present in some areas. The cause of this growth form of the Saguaro is poorly understood, and there is little agreement among researchers on a cause. The primary threats to the crested Saguaro are theft of plants. Habitat loss from development and vandalism of plants are also problematic.

Crested Saguaros are anticipated to occur in the Project area.

EFFECTS OF THE PROPOSED FACILITIES

This Exhibit discusses species anticipated to be present in or migrate through the Project area. Although as described, surveys have not been conducted over the entire Proposed Route to date, select locations in nearly all major geographic features (valleys, mountain ranges) crossed by the Proposed Route have been assessed for the potential for the presence of these species. Any of these species that are present at the time of construction are at risk from the potential impacts described in this section, and all of these species may experience habitat loss for the life of the Project.

Standard and selective mitigation measures that would reduce the impacts of the Project on biological resources were developed during the NEPA process and are recorded as required components of the Project Description in the ROD (Exhibit B-1). Measures that require complete avoidance of sensitive locations or seasons would be highly effective in preventing related impacts from occurring. In part, these measures specifically require avoidance of suitable nesting habitat for the Southwestern Willow Flycatcher and Yellow-billed Cuckoo to avoid disturbance caused by noise generated during construction.

Measures that prescribe construction practices and design features, such as surveys for sensitive species, design to minimize ground disturbance, implementation of measures to reduce the risk of bird collision, and reclamation of temporarily disturbed areas, would minimize impacts to biological resources but would not completely prevent those impacts from occurring.

Construction activities may result in temporary disturbance of sensitive wildlife species due to the presence of construction equipment and human activity. Small, terrestrial animals are at the highest risk of incidental injury or mortality during construction activities. Development of new access roads can result in avoidance and habitat edge effects for some species, particularly small animals that require vegetation cover for their movements as protection against predation. Such narrow, linear areas of ground disturbance are generally not a barrier to the movement of most larger mammals in the Southwest.

Access Roads

Linear features such as access roads could fragment wildlife habitat, adversely affecting species that are reluctant to cross areas of open ground due to threat of predation. New access roads may be used by OHVs or other recreational traffic, potentially causing ongoing disturbance to wildlife. Project development will likely increase human access potential in some areas with few existing roads (particularly in the San Pedro River Valley along Links C201 and C441). The presence of roads can increase the risk of vehicle mortality or illegal collection of sensitive reptile species such as the Sonoran Desert Tortoise and Gila Monster.

Edge effects can be created by linear features, which could affect species dependent on large blocks of contiguous habitat. Edge effects may reduce the effective size of habitat blocks for those species, limiting connectivity and dispersal between blocks. Increases in edge habitat may favor some generalist species over others with narrow habitat preferences. Open areas such as access roads may be beneficial to some predators such as raptors and carnivores, due to increased prey visibility. Overall, however, impacts of linear features on wildlife are mostly negative and difficult to fully avoid. Access roads not required for Project maintenance or access will be closed and restored (Selective Mitigation Measure 4).

Transmission Lines

Groundwires, conductors, and structures present collision hazards for some birds, particularly during nocturnal migration in poor weather conditions. Large-bodied species such as cranes and geese, which cannot make abrupt course corrections when obstacles are encountered in their flight path, are also at a higher risk than most bird species. Mitigation measures to improve visibility of groundwires (Selective Mitigation Measure 15) would reduce the collision risk for large birds. This may include the use of bird diverters on groundwires and guywires, and the use of one-inch optical ground wire rather than one-half-inch overhead ground wire where practicable. Although either groundwire type presents a collision risk, larger cables increase the visibility of the line and would create a lower risk than smaller cables. An Avian Protection Plan will be developed to mitigate the collision risk and loss of productivity for all birds. The mitigation measures proposed for identified areas of high collision risk would follow the recommendations of the Avian Powerline Interaction Committee (APLIC), including the application of bird diverters (APLIC 2012). In locations such as the San Pedro River or Picacho Reservoir area, these measures would reduce the risk of collision for sensitive riparian or aquatic bird species such as the Southwestern Willow Flycatcher, Yellow-billed Cuckoo, and Yuma Clapper Rail.

Electrical facilities may present electrocution hazards for large birds, although engineering requirements of 500 kV structures must place energy sources far enough from a potential path to ground so as to be beyond the wingspan of even the largest birds, effectively eliminating risk of electrocution from the Project itself. "Streamers" (liquid bird waste) directed from a perched bird can also present a conductive path for electricity. This risk can be reduced with design measures that prevent birds from perching on structures at locations where energized lines are placed with a short, near-vertical path to grounded components. Substations for 500 kV lines are engineered with spacing similar to transmission lines, with similarly low electrocution risk.

Nearly all vegetation communities affected by the Project are dominated by plants of relatively low stature, and a cleared or brushed right-of-way for conductor clearance and fire safety would not be required. Exceptions include riparian woodland and pine-oak woodland, and some individual trees or large shrubs in juniper savanna and xeroriparian scrubland that may require cutting. Tree cutting would be conducted to comply with the National Electric Safety Code and an appropriate level of safety, but would be minimized to the extent possible (Selective Mitigation Measure 14). Under most conditions, vegetation would be allowed to attain a height of no more than 12 feet. However, site-specific conditions may allow taller vegetation to remain, such as where an opportunity exists to place structures on elevated terrain at a stream or wash crossing. Efforts to leave vegetation in place under Selective Mitigation Measure 14 would minimize impacts to wildlife habitat.

Construction Activities and Temporary Work Areas

Construction noise and human presence can result in avoidance of the vicinity of construction sites by some wildlife. Noise can require that birds expend additional energy during territorial singing, or may result in abandonment of nest sites at high noise levels. Small animals such as rodents and lizards may not be able to feasibly avoid construction areas and may be harmed during construction activities, and can experience hearing loss from high noise levels such as those generated by heavy equipment (Brattstrom and Bondello 1983). Vibrations from heavy equipment and blasting can also disturb roosting bats.

Temporary ground disturbance would result in the loss of any vegetation and associated wildlife, although large or mobile species may successfully disperse out of work areas. However, displacement from established home ranges often lowers the survival of wildlife. Disturbed areas often facilitate the invasion of non-native plants, or the further spread of those that are already present. Invasive plants can displace native species, alter fire regimes, and may not provide suitable food sources to native wildlife. Invasive plants and associated changes in the fire regime are identified as the greatest threat facing the Sonoran Desert Tortoise. The risk of invasive plant colonization would be managed using mitigation measures included in the Noxious Weed Management Plan in the Plan of Development.

Disturbance of nesting raptors and other migratory birds may be avoided by constructing outside of nesting season (Selective Mitigation Measure 12). Mitigation measures addressing the reduction of ground disturbance and restoration of vegetation would help minimize effects to burrowing animals and ground-nesting birds such as the Western Burrowing Owl, as well as the small mammal prey base of many raptors (Selective Mitigation Measures 3, 5, and 14).

The degree of loss or direct disturbance of vegetation at any given point in the Project is determined by the availability of existing access roads and by ground slope, with road construction on steeper slopes resulting in increased ground disturbance. Within the area of ground disturbance, loss of vegetation would be minimized by (1) reducing this area to the extent practicable (Selective Mitigation Measure 1), (2) plant salvage and revegetation in areas of temporary disturbance (Selective Mitigation Measure 5), and (3) closure and restoration of any access roads not required for Project maintenance or access (Selective Mitigation Measure 4).

Temporary "drive and crush" impacts to vegetation would occur at small areas during construction, including conductor pulling and tensioning sites, turnarounds, temporary concrete batch plants, and temporary equipment storage yards (Selective Mitigation Measure 3). Closure of temporary access roads and the limiting of access through gating or other means (Selective Mitigation Measures 4 and 6) would minimize indirect impacts to vegetation caused by recreational travel, including off-road vehicle travel beyond the Project right-of-way. All of these measures to minimize ground disturbance and aid reclamation would also minimize effects to biological soil crusts.

Offsite and Compensatory Mitigation

Committed mitigation actions for impacts to ESA-listed species and their habitat are as described for those species in this Exhibit. Required and committed mitigation actions include replacement of lost forage plants (Saguaros, agaves) for Lesser Long-nosed Bats, avoidance of suitable habitat for the Southwestern Willow Flycatcher and Yellow-billed Cuckoo, and implementing existing guidance to minimize harm to Sonoran Desert Tortoises during construction.

SunZia is actively supporting and participating in the development of a Voluntary Migratory Bird Conservation Plan, which will include offsite mitigation actions to offset impacts to migratory bird habitat as well as measures to offset any collision mortality that may result from the Project. These actions may include habitat improvements, restoration of previously disturbed areas, the development of conservation easements, and funding research and monitoring efforts. Development of this plan was included as a stipulation in the ROD. All of these actions will provide benefits to sensitive wildlife species to offset potential impacts of the Project.

CONCLUSIONS

Potential impacts to ESA-listed species were analyzed and addressed during Section 7 consultation for the Project. Appropriate and effective mitigation has been proposed and committed to by SunZia to minimize or offset any impacts to ESA-listed species. The NEPA analysis addressed the potential for impacts to all other sensitive species. Although impacts are likely to occur to these species, Standard and Selective Mitigation Measures are in place to provide for preconstruction clearance surveys, avoidance of impacts where feasible, and best practices during construction to further minimize the potential for impacts. Restoration of temporarily disturbed areas will take place as provided in the Plan of Development. SunZia's commitment to offsite compensatory mitigation actions will further reduce the impact of the Project to sensitive biological resources.

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Exhibits D

EXHIBIT D – BIOLOGICAL RESOURCES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"List the fish, wildlife, plant life, and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, other proposed facilities will have thereon."

BIOLOGICAL RESOURCES

Physical Setting

The Project area lies within the southern and eastern portion of the Basin and Range Province. The Basin and Range Province is a physiographic region characterized by mostly parallel, north-south trending mountain ranges separated by valleys filled with alluvial soils (Fenneman 1931), and transitions into the Great Plains. Along the Proposed Route in Arizona, elevations vary from approximately 1,350 feet north of Casa Grande at the Gila River to approximately 5,800 feet where Link C260 crosses the southern Galiuro Mountains.

The Proposed Route passes through a region that is dominated by the southern Arizona "Sky Islands" physiography, which is a byproduct of geological metamorphic core complex and subsequent basin and range faulting that occurred between 25 and 10 million years before present. This physiography has significant elevation-driven climatic effects that are a direct influence on the diverse vegetation present in the region and the attendant wildlife that it supports. The Sky Island effect has driven speciation in a number of groups of organisms that are either of low mobility or lack adaptations that allow movement through the arid intervening valleys, effectively isolating mountain population ranges (Baker 2008; McCormack et al. 2008; Warshall 1994).

Annual precipitation in the vicinity of the study corridor results from a regional bimodal precipitation pattern of localized, often intense storms during the summer monsoon season (July to mid-September) and Pacific winter storms (November to March), with gentle rains that are typically more widespread and of greater duration. Moisture supporting the summer monsoon comes from the Gulf of Mexico and, to a lesser extent, from the Gulf of California. Leftover moisture from tropical hurricanes in both the Atlantic and Pacific often contribute significant amounts of moisture to the area, but this is infrequent and irregular (Lowe 1964). The combination of the dry air, high temperatures, and abundant sunshine results in high evaporation rates in the region (Hendricks 1985). Spring and fall are typically dry and hot, and extended droughts, often lasting several years, are not uncommon in the region.

Vegetation

Vegetation crossed by the Project is shown on Figure D-1.

Sonoran Desertscrub

The Sonoran Desertscrub biome is divided into two major subdivisions: the Lower Colorado River Valley subdivision and the Arizona Upland subdivision. The subdivisions are primarily separated by a variation in the total effective annual precipitation, and are a byproduct of the bimodal precipitation regime previously mentioned. Soil types are the primary determinant where the subdivisions meet and overlap in south-central Arizona, with the Arizona Upland subdivision restricted to rockier slopes, foothills, and desert mountains. Sonoran Desertscrub is typically bounded on the east by either Chihuahuan Desertscrub or semidesert grassland habitats. The presence of a variety of xeric-adapted sclerophyllous (having small leaves resistant to water loss) tree species and many species of cacti and other succulents distinguishes the Sonoran Desert from less diverse, shrub-dominated North American desert biomes (Turner 1982).

Lower Colorado River Valley Subdivision

The Lower Colorado River Valley subdivision is the warmer and drier of the two subdivisions of the Sonoran Desertscrub biome. It occurs at lower elevations and typically farther west, where regional geology limits annual precipitation. Precipitation falls mainly during winter from Pacific storms; moisture from monsoonal systems that occur in summer contribute only small amounts to total annual precipitation. Precipitation from monsoon events lessens in areas farther to the north and west from the sources of monsoonal moisture, the Gulf of Mexico and the Gulf of California. Because of the low annual precipitation, vegetation in the Lower Colorado River Valley subdivision is typically open and less diverse, with plant communities often dominated by creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*), or they may occur as monocultures of creosote bush over very large areas. Cacti are an important group within this subdivision, but do not dominate as they do in the Arizona Upland subdivision (Turner 1982).

Arizona Upland Subdivision

The Arizona Upland subdivision of Sonoran Desertscrub is a mix of desertscrub and subtropical thornscrub elements. Precipitation is higher than in other North American desert communities, with a notably bimodal pattern. Approximately half of the precipitation occurs in winter, supporting diverse spring annuals; and approximately half falls in a summer monsoon period as heavy, localized thunderstorms. The Arizona Upland subdivision occurs from higher-elevation valley floors typically associated with Sky Island mountain ranges, up to the elevation limit where winter freezes exclude many succulent species. This plant community is best developed on upper bajadas and low montane foothills where proximity to steep, often high mountains results in increased annual precipitation. Small trees or shrubs are a dominant vegetative component, with a high diversity of Fabaceae, including Yellow Paloverde (*Parkinsonia microphylla*), Blue Paloverde (*P. florida*), several Mesquites (*Prosopis* spp.), Desert Ironwood (*Olneya tesota*), Catclaw Acacia (*Acacia greggii*), and Whitethorn Acacia (*A. constricta*). Cactus diversity is relatively high, and cacti are often dominant or codominant. Prickly Pears (*Opuntia* spp.) and Chollas (*Cylindropuntia* spp.) may reach very high diversity. Common small or clumped cacti include several species of Hedgehog Cactus (*Echinocereus* spp.) and Pincushion Cactus (*Mammillaria* spp.). Larger cacti include the columnar Saguaro (*Carnegiea gigantea*) and Barrel Cacti (*Ferocactus* spp.). Jojoba (*Simmondsia chinensis*), Creosote Bush, Ocotillo (*Fouquieria splendens*), and numerous other shrubs are also present (Turner 1982).

Chihuahuan Desertscrub

Precipitation in Chihuahuan Desertscrub is largely from summer thunderstorms, although occasionally strong Pacific winter storms will reach the region. Dominant shrubs in finer soils include creosote bush, American Tarwort (*Flourensia cernua*), and Viscid Acacia (*Acacia neovernicosa*). Rocky uplands and bajadas are dominated by species of *Agave*, *Yucca*, *Nolina*, and other succulent shrubs. Some prickly pear species are the most common large cacti, but the diversity of small globular cacti is higher in this plant community than any other in North America. Some major cactus genera are *Coryphantha*, *Echinocereus*, *Escobaria*, and *Mammillaria*. Perennial herbaceous plants may be a significant component of the community, and some annuals may occur in response to sufficient winter rains. Chihuahuan Desertscrub gradually intergrades into semidesert grassland with increasing elevation or rainfall (Brown 1982a).

Semidesert Grassland

Semidesert grassland, while dominated by grasses, has high shrub diversity, and in areas with fire suppression or heavy grazing often converts to desertscrub. Precipitation is slightly greater in summer, and supports the majority of grass growth. Cacti may be common and include several species of cholla and prickly pear as occasional dominant plant species, particularly where livestock grazing is heavy. Typical grasses include species of Grama (*Bouteloua* spp.), Three-awn (*Aristida* spp.), Tobosa Grass (*Pleuraphis mutica*), and others. Mesquite is generally the most dominant shrub species, with Creosote Bush, *Yucca* species, and the related Sotol (*Dasylirion wheeleri*) and Beargrasses (*Nolina* spp.), Ocotillo, and several other shrubs common in places (Brown 1982b).

Riparian Woodland

Riparian woodlands are dominated by trees and shrubs dependent on surface water or shallow groundwater, and generally exist as narrow bands along major streams and rivers. The majority of the tree species are (at least regionally) riparian obligates, and do not occur in upland habitats within arid Southwestern biomes. The high productivity and cooler, humid microclimate within riparian woodlands supports numerous herbaceous plant and wildlife species generally restricted to riparian zones as well. Riparian plant communities do not change as rapidly with elevation as upland plant communities, as the woodlands provide thermal buffering not present elsewhere and competition for water is generally not a limiting factor.

Dominant tree species common to both communities include Fremont Cottonwood (*Populus fremontii*), Goodding's Willow (*Salix gooddingii*), and Velvet Mesquite (*Prosopis velutina*). Large stands of Velvet Mesquite in particular are important components of lowland woodlands in the Southwest. Increasing elevation allows the occurrence of Netleaf Hackberry (*Celtis laevigata*), Arizona Walnut (*Juglans major*), Arizona Sycamore (*Platanus wrightii*), Arizona Alder (*Alnus oblongifolia*), Velvet Ash (*Fraxinus velutina*), and others.

Numerous minor, ephemeral washes, found in Sonoran and Chihuahuan Desertscrub into semidesert grassland, do not represent entirely separate plant communities, as there is strong species overlap with surrounding uplands. However, they do represent shifts in species dominance to areas of higher density and productivity of shrub species, many of which may also be present away from washes. Xeroriparian scrubland varies in its species components regionally and with elevation, but plant density and stature are similar in this biome (Minckley and Brown 1982). The increased shelter and food availability in this habitat results in a habitat disproportionately richer than adjacent uplands, and of importance to most wildlife species that are present.

Wildlife

Lists of wildlife species that may be present along the Proposed Route were derived from regional references, online databases, and other publicly available sources of information. For species of mammals, birds, reptiles, and amphibians that may occur in the Project study area, see Table D-1, Table D-2, Table D-3, and Table D-4.

EFFECTS OF THE PROPOSED FACILITIES

Standard and selective mitigation measures that would reduce the impacts of the Project on biological resources were developed during the National Environmental Policy Act (NEPA) process and are recorded as required components of the Project Description in the Record of Decision (ROD) (Exhibit B-1). Measures that require complete avoidance of sensitive locations or seasons would be highly effective in preventing related impacts from occurring. Measures that prescribe construction practices and design features, such as surveys for sensitive species, design to minimize ground disturbance, implementation of measures to reduce the risk of bird collision, and reclamation of temporarily disturbed areas, would minimize impacts to biological resources but would not completely prevent those impacts from occurring.

Construction activities may result in temporary disturbance of wildlife due to the presence of construction equipment and human activity. Another construction-related impact is the potential for incidental injury or mortality of small animals. These impacts are anticipated to be low and short-term in duration. Development of new access roads can result in avoidance and habitat edge effects for some species, particularly small animals that require vegetation cover for their movements as protection against predation. Such narrow, linear clearings are generally more permeable for larger mammals.

Access Roads

Linear features such as access roads could fragment wildlife habitat, adversely affecting species that are reluctant to cross areas of open ground due to threat of predation. New access roads may be used by OHVs or other recreational traffic, potentially causing ongoing disturbance to wildlife. Project development will likely increase human access potential in some areas with few existing roads (particularly in the San Pedro River Valley along Links C201 and C441). Edge effects can be created by linear features, which could affect species dependent on large blocks of contiguous habitat. Edge effects may reduce the effective size of habitat blocks for those species, limiting connectivity and dispersal between blocks. Increases in edge habitat may favor some generalist species over others with narrow habitat preferences. Open areas such as access roads may be beneficial to some predators such as raptors and carnivores, due to increased prey visibility. Overall, however, impacts of linear features on wildlife are mostly negative and difficult to fully avoid. Access roads not required for Project maintenance or access will be closed and restored (Selective Mitigation Measure 4).

Transmission Lines

Groundwires, conductors, and structures present collision hazards for some birds, particularly during nocturnal migration in poor weather conditions. Large-bodied species such as cranes and geese, which cannot make abrupt course corrections when obstacles are encountered in their flight path, are also at a higher risk than most bird species. Mitigation measures to improve visibility of groundwires (Selective Mitigation Measure 15) would reduce the collision risk for large birds. This may include the use of bird diverters on groundwires and guywires, and the use of one-inch OPGW rather than one-half-inch OHGW where practicable. Although either groundwire type presents a collision risk, larger cables increase the visibility of the line and would create a lower risk than smaller cables. An Avian Protection Plan will be developed to mitigate the collision risk and loss of productivity for all birds. The mitigation measures proposed for identified areas of high collision risk would follow the recommendations of the Avian Powerline Interaction Committee (APLIC), including the application of bird diverters (APLIC 2012).

Electrical facilities may present electrocution hazards for large birds, although engineering requirements of 500 kV structures must place energy sources far enough from a potential path to ground so as to be beyond the wingspan of even the largest birds, effectively eliminating risk of electrocution from the Project itself. "Streamers" (liquid bird waste) directed from a perched bird can also present a conductive path for electricity. This risk can be reduced with design measures that prevent birds from perching on structures at locations where energized lines are placed with a short, near-vertical path to grounded components. Substations for 500 kV lines are engineered with spacing similar to transmission lines, with similarly low electrocution risk.

Nearly all vegetation communities affected by the Project are dominated by plants of relatively low stature, and a cleared or brushed right-of-way for conductor clearance and fire safety would not be required. Exceptions include riparian woodland and pine-oak woodland, and some individual trees or large shrubs in juniper savanna and xeroriparian scrubland that may require cutting. Tree cutting would be conducted to meet the National Electric Safety Code and an appropriate level of safety, but would be minimized to the extent possible (Selective Mitigation Measure 14). Under most conditions, vegetation would be allowed to attain a height of no more than 12 feet. However, site-specific conditions may allow taller vegetation to remain, such as where an opportunity exists to place structures on elevated terrain at a stream or wash crossing. Efforts to leave vegetation in place under Selective Mitigation Measure 14 would minimize impacts to wildlife habitat.

Construction Activities and Temporary Work Areas

Construction noise and human presence can result in avoidance of the vicinity of construction sites by some wildlife. Noise can require that birds expend additional energy during territorial singing, or may result in abandonment of nest sites at high noise levels. Small animals such as rodents and lizards may not be able to feasibly avoid construction areas and may be harmed during construction activities, and can experience hearing loss from high noise levels such as those generated by heavy equipment (Brattstrom and Bondello 1983).

Temporary ground disturbance would result in the loss of any vegetation and associated wildlife, although large or mobile species may successfully disperse out of work areas. However, displacement from established home ranges often lowers the survival of wildlife. Disturbed areas often facilitate the invasion of non-native plants, or the further spread of those that are already present. Invasive plants can displace native species, alter fire regimes, and may not provide suitable food sources to native wildlife. The risk of invasive plant colonization would be managed using mitigation measures included in the Noxious Weed Management Plan in the Plan of Development.

Disturbance of nesting raptors and other migratory birds may be avoided by constructing outside of nesting season (Selective Mitigation Measure 12). Mitigation measures addressing the reduction of ground disturbance and restoration of vegetation would help minimize effects to burrowing animals and ground-nesting birds such as the Western Burrowing Owl, as well as the small mammal prey base of many raptors (Selective Mitigation Measures 3, 5, and 14).

The Project would result in the removal of state protected native plant species. All species of cacti present in the Project study area, including Saguaros, are classified as salvage restricted under the Arizona Native Plant Law. Velvet Mesquite and Ironwood trees are classified as harvest restricted under the Arizona Native Plant Law. If these species are to be removed, the ADA should be notified 30 days before plants are removed or destroyed over an area greater than one acre but less than 40 acres, and 60 days before plants are removed or destroyed over an area greater than 40 acres. The Arizona State Land Department requires compensation for loss of native plants on State Trust Land.

The degree of loss or direct disturbance of vegetation at any given point in the Project is determined by the availability of existing access roads and by ground slope, with road construction on steeper slopes resulting in increased ground disturbance. Within the area of ground disturbance, loss of vegetation would be minimized by (1) reducing this area to the extent practicable (Selective Mitigation Measure 1), (2) plant salvage and revegetation in areas of temporary disturbance (Selective Mitigation Measure 5), and (3) closure and restoration of any access roads not required for Project maintenance or access (Selective Mitigation Measure 4).

Temporary "drive and crush" impacts to vegetation would occur at small areas during construction, including conductor pulling and tensioning sites, turnarounds, temporary concrete batch plants, and temporary equipment storage yards (Selective Mitigation Measure 3). Closure of temporary access roads and the limiting of access through gating or other means (Selective Mitigation Measures 4 and 6) would minimize indirect impacts to vegetation caused by recreational travel, including off-road vehicle travel beyond the Project right-of-way. All of these measures to minimize ground disturbance and aid reclamation would also minimize effects to biological soil crusts.

Offsite and Compensatory Mitigation

Committed mitigation actions for impacts to ESA-listed species and their habitat are provided in Exhibit C. SunZia is actively supporting and participating in the development of a Voluntary Migratory Bird Conservation Plan, which will include offsite mitigation actions to offset impacts to migratory bird habitat as well as measures to offset any collision mortality that may result from the Project. These actions may include habitat improvements, restoration of previously disturbed areas, the development of conservation easements, and funding research and monitoring efforts. Development of this plan was included as a stipulation in the ROD.

CONCLUSIONS

Native vegetation characteristic of the Sonoran Desert is extensive in southern Arizona. However, this vegetation community is affected by past and current landscape-scale changes such as large-scale urban and agricultural developments, alteration of ecosystem function from invasive plants and fire, and the contribution of climate change. While the Project would contribute to these changes through direct removal of habitat, the acreage of disturbance in proportion to the scale of cumulative developments is small, and the Project would not likely contribute to landscape-scale factors affecting the environment. Potential effects of the proposed project on wildlife and plants include vegetation clearing and associated habitat loss, as well as disturbance, injury, or mortality of wildlife due to construction activities. Overall, impacts to biological resources are anticipated to be low. In areas where native vegetation is cleared, there will be a permanent loss of potential habitat for small mammals, reptiles, and birds. Project vegetation mitigation measures will minimize impacts to native vegetation and enhance habitat recovery, and a construction mitigation and restoration plan will be developed to identify sensitive biological features and to delineate access. SunZia's commitment to provide compensatory mitigation for some impacts to biological resources will further reduce the total impact of the Project.

Table D-1. Mammal Species that May Occur in the Project Study Area	
Common Name *Scientific Name*	**Habitat**
Virginia Opossum *Didelphis virginiana*	Agricultural fields, forests, and urban regions.
Crawford's Gray Shrew *Notiosorex crawfordi*	Any area with ample ground cover including plant debris, trash, and lumber.
Dusky Shrew *Sorex monticolus*	Mesic willow and alder thickets, grassy stream banks, coniferous forests, and alpine tundra between approximately 4,000 and 11,000 feet in elevation.
Allen's Big-eared Bat *Idionycteris phyllotis*	Ponderosa pine, piñon-juniper woodland, and riparian woodlands. Roosts in caves and mines. Forages for insects gleaned from surfaces or in flight.
California Leaf-nosed Bat *Macrotus californicus*	Sonoran and Mohave desertscrub. Roosts in caves, mines, and rock shelters. Forages for large flying insects on the ground.
Lesser Long-nosed Bat *Leptonycteris curasoae yerbabuenae*	Desert up into oak transition. Roosts in mines and caves; feeds on cactus nectar, pollen, and fruit in summer and on agave nectar and pollen in fall.
Pocketed Free-tailed Bat *Nyctinomops femorosaccus*	Desertscrub and arid lowland habitats. Roosts in crevices in cliffs or in rocky areas. Preys on flying insects.
Big Free-tailed Bat *Nyctinomops macrotis*	Inhabits rugged, rocky country roosting in rock crevices, caves, buildings and tree holes. Feeds primarily on large moths but will take other insects.
Cave Myotis *Myotis velifer*	Roosts primarily in mines or caves in xeric habitats. Requires a permanent water source near roost sites; may also utilize bridges or buildings for roosts.
Yuma Myotis *Myotis yumanensis*	Riparian woodland, desertscrub, and woodlands. Roosts in caves, mines, attics, buildings, and underneath bridges. Forages for insects over water.
California Myotis *Myotis californicus*	Desertscrub with rock faces. Roosts in crevices, occasionally caves and mines. Preys on insects.
Fringed Myotis *Myotis thysanodes*	Mid-elevation habitats from deserts and grasslands to woodlands. Wide range of roost sites. Captures small insects in flight.
Long-Legged Myotis *Myotis Volans*	Coniferous forests, riparian woodlands, and desertscrub. Roosts in buildings, crevices, and beneath loose bark. Hibernates in caves and mines.
Southwestern Myotis *Myotis auriculus*	Primarily an arid woodland inhabitant, such as ponderosa pine. Little is known of their roosting habits. Moths are the primary food source.
Western Bonneted Bat *Eumops perotis*	Sonoran desertscrub adjacent to cliffs. Roosts in rock crevices; requires a 10-foot vertical drop to launch flight. Forages for insects at considerable heights.
Western Yellow Bat *Lasiurus xanthinus*	Associated primarily with palm trees, although they will use riparian gallery forests. Forages for flying insects.
Western Red Bat *Lasiurus blossevillii*	Riparian gallery forests. Roosts in trees, occasionally leafy shrubs. Forages for insects in open areas.
Mexican Long-tongued Bat *Choeronycteris mexicana*	Semidesert grasslands and woodlands. Roosts in caves, crevices, and mines. Forages for insects as well as nectar, pollen, and fruit of columnar cacti.
Spotted Bat *Euderma maculatum*	Roosts in rock crevices and cracks in cliff faces, over a wide elevation range but often near water. Forages for flying insects, primarily moths.
Townsend's Big-eared Bat *Corynorhinus townsendii*	Desertscrub, piñon-juniper woodland, and other coniferous woodlands. Roosts in caves, mines, and buildings. Captures small insects in flight.
Western Pipistrelle *Pipistrellus hesperus*	Areas with canyon walls or cliff faces for roosting, streambeds and tanks for foraging.
Big Brown Bat *Eptesicus fuscus*	Ponderosa pine forest, piñon-juniper woodlands, and desertscrub. Uses a wide range of roost sites. Preys on beetles and moths.
Hoary Bat *Lasiurus cinereus*	Mixed deciduous-coniferous forests and woodlands. Roosts among foliage in trees. Preys on a variety of insects.

Table D-1. Mammal Species that May Occur in the Project Study Area

Common Name *Scientific Name*	**Habitat**
Pallid Bat *Antrozous pallidus*	Desertscrub and evergreen woodlands. Roosts in caves, mines, cliffs, and bridges. Preys on ground-dwelling insects.
Brazilian Free-tailed Bat *Tadarida brasiliensis*	Desertscrub and foothills. Roosts in mines, caves, bridges, rock crevices and old buildings. Captures small insects in flight.
Silver-haired Bat *Lasionycteris noctivagans*	Broad-leafed riparian woodlands. Roosts in exfoliating bark on large trees. Preys on insects while flying.
Desert Cottontail *Sylvilagus audubonii*	Desertscrub, semi-desert grassland.
Eastern Cottontail *Sylvilagus floridanus*	Agriculture fields, forest edges, and prairies.
Black-tailed Jackrabbit *Lepus californicus*	Desertscrub and other areas with open ground cover.
Antelope Jackrabbit *Lepus alleni*	Creosote bush flats, grassy mesas with mesquite trees.
American Beaver *Castor canadensis*	Swamps, lakes, rivers, and streams in wooded areas.
Harris' Antelope Squirrel *Ammospermophilus harrisii*	Rocky areas of creosote bush/saltbush/bursage.
Rock Squirrel *Spermophilus variegatus*	Rocky areas above 1,600 feet.
Arizona Gray Squirrel *Sciurus arizonensis*	Mixed deciduous forests in canyon bottoms. Usually associated with walnut, oak, or alder.
Round-tailed Ground Squirrel *Spermophilus tereticaudus*	Creosote bush/saltbush desert with sandy or gravelly soil.
Spotted Ground Squirrel *Spermophilus spilosoma*	Sparsely vegetated, dry grasslands and deserts with sandy soils.
Cliff Chipmunk *Tamias dorsalis*	Sagebrush hills, juniper woodlands, and montane forests.
Botta's Pocket Gopher *Thomomys bottae*	Any area with soil suitable for digging burrows from sea level to above timberline.
Southern Pocket Gopher *Thomomys umbrinus*	Rocky, shallow soil in oak woodland between 3,000 and 5,000 feet in elevation.
Arizona Pocket Mouse *Perognathus amplus*	Desertscrub.
Silky Pocket Mouse *Perognathus flavus*	Lowland grassy bajadas.
Hispid Pocket Mouse *Chaetodipus hispidus*	Grassy areas in plains and deserts with sandy soils.
Rock Pocket Mouse *Chaetodipus intermedius*	Rocky slopes.
Chihuahuan Pocket Mouse *Chaetodipus eremicus*	Sandy, sparsely vegetated areas of desertscrub.
Desert Pocket Mouse *Chaetodipus penicillatus*	Sandy areas of desertscrub with sparse vegetation.
Bailey's Pocket Mouse *Chaetodipus baileyi*	Flats and lower slope areas of desertscrub.

Table D-1. Mammal Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Northern Pygmy Mouse *Baiomys taylori*	Semi-desert grasslands and agriculture fields with dense ground cover.
Banner-tailed Kangaroo Rat *Dipodomys spectabilis*	Semidesert grasslands with scattered shrubs; often associated with hard soils with high gravel content.
Merriam's Kangaroo Rat *Dipodomys merriami*	Sandy areas of desertscrub.
Desert Kangaroo Rat *Dipodomys deserti*	Areas with friable sand such as washes, or wind-blown sands stabilized by creosote bush or other vegetation.
Ord's Kangaroo Rat *Dipodomys ordii*	Dry grasslands, desertscrub, piñon-juniper woodlands, and sagebrush shrublands with find sandy soils.
American Deer Mouse *Peromyscus maniculatus*	Occupies a wide range of habitats ranging from boreal forests and tundra to deserts and prairies.
Plains Harvest Mouse *Reithrodontomys montanus*	Desertscrub or chaparral.
Fulvous Harvest Mouse *Reithrodontomys fulvescens*	Semidesert grasslands and agriculture fields.
Western Harvest Mouse *Reithrodontomys megalotis*	Desertscrub or chaparral.
Brush Mouse *Peromyscus boylii*	Densely vegetated woodlands and shrublands with rocks and fallen trees.
Northern Rock Deermouse *Peromyscus nasutus*	Rocky outcrops and talus slopes in piñon-juniper woodlands at higher elevations.
Cactus Mouse *Peromyscus eremicus*	Desertscrub, rocky areas, chaparral.
Mesquite Mouse *Peromyscus merriami*	Dense mesquite and salt-bush lowlands.
Chihuahuan Grasshopper Mouse *Onychomys arenicola*	Sparsely vegetated low desert on gravelly or rocky soils. Dominant plants include Creosote Bush, Tarbush, and Snakeweed.
Northern Grasshopper Mouse *Onychomys leucogaster*	Deserts, grasslands, and shrub-steppe with sparse vegetation and sandy soils.
Southern Grasshopper Mouse *Onychomys torridus*	Desertscrub or semi-desert grassland with compact soil.
White-footed Mouse *Peromyscus leucopus*	Mixed deciduous forests, agriculture fields and semi-desert grasslands.
Hispid Cotton Rat *Sigmodon hispidus*	Densely vegetated areas within tall-grass prairies, meadows, agriculture fields, and roadsides.
Arizona Cotton Rat *Sigmodon arizonae*	Mesquite scrub and weedy areas along canals and washes.
Tawny-bellied Cotton Rat *Sigmodon fulviventer*	Densely vegetated areas in mesquite grasslands and piñon-juniper woodlands.
Yellow-nosed Cotton Rat *Sigmodon ochrognathus*	Rocky, sparsely vegetated slopes in foothills and mountains.
White-throated Wood Rat *Neotoma albigula*	Areas below the conifer belt, especially with Prickly Pear or Paloverde.
Brown Rat *Rattus norvegicus*	Grain fields, salt marshes and urban areas. Introduced, non-native species.

Table D-1. Mammal Species that May Occur in the Project Study Area

Common Name *Scientific Name*	**Habitat**
Roof Rat *Rattus rattus*	Strongly associated with human development, but may stray into open woodlands. Introduced, non-native species.
House Mouse *Mus musculus*	Cultivated fields, in or at the edges of towns in rural areas. Introduced, non-native species.
North American Porcupine *Erethizon dorsatum*	Deciduous and mixed coniferous forests and acacia stands along desert washes.
Coyote *Canis latrans*	Cosmopolitan, from spruce forest to low desert. Tolerant of urban areas and human presence.
Kit Fox *Vulpes macrotis*	Desertscrub and desert grassland with sandy or softer clay soils.
Gray Fox *Urocyon cinereoargenteus*	Open desertscrub, chaparral, lower elevation woodland.
American Black Bear *Ursus americanus*	Mixed coniferous forests, interior chaparral, and occasionally desertscrub.
Ringtail *Bassariscus astutus*	Dry, rocky, or mountainous areas with scattered oaks and conifers.
Northern Raccoon *Procyon lotor*	Occupies a wide range of habitats, from wetlands and mesic woodlands to urban areas.
White-nosed Coati *Nasua narica*	Mountainous riparian woodlands and desertscrub located in canyons.
Western Spotted Skunk *Spilogale gracilis*	Open woods, canyons, and agriculture fields.
Striped Skunk *Mephitis mephitis*	Open woods, deserts, and agriculture fields, as well as urban environments.
Hooded Skunk *Mephitis macroura*	Densely vegetated areas along streams, canyons, desert washes, and shrublands.
American Hog-nosed Skunk *Conepatus leuconotus*	Ranges from mesquite shrublands to dry, rocky slopes in canyons. Also found in agriculture fields.
Long-tailed Weasel *Mustela frenata*	Open forests, meadows, and agriculture fields.
American Badger *Taxidea taxus*	Flats and drainages adjacent to mountains, grasslands.
Mountain Lion *Puma concolor*	Almost any area that provides prey.
Jaguar *Panthera onca*	Occurs in a wide range of habitats up to subalpine forest in the Southwest, often near water. Critical habitat designated outside of Project area.
Bobcat *Lynx rufus*	Rocky upland areas interspersed with open desert, grassland, or woodland.
Ocelot *Leopardus pardalis*	Dense thorny chaparral with high prey populations.
Collared Peccary *Pecari tajacu*	Desertscrub and up to approximately 6,500 feet; washes and brushy hillsides; shelter in mine adits.
White-tailed Deer *Odocoileus virginianus*	Variable vegetative communities as long as adequate cover and forage are available.
Mule Deer *Odocoileus hemionus*	Semi-desert grasslands, desertscrub and dry coniferous forests.

Table D-1. Mammal Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Pronghorn *Antilocapra americana*	Open grasslands and sagebrush deserts.
Source: Hoffmeister 1986; Reid 2006	

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Eared Grebe *Podiceps nigricollis*	Lakes and ponds. May nest within Project area.
Clark's Grebe *Aechmophorus clarkii*	Lakes, ponds, and lagoons. Migrates though Project area.
Western Grebe *Aechomophorus occidentalis*	Open, deep water lakes and bays. Winters within Project area.
Pied-billed Grebe *Podilymbus podiceps*	Shallow ponds and marshes with emergent vegetation. Nests within the Project area.
American White Pelican *Pelecanus erythrorhynchos*	Shallow, protected water. Migrates through the Project area.
Brown Pelican *Pelecanus occidentalis*	Primarily coastal habitats; occasionally inland at large water bodies. Rare migrant within the Project area.
Double-crested Cormorant *Phalacrocorax auritus*	Lakes, ponds, streams, and aqueducts. Nests within the Project area.
American Bittern *Botaurus lentiginosus*	Freshwater habitats with dense emergent vegetation. Winters within the Project area.
Least Bittern *Ixobrychus exilis*	Marshy wetlands with dense, tall emergent vegetation. Nests within the Project area.
Black-crowned Night-heron *Nycticorax nycticorax*	Freshwater swamps, marshes, and ponds with emergent vegetation. May nest within the Project area.
Green Heron *Butorides virescens*	Streams, ponds, or marshes that include edge canopy. May nest within the Project area.
Cattle Egret *Bubulcus ibis*	Pastures, weedy fields, along weedy irrigation ditches. May nest within the Project area.
Snowy Egret *Egretta thula*	Marshes, drainage ditches, wetlands. May nest within the Project area.
Great Egret *Ardea alba*	Wetland habitats including marshes, drainage ditches, and ponds. Nests within the Project area.
Great Blue Heron *Ardea herodias*	Rivers, streams, lakes, reservoirs, canals, and agricultural fields. Nests within the Project area.
White-faced Ibis *Plegadis chihi*	Any open water source. Migrates through the Project area.
Mallard *Anas platyrhynchos*	Lakes, ponds, streams, and canals. Nests within Project area.
Gadwall *Anas strepera*	Shallow fresh water. Winters within the Project area.
Cinnamon Teal *Anas cyanoptera*	Ponds, streams, and canals. Nests within Project area.
Green-winged Teal *Anas crecca*	Shallow ponds, marshes, and flooded fields. Winters within the Project area.
Northern Pintail *Anas acuta*	Shallow ponds and marshes with emergent vegetation. Winters within the Project area.
American Wigeon *Anas americana*	Freshwater lakes and ponds; may graze in fields. Winters within the Project area.
Northern Shoveler *Anas clypeata*	Shallow, weedy or grassy ponds. Winters within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Redhead *Aythya americana*	Lakes and ponds. May nest within Project area.
Ring-necked Duck *Aythya collaris*	Ponds and rivers, often near trees. Winters within the Project area.
Lesser Scaup *Aythya affinis*	Ponds, lakes, and protected bays. Winters within the Project area.
Bufflehead *Bucephala albeola*	Open lakes, harbors, and bays. Winters within the Project area.
Common Merganser *Mergus merganser*	Deep, clear lakes and rivers. Winters within the Project area.
Hooded Merganser *Lophodytes cucullatus*	Wetlands, streams, and rivers. Winters within the Project area.
Ruddy Duck *Oxyura jamaicensis*	Lakes and ponds. Nests within Project area.
Black-bellied Whistling-duck *Dendrocygna autumnalis*	Wetland and riparian areas. May nest within Project area.
Wood Duck *Aix sponsa*	Sheltered ponds, rivers, and swamps; usually stays near emergent vegetation. May winter within the Project area.
Canvasback *Aythya valisineria*	Marshes and ponds. Winters within the Project area.
Snow Goose *Chen caerulescens*	Roosts on sheltered water and forages on agriculture fields. May winter within the Project area.
Ross's Goose *Chen rossii*	Roosts on sheltered water and forages on agriculture fields. May winter within the Project area.
Turkey vulture *Cathartes aura*	Open country, woodlands, farms. May nest within the Project area.
Black Vulture *Coragyps atratus*	Sonoran desertscrub with abundant trees. May nest within the Project area.
Osprey *Pandion haliaetus*	Lakes, rivers, and estuaries. Perches in trees, poles, and towers. Migrates through the Project area.
White-tailed Kite *Elanus leucurus*	Open grasslands with scattered shrubs. May nest within the Project area.
Northern Harrier *Circus cyaneus*	Wetlands, grasslands, and fallow agricultural fields. Winters within the Project area.
Common Black Hawk *Buteogallus anthracinus*	Gallery forest habitats with tall trees along shallow permanent streams and rivers with clear water. Nests within the Project area.
Ferruginous Hawk *Buteo regalis*	Healthy, arid grasslands and adjacent agriculture fields. Winters within the Project area.
Harris's Hawk *Parabuteo unicinctus*	Semi-arid woodland and desertscrub. Nests within the Project area.
Gray Hawk *Buteo plagiatus*	Riparian deciduous forest and adjacent open lands. Nests within the Project area.
Red-tailed Hawk *Buteo jamaicensis*	Plains, prairie groves, desert. Nests within the Project area.
Swainson's Hawk *Buteo swainsoni*	Prairies and agriculture fields. May nest within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area

Common Name *Scientific Name*	Habitat
Cooper's Hawk *Accipiter cooperii*	Broken woodlands or streamside groves. Nests within the Project area.
Sharp-shinned Hawk *Accipiter striatus*	Mixed coniferous forests; forages along forest edges, hedgerows, and urban areas. Winters within Project area.
Zone-tailed Hawk *Buteo albonotatus*	Foothill canyons with permanent streams and open woodland. Nests within the Project area.
Bald Eagle *Haliaeetus leucocephalus*	Undisturbed foraging/nesting areas. Commonly found adjacent to lakes, reservoirs, and perennial rivers. Winters in Project area.
Golden Eagle *Aquila chrysaetos*	Inhabits open, mountainous, or hilly terrain. Nests within the Project area.
American Kestrel *Falco sparverius*	Open country, cities. Nests within the Project area.
Peregrine Falcon *Falco peregrinus*	Areas of topographic relief such as cliffs and canyons, usually near water. May nest within Project area.
Prairie Falcon *Falco mexicanus*	Dry, open country; prairies. May nest within the Project area.
Crested Caracara *Caracara cheriway*	Sonoran desertscrub. Rare migrant within the Project area.
Merlin *Falco columbarius*	Open forests. Winters within the Project area.
Mississippi Kite *Ictinia mississippiensis*	Riparian woodlands and adjacent open lands. Nests within the Project area.
Gambel's Quail *Callipepla gambelii*	Desert scrublands and thickets. Nests within Project area.
Montezuma Quail *Cyrtonyx montezumae*	Arid, grassy slopes with scattered oaks and yuccas. May nest within Project area.
Scaled Quail *Callipepla squamata*	Semidesert grasslands. Nests within Project area.
Wild Turkey *Meleagris gallopavo*	Open woodlands with clearings and agriculture fields. May nest within Project area.
Virginia Rail *Rallus limicola*	Freshwater wetlands with dense emergent vegetation. May nest within the Project area.
Yuma Clapper Rail *Rallus longirostris yumanensis*	Fresh and brackish water marshes. May nest within the Project area.
Sora *Porzana carolina*	Most freshwater habitats with dense emergent vegetation. Winters within the Project area.
Common Gallinule *Gallinula galeata*	Lakes and pond with abundant emergent vegetation. Year-round resident within the Project area.
Sandhill Crane *Grus canadensis*	Winters in large flocks on open grasslands and agriculture fields and roosts in shallow waters. Winters within the Project area.
Common Moorhen *Gallinula chloropus*	Lowland marshes and other freshwater habitats with emergent vegetation. Nests within the Project area.
American Coot *Fulica americana*	Lakes, ponds, streams, and marshes. Nests within the Project area.
Killdeer *Charadrius vociferus*	Open terrain, not always associated with shores; disturbed ground; agricultural areas. Nests within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Semipalmated Plover *Charadrius semipalmatus*	Open mudflats and beaches. Migrates through the Project area.
Mountain Plover *Charadrius montanus*	Shortgrass prairies often associated with prairie-dog colonies. Winters within the Project area.
American Avocet *Recurvirostra americana*	Open, shallow bodies of water. May nest within the Project area.
Black-necked Stilt *Himantopus mexicanus*	Shallow, open waters of treatment plants and ponds. May nest within the Project area.
Greater Yellowlegs *Tringa melanoleuca*	Shallow water and mudflats. May winter within the Project area.
Lesser Yellowlegs *Tringa flavipes*	Shallow water and mudflats with scattered emergent vegetation. Migrates through the Project area.
Solitary Sandpiper *Tringa solitaria*	Small freshwater mudflats and ponds with emergent vegetation. Migrates through the Project area.
Spotted Sandpiper *Actitis macularius*	Any manmade or natural aquatic habitat. Winters within the Project area.
Western Sandpiper *Calidris mauri*	Mudflats and sandy beaches. Migrates through the Project area.
Least Sandpiper *Calidris minutilla*	Mudflats with scattered vegetation. Migrates through the Project area.
Baird's Sandpiper *Calidris bairdii*	Mudflats and adjacent short-grass fields. Migrates through the Project area.
Stilt Sandpiper *Calidris himantopus*	Shallow muddy ponds and flooded fields. Migrates through the Project area.
Willet *Tringa semipalmata*	Open beaches and mudflats. Migrates through the Project area.
Long-billed Curlew *Numenius americanus*	Wetlands; fallow agricultural fields. Winters within the Project area.
Long-billed Dowitcher *Limnodromus scolopaceus*	Shallow muddy pools and freshwater ponds. Winters within the Project area.
Wilson's Snipe *Gallinago delicata*	Most damp to shallow wet habitats with adjacent vegetation. May winter within the Project area.
Wilson's Phalarope *Phalaropus tricolor*	Shallow ponds and grassy marshes. Migrates through the Project area.
Ring-billed Gull *Larus delawarensis*	Lakes, ponds, and rivers. Migrates through the Project area.
Bonaparte's Gull *Larus delawarensis*	Uses various wetlands and bodies of water during migration. Migrates through the Project area.
Franklin's Gull *Larus delawarensis*	Uses various wetlands and bodies of water during migration. Migrates through the Project area.
California Gull *Larus delawarensis*	Uses large bodies of water during migration, often forages in urban areas and near landfills. Migrates through the Project area.
Forster's Tern *Sterna forsteri*	Open water and marshes. Migrates through the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Black Tern *Chlidonias niger*	Marshes and ponds; roosts on sandbars. Migrates through the Project area.
Rock Pigeon *Columba livia*	Towns, parks, agricultural landscapes; associated with human developments. May nest within the Project area.
Band-tailed Pigeon *Patagioenas fasciata*	Mixed conifer forests with an abundance of oak. May nest within the Project area.
Eurasian Collared-dove *Streptopelia decaocto*	Associated with human development. Non-native, invasive species.
Mourning Dove *Zenaida macroura*	Wide variety of habitats. Nests within the Project area.
White-winged Dove *Zenaida asiatica*	Habitat generalists. Nests within the Project area.
Inca Dove *Columbina inca*	Associated with urban and rural human developments. May nest within the Project area.
Common Ground-dove *Columbina passerina*	Open or brushy areas near washes. May nest within the Project area.
Ruddy Ground-dove *Columbina talpacoti*	Irrigation canals, ponds, and other open and edge habitats associated with human developments. Rarely present within the Project area.
Yellow-billed Cuckoo *Coccyzus americanus*	Mature, native riparian woodlands. May nest within the Project area. Critical habitat proposed within Project area.
Greater Roadrunner *Geococcyx californianus*	Scrub desert and mesquite groves, less common in chaparral and oak woodland. Nests within the Project area.
Barn Owl *Tyto alba*	Open country; nests in embankments, mine adits, buildings, bridges, and other locations. Nests within the Project area.
Northern Saw-whet Owl *Aegolius acadicus*	Mature mixed-coniferous and deciduous forests. May winter in Project area.
Whiskered Screech-owl *Megascops trichopsis*	Oak woodlands. May nest within the Project area.
Western Screech-owl *Megascops kennicottii*	Open woodlands, streamside groves, deserts, suburban areas. Nests within the Project area.
Great Horned Owl *Bubo virginianus*	Common in wide variety of habitats. Nests within the Project area.
Elf owl *Micrathene whitneyi*	Desert lowlands, canyons, foothills. Nests within the Project area.
Flammulated Owl *Psiloscops flammeolus*	Mixed coniferous forests with scattered oaks; often associated with ponderosa pine. May migrate through Project area.
Northern Pygmy-Owl *Glaucidium gnoma*	Madrean evergreen-oak woodlands. May nest within Project area.
Burrowing Owl *Athene cunicularia*	Open country, golf courses, and airports. Nests within the Project area.
Cactus Ferruginous Pygmy-Owl *Glaucidium brasilianum cactorum*	Ironwood and saguaro forest, or along riparian corridors. Nests within the Project area.
Mexican Spotted Owl *Strix occidentalis lucida*	Dense coniferous forest and steep-walled canyons. May nest within the Project area. Critical habitat designated outside Project area.
Lesser Nighthawk *Chordeiles acutipennis*	Dry, open country, scrubland, desert. Nests within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area

Common Name *Scientific Name*	**Habitat**
Common Nighthawk *Chordeiles minor*	Open environments including clearings, ponds, and urban areas. May nest within the Project area.
Common Poorwill *Phalaenoptilus nuttallii*	Occurs in a wide range of vegetation communities in arid and semi-arid country. May nest within the Project area.
Buff-collared Nightjar *Antrostomus ridgwayi*	Dry, brushy, desert washes. May nest within the Project area.
Mexican Whip-poor-will *Antrostous arizonae*	Open mixed-coniferous woodland. May nest within the Project area.
White-throated Swift *Aeronautes saxatalis*	In or near areas with steep canyon walls or cliffs. Nests within the Project area.
Black-chinned Hummingbird *Archilochus alexandri*	Habitat generalists in lowlands and low mountains. Nests within the Project area.
Broad-tailed Hummingbird *Selasphorus platycercus*	Dry, montane-coniferous forests with openings such as groves, meadows, and riparian thickets. May nest within the Project area.
Rufous Hummingbird *Selasphorus rufus*	Mountain meadows and riparian habitats. Migrates through the Project area.
Allen's Hummingbird *Selasphorus sasin*	Lowland riparian habitats. Migrates through the Project area.
Anna's Hummingbird *Calypte anna*	Coastal lowlands, mountains, deserts. Nests within the Project area.
Costa's Hummingbird *Calypte costae*	Desert washes, dry chaparral. Nests within the Project area.
Violet-crowned Hummingbird *Amazilia violiceps*	Riparian woodlands. Nests in cottonwoods and sycamores.
Lucifer Hummingbird *Calothorax lucifer*	Desertscrub with an abundance of agaves. May nest within the Project area.
Broad-billed Hummingbird *Cynanthus latirostris*	Riparian woodlands and wooded canyons. May nest within the Project area.
White-eared Hummingbird *Hylocharis leucotis*	Mixed coniferous forests with scattered oaks. Rare migrant through the Project area.
Blue-throated Hummingbird *Lampornis clemenciae*	Moist, shady canyons in mixed coniferous and deciduous forests; commonly associated with sycamores. May nest within the Project area.
Magnificent Hummingbird *Eugenes fulgens*	Montane pine-oak forests; also utilizes sycamore dominated canyons. May nest within the Project area.
Elegant Trogon *Trogon elegans*	Riparian areas in extreme southeastern Arizona.
Belted Kingfisher *Megaceryle alcyon*	Sheltered, open water. Winters within the Project area.
Gila Woodpecker *Melanerpes uropygialis*	Towns, scrub desert, cactus country, streamside woods. Nests within the Project area.
Acorn Woodpecker *Melanerpes formicivorus*	Open mixed coniferous forests with an abundance of oaks. May nest within the Project area.
Ladder-backed Woodpecker *Picoides scalaris*	Dry shrublands; mesquite and cactus country; towns and rural areas. Nests within the Project area.
Arizona Woodpecker *Picoides arizonae*	Foothill oak woodlands. May nest within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name *Scientific Name*	**Habitat**
Hairy Woodpecker *Picoides villosus*	Mature forests, winters in piñon-juniper woodlands. Winters in Project area.
Williamson's Sapsucker *Sphyrapicus thyroideus*	Ponderosa pine forests. Winters within Project area.
Red-naped Sapsucker *Sphyrapicus nuchalis*	Lowland riparian forests. Winters within Project area.
Gilded Flicker *Colaptes chrysoides*	Sonoran Desert upland; favors Saguaro forests. Nests within Project area.
Northern Flicker *Colaptes auratus*	Riparian woodlands. May nest within the Project area.
Black Phoebe *Sayornis nigricans*	Rivers, streams, canals, ponds, reservoirs, and other aquatic habitats. Nests within the Project area.
Say's Phoebe *Sayornis saya*	Dry, open areas; canyons, cliffs. Nests within the Project area.
Greater Pewee *Contopus pertinax*	Montane mixed coniferous forests and shaded canyons. May nest within the Project area.
Western Wood-pewee *Contopus sordidulus*	Mature mixed-deciduous forests. May nest within the Project area.
Cordilleran Flycatcher *Empidonax occidentalis*	Shaded coniferous forests and Madrean evergreen/sycamore woodlands. May nest within the Project area.
Hammond's Flycatcher *Empidonax hammondii*	Mixed coniferous forests. Winters within the Project area.
Dusky Flycatcher *Empidonax oberholseri*	Brushy patches of forest clearings. Winters within Project area.
Gray Flycatcher *Empidonax wrightii*	Sagebrush shrublands within arid piñon-juniper woodlands. Winters in Project area.
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Dense riparian thickets. May nest within Project area. Critical habitat designated within the Project area.
Vermilion Flycatcher *Pyrocephalus rubinus*	Streamside shrubs, bottomlands; near small wooded ponds. Nests within the Project area.
Ash-throated Flycatcher *Myiarchus cinerascens*	Wide variety of habitats. Nests within the Project area.
Brown-crested Flycatcher *Myiarchus tyrannulus*	Saguaro desert, riparian woodlands, groves, and low elevation woodlands. Nests within the Project area.
Sulphur-bellied Flycatcher *Myiodynastes luteiventris*	Riparian woodlands; commonly associated with sycamores. May breed within the Project area.
Western Kingbird *Tyrannus verticalis*	Dry, open country. Nests within the Project area.
Cassin's Kingbird *Tyrannus vociferans*	Mixed coniferous forests with interspersed meadows. Nests within the Project area.
Thick-billed Kingbird *Tyrannus crassirostris*	Lowland riparian woodlands. May nest within the Project area.
Tropical Kingbird *Tyrannus melancholicus*	Lowland riparian woodlands and urban areas. Nests within the Project area.
Northern Beardless-Tyrannulet *Camptostoma imberbe*	Lowland riparian woodlands. Nests within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area

Common Name *Scientific Name*	Habitat
Loggerhead Shrike *Lanius ludovicianus*	Open and relatively flat habitats with thorny trees and shrubs. Nests within the Project area.
Western Scrub-jay *Aphelocoma californica*	Piñon-juniper woodlands. Nests within the Project area.
Mexican Jay *Aphelocoma wollweberi*	Montane pine-oak woodlands. Nests within the Project area.
Steller's Jay *Cyanocitta stelleri*	Mature coniferous forests as well as piñon-juniper woodlands. May nest within the Project area.
Chihuahuan Raven *Corvus cryptoleucus*	Grasslands and desert flats. Nests within the Project area.
Common Raven *Corvus corax*	Mountains, deserts, coastal areas. Nests within the Project area.
Bell's Vireo *Vireo bellii*	Riparian areas, especially in mesquite trees. Nests within the Project area.
Gray Vireo *Vireo vicinior*	Arid, open vegetative communities with junipers. Nest within the Project area.
Plumbeous Vireo *Vireo plumbeus*	Open ponderosa pine and mixed conifer woodlands. May nest within the Project area.
Cassin's Vireo *Vireo cassinii*	Mixed coniferous woodlands. Migrates through the Project area.
Warbling Vireo *Vireo gilvus*	Riparian woodlands. May nest within the Project area.
Hutton's Vireo *Vireo huttoni*	Mixed oak-conifer woodlands. Nests within the Project area.
Horned Lark *Eremophila alpestris*	Habitat generalists in areas with open, barren ground. Nests within the Project area.
Northern Rough-winged Swallow *Stelgidopteryx serripennis*	Banks of streams and canals, streams, ponds, and lakes. Nests within the Project area.
Cliff Swallow *Petrochelidon pyrrhonota*	Lakeside, cliffs, and canals; nesting under nearby bridges, buildings, and other overhangs; streams and ponds. May nest within the Project area.
Barn Swallow *Hirundo rustica*	Variety of open habitats; nest on bridges, buildings, culverts, etc; require access to mud for nest building. Nests within the Project area.
Violet-green Swallow *Tachycineta thalassina*	Open habitats; nest in tree cavities and cliff crevices. Nests within the Project area.
Purple Martin *Progne subis*	Sonoran desertscrub in the presence of saguaros. Nests within Project area.
Juniper Titmouse *Baeolophus ridgwayi*	Arid piñon-juniper woodlands. May nest within the Project area.
Bridled Titmouse *Baeolophus wollweberi*	Piñon-juniper and oak woodlands. Nests within the Project area.
Bushtit *Psaltriparus minimus*	Interior chaparral. Nests within the Project area.
Verdin *Auriparus flaviceps*	Southwestern desert. Nests within the Project area.
White-breasted Nuthatch *Sitta carolinensis*	Piñon-juniper woodlands and mixed coniferous forests. Nests in Project area.

Table D-2. Bird Species that May Occur in the Project Study Area

Common Name / ***Scientific Name***	**Habitat**
Pygmy Nuthatch *Sitta pygmaea*	Mixed coniferous forests. May nest within the Project area.
Brown Creeper *Certhia americana*	Tall montane coniferous forests; will utilize piñon-juniper woodlands. May nest within Project area.
Cactus Wren *Campylorhynchus brunneicapillus*	Desertscrub habitats. Nests in Project area.
Bewick's Wren *Thryomanes bewickii*	Dense, brushy habitats from mesquite thickets to chaparral and riparian thickets. Nests in Project area.
Rock Wren *Salpinctes obsoletus*	Rocky habitats in canyons, open hillsides, talus slopes. Nests within Project area.
Canyon Wren *Catherpes mexicanus*	Rocky habitats in canyons, open hillsides, cliffs. Nests within Project area.
House Wren *Troglodytes aedon*	Dense, brushy areas. May nest within Project area.
Marsh Wren *Cistothorus palustris*	Marshes of cattails, tules, or reeds. Winters within Project area.
Ruby-crowned Kinglet *Regulus calendula*	Woodlands, thickets. Winters within Project area.
Black-tailed Gnatcatcher *Polioptila melanura*	Desert, especially washes. Nests within the Project area.
Blue-gray Gnatcatcher *Polioptila caerulea*	Interior chaparral and arid piñon-juniper woodlands. Nests within the Project area.
Townsend's Solitaire *Myadestes townsendi*	Winters in piñon-juniper woodlands with abundant fruit. Winters within the Project area.
Northern Mockingbird *Mimus polyglottos*	Variety of habitats. Nests within the Project area.
Mountain Bluebird *Sialia currucoides*	Winters in piñon-juniper woodlands, desertscrub, and agriculture fields. Winters within the Project area.
Western Bluebird *Sialia mexicana*	Mixed coniferous forests with open grassy patches and occasionally in urban environments such as parks. May nest within the Project area.
Hermit Thrush *Catharus guttatus*	Mixed coniferous forests with brushy understories. Nests within the Project area.
American Robin *Turdus migratorius*	Any open woodland habitat. May nest within the Project area.
Bendire's Thrasher *Toxostoma bendirei*	Desertscrub and brushy grasslands. Nests within the Project area.
Curve-Billed Thrasher *Toxostoma curvirostre*	Cholla deserts and suburban areas. Nests within the Project area.
Crissal Thrasher *Toxostoma crissale*	Tall, dense brush and shrub thickets. Nests within the Project area.
Sage Thrasher *Oreoscoptes montanus*	Sagebrush shrublands; as well as shrub-steppe. Winters within the Project area.
Le Conte's Thrasher *Toxostoma lecontei*	Sparsely vegetated low elevation Sonoran Desert. May nest within Project area.
Phainopepla *Phainopepla nitens*	Riparian areas, especially in trees with mistletoe. Nests within Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
European Starling *Sturnus vulgaris*	Generally distributed. Non-native, invasive species. Nests within the Project area.
American Pipit *Anthus rubescens*	Expansive open prairies, fields, and beaches. Winters within the Project area.
Sprague's Pipit *Anthus spragueii*	Open, healthy grasslands. May winter within Project area.
Cedar Waxwing *Bombycilla cedrorum*	Winters in open woodlands with abundant fruit, including urban environments. Winters within the Project area.
Chestnut-collared Longspur *Calcarius ornatus*	Short grass prairies. Winters within the Project area.
Lucy's Warbler *Oreothlypis luciae*	Mesquite and cottonwood along water courses and xeric washes. Nests within the Project area.
Grace's Warbler *Setophaga graciae*	Pine and mixed-pine forests. Nests within the Project area.
Orange-crowned Warbler *Oreothlypis celata*	Winters in brushy habitats, including interior chaparral, open woodlands, desertscrub, and urban environments. Winters within the Project area.
MacGillivray's Warbler *Geothlypis tolmiei*	Dense thickets in riparian woodlands and piñon-juniper woodlands. May nest within the Project area.
Virginia's Warbler *Oreothlypis virginiae*	Dense, brushy undergrowth of open piñon-juniper woodlands. Nests within the Project area.
Yellow Warbler *Setophaga petechia*	Riparian thickets. Nests within the Project area.
Yellow-rumped Warbler *Setophaga coronata*	Brushy undergrowth of piñon-juniper woodlands, as well as riparian thickets. Nests and winters within Project area.
Black-throated Gray Warbler *Setophaga nigrescens*	Pine-oak woodlands. Nests within the Project area.
Hermit Warbler *Setophaga occidentalis*	Mixed coniferous forests. Migrates through the Project area.
Townsend's Warbler *Setophaga townsendi*	Mixed coniferous forests with an oak understory. Migrates through the Project area.
Wilson's Warbler *Cardellina pusilla*	Riparian thickets, especially willows. Migrates through the Project area.
Red-faced Warbler *Cardellina rubrifons*	Montane pine-oak forests in shaded canyons, as well as shaded riparian woodlands. May nest within the Project area.
Common Yellowthroat *Geothlypis trichas*	Thick, low vegetation in damp areas. Nests within the Project area.
Painted Redstart *Myioborus pictus*	Pine-oak forests in mountain canyons. May nest within the Project area.
Yellow-breasted Chat *Icteria virens*	Dense thickets and brush. Nests within the Project area.
Canyon Towhee *Melozone fuscus*	Sonoran desertscrub. Nests within the Project area.
Abert's Towhee *Melozone aberti*	Riparian areas, suburban areas. Nests within the Project area.
Green-tailed Towhee *Pipilo chlorurus*	Dense brush; in lowlands in winter. Winters within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Spotted Towhee *Pipilo maculatus*	Chaparral, shrub-steppe, riparian thickets, and oak stands in piñon-juniper woodlands. Nests within the Project area.
Rufous-winged Sparrow *Peucaea carpalis*	Habitats with scattered shrubs and trees in Sonoran Desert and semi-desert grasslands. Nests within the Project area.
Rufous-crowned Sparrow *Aimophila ruficeps*	Brushy hillsides with outcrops, scattered trees, low shrubs, and grasses. Nests within the Project area.
Cassin's Sparrow *Peucaea cassinii*	Semidesert grasslands. Nests within the Project area.
Chipping Sparrow *Spizella passerina*	Brushy edges and riparian areas.
Baird's Sparrow *Ammodramus bairdii*	Uninterrupted, arid, grasslands.
Grasshopper Sparrow *Ammodramus savannarum*	Semidesert grasslands with scattered shrubs. Winters in Project area.
Black-chinned Sparrow *Spizella atrogularis*	Chaparral located on arid hillsides. Nests within the Project area.
Brewer's Sparrow *Spizella breweri*	Deserts, field edges, and suburban areas. Winters within Project area.
Clay-colored Sparrow *Spizella pallida*	Desertscrub. Migrates through Project area.
Sagebrush Sparrow *Artemisiospiza nevadensis*	Sagebrush shrublands and arid shrub-steppe. Winters within Project area.
Savannah Sparrow *Passerculus sandwichensis*	Semidesert grasslands, marshes, and agriculture fields. Winters within Project area.
Lark Sparrow *Chondestes grammacus*	Brushy, weedy areas, riparian areas, and field edges. Nests within Project area.
Song Sparrow *Melospiza melodia*	Dense undergrowth near water. Nests within Project area.
Lincoln's Sparrow *Melospiza lincolnii*	Upland grasslands near riparian areas. Winters within Project area.
Swamp Sparrow *Melospiza georgiana*	Fallow agriculture fields adjacent to water. Winters within the Project area.
Vesper sparrow *Pooecetes gramineus*	Habitat generalists. Winters within Project area.
Black-throated Sparrow *Amphispiza bilineata*	Desertscrub. Nests in Project area.
White-crowned Sparrow *Zonotrichia leucophrys*	Suburban, riparian, and other brushy areas. Winters within the Project area.
White-throated Sparrow *Zonotrichia albicollis*	Mixed coniferous-deciduous forests. Winters within the Project area.
Dark-eyed Junco *Junco hyemalis*	Open woodlands including urban environments. Winters within Project area.
Yellow-eyed Junco *Junco phaeonotus*	Open, montane coniferous forests, Madrean evergreen woodlands, and sycamore dominated canyons. May nest within the Project area.
Northern Cardinal *Cardinalis cardinalis*	Woodland edges, swamps, streamside thickets, suburban gardens. Nests within the Project area.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Pyrrhuloxia *Cardinalis sinuatus*	Thorny brush, mesquite thickets, desert, woodland edges, ranchlands. Nests within the Project area.
Black-headed Grosbeak *Pheucticus melanocephalus*	Open woodlands including deciduous and mixed conifer-deciduous forests. May nest within the Project area.
Blue Grosbeak *Passerina caerulea*	Riparian areas and mesquite bosques. Nests within the Project area.
Lark Bunting *Calamospiza melanocorys*	Semidesert grasslands and desertscrub. Winters within the Project area.
Lazuli Bunting *Passerina amoena*	Weedy and shrubby areas along irrigation ditches and other bodies of water and suburban areas. Winters within Project area, may nest.
Varied Bunting *Passerina versicolor*	Dense mesquite bosques. May nest within the Project area.
Indigo Bunting *Passerina cyanea*	Riparian thickets, fallow agriculture fields and other shrubby areas. May nest within the Project area.
Hepatic Tanager *Piranga flava*	Montane mixed-coniferous forests with an oak understory. May nest within the Project area.
Summer Tanager *Piranga rubra*	Mature riparian woodlands. Nests within the Project area.
Western Tanager *Piranga ludoviciana*	Mixed coniferous forests. May nest within the Project area.
Western Meadowlark *Sturnella neglecta*	Fields and other open areas; deserts. May nest within the Project area.
Eastern Meadowlark *Sturnella magna*	Expansive grasslands. Nests within the Project area.
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*	Marshy areas with emergent vegetation. Winters within the Project area.
Red-winged Blackbird *Agelaius phoeniceus*	Emergent vegetation in wetland habitats; including irrigated agricultural lands. Nests within the Project area.
Great-tailed Grackle *Quiscalus mexicanus*	Open areas with reliable water sources; including agricultural and urbanized areas. Nests within the Project area.
Brewer's Blackbird *Euphagus cyanocephalus*	Open habitats; gregarious. Winters within the Project area.
Brown-headed Cowbird *Molothrus ater*	Habitat generalists; common in human modified environments. Nests within the Project area.
Bronzed Cowbird *Molothrus aeneus*	Rural and urban areas. May nest within the Project area.
Bullock's Oriole *Icterus bullockii*	Riparian woodlands. Nests within the Project area.
Scott's Oriole *Icterus parisorum*	Arid scrub and open woodland landscapes. Nests within the Project area.
Hooded Oriole *Icterus cucullatus*	Open woodlands often adjacent to fan palms. Nests within the Project area.
House Finch *Haemorhous mexicanus*	Riparian and suburban areas, farmland, desert. Nests within the Project area.
Pine Siskin *Spinus pinus*	Open mixed-coniferous forests. Winters within the Project area, may nest.

Table D-2. Bird Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Lesser Goldfinch *Carduelis psaltria*	Riparian areas. Nests within the Project area.
American Goldfinch *Spinus tristis*	Orchards, hedgerows, overgrown fields and gardens. Winters within the Project area.
Lawrence's Goldfinch *Spinus lawrencei*	Riparian corridors and piñon-juniper grasslands. Winters within the Project area.
House Sparrow *Passer domesticus*	Associated with human presence. Introduced non-native. Nests within the Project area.
Sources: Corman and Wise-Gervais 2005; Sibley 2014	

Table D-3. Reptile Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Spiny Softshell *Apalone spinifera*	Rivers, urban lakes, and irrigation canals – introduced from eastern United States.
Sonoran Desert Tortoise *Gopherus morafkai*	Bajadas, hillsides, mountain slopes, and canyons in desertscrub and semidesert grasslands. Requires moderately firm soils for burrows.
Yellow Mud Turtle *Kinosternon flavescens*	Chihuahuan desertscrub and semidesert grassland near permanent sources of water.
Sonora Mud Turtle *Kinosternon sonoriense*	Rocky streams, creeks, rivers, ponds, cattle tanks and ditches within Sonoran desertscrub through woodlands.
Desert Ornate Box Turtle *Terrapene ornate luteola*	Low valleys, plains, and gentle bajadas within semidesert grassland and Chihuahuan desertscrub.
Madrean Alligator Lizard *Elgaria kingii*	Riparian woodlands, semidesert grasslands, interior chaparral, montane coniferous forests.
Desert Iguana *Dipsosaurus dorsalis*	Creosote bush desert to subtropical scrub, most common in sandy habitats, also along rocky streambeds, on bajadas, floodplains, and clay soils.
Common Chuckwalla *Sauromalus ater*	Rocky habitats such as boulder piles, outcrops, and lava fields.
Eastern Collared Lizard *Crotaphytus collaris*	Desertscrub, grasslands, interior chaparral, and mixed woodlands.
Long-nosed Leopard Lizard *Gambelia wislizenii*	Arid and semi-arid areas with bunchgrass, alkali bush, sagebrush, creosote bush, or other low plants; ground may be hardpan, gravel, or sand.
Zebra-tailed Lizard *Callisaurus draconoides*	Frequents washes, desert pavements of small rocks, and hardpan.
Greater Earless Lizard *Cophosaurus texanus*	Sonoran desertscrub, semidesert grassland, interior chaparral, and mixed conifer woodland.
Elegant Earless Lizard *Holbrookia elegans*	Semidesert grassland, grasslands, and Madrean evergreen woodland.
Common Lesser Earless Lizard *Holbrookia maculata*	Semidesert grassland, interior chaparral, and woodlands.
Long-tailed Brush Lizard *Urosaurus graciosus*	Lower Colorado River and Mojave desertscrub; brushy habitats along drainages and also on valley flats.
Ornate Tree Lizard *Urosaurus ornatus*	Frequents mesquite, oak, pine, juniper, alder, cottonwood, and non-native trees; also may occur in treeless areas, especially attracted to river courses.
Common Side-blotched Lizard *Uta stansburiana*	Arid or semi-arid regions with sand, rock, hardpan, or loam with grass, shrubs, and scattered trees; often found along sandy washes.
Desert Spiny Lizard *Sceloporus magister*	Arid and semi-arid regions on plains and lower slopes of mountains, found in most desertscrub habitats and associated riparian areas.
Twin-spotted Spiny Lizard *Sceloporus bimaculosus*	Chihuahuan desertscrub and semidesert grassland.
Clark's Spiny Lizard *Sceloporus clarkii*	Riparian corridors and foothills in desertscrub, semidesert grassland, interior chaparral, and woodlands.
Great Plains Skink *Plestiodon obsoletus*	Semidesert grassland, interior chaparral, Madrean evergreen woodland, and mixed coniferous woodlands. Strongly associated with mesic habitat.
Regal Horned Lizard *Phrynosoma solare*	Frequents rocky and gravelly slopes in desertscrub and desert grasslands.
Texas Horned Lizard	Playas, low valleys, gentle bajadas in desertscrub communities.

Phrynosoma cornutum	
Goode's Horned Lizard *Phrynosoma goodei*	Sonoran desertscrub on flat, open areas with sandy or loamy soil.
Greater Short-horned Lizard *Phrynosoma hernandesi*	Semidesert grassland, grassland, interior chaparrall, and mixed coniferous forests.
Round-tailed Horned Lizard *Phrynosoma modestum*	Chihuahuan desertscrub and semidesert grassland in valleys, bajadas, and low foothills.
Southwestern Fence Lizard *Sceloporus cowlesi*	Chihuahuan desertscrub, semidesert grassland, and Madrean evergreen woodland.
Plateau Fence Lizard *Sceloporus tristichus*	Low valleys, grassy plains, bajadas, foothills, and rocky canyons in a variety of biotic communities.
Tiger Whiptail *Aspidoscelis tigris*	Inhabits deserts and semi-arid habitats, usually where plants are sparse; also found in woodland, streamside growth, and in warmer, drier forests.
Arizona Striped Whiptail *Aspidoscelis arizonae*	Semidesert grassland and Chihuahuan desertscrub; commonly associated with sandy flatlands.
Chihuahuan Spotted Whiptail *Aspidoscelis exsanguis*	Madrean evergreen woodland and semidesert grassland.
Gila Spotted Whiptail *Aspidoscelis flagellicauda*	Interior chaparral, Madrean evergreen woodland and mixed conifer forests.
Sonoran Spotted Whiptail *Aspidoscelis sonorae*	Semidesert grassland, desertscrub, mixed coniferous forest, and Madrean evergreen woodland.
Desert Grassland Whiptail *Aspidoscelis uniparens*	Primarily inhabits semidesert grassland, but may follow drainages up into interior chaparral and woodland communities.
Canyon Spotted Whiptail *Aspidoscelis burti*	Canyons and drainages within mountainous terrain in semidesert grassland, desertscrub, and Madrean evergreen woodland.
Western Banded Gecko *Coleonyx variegatus*	Resident of desertscrub communities.
Mediterranean House Gecko *Hemidactylus turcicus*	Introduced non-native urban gecko.
Gila Monster *Heloderma suspectum*	Canyon bottoms and washes in desert or desert grassland.
New Mexico Threadsnake *Rena dissectus*	Chihuahuan desertscrub, semidesert grassland, and lower reaches of Madrean evergreen woodland.
Western Threadsnake *Rena humilis*	Inhabits elevations from desertscrub up to chaparral; primarily nocturnal.
Sonoran Coralsnake *Micruroides euryxanthus*	Ranges from Sonoran desertscrub up through at least semi-desert grassland elevations; primarily nocturnal.
Tucson Shovel-nosed Snake *Chionactis occipitalis klauberi*	Dunes or washes in the Lower Colorado subdivision of the Sonoran Desert.
Variable Sandsnake *Chilomeniscus stramineus*	Arizona Upland desertscrub, but may occur at lower elevations along drainages.
Western Groundsnake *Sonora semiannulata*	Inhabit elevations from Lower Colorado River desertscrub up into woodland habitats.
Smith's Black-headed Snake *Tantilla hobartsmithi*	Arizona Upland desertscrub to Great Basin Conifer Woodland.
Plains Black-headed Snake *Tantilla nigriceps*	Chihuahuan desertscrub, semidesert grassland, and Madrean evergreen woodland.
Chihuahuan Nightsnake *Hypsiglena jani*	Sonoran desertscrub, Chihuahuan desertscrub, grasslands, and montane coniferous forests.

Desert Nightsnake *Hypsiglena chlorophaea*	Inhabits Lower Colorado Subdivision Sonoran Desert up into Petran Montane Conifer Forest; crepuscular to nocturnal.
Sonoran Lyresnake *Trimorphodon lambda*	Desertscrub, semidesert grassland, interior chaparral, Madrean evergreen woodland, and montane coniferous forest.
Gophersnake *Pituophis catenifer*	Nearly all terrestrial habitats from mountains to low desert and coastal areas.
Glossy Snake *Arizona elegans*	Below 6,000 feet in sparsely vegetated woodland, chaparral, grassland, or desertscrub with loose soil.
Spotted Leaf-nosed Snake *Phyllorhynchus decurtatus*	Open desert with finer loose soils, especially creosote bush.
Saddled Leaf-nosed Snake *Phyllorhynchus browni*	Usually an Arizona Upland desertscrub dweller of alluvial soils or bajadas, but may be present on flats of Lower Colorado River desertscrub.
Desert Patch-nosed Snake *Salvadora hexalepis*	Piñon–juniper woodland to low deserts on variety of soil types.
Mexican Hog-nosed Snake *Heterodon kennerlyi*	Semidesert grassland and Chihuahuan desertscrub with loose, well-drained soil.
Ring-necked Snake *Diadophis punctatus*	Desertscrub into montane coniferous forests.
Striped Whipsnake *Coluber taeniatus*	Interior chaparral, grasslands, desertscrub, and mixed conifer forests.
Chihuahuan Hook-nosed Snake *Gyalopion canum*	Chihuahuan desertscrub and semidesert grassland.
Sonoran Whipsnake *Coluber bilineatus*	Inhabits Arizona Upland Sonoran desertscrub and up into Great Basin Conifer Woodland and Madrean Evergreen Woodland.
Coachwhip *Coluber flagellum*	Sparsely vegetated areas from juniper woodland to low desert.
Long-nosed Snake *Rhinocheilus lecontei*	Desertscrub, prairie, tropical woodland to 5,500 feet.
California Kingsnake *Lampropeltis californiae*	Inhabits elevations from desertscrub up to lower portions of Great Basin Conifer Woodland and Madrean Evergreen Woodland.
Checkered Gartersnake *Thamnophis marcianus*	Desertscrub up to semi-desert grassland; moist environments; expanding in areas where irrigation and cattle tanks provide habitat.
Black-necked Gartersnake *Thamnophis cyrtopsis*	Sonoran desertscrub, semidesert grassland, interior chaparral, Madrean evergreen woodland, grassland, and montane coniferous forest.
Northern Mexican Gartersnake *Thamnophis eques megalops*	Riparian obligate inhabiting aquatic sites with dense vegetation across a wide elevation range.
Arizona Black Rattlesnake *Crotalus cerberus*	Semidesert grassland, interior chaparral, Madrean evergreen woodland, and montane coniferous forest.
Western Diamondback Rattlesnake *Crotalus atrox*	Wide range of habitats below 7,000 feet; predominantly nocturnal.
Mohave Rattlesnake *Crotalus scutulatus*	Desertscrub and semi-desert grassland habitats; predominantly nocturnal.
Black-tailed Rattlesnake *Crotalus molossus*	Occurs over a wide range of elevations from Lower Colorado River Subdivision desertscrub up to Petran Subalpine Conifer Forest.
Sidewinder *Crotalus cerastes*	Desertscrub elevations; flat, open desert in the presence of sandy or loamy soils; predominantly in stabilized aeolian sands.
Tiger Rattlesnake *Crotalus tigris*	Foothills and lower mountains in Arizona Upland desertscrub up into Madrean Evergreen Woodland.
Sources: Brennan and Holycross 2009; Brennan 2012; Stebbins 2003.	

Table D-4. Amphibian Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Couch's Spadefoot *Scaphiopus couchii*	Frequents shortgrass plains, mesquite savannah, creosote bush desert, thornscrub, tropical deciduous forest, and other areas of low rainfall.
Plains Spadefoot *Spea bombifrons*	Open country in grasslands, piñon-juniper woodlands, and Great Basin Desert.
Mexican Spadefoot *Spea multiplicata*	Desertscrub and semidesert grasslands.
Red-spotted Toad *Anaxyrus punctatus*	Occurs from Lower Colorado River desertscrub up to Petran Montane Conifer Forest; creeks, washes, rocky hillsides, cattle tanks.
Woodhouse's Toad *Anaxyrus woodhousii*	Desertscrub, woodland, and agricultural habitats.
Great Plains Toad *Anaxyrus cognatus*	Inhabits valley bottoms in prairies or deserts, often breeding after heavy rains in summer in shallow temporary pools or quiet streams.
Sonoran Desert Toad *Incilius alvarius*	Ranges from arid lowlands and arid grasslands into riparian mountain canyons, often found near permanent water.
Green Toad *Anaxyrus debilis*	Valleys and bajadas in semidesert grasslands and Chihuahuan desertscrub.
Barred Tiger Salamander *Ambystoma mavortium*	Still or sluggish waters of ponds, cattle tanks, backwaters and lakes in open country.
American Bullfrog *Lithobates catesbeianus*	Highly aquatic, remaining in or near permanent standing water. Introduced, invasive species.
Canyon Treefrog *Hyla arenicolor*	Canyons and arroyos along rocky intermittent or permanent streams.
Lowland Leopard Frog *Lithobates yavapaiensis*	Large rivers, streams, cienegas, and manmade structures such as cattle tanks, agricultural canals and ditches within piñon-juniper woodlands.
Sources: Brennan and Holycross 2009; Brennan 2012; Stebbins 2003.	

Table D-4. Fish Species that May Occur in the Project Study Area	
Common Name ***Scientific Name***	**Habitat**
Longfin Dace *Agosia chrysogaster*	Variable habitats ranging from low-desert streams to cool brooks at high elevations. Generally occupy streams with sandy or gravelly bottoms.
Red Shiner *Cyprinella lutrensis*	Occupies a variety of habitats and can thrive in waters of high turbidity, high temperatures, and intermittency. Non-native, invasive.
Yellow Bullhead *Ameiurus natalis*	Clear water with a rocky substrate. Non-native.
Green Sunfish *Lepomis cyanellus*	Warm water lakes and streams. Prefers rocky substrate and piles of rubble. Non-native.
Fathead Minnow *Pimephales promelas*	Occupies a variety of habitats and can thrive in waters of high turbidity and low oxygen. Non-native.
Western Mosquitofish *Gambusia affinis*	Shallow waters protected from larger fish. Non-native.
Common Carp *Cyprinus carpio*	Large bodies of slow moving or standing water. Non-native.
Black Bullhead *Ameiurus melas*	Stagnant or slow moving waters. Non-native.
Sources: Minckley and Marsh 2009.	

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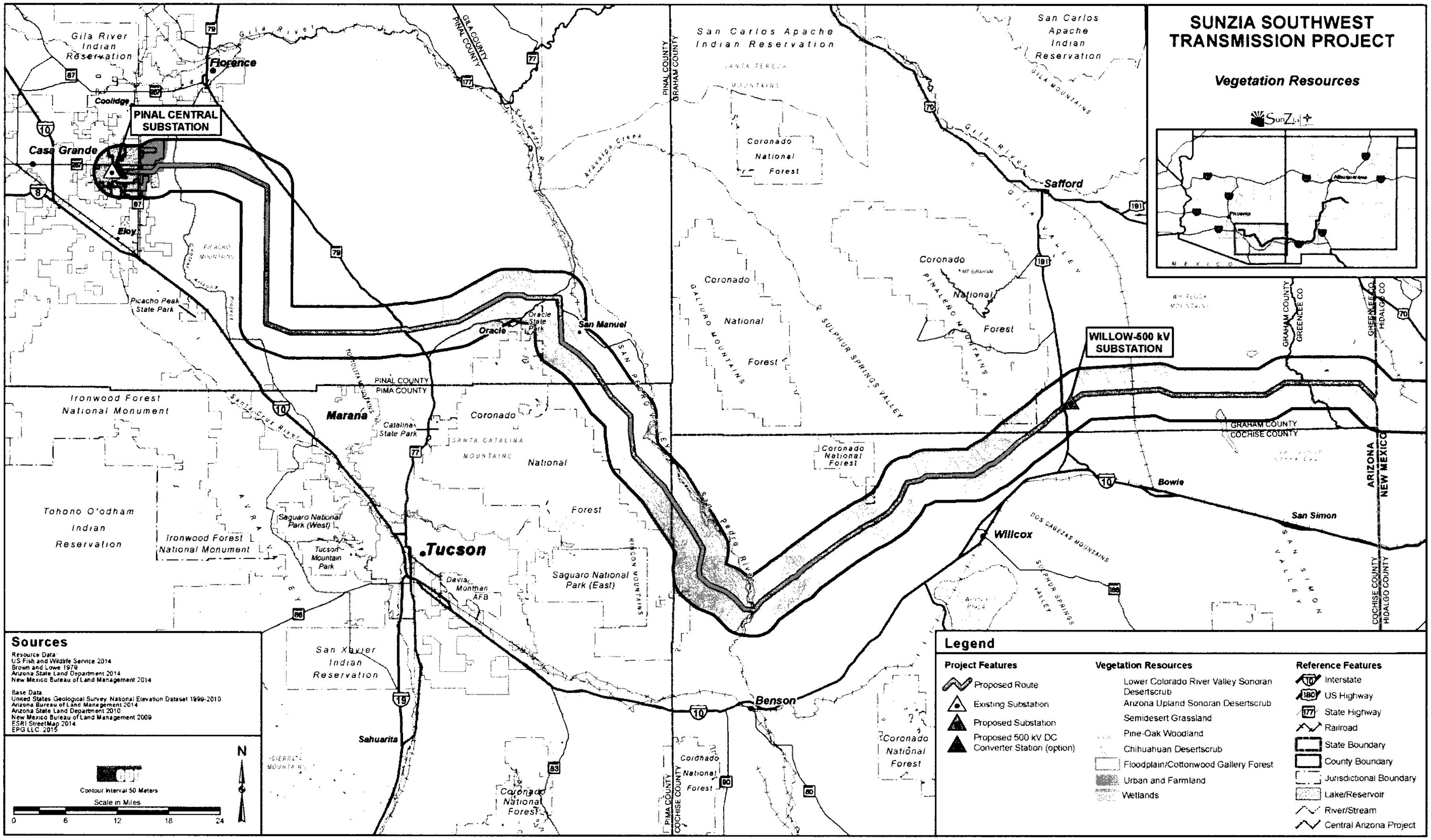

Figure D-1. Vegetation Resources

Exhibits E

EXHIBIT E – SCENIC AREAS, HISTORIC SITES AND STRUCTURES, AND ARCHAEOLOGICAL SITES

Pursuant to the ACC Rules of Practice and Procedure R14-3-219, applications for CECs shall include information required as exhibits. Exhibit E reads as follows:

"Describe any existing scenic areas, historic sites and structures or archaeological sites in the vicinity of the proposed facilities and state the effects, if any, the proposed facilities will have thereon."

EXHIBIT E-1 SCENIC AREAS

Exhibit E1 includes summaries of existing scenic resources, as well as the potential impacts the proposed Project may have on each resource.

Introduction

This section of Exhibit E addresses the inventory and potential impacts on scenic (visual) resources. In the context of CEC regulations regarding "scenic areas", the following features were identified and inventoried based on public comment as described in the SunZia Southwest Environmental Impact Statement (EIS) (Exhibit B-1), existing resource management plans, agency scoping, field investigations, and previous National Environmental Policy Act (NEPA)/siting studies. Scenic areas were characterized and described by assessing scenery and sensitive viewers in context with the construction and operation of the SunZia Southwest Transmission Project. The following are key elements, including inventory methodology, landscape scenery inventory, sensitive viewer inventory, impact methodology, scenery impacts, sensitive viewer impacts, and substations within the visual four-mile-wide study corridor.

Methodology

The methods used to conduct the visual inventory are consistent with and based on the Bureau of Land Management (BLM)'s Visual Resource Management (VRM) Manual (BLM 1986), the SunZia Southwest Transmission Project EIS, and past visual resource studies conducted for similar projects that have been approved by the state siting committee. The visual assessment study area was focused within a four-mile-wide corridor (two miles on either side of the reference centerline of the transmission line route and boundary of the substation siting area). The visual resources inventory was conducted on all land regardless of jurisdiction, including public, state, and private land that may be affected by the Project within the study area. Visual resource data collected within the Project study area was based on aerial photographs, topographic maps, planning documents, consultation with participating agencies, and field investigations. This data was reviewed and an inventory was conducted to determine the quality of scenery, sensitive viewers and associated viewing conditions. Following are specific processes used to inventory scenery and sensitive viewers.

Landscape Scenery

In the context of this Project, scenery is a measure of the inherent aesthetic value of the landscape (scenery) based on existing landscape features, including landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications (BLM VRM 8400 Series). This definition of scenery was based on, and is consistent with, BLM scenic quality concepts. In determining scenery, discreet landscape units were inventoried by the BLM using GIS within each affected BLM Field Office based on similarities of the landscape features. This data provided adequate coverage within the context of the four-mile-wide Visual Resource study corridor. Generally, landscapes with a greater diversity of landscape features receive a higher rating. Scenic quality rankings for landscape units include three categories: Class A (outstanding), B (above average), and C (common). Please refer to Exhibit A-1, Existing Land Use, for link and milepost references.

Sensitive Viewers

The term *sensitive viewers* refers to specific user groups associated with various land uses that are associated with viewers that have a sensitivity to landscape change and therefore could be affected by the construction and operation of the proposed Project. The sensitivity rating for each sensitive viewer is based on the following five criteria: type of use, volume of use, duration of use, concern for aesthetics, and formal scenic or historic designations. The results of the sensitivity assessment for each identified sensitive viewer can be found in the SunZia FEIS (Exhibit B-1). Sensitive viewers identified within the study area include residences, recreation areas (including trails), and travel routes. Sensitive viewer data was collected within the Project study area based on aerial photographs, planning documents, consultation with participating agencies, and field investigations. Sensitive viewer data was updated for the CEC Application in summer 2015.

High sensitivity viewers (residences, recreation areas, and scenic travel routes) are typically sensitive to changes in the landscape due to longer viewing duration and high expectations for aesthetics. Moderate sensitivity viewers are those that have concern for landscape change but are in transit (e.g. highway and county roads) or the use is not focused on aesthetics (such as off highway vehicle (OHV) users in Hot Well Dunes Recreation Area). Viewing conditions include consideration for distance from a Project, visibility, and viewer elevation.

Inventory Results

Landscape Character

The Project is located within the Sonoran Desert subdivisions of the Basin and Range Province (Fenneman 1931). The Sonoran Desert subdivision is characterized by mountain ranges and intervening desert plains; however, the ranges are smaller, rock pediments are much more prevalent, and undrained basins are less general than those typically characterized by the Basin and Range Province, such as in Nevada. Mountain ranges in the Project area include the Tortolita, Rincon, Santa Catalina, Galiuro, and Pinaleño Mountains. Major ecosystems in the Project area include Palo Verde-Mixed Cacti Desertscrub basins, Chihuahuan semidesert grasslands, semi-arid hills, and piñon-juniper woodland foothills and mixed evergreen forests (Brown 1982a).

Regional landscapes have a range of developed and natural landscapes. More intact and natural appearing landscapes occur in the central portion of the Project area. Topography and vegetation associated with the Pinaleño, Galiuro, and the Santa Catalina mountains, and the San Pedro River Valley provide a more diverse landscape than the surrounding valley plains, which are relatively flat and often uniformly covered with creosote or desert grasslands.

Agricultural activities such as irrigated agriculture occur within the valley plain landscapes in northern Cochise County and southern Pinal County in the Project area.

Scenery Inventory

The majority of the project is located in Class B scenery crossing approximately 134 miles with 64 miles crossing Class C landscapes and one mile of Class A associated with the San Pedro River.

Class B scenery was identified along the Proposed Route in the San Simon (links B160c), Pinaleño Foothills (Link C71 and C110) and the San Pedro Valleys (links C201, C441, and C450), and the Tortolita Foothills (Link C680, C818). These landscapes are characterized by moderately to highly dissected bajadas covered with a wide range of vegetation, including desert cacti, piñon-juniper and oak, and riparian species. Cultural modifications that have locally modified landscapes associated with Class B scenery within these landscapes include high voltage transmission lines (HVTL) (500 kV and 115 kV), pipelines, substations, mining operations, major transportation corridors (e.g., SR 77 & SR 79), local transportation routes, and unpaved roads.

Agricultural lands that associated with the Sulphur Springs Valley north of Willcox (Link C110) and north of Eloy near the Pinal Central Substation (links C880 and C880A) are representative of

Class B lands that exhibit a unique agrarian setting in the arid southwest. Cultural modifications that have locally modified these landscapes include HVTLs (500 kV and 345 kV), Pinal Central Substation, local transportation routes, unpaved roads, and development associated with the agriculture processing facilities north of Eloy.

Class C landscapes crossed by the Proposed Route are associated with the San Simon and Sulphur Springs Valleys and plains south of the Galiuro Mountains (links B160b, B170, C110 and C260, respectively), and in the creosote dominated Upland Sonoran Desert north of the Picacho Mountains (links C670 to C830). Cultural modifications that have locally modified landscapes associated with Class C include HVTLs (500 kV and 345 kV), pipelines, and paved and unpaved roads.

A limited area of Class A landscape crossed by the Proposed Route is associated with the San Pedro River (link 201). These landscapes are characterized by the meandering form of the San Pedro River and the diverse riparian vegetation that is adjacent to and interwoven within the river itself. Cultural modifications that have locally modified landscapes associated with Class A scenery include HVTLs (345 kV), local transportation routes, and unpaved roads.

Sensitive Viewer Inventory

Visual Sensitivity reflects the degree of concern for change in the scenic quality of the natural landscape or existing conditions from a sensitive viewpoint in the study area. Sensitive viewers identified within the study area include residential, recreation, and travel route viewers as described below.

Residential

Concentrations of residential viewers, which are associated with a high sensitivity level, are located north of Willox in the San Manuel and Oracle area (including Saddlebrooke Ranch), and north Eloy along links C110, C450, C670, C680, and C880a. In these locations, there are residences that occur in close proximity to existing HVTL corridors. Smaller residential concentrations are located in Cascabel along links C261 and C201, Redington (Link C441) and west of Oracle (Link C680). Dispersed low-density rural residences are located in proximity to the aforementioned towns.

Recreation

Sensitive recreation viewers associated with the Project include Wilderness Areas, Areas of Critical Environmental Concern (ACEC), National Forest Lands, state park, trails, golf courses, OHV areas, and dispersed recreation. High sensitivity level recreation viewers include portions of the Peloncillo Mountains Wilderness (including Peloncillo Mountains Wilderness Study Area [WSA] (Link B160b), the Hot Wells Dune OHV area (Link B160b), the Rincon Mountains Wilderness (Links C201 and C441), Oracle State Park (including Bellota Trail Loop, Granite Overlook Trail Loop, Manzanita Trail, Mariposa Trail, Nature Trail Loop, Wildlife Corridor Trail, and the Historic Kannally Ranch House) (Link C670), and the Arizona Trail Trailhead (Tiger Mine) and associated trail (Link C661). Moderate sensitivity level recreation viewers include the Northern Peloncillo Mountains ACEC (Link B160b), portions of the Coronado National Forest (Link C441), A7 Ranch (C441), San Manuel Golf Club, Saddlebrooke Ranch Golf Club, and Pinal County Fairgrounds near links C441, C450, C680, and C880a, respectively.

Travel Routes

Travel routes with associated scenic, historic, and/or auto tour route designations include Redington Road (Link C441), Control Road (Mount Lemmon Highway FR 38) (Link C661), SR 77, and SR 79 (Pinal Pioneer Parkway). Moderate sensitivity level travel routes include portions of I-10 and US Routes 191 and 287, Fort Grant Road, Three Links Road, Cascabel Road (Link 261), Ocotillo Road, and SR 76 (San Pedro River Road) (Link C441). Moderate sensitivity level recreation access/four-wheel drive roads include Muleshoe Ranch Road (link C260), Black Hills Mine Road/Catalina Ridge (Link C450), and Buehman Canyon Trail.

Impact Methodology

The purpose of the visual impact assessment was to identify and characterize the level of visual change to the landscape and views from sensitive viewers that would result from the construction and operation of the Proposed Route. The following text describes the process used to measure visual contrast and associated visual impacts in context with landscape scenery and sensitive viewers.

Impacts to scenery were assessed based on the scenic quality of the landscape in conjunction with the proposed project's anticipated visual contrast. Visual contrast is defined as the degree of perceived change that would occur in the landscape as a result of the construction, operation, and maintenance of the Proposed Route. In the context of the Project, visual contrast was assessed considering (1) landscape contrast – removal of vegetation (i.e., agricultural crops, orchards, and riparian) in order to prepare the right-of-way for Project access, and to construct and maintain Project facilities, and (2) structure contrast – the introduction of aboveground facilities into the landscape.

Impacts to sensitive viewers were assessed based upon (1) level of visual contrast as previously described (i.e., new line, co-located, or parallel existing linear features), (2) distance from the Project, (3) viewing condition, (4) visibility (screened or backdropped views), and (5) viewer sensitivity (high or moderate). Generally, for sensitive viewers, as distance from the Project increases, the perception of visual contrast decreases. For this study, Project-specific distance zones were established based on visibility thresholds specific to 500 kV transmission line facilities. Visibility is the perception of form, line, color, texture, and other visual elements in the landscape. These elements become less detailed and obvious as distance from a viewpoint increases.

Impacts are anticipated to be highest where new structures are introduced into the landscape for residential viewers with unobstructed views of the Project within the immediate foreground distance zone. Residences with similar viewing conditions would have reduced impacts where the Project would be co-located with or parallel existing transmission lines, because structure contrast is reduced.

Impact Results

Scenery Impacts

Scenery impacts for the Proposed Route are predominantly Moderate to Moderate-High for Class B landscapes, Low for Class C, and Moderate-High for approximately one mile of Class A landscape associated with the San Pedro River crossing.

Moderate to Moderate-High impacts for Class B landscape were identified in the San Simon (links B160c), the San Pedro Valleys (links C201, C441, and C450), and the Tortolita Foothills (Link C680, C818). These impacts are anticipated to occur within the bajada landscapes where the terrain is moderately dissected and does not parallel existing transmission lines.

Low-moderate impacts are anticipated to occur within Class B scenery where the Project parallels existing transmission lines (Links C71, C110, C212, C260, C680, and C880a). Low-moderate to Low impacts would also occur within Class C scenery associated with valley plains (Links B160b, C110, C260, and C860). Low impacts to Class C scenery are anticipated where the Project would parallel existing transmission lines or pipeline facilities.

Residential

The majority of impacts for residential viewers range from Moderate to Low where the Project is located adjacent to existing transmission lines. In these locations, contrast would be reduced because existing access roads would be used for construction. These residences are located north of Willcox, in the San Manuel and Oracle area, including Saddlebrooke Ranch (refer to simulation Figures G-4-3 and G-4-6 in Exhibit G), and north of Eloy along links C110, C450, C670, C680, and C880a. Moderate to Low impacts were also identified for the smaller residential concentrations associated with Cascabel and Redington (along links C261 and C201 and Link C441, respectively) and west of Oracle (Link C680). In these locations, the Proposed Project is located over two miles away with partially screened views.

Moderate impacts are anticipated for dispersed residences south of San Manuel (Link C450 and C441).These impacts are based primarily on distance from the Project to the viewer in context with rolling hills which would partially screen the Project. Moderate-High to Moderate impacts are anticipated in limited areas where residences are within 0.5 miles of the Project with partial screening based on topography and vegetation (Rosendo Road residence).

Dispersed residences in agricultural lands north of Willcox and Eloy would have level foreground views of the Project (links C110 and C880a, respectively). However, the Project would be seen in context with existing transmission lines, resulting in Moderate impacts. Moderate-High impacts would occur in limited situations where residences are located between the Proposed Route and existing facilities.

Future Residences

The Saddlebrooke Ranch subdivision is expected to expand with an ultimate build-out north of the Proposed Route. Effects are anticipated to be Moderate for high-sensitivity viewers in the future expansion.

Recreation

High impacts are anticipated for users of the Arizona National Scenic Trail near the Tiger Mine Trailhead northeast of Oracle (refer to simulation Figure G-4-5 in Exhibit G, Link C670). The Project would cross the trail in rolling terrain with unobstructed views of the Proposed Project. Moderate-high to moderate impacts are anticipated for recreation viewers using Buehman Canyon Trail (Link 441) and nearby A7 Ranch. In this location, the Project would be visible within one mile of the trail in a landscape with few modifications. High to Moderate impacts are also anticipated for recreation access and dispersed users of the Hot Wells Dune OHV Recreation Area, respectively (Link B160b). Impacts are anticipated to range from Low-moderate to low for dispersed recreation users associated with portions of the Peloncillo Mountains Wilderness (including Peloncillo Mountains WSA (Link B160b), the Rincon Mountains Wilderness (Links C201 and C441) and Coronado National Forest (and associated trails/trailheads) (Link C450). For this region of the Project, views would occur in the background (beyond two miles) and would be screened and backdropped by local topography and vegetation, further reducing visibility. Low-moderate to low impacts are anticipated for high sensitivity viewers at Oracle State Park (and associated trails/visitor areas) and Saddlebrooke Ranch Golf Club (refer to simulation Figure G-4-3 in Exhibit G). For these locations (links C661 and C680, respectively), the Project would be located within one mile of the viewers where terrain and vegetation would partially screen the Project. Moderate to Moderate-high impacts are anticipated for the San Manuel Golf Course based on visibility of the project being seen in the context with the existing 115 kV transmission line. Low impacts are anticipated for the Pinal County Fairgrounds due to viewer orientation and the existing transmission and substation facilities.

Travel Routes

The Project would cross Redington Road (a high-sensitivity travel route – see G-4-2 in Exhibit G), south of Redington (Link C441). High impacts would occur at this crossing where the Project (i.e. transmission towers and access road) would be visible in rolling terrain. Moderate-high impacts are anticipated along SR77 where the Project crosses the road (Link C450). These impacts would remain for a short duration based on the speed associated with each of these roads and angle at which the proposed route would cross the roads. Low-moderate impacts on Pinal Pioneer Parkway (SR 79) are anticipated where the travel route would be crossed by Link C680 (refer to simulation Figure G-4-4 in Exhibit G) immediately adjacent to multiple transmission lines with similar scale and orientation.

Generally, Moderate-high impacts are anticipated for moderate sensitivity travelers using Muleshoe Ranch Road (link C260), Cascabel Road (Link 261) (see G-4-1 in Exhibit G), Black Hills Mine Road/Catalina Ridge (Link C450), Webb Road (Link C450), North Redington Road (Link C450), and Park Link Drive (Link C820). These impacts would remain for a short duration based on the speed associated with each of these roads and angle at which the proposed route would cross the roads. Low-moderate to low impacts are anticipated for travelers along SR 191 (Link C71) due to the Project being seen in context with similar industrial features (i.e. high voltage transmission lines) and screening due to vegetation and topography.

Substations

Willow-500 kV Substation

The proposed Willow-500 kV Substation would be constructed approximately one mile east of Highway 191 (Link C71). The proposed Willow-500 kV Substation footprint would cover approximately 25 acres of Arizona State Trust land used for livestock grazing. The proposed Willow substation is located within Class B scenery that has been modified by two 500 kV transmission lines and impacts to scenery are anticipated to be Low. The only sensitive viewers identified for this site are moderately sensitive viewers from SR 191. Impacts for travelers along

Highway 191 are anticipated to be Low-moderate due to the distance from the road, vegetation screening, and the travel speed for viewers.

DC Converter Station (option)

The DC converter station would be located on up to 45 acres east and within one mile of the existing Pinal Substation, if one of the lines is constructed as a DC line. The Converter Station could be sited on agricultural lands or vacant lands classified as Class B lands. Impacts to scenery are anticipated to be low for the converter station because the existing substation and transmission lines are similar in scale and character. Impacts to dispersed residences would range from Moderate to Low based on the final location and proximity to residences and existing substation and transmission lines.

References

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EXHIBIT E-2 HISTORIC SITES AND STRUCTURES AND ARCHAEOLOGICAL SITES

Overview

This portion of Exhibit E describes historic sites, structures, and archaeological sites in the vicinity of the proposed facilities as well as potential effects to those sites and structures.

To identify historic sites, structures, and archaeological sites, a review of existing historic and archaeological records was performed for all areas within 1,250 feet of the proposed centerline, for a total width of 2,500 feet. Records at the following agencies and research institutions were reviewed:

- State Historic Preservation Office
- Arizona State Museum (ASM) AZSITE Database

- Bureau of Land Management (BLM) Tucson and Safford Field Offices
- National Register of Historic Places.

Description of Historic Sites, Structures, and Archaeological Sites

Based on the records review, approximately 16 percent of the 2,500 foot review area has been previously surveyed for historic or archaeological sites and structures. The records review identified a total of 113 known historic or archaeological sites or structures: 63 prehistoric archaeological sites, 28 historic sites or structures, five multicomponent (historic and prehistoric) sites or structures, and 17 sites or structures of unstated age.

The majority of the prehistoric archaeological sites consist of Native American sites with stone features and/or artifacts. Four of the archaeological sites are Native American village/habitations, and two are Native American rock art sites. The historic sites and structures consist of trash scatters and infrastructure such as roads, canals, transmission lines, trails, and a railroad. The Butterfield Stage Route and the Southern Pacific Mail and Stage Line intersect the project. In addition, one of the historic sites is a Native American (Tohono O'odham) habitation site.

A list of known historic sites and structures and archaeological sites identified in the records review is provided in Table E-2-1.

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites

No.	Type	Description	Identifier
1	**Archaeological and historic site**	**Native American artifacts; Historic channel and artifact scatter**	**AZ AA:3:308(ASM)**
2	Archaeological and historic site	Native American cooking/heating feature and artifacts; Historic habitation	AZ CC:8:7(ASM)
3	**Archaeological site**	**Native American artifacts**	**AZ AA:3:116(ASM)**
4	Archaeological site	Native American artifacts	AZ AA:3:128(ASM)
5	Archaeological site	Native American artifacts	AZ AA:3:129(ASM)
6	Archaeological site	Native American artifacts	AZ AA:3:131(ASM)
7	**Archaeological site**	**Native American artifacts**	**AZ AA:3:137(ASM)**
8	Archaeological site	Native American artifacts	AZ AA:3:139(ASM)

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites			
No.	**Type**	**Description**	**Identifier**
9	Archaeological site	Native American artifacts	AZ AA:3:28(ASM)
10	Archaeological site	Native American artifacts	AZ AA:3:289(ASM)
11	Archaeological site	Native American artifacts	AZ AA:3:290(ASM)
12	Archaeological site	Native American artifacts	AZ AA:3:295(ASM)
13	Archaeological site	Native American artifacts	AZ AA:3:296(ASM)
14	Archaeological site	Native American artifacts	AZ AA:3:302(ASM)
15	Archaeological site	Native American artifacts	AZ AA:3:303(ASM)
16	**Archaeological site**	**Native American artifacts**	**AZ AA:3:304(ASM)**
17	**Archaeological site**	**Native American artifacts**	**AZ AA:3:305(ASM)**
18	**Archaeological site**	**Native American artifacts**	**AZ AA:3:306(ASM)**
19	**Archaeological site**	**Native American artifacts**	**AZ AA:3:310(ASM)**
20	**Archaeological site**	**Native American artifacts**	**AZ AA:3:311(ASM)**
21	Archaeological site	Native American artifacts	AZ AA:3:312(ASM)
22	Archaeological site	Native American artifacts	AZ AA:3:9(ASM)
23	Archaeological site	Native American artifacts	AZ AA:7:270(ASM)
24	Archaeological site	Native American artifacts	AZ AA:7:491(ASM)
25	Archaeological site	Native American artifacts	AZ AA:7:657(ASM)
26	Archaeological site	Native American artifacts	AZ AA:8:330(ASM)
27	Archaeological site	Native American artifacts	AZ AA:8:332(ASM)
28	Archaeological site	Native American artifacts	AZ BB:5:49(ASM)
29	Archaeological site	Native American artifacts	AZ CC:10:3(ASM)
30	**Archaeological site**	**Native American artifacts**	**AZ CC:11:17(BLM)**
31	**Archaeological site**	**Native American artifacts**	**AZ AA:3:293(ASM)**
32	Archaeological site	Native American artifacts	AZ AA:8:324(ASM)

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites			
No.	Type	Description	Identifier
33	Archaeological site	Native American artifacts	AZ CC:9:17(ASM)
34	**Archaeological site**	**Native American artifacts**	**AZ CC:9:52(ASM)**
35	Archaeological site	Native American artifacts and historic trash	AZ AA:3:288(ASM)
36	**Archaeological site**	**Native American artifacts and historic trash**	**AZ AA:3:317(ASM)**
37	**Archaeological site**	**Native American cooking feature and artifacts**	**AZ AA:7:439(ASM)**
38	Archaeological site	Native American cooking/heating feature	AZ AA:3:297(ASM)
39	Archaeological site	Native American cooking/heating features and artifacts	AZ AA:3:115(ASM)
40	Archaeological site	Native American hearth and artifacts	AZ AA:3:48(ASM)
41	Archaeological site	Native American petroglyphs and ceramic artifacts	AZ AA:8:4(ASM)
42	**Archaeological site**	**Native American pictographs and artifacts**	**AZ CC:9:15(ASM)**
43	Archaeological site	Native American rock feature and artifact scatter	AZ CC:10:97(ASM)
44	**Archaeological site**	**Native American rock features and artifact scatter**	**AZ BB:16:45(ASM)**
45	Archaeological site	Native American rock pile	AZ AA:7:441(ASM)
46	Archaeological site	Native American rock shelter and artifacts	AZ AA:8:325(ASM)
47	Archaeological site	Native American rock shelter and artifacts	AZ AA:8:328(ASM)
48	Archaeological site	Native American rock shelter and artifacts	AZ AA:8:329(ASM)
49	Archaeological site	Native American rock shelter and artifacts	AZ AA:8:331(ASM)
50	**Archaeological site**	**Native American stone feature(s) and artifacts**	**AZ AA:3:134(ASM)**
51	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:135(ASM)
52	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:291(ASM)
53	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:301(ASM)
54	**Archaeological site**	**Native American stone feature(s) and artifacts**	**AZ AA:3:138(ASM)**
55	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:141(ASM)

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites			
No.	**Type**	**Description**	**Identifier**
56	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:294(ASM)
57	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:298(ASM)
58	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:299(ASM)
59	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:300(ASM)
60	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:307(ASM)
61	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:309(ASM)
62	Archaeological site	Native American stone feature(s) and artifacts	AZ AA:3:47(ASM)
63	**Archaeological site**	**Native American stone feature(s) and artifacts**	**AZ BB:15:87(ASM)**
64	Archaeological site	Native American stone feature(s) and artifacts	AZ BB:15:89(ASM)
65	**Archaeological site**	**Native American stone feature(s) and artifacts**	**AZ AA:7:440(ASM)**
66	**Archaeological site**	**Native American stone feature(s) and artifacts**	**AZ AA:8:326(ASM)**
67	**Archaeological site**	**Native American trash mounds**	**AZ AA:3:316(ASM)**
68	**Archaeological site**	**Native American village/habitation**	**AZ AA:3:136(ASM)**
69	Archaeological site	Native American village/habitation	AZ CC:11:52(ASM)
70	**Archaeological site**	**Native American village/habitation**	**AZ BB:15:86(ASM)**
71	**Archaeological site**	**Native American village/habitation**	**AZ BB:15:88(ASM)**
72	**Historic site**	**Historic artifact scatter**	**AZ AA:2:356(ASM)**
73	**Historic site**	**Historic artifact scatter**	**AZ AA:3:314(ASM)**
74	Historic site	Historic artifact scatter	AZ CC:11:65(ASM)
75	**Historic site**	**Historic dump**	**AZ AA:3:315(ASM)**
76	Historic site	Native American (Tohono O'odham) habitation	AZ AA:8:6(ASM)
77	**Historic site**	**Trail and historic trash**	**AZ AA:3:318(ASM)**
78	**Historic structure**	**Butterfield Stage Route**	**AZ T:14:61(ASM)**
79	**Historic structure**	**Canada del Oro/Camp Grant Wagon Road**	**AZ BB:9:41(ASM)**

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites			
No.	**Type**	**Description**	**Identifier**
80	**Historic structure**	**Casa Grande Canal**	**AZ AA:3:209(ASM)**
81	**Historic structure**	**Coolidge to Oracle 115 kV Transmission Line**	**AZ BB:5:134(ASM)**
82	**Historic structure**	**Florence Canal**	**AZ AA:3:211(ASM)**
83	Historic structure	Florence-Casa Grande Canal	AZ AA:3:215(ASM)
84	**Historic structure**	**Historic road**	**AZ AA:2:132(ASM)**
85	Historic structure	Historic road	AZ AA:3:292(ASM)
86	**Historic structure**	**Mammoth Mine to Oracle 12kV Transmission Line**	**AZ BB:6:223(ASM)**
87	**Historic structure**	**Oracle to Holbrook Highway**	**AZ BB:2:78(ASM)**
88	**Historic structure**	**Phoenix to Tucson Highway**	**AZ AA:8:360(ASM)**
89	Historic structure	Saguaro to Oracle 115kV Transmission Line	AZ AA:8:366(ASM)
90	Historic structure	San Manuel Railroad	AZ BB:6:227(ASM)
91	**Historic structure**	**Southern Pacific Mail and Stage Line**	**Not assigned**
92	Historic structure	Southern Pacific Railroad, Wellton to Phoenix to Eloy spur	AZ T:10:84(ASM)
93	**Historic structure**	**State Route 80**	**AZ FF:9:17(ASM)**
94	**Historic structure**	**State Route 87**	**AZ AA:6:63(ASM)**
95	**Historic structure**	**Sunshine Road**	**AZ AA:2:176(ASM)**
96	**Historic structure**	**Tiger Mine Road**	**AZ BB:6:243(ASM)**
97	**Historic structure**	**US Highway 191**	**AZ FF:1:33(ASM)**
98	**Not stated in records**	**Unknown**	**4(BLM)**
99	Not stated in records	Unknown	89-3(NMSN)
100	Not stated in records	Unknown	89-4(NMSN)
101	Not stated in records	New site not completely entered into database.	AZ AA:2:305(ASM)
102	Not stated in records	New site not completely entered into database.	AZ AA:3:313(ASM)
103	Not stated in records	New site not completely entered into database.	AZ AA:3:321(ASM)

Table E-2-1. Known Historic Sites, Structures, and Archaeological Sites			
No.	**Type**	**Description**	**Identifier**
104	Not stated in records	New site not completely entered into database.	AZ AA:7:654(ASM)
105	Not stated in records	New site not completely entered into database.	AZ AA:7:655(ASM)
106	Not stated in records	New site not completely entered into database.	AZ AA:7:656(ASM)
107	**Not stated in records**	**New site not completely entered into database.**	**AZ BB:5:1(MNA)**
108	Not stated in records	New site not completely entered into database.	AZ CC:10:127(ASM)
109	Not stated in records	New site not completely entered into database.	AZ CC:9:55(ASM)
110	Not stated in records	New site not completely entered into database.	AZ CC:9:56(ASM)
111	Not stated in records	New site not completely entered into database.	AZ CC:9:57(ASM)
112	**Not stated in records**	**New site not completely entered into database.**	**AZ CC:9:58(ASM)**
113	Not stated in records	Unknown	IHCRS 83-9 214
Bold items are located in 400-foot-wide ROW.			

Potential Impacts to Historic Sites, Structures, and Archaeological Sites

Forty-six sites are known to occur to occur within the 400-foot ROW. Three Native American sites, AZ AA:3:136(ASM), AZ AA:3:316(ASM), and AZ BB:15:88(ASM), could be located directly under the proposed transmission line. Sites AZ AA:3:136(ASM) and AZ BB:15:88(ASM) are large habitation sites or villages, while AZ AA:3:316(ASM) consists of four refuse mounds. The known sites within the 400-foot ROW are small enough that they can be avoided by careful placement of transmission line poles. However, since only 16 percent of the review area has been surveyed for cultural resources, it is likely that a complete inventory would identify many additional historic sites, structures, and archaeological sites.

The BLM has prepared a Programmatic Agreement (PA) for the project to address any potential impacts to cultural resources, including historic sites, structures, and archaeological sites. A copy of the PA is provided in Exhibit B-1. The PA was prepared with extensive consultation and input from state and federal agencies, Native American tribes, and other interested parties. In accordance with that PA, the proponent will pay for a complete inventory of the project footprint including a buffer zone, will perform an extensive records review to identify potential visual effects, and will be required to avoid and or mitigate any potential impacts to cultural resource sites. Also in accordance with the PA, consulting parties and signatories to the PA will be provided the opportunity for ongoing input during implementation of cultural site avoidance and mitigation.

Through implementation of the stipulations in the PA prepared for the project, impacts to historic sites, structures, and archaeological sites would be avoided and/or mitigated.

Exhibits F

EXHIBIT F – RECREATIONAL PURPOSES AND ASPECTS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route."

Exhibit F includes a county by county summary of recreation uses, as well as the potential impacts the Project may have on recreation. For further information on recreation, refer to the FEIS included as Exhibit B-1. For further information on visual resources, refer to Exhibit E.

The Applicant has no current plans to develop recreational facilities within the Project area. Existing designated and dispersed recreation opportunities will remain available for existing recreation uses and opportunities. Where the Project crosses existing roads or trails, permanent access to and along these features for recreation use would not be affected. The following is a list of recreation features within the Project study area, listed by county.

GREENLEE COUNTY

Within the Project study corridor in Greenlee County, there are no designated recreation facilities, though Arizona State Land Department (ASLD) and Bureau of Land Management (BLM)-managed lands provide dispersed recreation opportunities such as rock-hounding, hiking, camping, and off-highway vehicle (OHV) driving.

GRAHAM COUNTY

Within the portion of the Project study corridor in Graham County, dispersed recreation opportunities, including camping, hiking, picnicking, and OHV driving, can be found on ASLD, BLM, and United States Forest Service (USFS)-managed lands, and are described in more detail below.

The Hot Well Dunes Recreation Area is located on BLM lands within Graham County, approximately 15 miles north of Bowie, Arizona. The BLM Safford Field Office manages the Hot Well Dunes Recreation Area as a Special Recreation Management Area (SRMA) to provide recreation opportunities including natural hot tub facilities, OHV driving, camping, picnicking, and fishing (BLM 2015). No impacts to recreation opportunities at the Hot Well Dunes Recreation Area are expected from the Project, as it is not crossed by the Project.

The USFS Coronado National Forest (CNF) manages a portion of the corridor that travels southeast of the Pinaleño Mountains, wherein dispersed recreation opportunities such as camping, hiking, horseback riding, picnicking, and fishing are available. No impacts to recreation opportunities within the CNF-Pinaleño Mountains are expected from the Project, as the CNF is not crossed by the Project.

COCHISE COUNTY

Dispersed recreation opportunities exist on privately held and ASLD, BLM, and USFS-managed land within the portion of the Project study corridor in Cochise County. Publicly available recreation opportunities found on private lands include several private orchards and farms in the regions northwest of Willcox, Arizona, available for produce picking; and The Nature Conservancy's Three Links Farm, which is located approximately 13 miles north of Benson, Arizona, and is encumbered with a conservation easement that restricts use of the riparian corridor to passive recreation, such as wildlife viewing and hiking.

In addition, the CNF manages two portions of the Project study corridor located in Cochise County, one southeast of the Winchester Mountains, and a second east of the Rincon Mountains, both providing dispersed recreation opportunities, such as camping, hiking, backpacking, and equestrian activities. There are also dispersed recreation opportunities along the San Pedro River, including hiking, bicycling, equestrian, fishing, birding, and other wildlife watching activities. No impacts to these dispersed recreation opportunities within Cochise County are expected from the Project.

PIMA COUNTY

Within the portion of the Project study corridor in Pima County, dispersed recreation opportunities exist on privately held, ASLD, and USFS-managed land, including camping, hiking, biking, picnicking, and OHV driving. Dispersed recreation opportunities exist along the San Pedro River, including hiking, bicycling, equestrian, fishing, birding, and other wildlife watching activities. No impacts to these dispersed recreation opportunities are expected from the Project. A portion of the CNF-managed Rincon Mountain Wilderness is within the Project study corridor in Pima County, east of the Rincon Mountains. The Rincon Mountain Wilderness provides dispersed primitive recreation opportunities, including hiking, backpacking, camping, and other non-motorized recreation. The proposed transmission lines would not cross the Rincon Mountain Wilderness, and no impacts to recreation opportunities within the Rincon Mountain Wilderness are expected from the Project.

Conservation parcels owned and managed by Pima County and The Nature Conservancy are located within the Project study corridor, and provide dispersed recreation opportunities, including hiking trails and four-wheel drive roads. No impacts to these dispersed recreation opportunities are expected from the Project.

A portion of the Redington Scenic Road passes through private and ASLD land within the Pima County portion of the Project study corridor, and would be crossed by the Project. The Redington Scenic Road is a Pima County-designated scenic route that travels between the Santa Catalina and Rincon Mountains, and provides scenic vistas characteristic of southern Arizona landscapes. While the Project would cross Redington Scenic Road, the transmission line would span the roadway and no direct impacts to dispersed recreation opportunities accessible along Redington Scenic Road, such as hiking, biking, and wildlife viewing, are expected from the Project.

PINAL COUNTY

Within Pinal County, dispersed recreation opportunities can be found on ASLD, BLM, and USFS-managed lands, including camping, hiking, biking, picnicking, and OHV driving. The CNF manages a portion of land traversed by the Project study corridor in Pinal County, north of the Catalina Mountains, as well as a portion of the Arizona National Scenic Trail (AZT) where dispersed recreation opportunities, such as hiking, biking, backpacking, and wildlife viewing, can be found.

Designated recreation facilities within the Project study corridor include several Pinal County-designated existing multi-use (e.g., biking, hiking, walking, and off-highway vehicle) corridors near the Pinal Central Substation, the majority of which run adjacent to existing washes; the Pinal County Fairgrounds and Event Center, which is located adjacent to the Pinal Central Substation, and hosts carnival, music, livestock, and food-based entertainment and recreation opportunities; the Tierra Grande Golf Course, located less than one mile southwest of the Pinal Central Substation; and the CAP canal, located approximately seven miles east of the Pinal Central Substation, which includes a recreation corridor on the east side of the canal, within the Project study area. No impacts to recreation opportunities within these designated facilities are expected from the Project.

The AZT, a congressionally designated National Scenic Trail, travels through a portion of the Project study corridor within Pinal County. The AZT provides recreation opportunities including hiking, backpacking, equestrian activities, mountain biking, trail running, and sightseeing. While the Project will cross a segment of the AZT, the transmission line will span the trail segment and no direct impacts to recreation opportunities on the AZT are expected from the Project.

A portion of Oracle State Park, managed by the Arizona State Parks, is located within the Pinal County portion of the Project study area. Oracle State Park provides recreation opportunities including historic exhibits, hiking, biking, picnicking, equestrian activities, and wildlife viewing. Within Oracle State Park are numerous hiking, biking, and equestrian trails, including a portion of the AZT. No impacts to recreation opportunities within Oracle State Park are expected from the Project.

Portions of the Pinal Pioneer Parkway (SR79) including a designated roadside table, and the Mount Lemmon Highway National Scenic Byway, are crossed by the Project study corridor. These designated scenic roadways provide scenic recreation opportunities to travelers. The Pinal Pioneer Parkway would be crossed by the Project, but the transmission line will span the roadways and no direct impacts to scenic roadways are expected from the Project. While the Mount Lemmon Highway is within the Project study area, the Project would not cross this scenic roadway.

The Picacho Reservoir is within the Project study corridor, located approximately 4.5 miles east of the Pinal Central Substation, and offers fishing and bird viewing opportunities. While the water level in the reservoir is seasonal, there is a primitive boat ramp, and camping is permitted around the reservoir. The Project would not affect the current recreation that takes place in and around the Picacho Reservoir.

Additional designated recreation opportunities within the Pinal County portion of the Project study corridor include various parks and schools within the communities of San Manuel and Oracle, Arizona, the closest of which is approximately two miles from the proposed route. A golf course associated with the Saddlebrook Ranch community development, located north of the intersection of SR77 and SR79, is within the Project study corridor. No impacts to recreation opportunities provided by these community facilities are expected from the Project.

According to the Pinal County Open Space and Trails Master Plan, there are two proposed/regional parks within the Pinal County portion of the Project study area. At this time, these parks are in the conceptual stage and no development has taken place. The first regional park is proposed north of Picacho Peak State Park and includes the Picacho Mountains. This proposed park within Pinal County would provide passive oriented recreation opportunities, including wildlife viewing and hiking. The second planned regional park is located west of Highway 79 and east of the proposed regional park near Picacho Peak State Park. This proposed park would also provide passive recreational opportunities to support the future development that may occur in the area. No impacts to the recreation facilities or use of these proposed parks are expected from the Project, because the Proposed Route, in these areas, is colocated with existing infrastructure.

Exhibits G

Exhibits E

EXHIBIT G CONCEPTS OF PROPOSED FACILITIES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Attach any artist's or architect's conception of the proposed plan or transmission line structures and switchyards, which applicant believes may be informative to the committee."

EXHIBIT G-1 TRANSMISSION STRUCTURE CONCEPTS

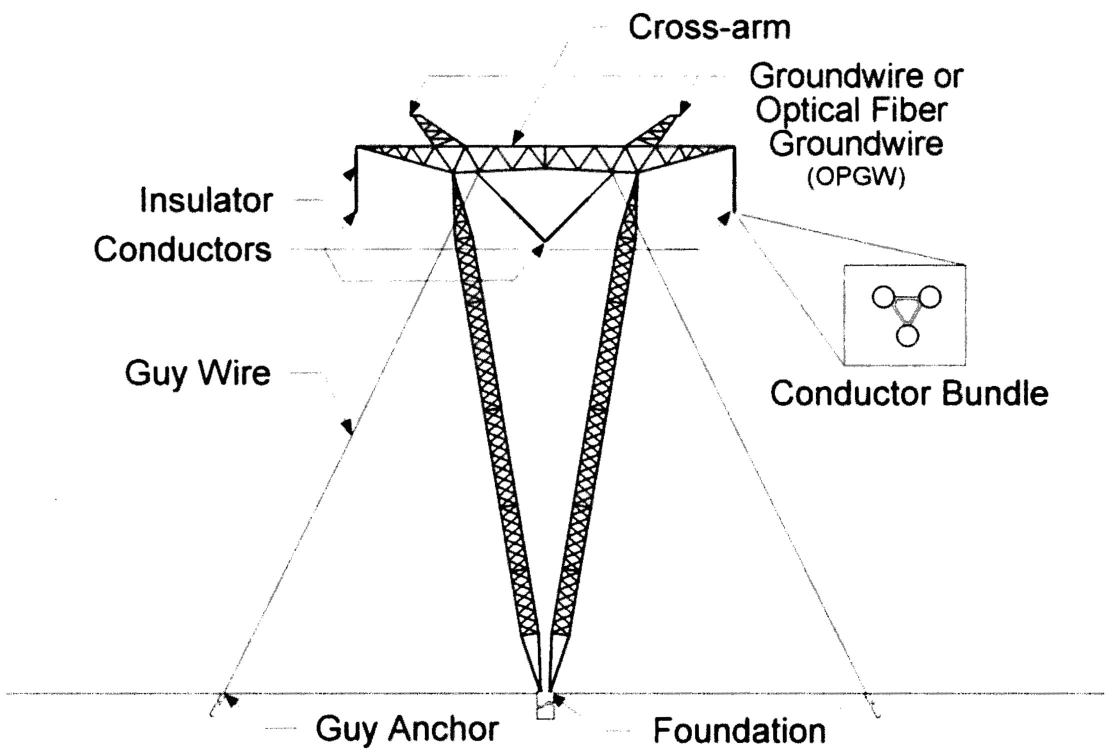

Figure G-1-1. Typical 500 kV Structure Diagram

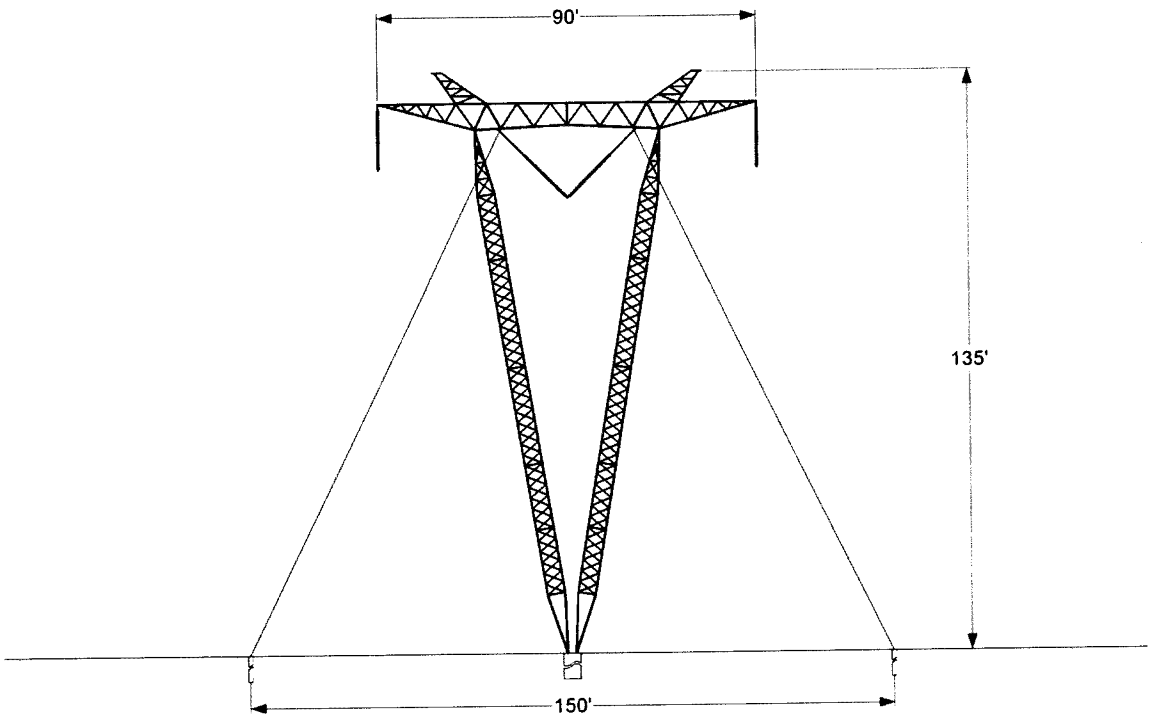

Figure G-1-2. Typical 500 kV Guyed "V" Lattice Tangent Structure

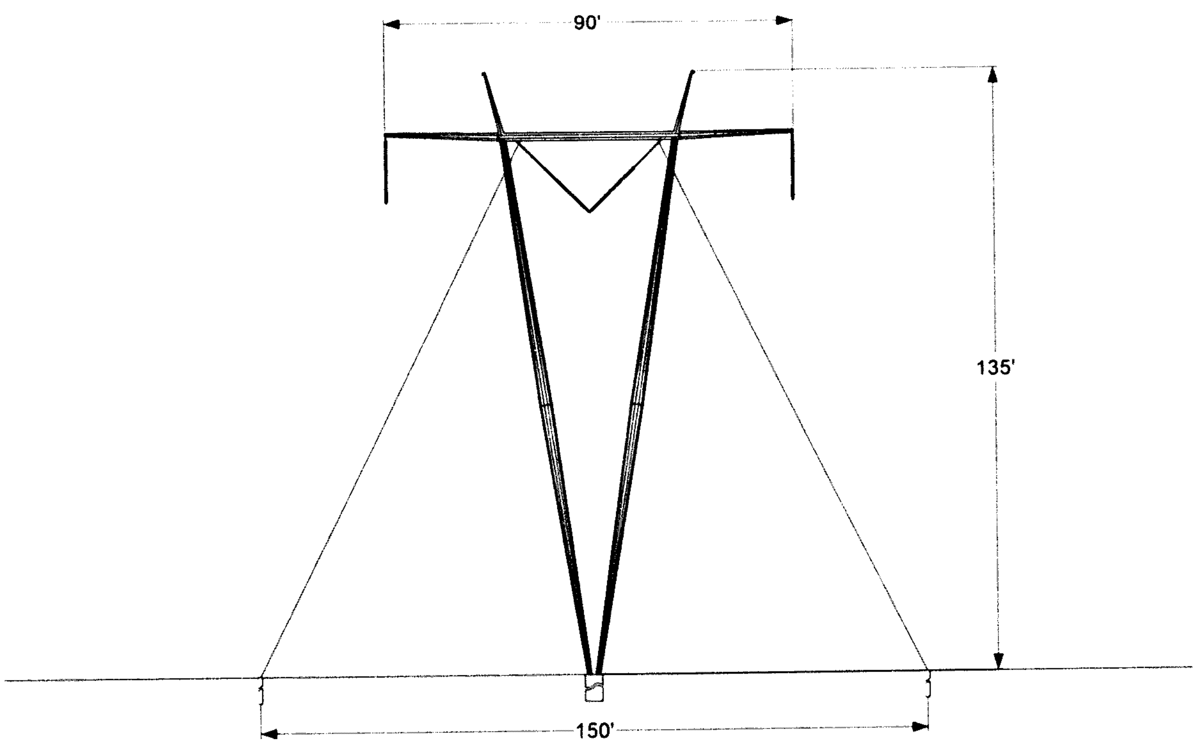

Figure G-1-3. Typical AC Guyed "V" Tubular Tangent Structure

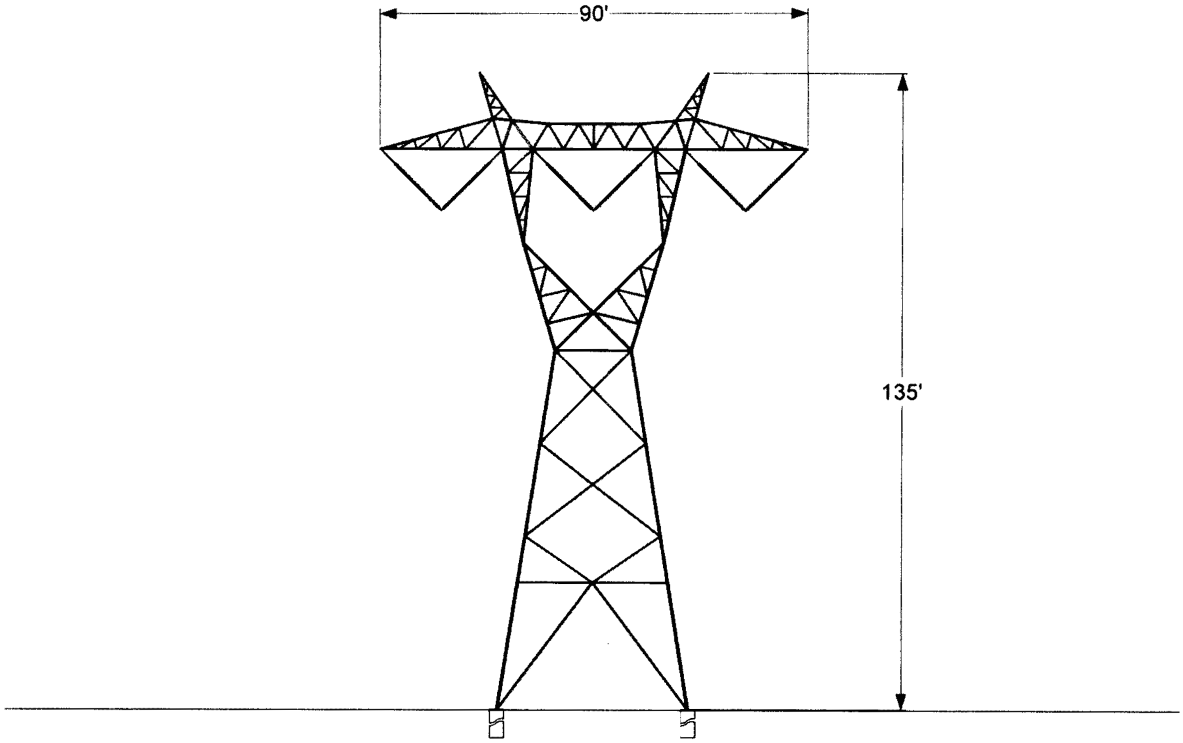

Figure G-1-4. Typical AC Self-Supporting Lattice Tangent Structure

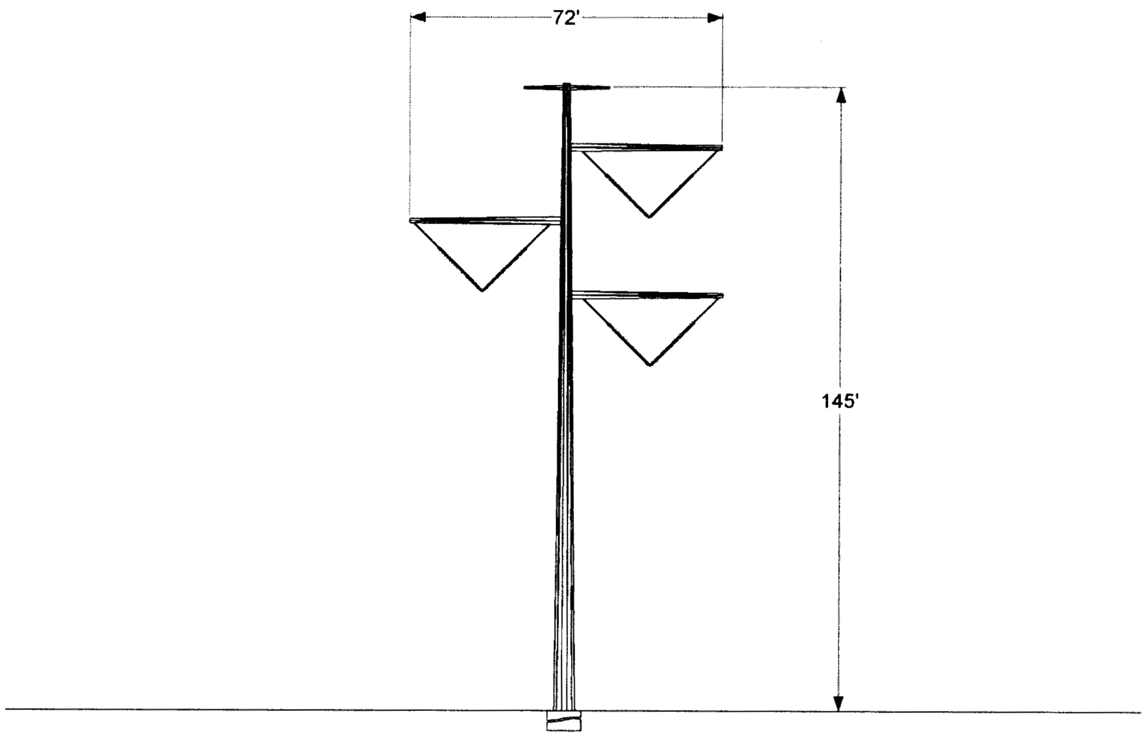

Figure G-1-5. Typical AC Self-Supporting Tubular Tangent Structure

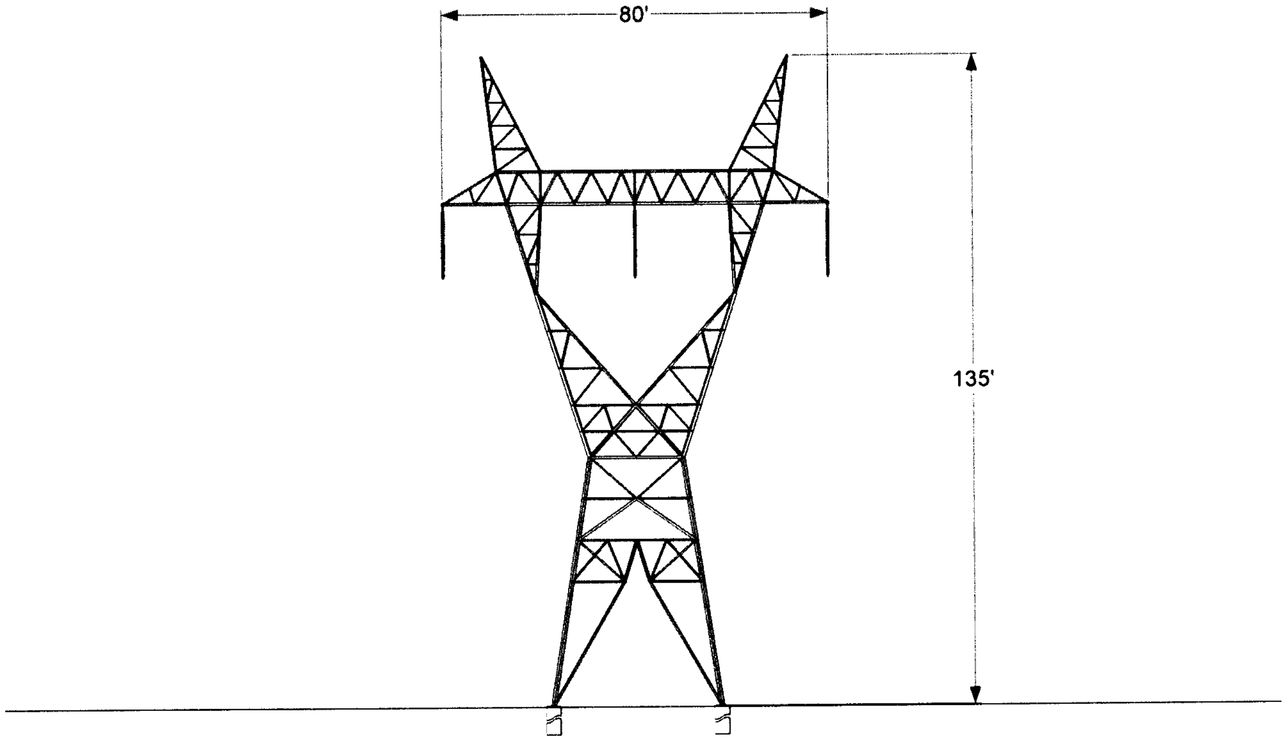

Figure G-1-6. Typical AC Self-Supporting Dead-End Lattice Structure

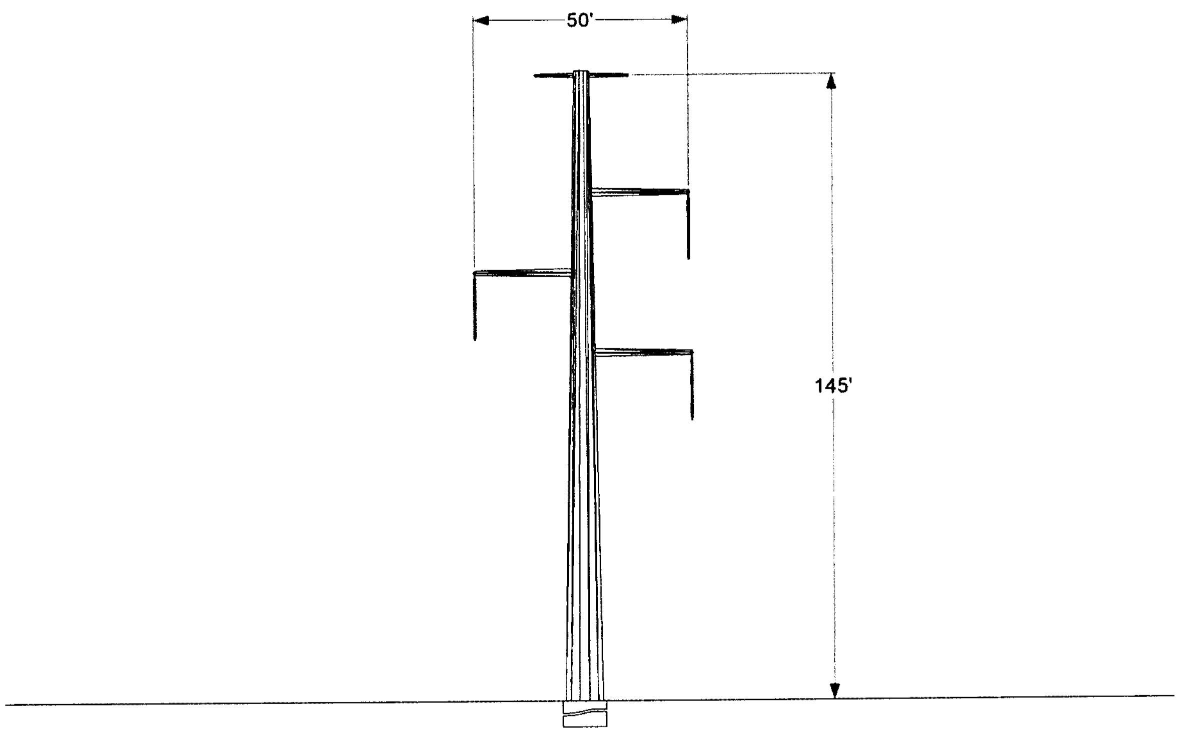

Figure G-1-7. Typical AC Self-Supporting Dead-End Tubular Structure

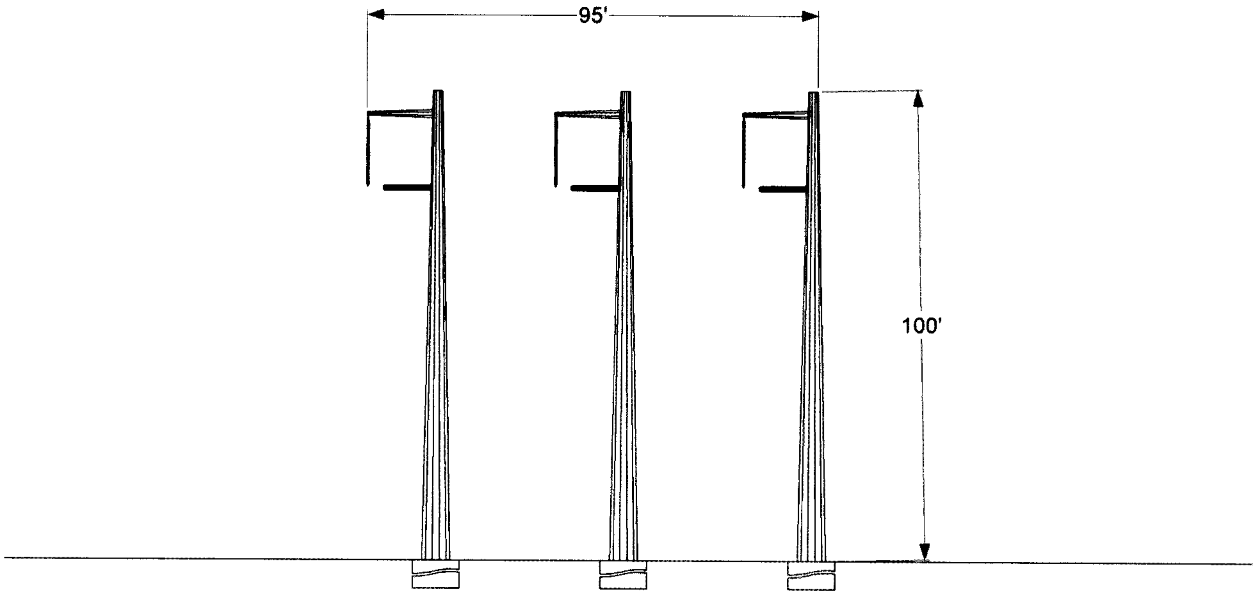

Figure G-1-8. Typical AC Self-Supporting Dead-End Tubular, 3-Pole Structure

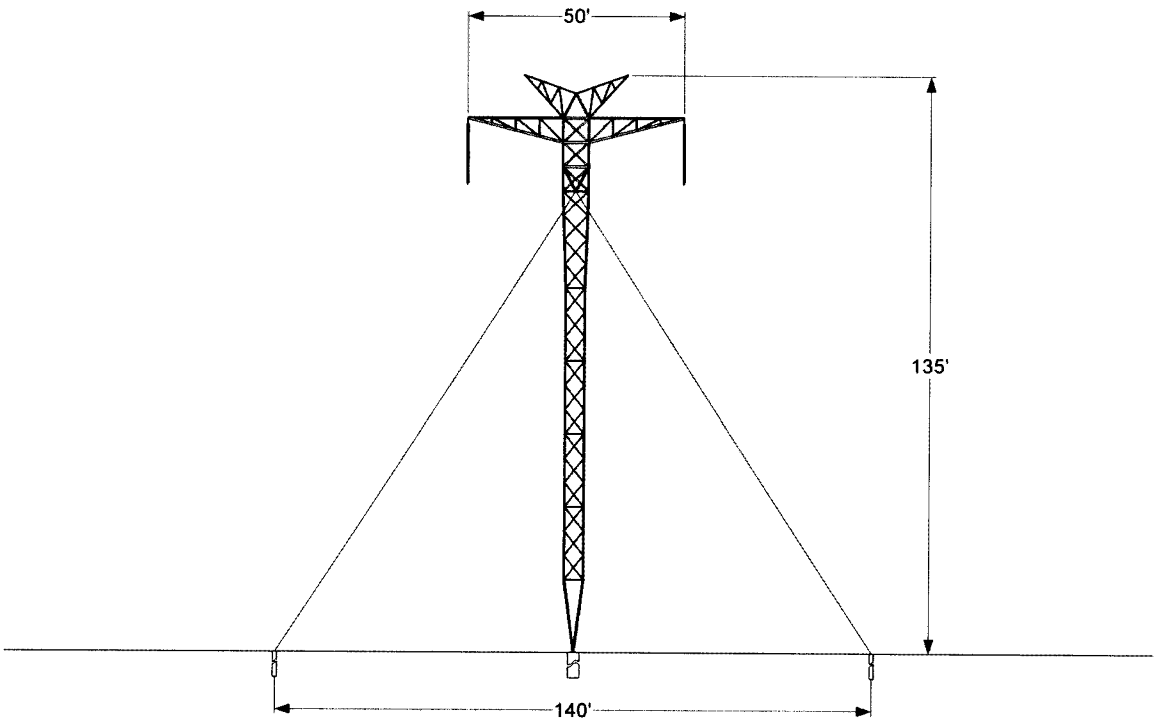

Figure G-1-9. Typical DC Guyed Lattice Tangent Structure

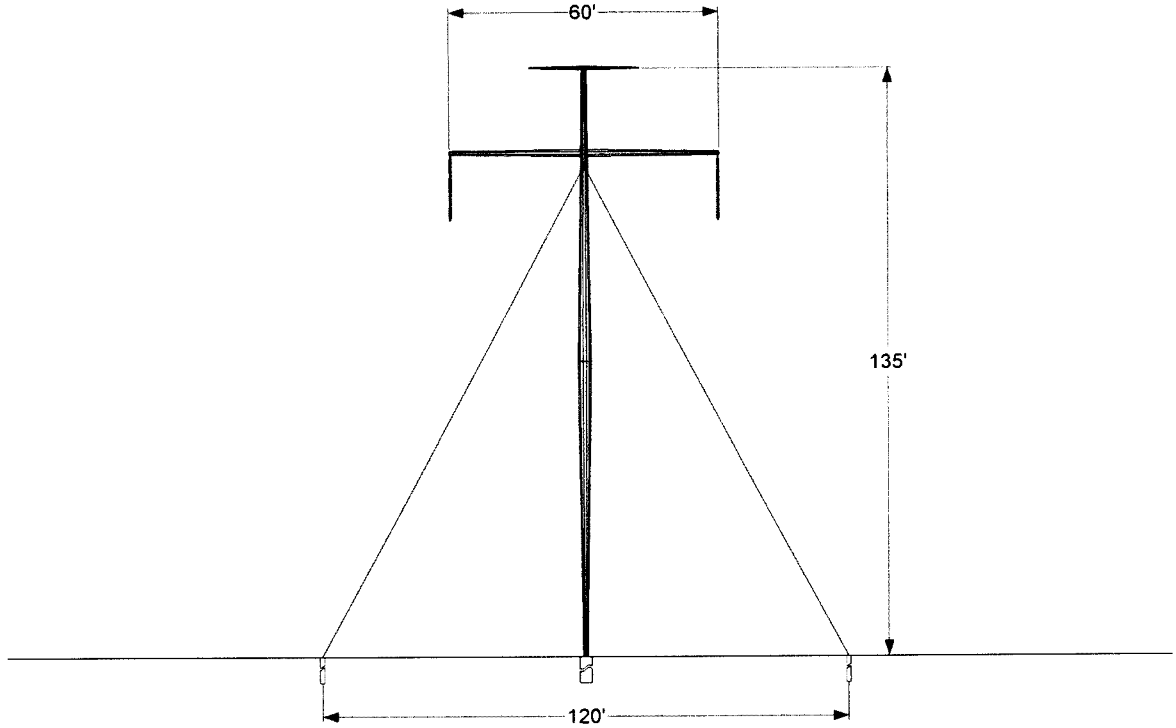

Figure G-1-10. **Typical DC Guyed Tubular Tangent Structure**

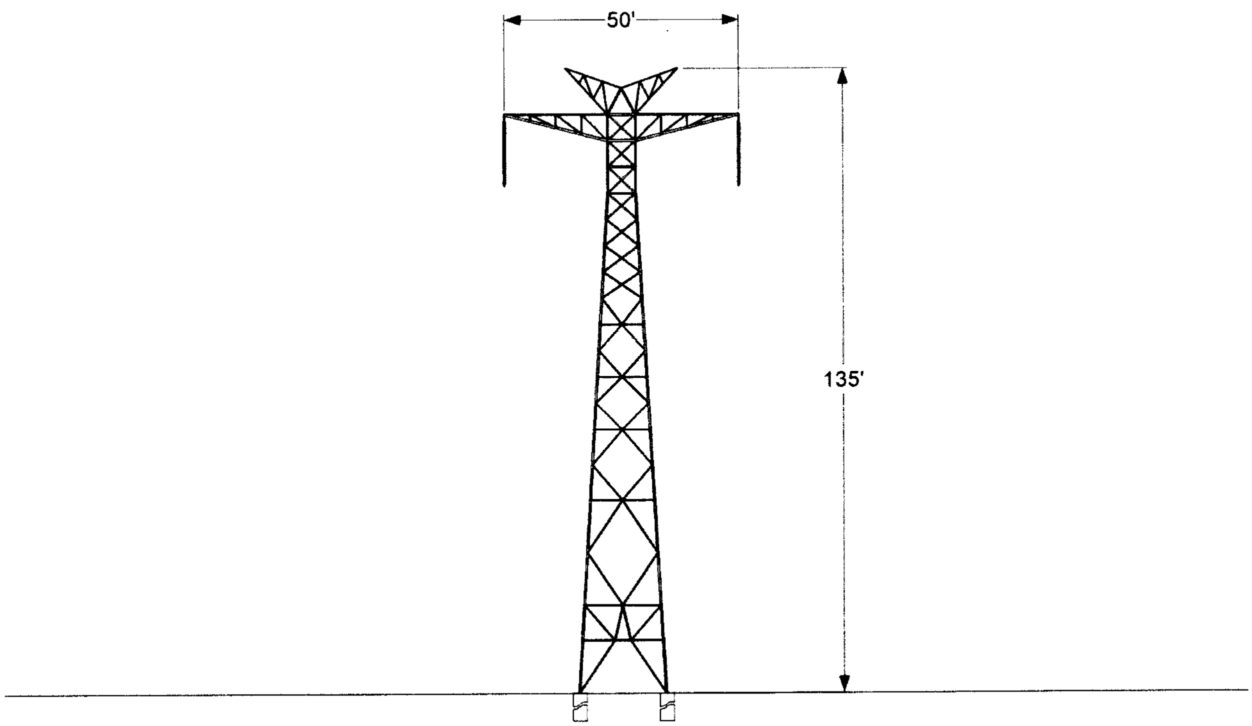

Figure G-1-11. **Typical DC Self-Supporting Lattice Tangent Structure**

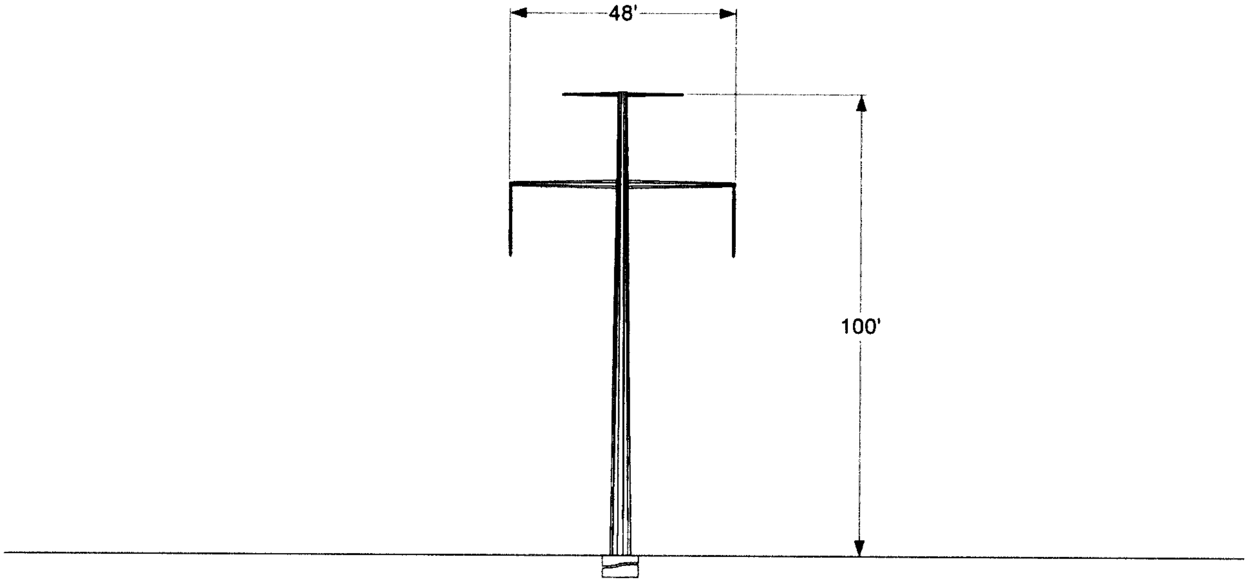

Figure G-1-12. Typical DC Self-Supporting Tubular Tangent Structure

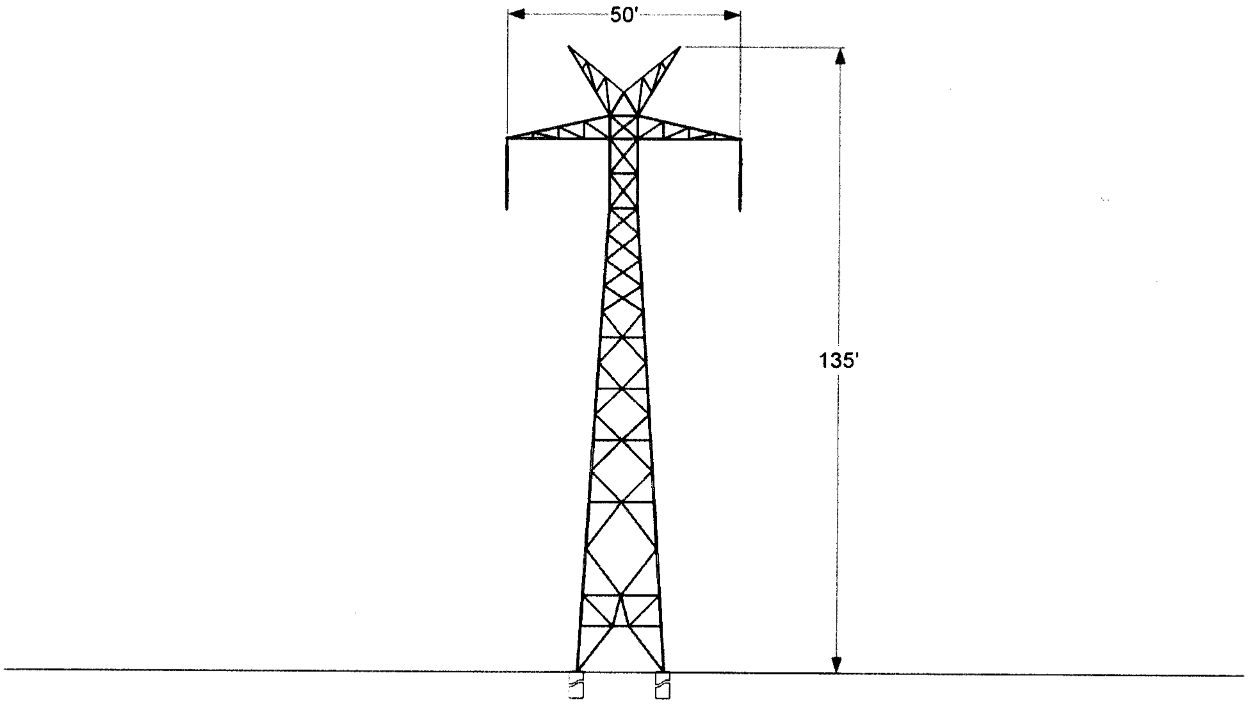

Figure G-1-13. Typical DC Self-Supporting Dead-End Lattice Structure

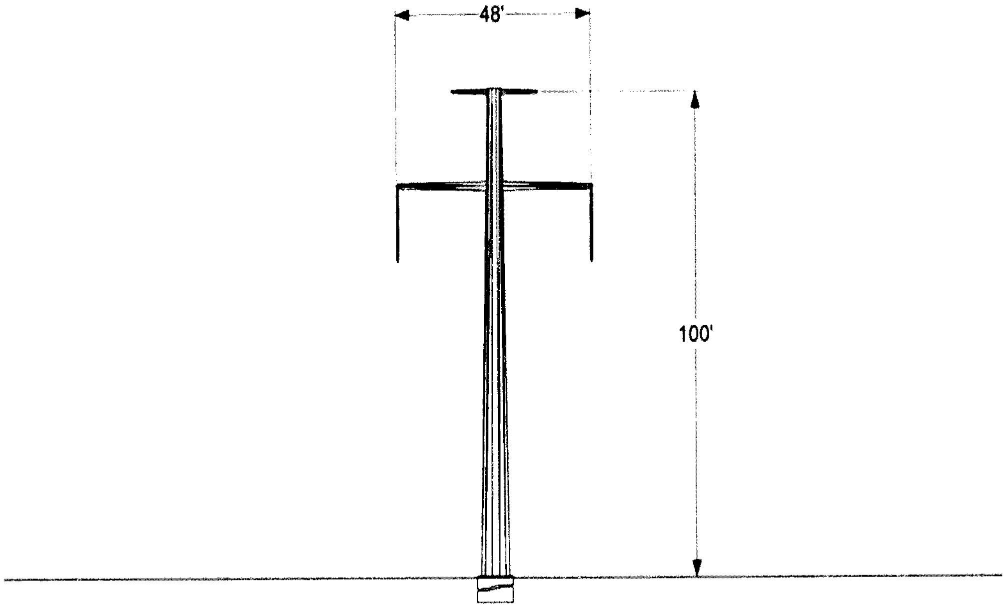

Figure G-1-14. Typical DC Self-Supporting Dead-End Tubular Structure

EXHIBIT G-2 PROPOSED SUBSTATION LAYOUT: WILLOW-500 KV

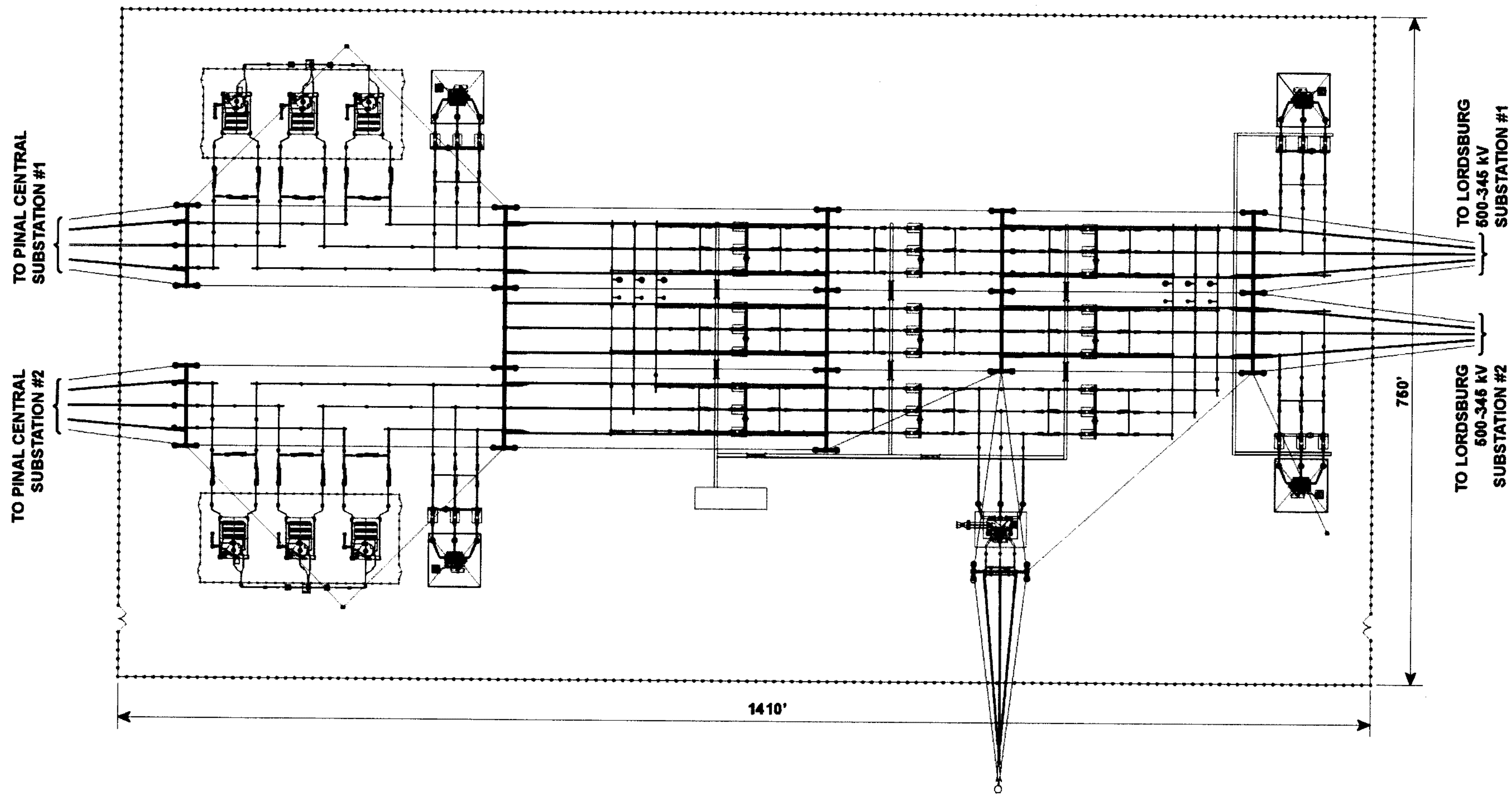

Figure G-2-1. Proposed Substation Layout: Willow-500kV

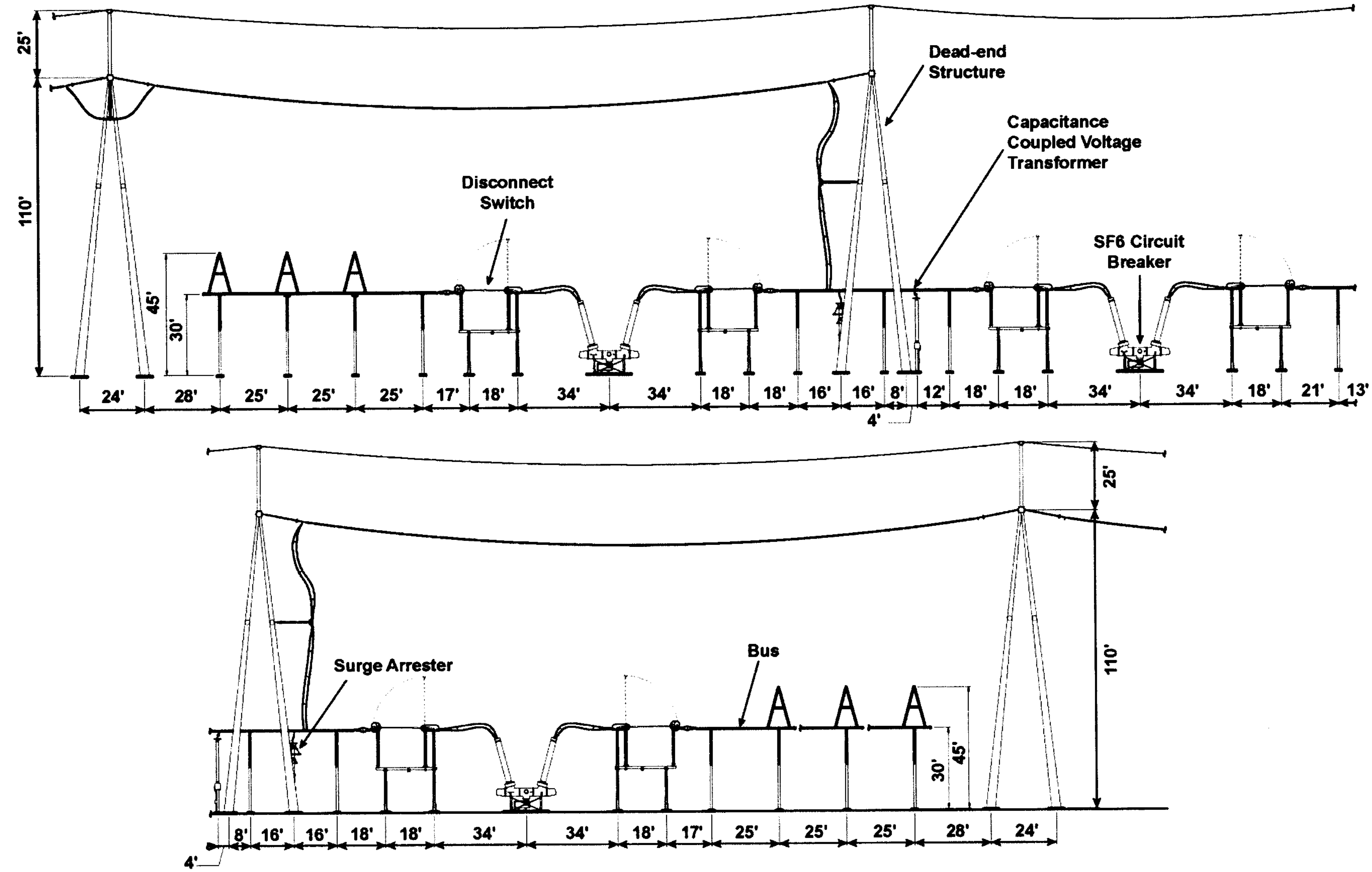

Figure G-2-2. Typical 500 kV Substation Schematic – Elevation View

EXHIBIT G-3 TYPICAL 500 KV DC CONVERTER STATION

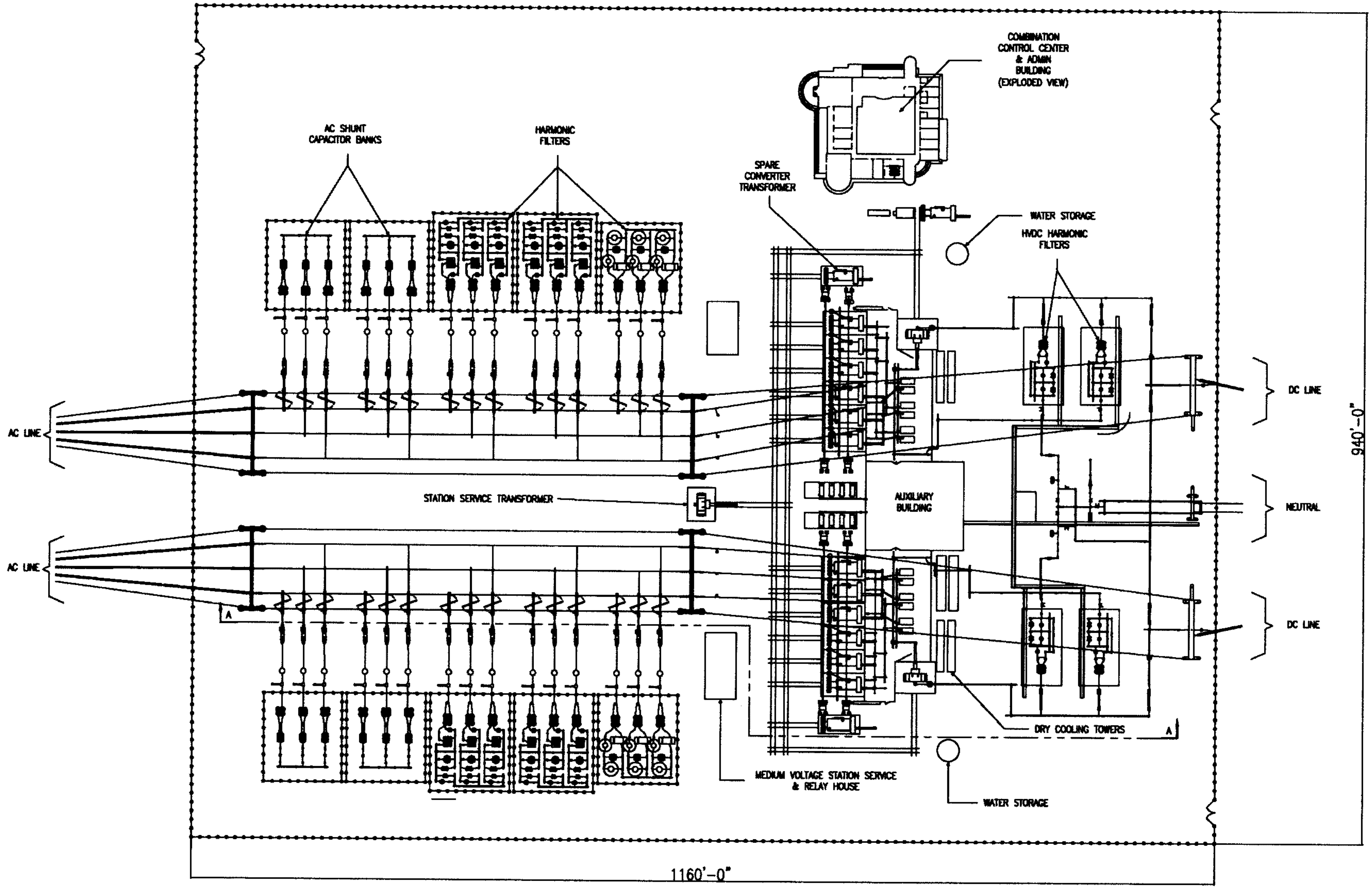

Figure G-3-1. Typical 500 kV DC Converter Station – Plan

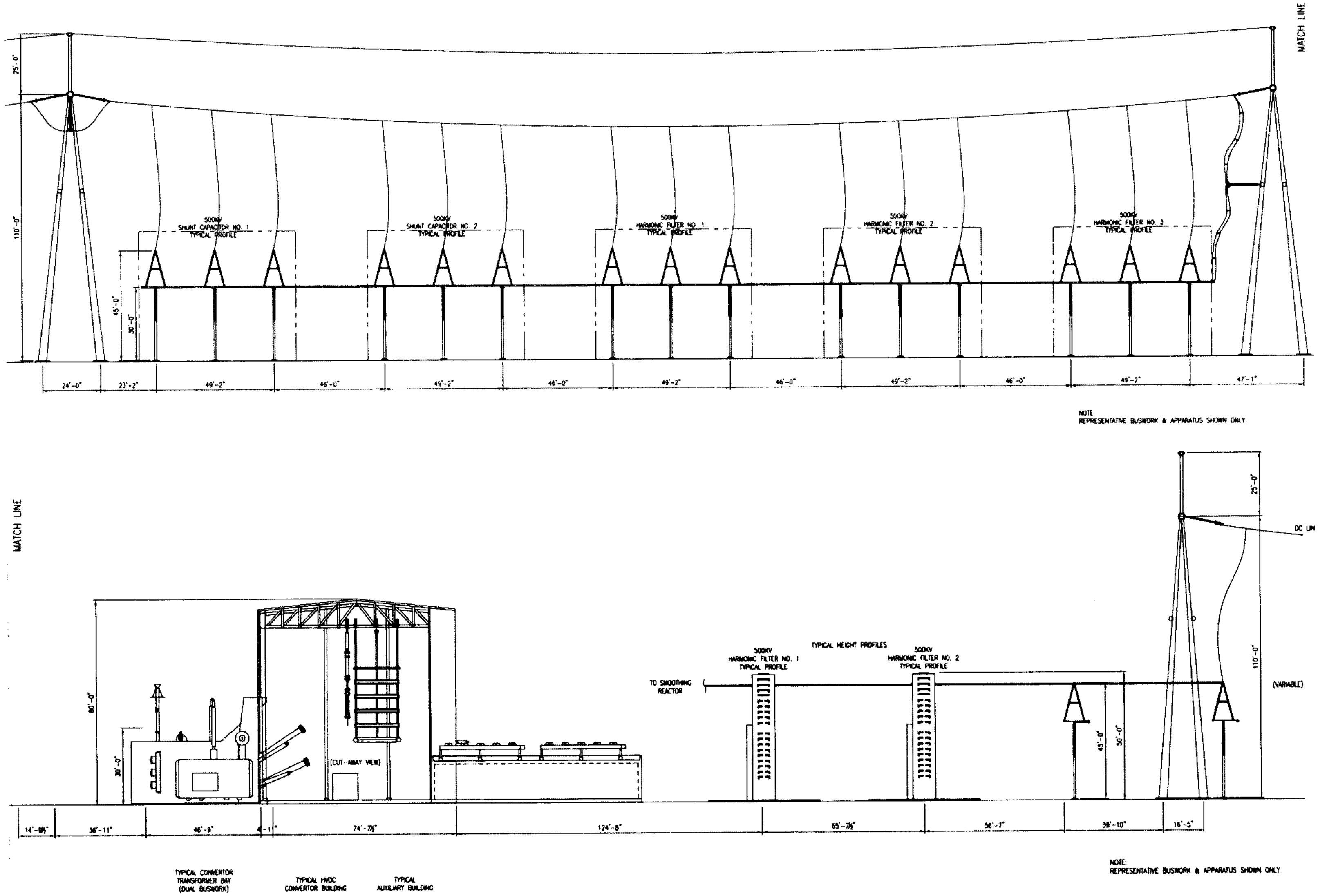

Figure G-3-2. Typical 500 kV DC Converter Station – Section AA

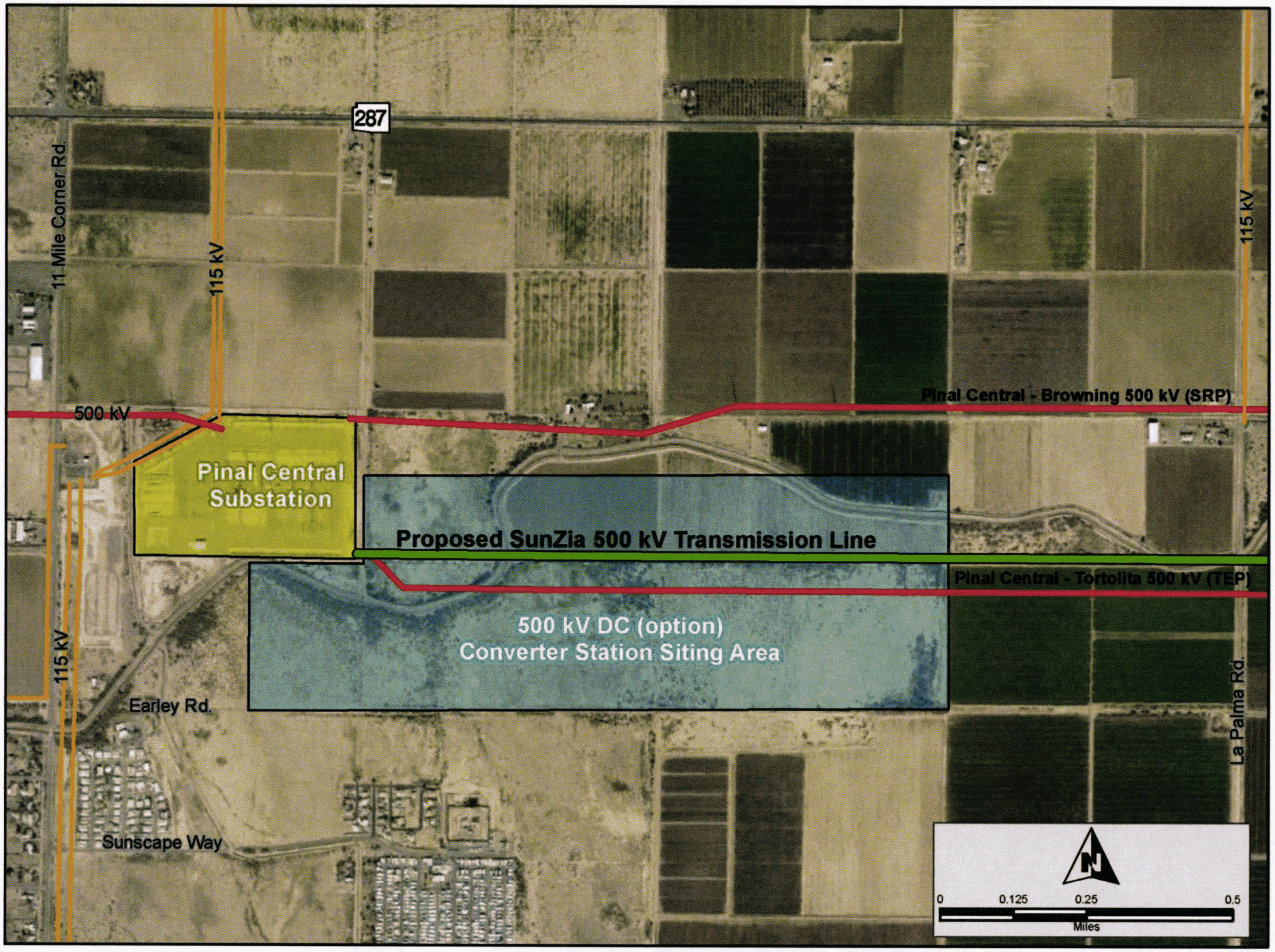

Figure G-3-3. **500 kV DC (option) Converter Station Siting Area**

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EXHIBIT G-4 SIMULATIONS

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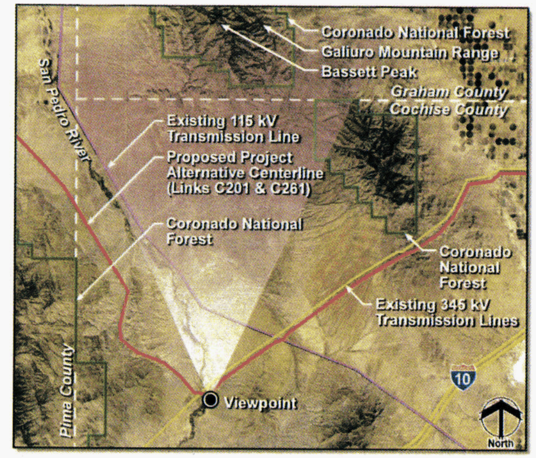
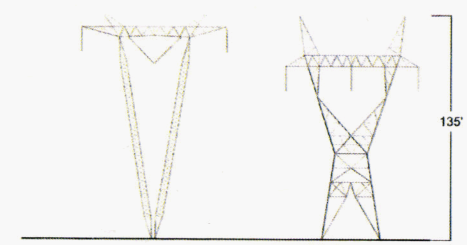
Existing Condition – View looking north along Cascabel Road toward existing 345 kV transmission line corridor approximately 1 mile north of viewpoint. Adjacent scenery includes Class A landscape of the San Pedro River.



Photograph Location: Viewpoint is located 0.3 miles South of the proposed Route.

Simulation – The Project (see structure diagram) spanning Cascabel Road and the San Pedro River.

AC 500 kV TOWER STRUCTURE DIAGRAMS



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Typical single-circuit 500 kV galvanized self-supporting lattice dead-end transmission tower.

Photo Date and Time: 3-2-11, 11:46 a.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 57-degree field of view)

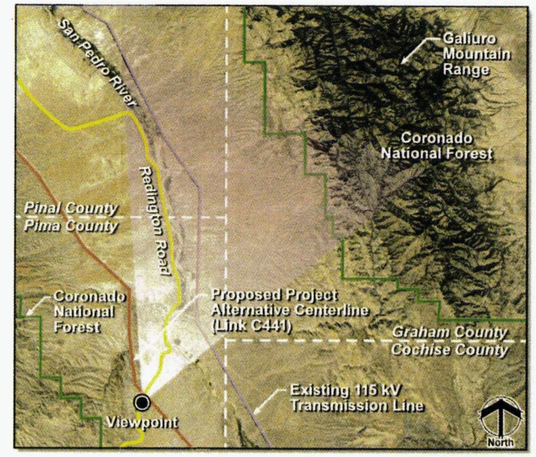
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

Exhibit G-4-1

September 2015

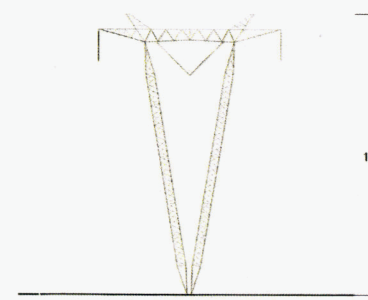
Existing Condition – View looking north-northeast from Pima County-designated Scenic Redington Road. Views from the travel route overlook the San Pedro Valley.



Photograph Location: Viewpoint is located 0.4 miles South of the proposed Route.

Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped and partially screened by topography and vegetation.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

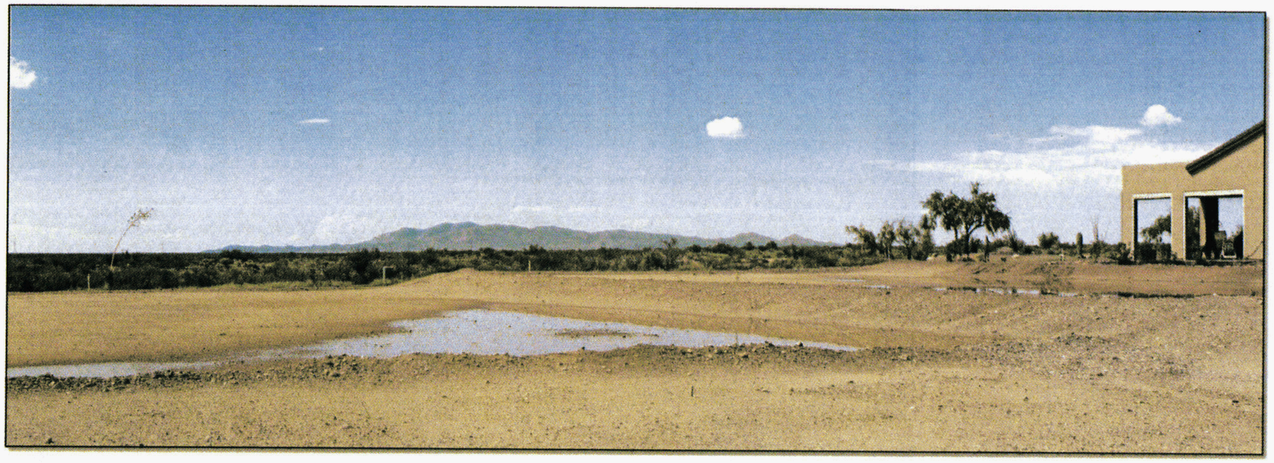
Photo Date and Time: 4-16-10, 12:43 p.m. Focal Length: 50mm

Simulations were prepared using three-dimensional structure models provided by the owner's engineer. Facility locations, colors, and heights will differ based on final engineering and design.

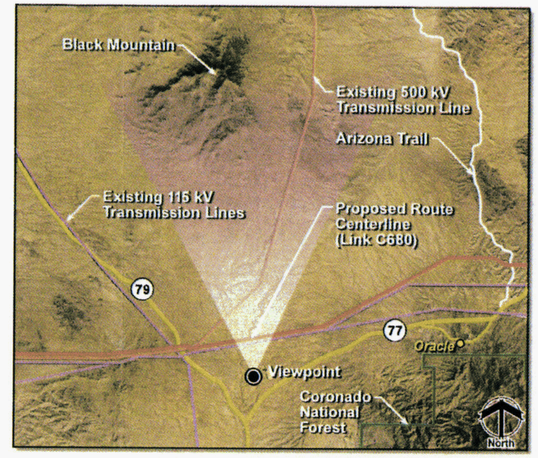
SunZia Southwest Transmission Line Project

Exhibit G-4-2

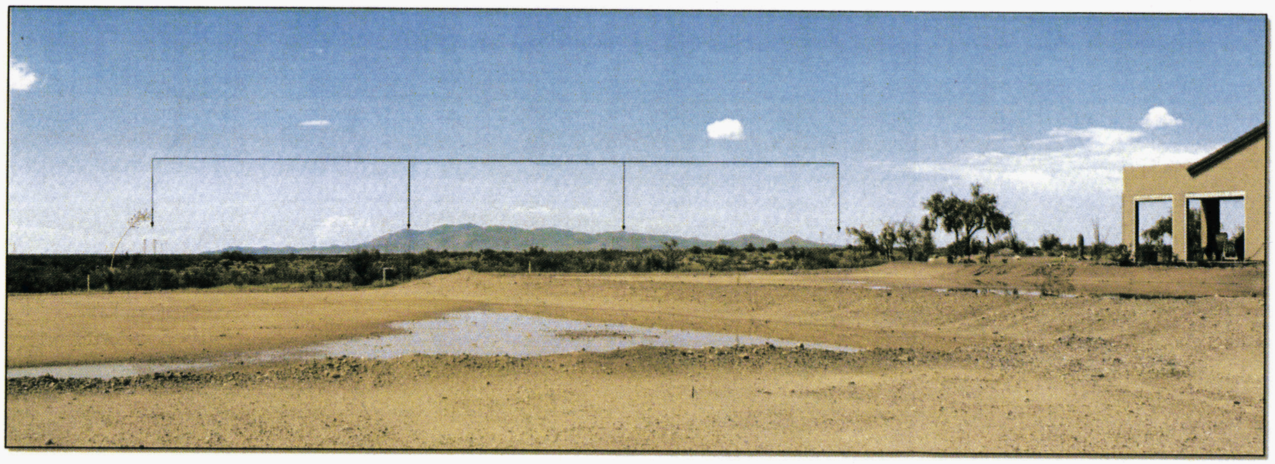
September 2015



Existing Condition – View looking north toward the existing 500 kV and 115 kV transmission lines.

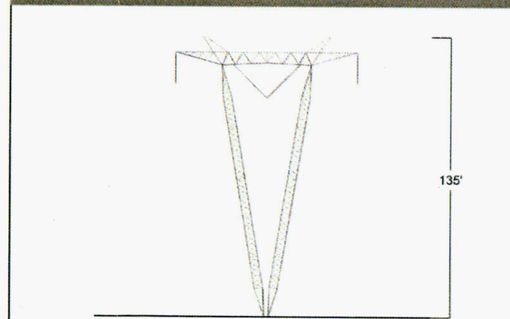


Photograph Location: Viewpoint is located 1.6 miles South of the proposed Route.



Simulation – The Project (see structure diagram) north of Saddlebrooke Ranch. The Project would have some sections skylined and others backdropped by the Black Mountains.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 8-12-15, 4:07 p.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 53-degree field of view)

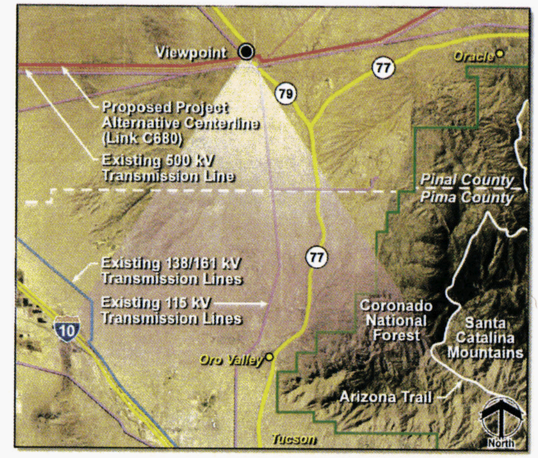
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

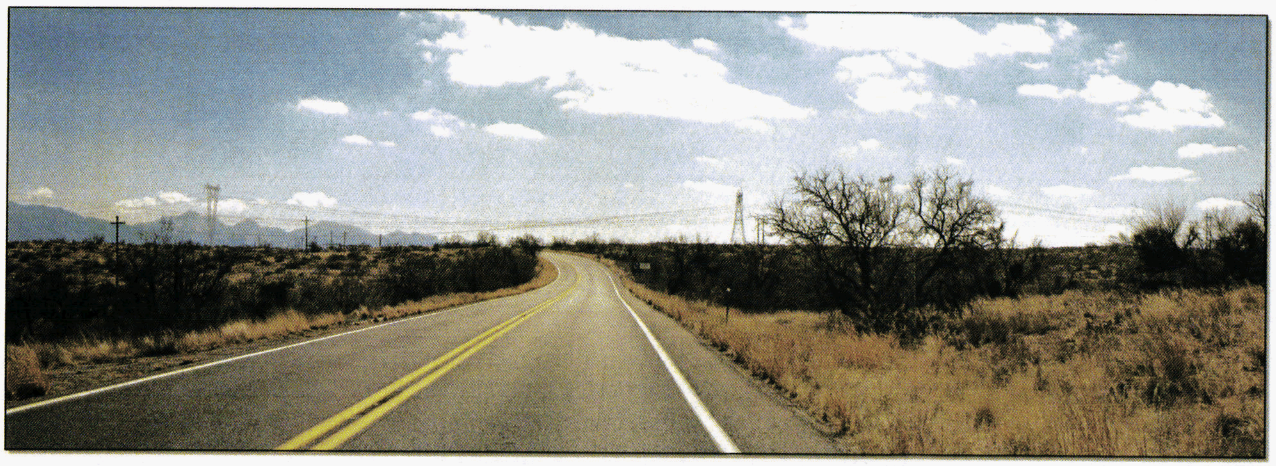
Exhibit G-4-3

September 2015

Existing Condition – View south along State-designated Scenic Pinal Pioneer Parkway (SR 79). Existing 500 kV and 115 kV transmission lines cross, or are adjacent to, this travel route.

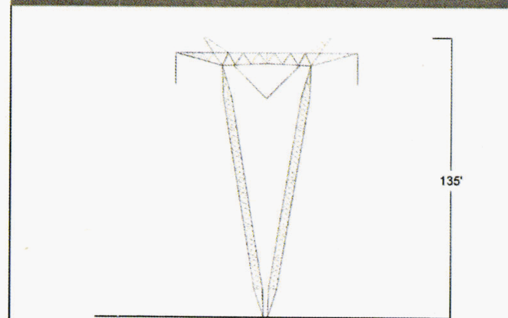


Photograph Location: Viewpoint is located 0.4 miles South of the proposed Route.



Simulation – The Project (see structure diagram) with typical spans. The Project would parallel existing transmission lines when crossing the travel route. The Project would have skylined conditions with partial screening due to topography and vegetation.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 2-24-11, 2:10 p.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 66-degree field of view)

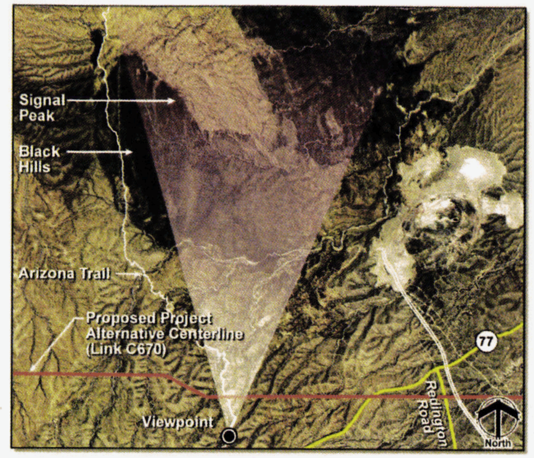
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

Exhibit G-4-4

September 2015

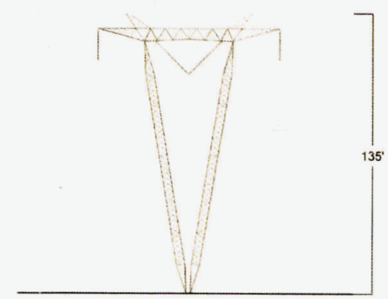
Existing Condition – View north from the Tiger Mine Trailhead on the Arizona Trail, a nationally designated scenic trail. Terrain in this viewshed includes Signal Peak and Pinal Peak, which are associated with the Black Hills north of Oracle.



Photograph Location: Viewpoint is approximately 0.7 mile from proposed transmission lines.

Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped by adjacent terrain.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

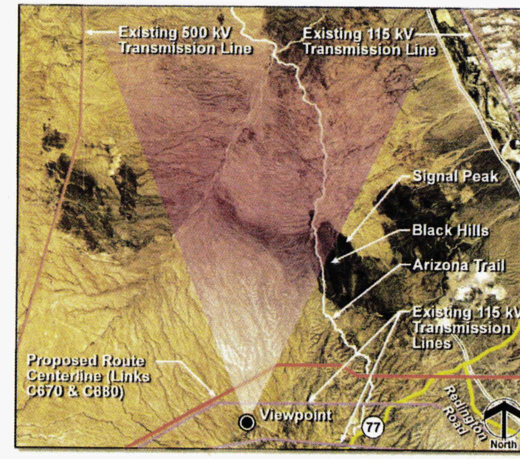
Photo Date and Time: 1-25-11, 1:05 p.m. Focal Length: 50mm
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Typical structures would range between 125 to 160 feet above ground with a span of 1,000 to 1,500 feet. Typical conductor sag would be 45' feet above ground.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

Exhibit G-4-5

September 2015

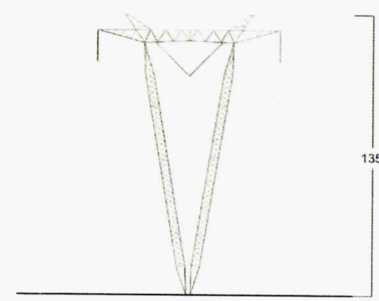
Existing Condition – View north from residences near Oracle toward an existing 115 kV transmission line. Adjacent scenery includes Signal Peak and the Black Hills.



Photograph Location: Viewpoint location is approximately 1.0 mile South of the proposed Route.

Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped by adjacent terrain and viewed in context with an existing 115 kV transmission line.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

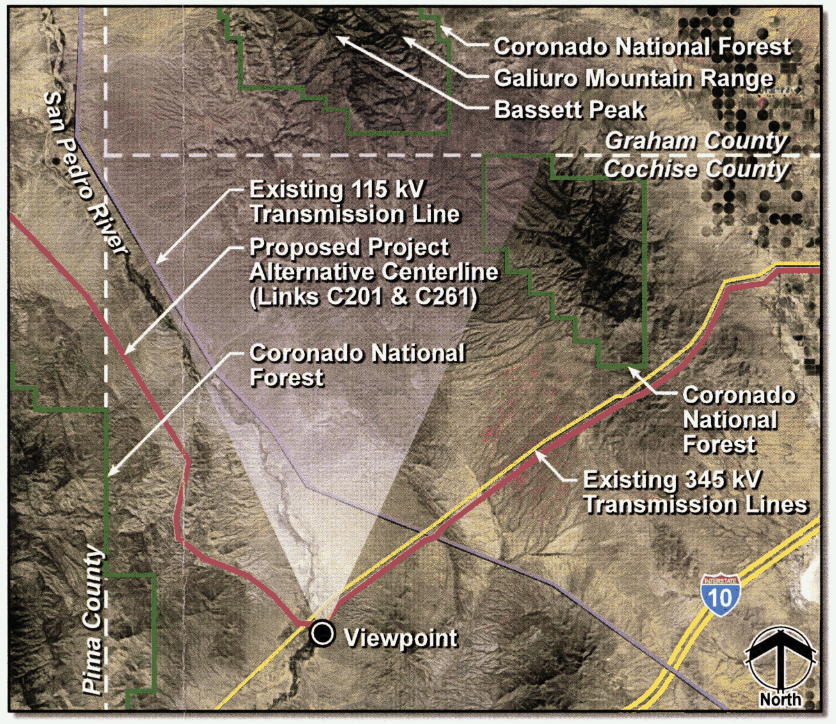
Photo Date and Time: 1-25-11, 12:48 p.m. Focal Length: 50mm
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Typical structures would range between 125 to 160 feet above ground with a span of 1,000 to 1,500 feet. Typical conductor sag would be 45' feet above ground.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

EXHIBIT G-4-6

September 2015

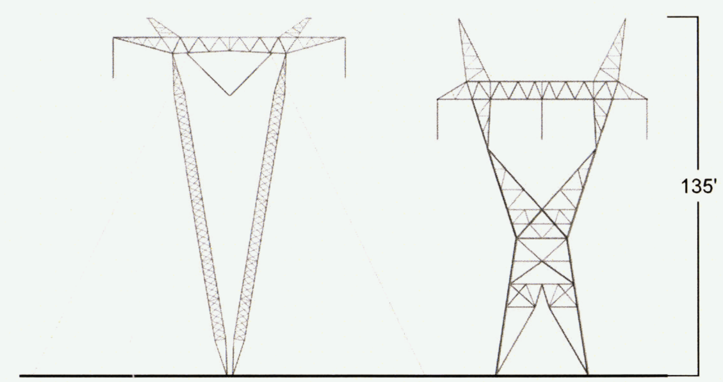
Existing Condition – View looking north along Cascabel Road toward existing 345 kV transmission line corridor approximately 1 mile north of viewpoint. Adjacent scenery includes Class A landscape of the San Pedro River.



Photograph Location: Viewpoint is located 0.3 miles South of the proposed Route.

Simulation – The Project (see structure diagram) spanning Cascabel Road and the San Pedro River.

AC 500 kV TOWER STRUCTURE DIAGRAMS



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Typical single-circuit 500 kV galvanized self-supporting lattice dead-end transmission tower.

Photo Date and Time: 3-2-11, 11:46 a.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 57-degree field of view)

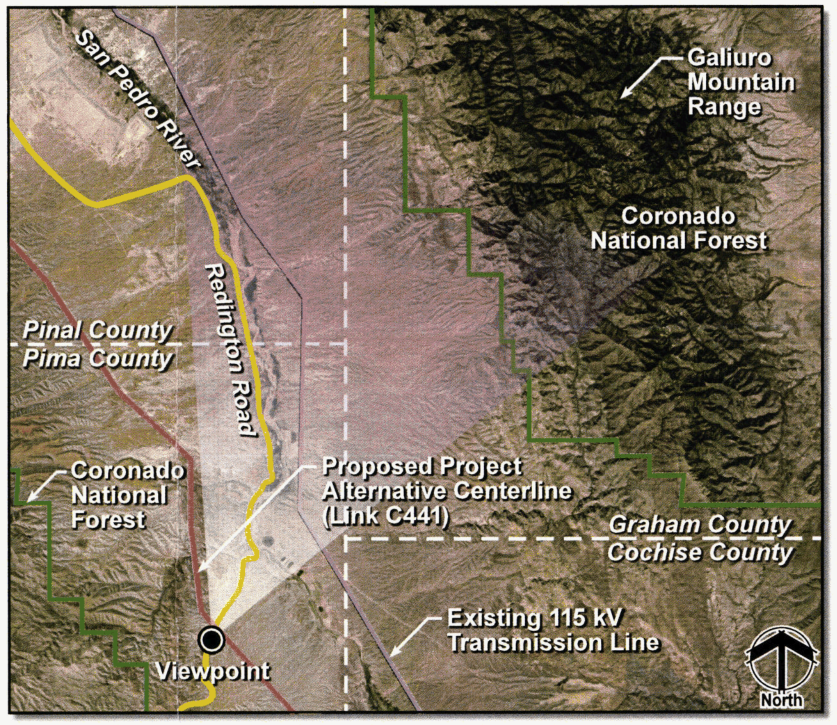
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

Exhibit G-4-1

September 2015

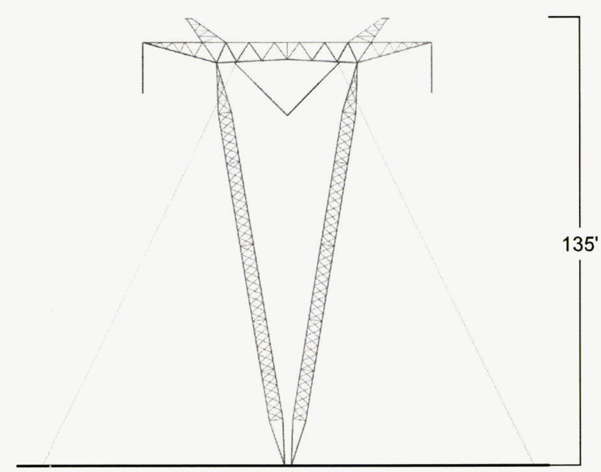
Existing Condition – View looking north-northeast from Pima County-designated Scenic Redington Road. Views from the travel route overlook the San Pedro Valley.



Photograph Location: Viewpoint is located 0.4 miles South of the proposed Route.

Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped and partially screened by topography and vegetation.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 4-16-10, 12:43 p.m. Focal Length: 50mm

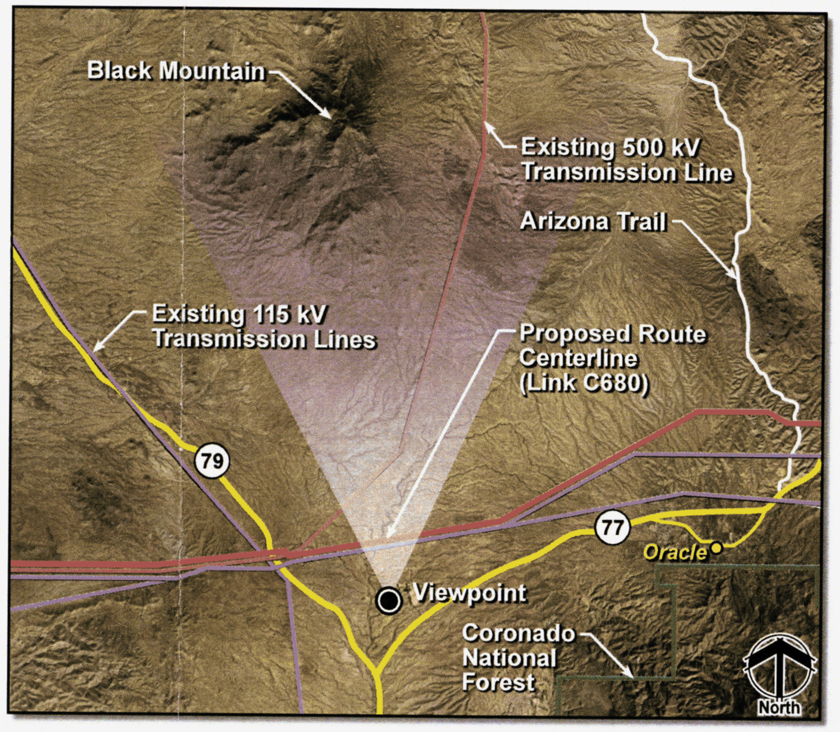
Simulations were prepared using three-dimensional structure models provided by the owner's engineer. Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

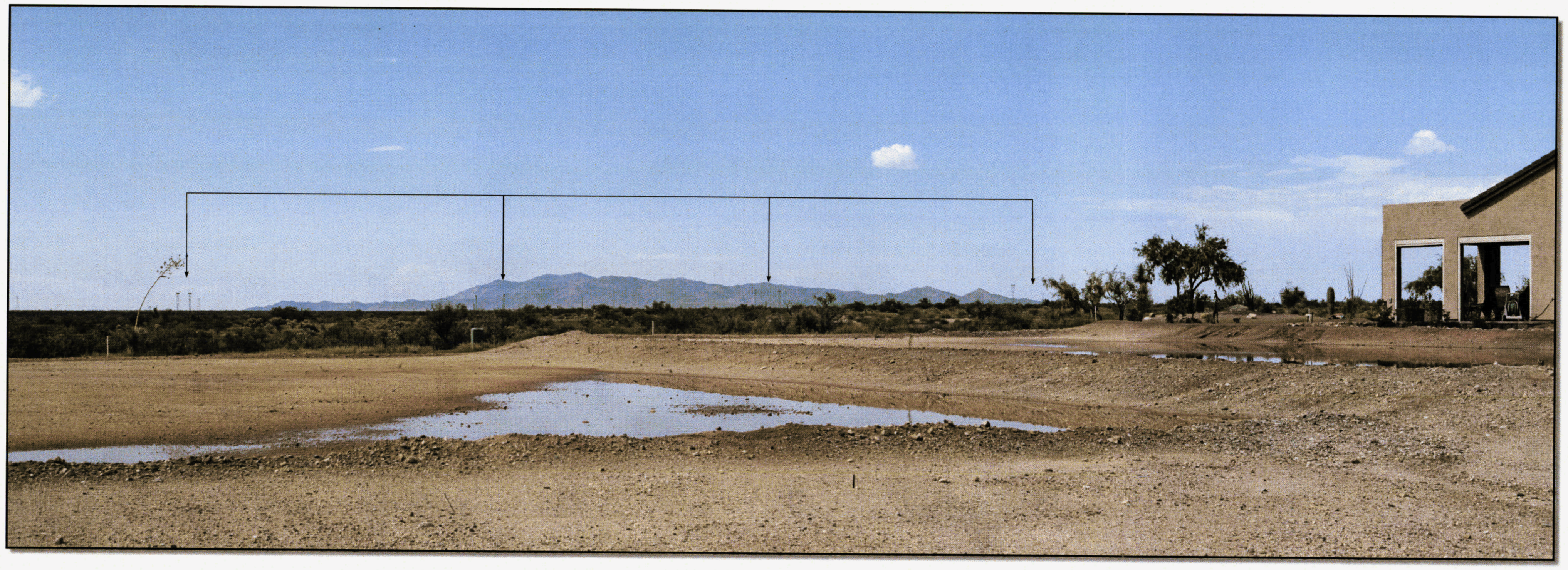
Exhibit G-4-2

September 2015

Existing Condition – View looking north toward the existing 500 kV and 115 kV transmission lines.

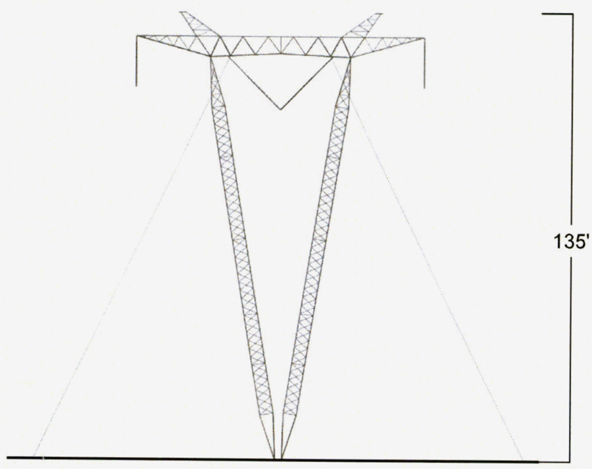


Photograph Location: Viewpoint is located 1.6 miles South of the proposed Route.



Simulation – The Project (see structure diagram) north of Saddlebrooke Ranch. The Project would have some sections skylined and others backdropped by the Black Mountains.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 8-12-15, 4:07 p.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 53-degree field of view)

Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

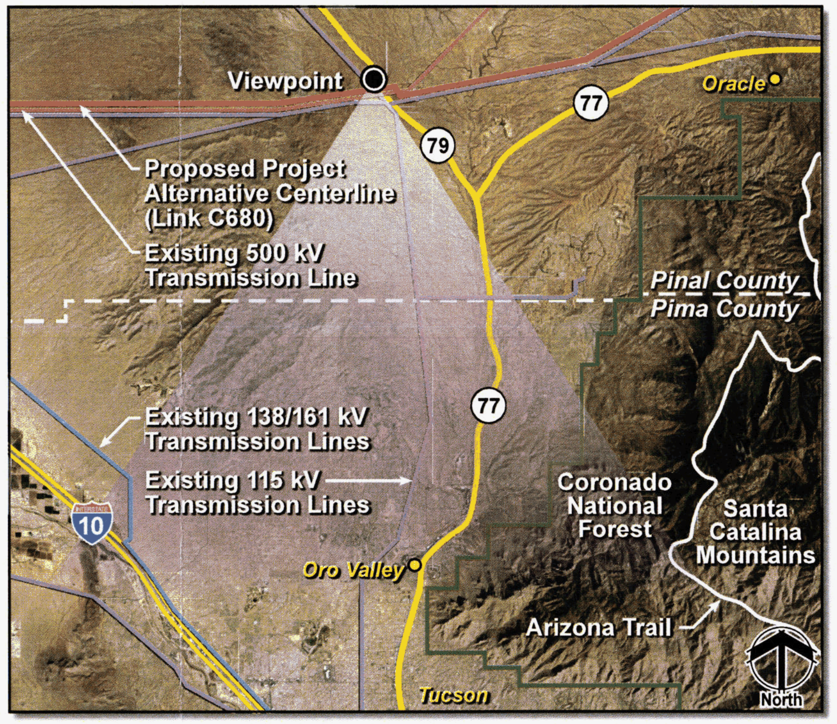
SunZia epg

SunZia Southwest Transmission Line Project

Exhibit G-4-3

September 2015

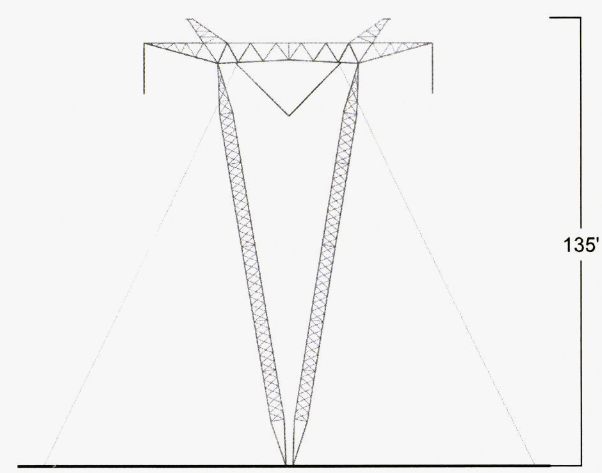
Existing Condition – View south along State-designated Scenic Pinal Pioneer Parkway (SR 79). Existing 500 kV and 115 kV transmission lines cross, or are adjacent to, this travel route.



Photograph Location: Viewpoint is located 0.4 miles South of the proposed Route.

Simulation – The Project (see structure diagram) with typical spans. The Project would parallel existing transmission lines when crossing the travel route. The Project would have skylined conditions with partial screening due to topography and vegetation.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 2-24-11, 2:10 p.m. Focal Length: 50mm
(The original photographs were taken at 50mm, then stitched together to create this panorama, resulting in an approximately 66-degree field of view)

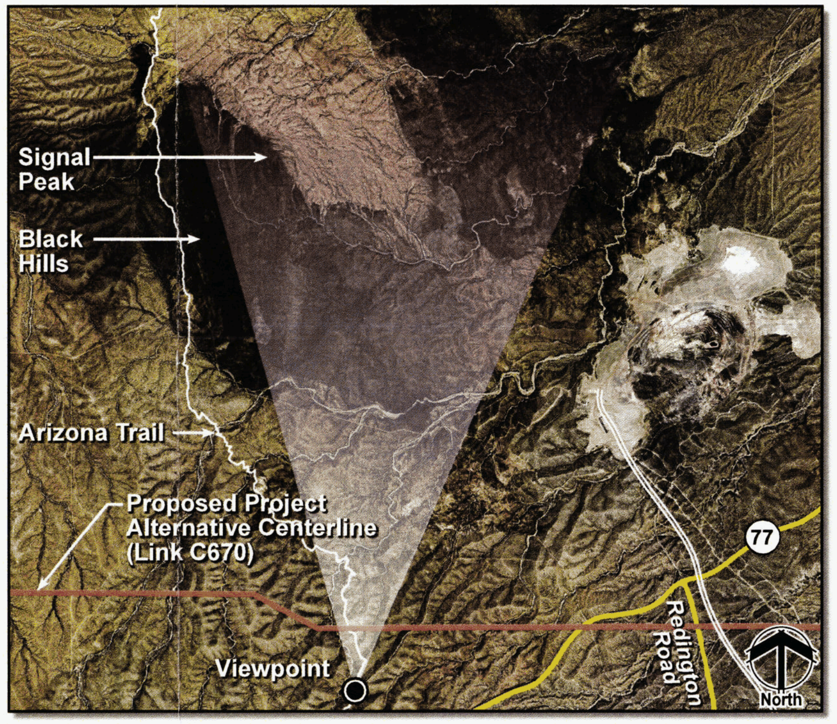
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

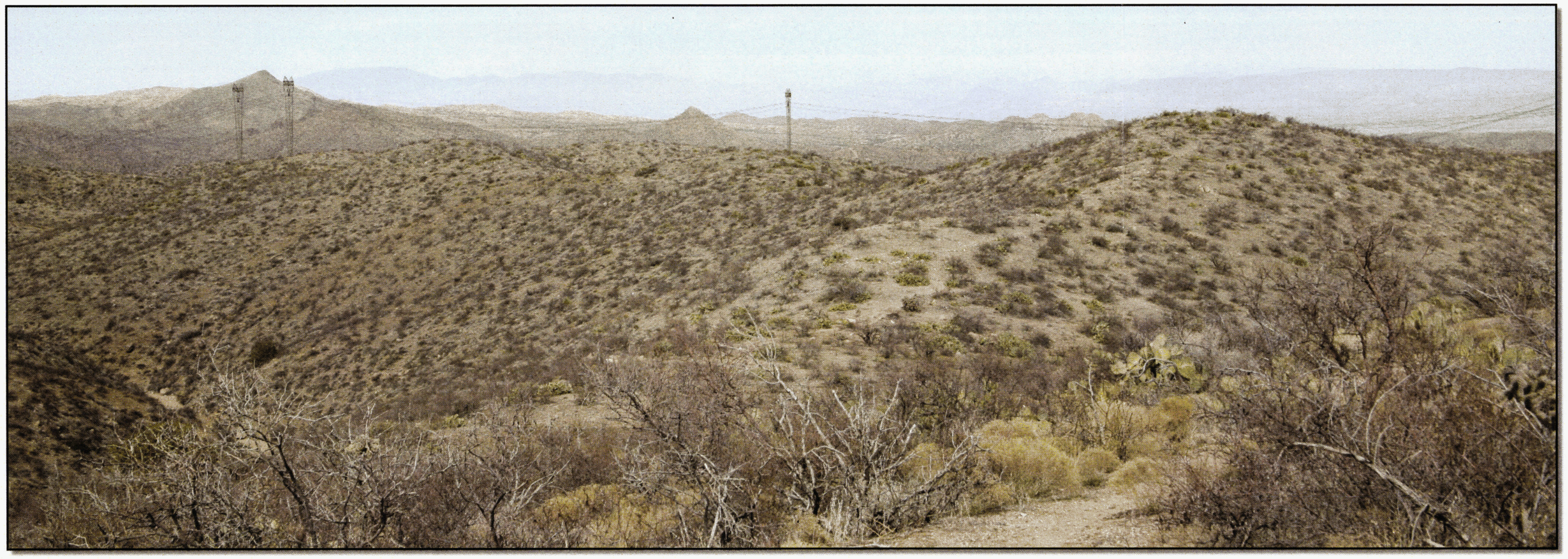
Exhibit G-4-4

September 2015

Existing Condition – View north from the Tiger Mine Trailhead on the Arizona Trail, a nationally designated scenic trail. Terrain in this viewshed includes Signal Peak and Pinal Peak, which are associated with the Black Hills north of Oracle.

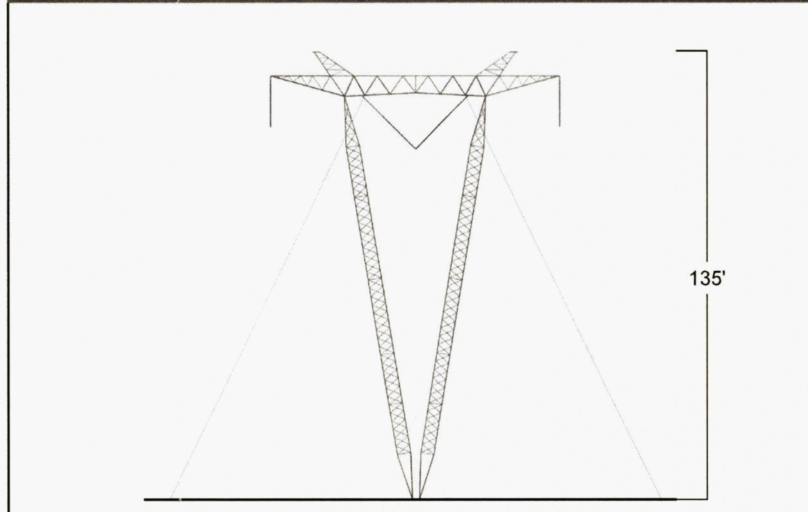


Photograph Location: Viewpoint is approximately 0.7 mile from proposed transmission lines.



Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped by adjacent terrain.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

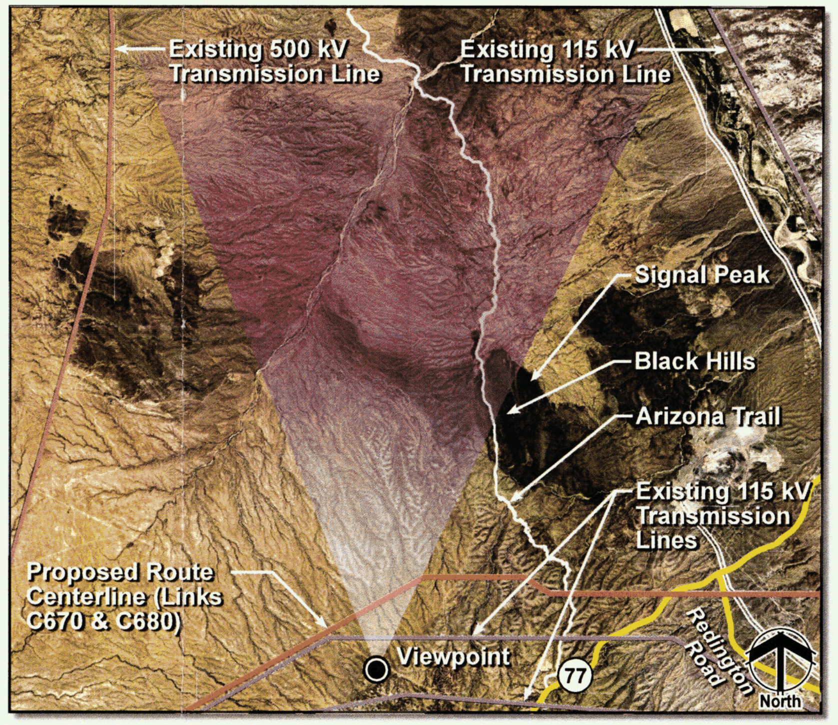
Photo Date and Time: 1-25-11, 1:05 p.m. Focal Length: 50mm
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Typical structures would range between 125 to 160 feet above ground with a span of 1,000 to 1,500 feet. Typical conductor sag would be 45' feet above ground.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia Southwest Transmission Line Project

Exhibit G-4-5

September 2015

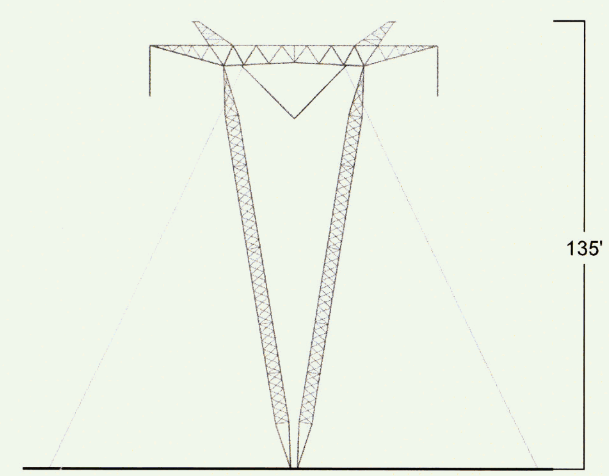
Existing Condition – View north from residences near Oracle toward an existing 115 kV transmission line. Adjacent scenery includes Signal Peak and the Black Hills.



Photograph Location: Viewpoint location is approximately 1.0 mile South of the proposed Route.

Simulation – The Project (see structure diagram) with typical spans. The Project would be backdropped by adjacent terrain and viewed in context with an existing 115 kV transmission line.

AC 500 kV TOWER STRUCTURE DIAGRAM



Typical single-circuit 500 kV galvanized guyed-V lattice transmission tower.

Photo Date and Time: 1-25-11, 12:48 p.m. Focal Length: 50mm
Simulations were prepared using three-dimensional structure models provided by the owner's engineer.
Typical structures would range between 125 to 160 feet above ground with a span of 1,000 to 1,500 feet. Typical conductor sag would be 45' feet above ground.
Facility locations, colors, and heights will differ based on final engineering and design.

SunZia epg

SunZia Southwest Transmission Line Project

EXHIBIT G-4-6

September 2015

Exhibits H

EXHIBIT H – EXISTING PLANS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"To the extent applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route."

Exhibit H-1 – Summary of Existing Plans

Exhibit H-2 – Copy of letter and written responses

EXHIBIT H-1 – SUMMARY OF EXISTING PLANS

Land management decisions, land use plans and the development approval process are the responsibility of the Arizona State Land Department, for Arizona State Trust Lands, and cities or counties, for private lands.

Existing and future land uses are mapped in Exhibits A-2 and A-3, respectively. As part of the land use study, general and comprehensive plans adopted by cities and counties with jurisdiction within the six-mile wide Project corridor were reviewed. These include Pinal, Pima, Cochise, Graham, and Greenlee counties and the cities of Coolidge, Eloy, and Willcox. Representatives from these cities and counties participated in the stakeholder group and open house meetings for the planning process, through which the alternative routes were identified, during the environmental review and study period leading to the issuance of the Record of Decision (ROD) by the Bureau of Land Management (BLM).

During the National Environmental Policy Act (NEPA) process, members of the SunZia Project study team also met with representatives from the Department of Defense (DOD), BLM, Bureau of Reclamation (BOR), Arizona State Land Department (ASLD), Arizona Department of Transportation (ADOT), Arizona Game and Fish Department (AGFD), United States Forest Service (USFS), National Park Service (NPS), and the aforementioned counties and cities, as well as legal representatives from private land owners within the regional study area. In 2015, letters were sent to the jurisdictions (listed in Table H-1) to provide project information, identify the Proposed Route, and request new or additional information regarding plans for development. Exhibit H-1 provides a Summary of Existing Plans. Exhibit H-2 provides a copy of the 2015 letter and written responses.

Planned Land Use

Greenlee County

The Proposed Route (Link B161) crosses the southern portion of Greenlee County entirely on lands managed by the BLM, which is designated rural, and most of which is undeveloped. The *Greenlee County Comprehensive Plan (2003)* depicts how the citizens, business people, landowners, and elected and appointed officials believe the County should develop in the future. The Plan is only advisory, is not a plan of development, and focuses attention on the perceived needs. No foreseeable future developments have been identified in the area of Greenlee County traversed by the Proposed Route.

Graham County

The *Graham County Comprehensive Plan (1996)* contains land use policies designed to guide the locating of specific land uses, rather than having a very general countywide land use map. The goals described in the county plan outline a desired outcome and provide a vision of what Graham County currently offers and wants to continue to provide its residents and visitors through the orderly growth and development of those lands within its jurisdiction. The portion of the Proposed Route traversing Graham County is located entirely on lands managed by the BLM and ASLD. No specific development plans have been identified at this time, with respect to the lands crossed by the Proposed Route in Graham County.

Cochise County

The Land Use Element of the *Cochise County Comprehensive Plan (2006) amended (2015)* identifies where and how growth in the county should occur with the goal of promoting development that occurs in a manner that preserves open space, agriculture and ranching resources, wildlife corridors, hydrologic recharge areas, floodplains, geologic features, historic, archaeological, or cultural resources, and arable soils.

A recent amendment to the Comprehensive Plan includes the Renewable Energy Element, for which a high resolution land use suitability analysis for locating utility-scale solar facilities was conducted by the University of Arizona in 2013. The study shows over 770,000-acres of high potential for small scale solar projects of 5 megawatts (MW) or less, and over 640,000-acres of high potential for large scale solar projects greater than 5 MW throughout the county.

As a governmental entity, Cochise County directly and indirectly influences energy efficiency in the county through its planning activities. According to the county plan, one main goal is to support the development of local renewable energy projects and technologies. Implementation of that goal includes the following policies: (a) Encourage utility-scale renewable energy projects, using the University of Arizona's Renewable Energy Opportunity Analysis and other resources as a guide for determining the suitability of proposals in any one location; (b) Encourage renewable energy business development; (c) Support renewable energy employment training opportunities at local colleges; and (d) Permit flexible site development standards.

The Proposed Route enters Cochise County on Arizona State Trust Land that is undeveloped. According to the Cochise County Comprehensive Plan, the areas surrounding Willcox that are located within the Proposed Route study corridor are categorized as follows:

- Category B: Community Growth Areas, which includes those areas adjacent to Category A: Urban Growth Areas, as well as the larger unincorporated communities of the County, which are experiencing growth. These are areas in transition from a traditional rural environment to a more urbanized environment. Lands located within the project corridor for the Proposed Route within this area have the following designations:
  - "Neighborhood Conservation" (NC), is an area that has an established character, is primarily residential, and needs special rezoning protections to maintain the character of land use that occurs, in general, on lot sizes of one acre or less, located approximately 1.5 to three miles south of Link C110 between mile posts 5 through 8.
  - "Developing" (DEV), are areas experiencing non-rural growth rates that are developed with scattered mixed residential, business or industrial, and agriculture-related uses and that ultimately will accommodate future growth as the more populated areas reach build-out. Most of the area surrounding the Willcox city boundary is within this designation.
  - "Enterprise" (ENT), is an area that has an established pattern of commercial and/or industrial land use; any future development should follow that trend. The area surrounding Cochise County airport just west of Willcox is under this designation.

- Category D: Rural Areas include the outlying rural areas between cities and unincorporated communities and are characterized by a low rate of growth; unimproved roads; low density, large lot rural residential development; agricultural production; and large tracts of undeveloped private and public lands. Continuing through Cochise County, the Proposed Route (Links C212, C260, C261, and C201) crosses primarily undeveloped land within this category.

The route crosses Arizona State Trust Land primarily dedicated to grazing (Link C441). The Nature Conservancy lands are located along the San Pedro River, north of the site where the Proposed Route crosses the river. No planned developments are crossed by, or located within the study corridor of the Proposed Route in Cochise County.

City of Willcox

The Proposed Route study corridor crosses private land located within the City of Willcox planning area south of Link C110 (approximately between mileposts 9 through 14). This area is designated Low Density Residential/Rural according to the *City of Willcox General Plan (2009)*, with agriculture as the primary use.

Pima County

The most recent update to the *Pima County Comprehensive Plan (2007)* is called *Pima Prospers (2015)*. The plan focuses on regional infill and logical suburban expansion of some parts of the unincorporated area being or having been reviewed by municipalities in their planning.

The Proposed Route enters Pima County (Link C441) in the San Pedro Planning Area as described in Pima Prospers (2015) on Arizona State Trust Land dedicated to grazing. County-owned conservation/preservation lands exist along the San Pedro River and to the west of the Proposed Route. Properties identified as preserve lands and owned in fee by Pima County are designated Resource Conservation (RC) in the land use plan. The remainder of the area within the study corridor, approximately 16 miles of the Proposed Route traversing Pima County, is undeveloped land owned by the State of Arizona and designated Low Intensity Rural (LIR). The definition of the RC and LIR land use designations as described in the Pima County Comprehensive Plan (2001) is provided below. No specific planned developments have been identified in these areas.

Low Intensity Rural (LIR)

- Objective: To designate areas for residential uses at densities consistent with rural and resource based characteristics.
- Residential Gross Density: Residential gross density shall conform to the following:
  - 1) Minimum – none
  - 2) Maximum – 0.3 residences per acre (RAC).
- Residential Gross Densities for Developments Using Transfer of Development Rights (TDRs): Projects within designated Receiving Areas utilizing TDRs for development shall conform to the following density requirements:
  - 1) Minimum – none
  - 2) Maximum – 0.3 RAC.

Resource Conservation (RC)

- Objective: To designate publicly-owned lands that are public resource lands and preserves that protect sensitive and high-value biological, resource value, cultural, recreational, and other sensitive resources lands. These do not include private or state trust lands, whether or not they are leased by the County for open space purposes. If these lands become privately held during the lifespan of this plan, they will be treated as Resource Sensitive unless otherwise designated through a plan amendment process.

- Residential Gross Density: None, other than allowances for life estates, ranch caretakers and similar uses.

Pinal County

The *Pinal County Comprehensive Plan (2009) updated (2014)* was reviewed in order to identify planned land use and growth areas located in the vicinity of the Proposed Route. The Proposed Route enters Pinal County on Arizona State Trust Land along Link C450 (milepost 5) and continues through and near multiple areas designated in the plan as "Moderate Low Density Residential," in and around the communities of San Manuel and Oracle (Link C670). Existing homes in areas surrounding San Manuel and Oracle are widely dispersed and located within the area designated "very low residential" according to the plan.

The Proposed Route crosses the Tri-Communities and West Pinal Growth Areas as described in the Growth Area Plan of the Comprehensive Plan.

- **Tri-Communities Growth Area:** The SR 77 corridor extending from the Tucson metropolitan area through Oracle Junction to the Town of Mammoth is the spine of the Tri-Communities Growth Area. Growth is anticipated to occur in this area due to its proximity to Tucson, state highway access and environmental resources. The Tri-Communities Growth Area identifies High and Mid-Intensity Mixed Use Activity Centers at Oracle Junction, a Mid-Intensity Activity Center in San Manuel and Low Intensity Activity Centers in Oracle and Mammoth.
- **West Pinal Growth Area:** The West Pinal growth area encompasses much of the cities of Casa Grande, Eloy, Coolidge, Florence, and Maricopa. Within this growth area, the plan identifies a mix of High and Mid-Intensity Mixed Use Activity Centers and numerous large parcels of employment land identified by the municipalities. The development of these activity centers and employment areas will significantly add to the job base of Pinal County. The residential development planned within the activity centers will also change the development pattern considerably within this Growth Area.

The Proposed Route (Link C680) crosses the Saddlebrooke Ranch Planned Area Development (PAD) Overlay District, parallel to the existing APS 115 kV transmission line near the northern boundary of the district. Land uses described in the PAD, as approved by Pinal County, include single family and multi-family residential, commercial, resort, golf course, open space, industrial, and a utility corridor.

According to the Pinal County Comprehensive Plan, the area north of the Proposed Route (Links C840 and C850) near the existing Coolidge Airport in Pinal County has been identified for future development of an Aviation-Based Commerce Center. The 47-square-mile area is between the CAP canal and SR 79 on Arizona State land. No specific plans for development of this area have been identified.

City of Coolidge

The Growth Areas Element of the *City of Coolidge General Plan (2014)* describes the focus of each of four different growth areas within the planning area of the city. The Proposed Route would cross Growth Area 4, which is a large area of state trust lands surrounding isolated pockets of private property. No development within this growth area is expected.

The area surrounding the Pinal Central Substation is given the land use classification of "Urban Neighborhood". This designation makes up about 50 percent of the total land area of the city according to the General Plan. Most of the land crossed by the Proposed route and within the study corridor, including the Pinal Central Substation, in this area is designated "Agricultural" (AG), with a few areas north of the Proposed Route study corridor designated "Planned Area Development" (PAD), and "General Industrial" (I-2).

The Coolidge General Plan describes the "Urban Neighborhood" land use category as: "providing for a mixture of uses that would typically be found in an urbanized section of land including neighborhood scale commercial services, professional office, single family and multi-family residential at varying densities, community facilities including churches and schools, public utility installations and parks and open space. Within the planning area boundary, the Urban Neighborhood category is located over previously approved planned area developments that provide a mix of uses that are designed with places of character" (City of Coolidge 2014).

The City of Mesa currently owns several acres of land adjacent to SR 87 south of SR 287 within the City of Coolidge boundary and planning area that is designated as "Agricultural" (AG), according to the Coolidge General Plan. Much of this land is currently being sold to private developers and has been annexed by the City of Coolidge. No specific development plans have been identified in this area. (See Exhibit A-3 for specific location).

City of Eloy

According to the *City of Eloy General Plan (2010)*, the majority of the land within the current City limits of Eloy is designated for residential purposes. The predominant current land use is agriculture. There are also many areas within the City and the Planning Area that have not been developed and remain vacant in natural desert conditions. The Proposed Route does not cross locations within the Eloy incorporated area or planning area; however, the most northern portion of the city is located just inside the study corridor for the Proposed Route. Within this area are lands designated Medium Density Residential according to the General Plan.

In accordance with the General Plan, the following growth areas described would be within the study corridor for the Proposed Route along Links C880 and C880a as they terminate at the Pinal Central Substation.

- Eloy-Casa Grande Interface: This growth area interfaces with the City of Casa Grande. It includes Eloy's first upscale Master Planned Community as well as other proposed retail establishments, catering to travelers along Interstate 10. Transportation related industries are also ideally suited for this growth area. The area includes a mixture of low to high density residential with some commercial and industrial designated parcels.
- North Central: This growth area includes potential energy hubs for the Pinal Central Substation area. This area includes mostly residential designated land with small five to 10 acre commercial sites and some industrial, designated for airport uses.
- Picacho Vista: This growth area is another potential employment corridor with access to Interstate 10, Highway 87, and the Union Pacific Rail Road. The eastern edge of this area also has the potential for upscale "Resort Style" living given its proximity to the base of the Picacho Mountain range. This Growth Area is focused around industrial and commercial uses with some higher density residential uses.

Other Plans

In order to identify potential developments that may be located in the vicinity, contacts were made with the cities of Benson, Casa Grande, Marana, Safford, and Tucson. Listed below are the existing plans for these areas.

- City of Benson General Development Plan (2002) (2015)
- City of Casa Grande General Plan (2009)
- City of Safford General Plan (2004)
- City of Tucson General Plan (2001) Plan Tucson (2013)
- Town of Marana General Plan Update (2007) (2010)

These cities, along with the jurisdictions previously described in detail above, were sent letters providing Project information, including the identification of the Proposed Route, and a request for new or additional information on plans or planned developments in their areas (Table H-1).

Table H-1. Entities that Received Letters with Project Information	
Contact Name and Title	**Jurisdiction/Agency/Organization**
Steve Abraham, *Planning Manager* cc: Pete Rios, *County Supervisor* District 1 cc: Greg Stanley, *County Manager*	Pinal County
Lisa Atkins, *State Land Commissioner*	Arizona State Land Department
Sue Black, *Executive Director*	Arizona State Parks
Paul David, *P.E.*	Arizona Department of Transportation
Ernie Duarte, *Planning and Development Services Director* cc: Michael Ortega, *City Manager*	City of Tucson
Peter Gerstman, *Executive Vice President*	Robson Communities
Joe Goodman, *Planning and Zoning Director* cc: Terry Cooper, *County Manager*	Graham County
Mary Gomez, *Interim Director Community Development* cc. Richard Searle, *Board of Supervisors* District 3 cc: James Vlahovich, *County Administrator*	Cochise County
Brad Hamilton, *Zoning Administrator* cc: Bill Stevens, *City Manager*	City of Benson
Chuck Huckleberrry, *County Administrator* cc: Arlan Colton, *Planning Director*	Pima County
Lesley Meyers, *Area Manager*	Bureau of Reclamation Central Arizona Project Canal
Rick Miller, *Growth Management Director* cc: Robert Flatley, *City Manager*	City of Coolidge
Phillip Ronnerud, *Director Planning and Zoning* cc: David Gomez, *Chairman* District 1 cc: Deborah Gale, *County Administrator*	Greenlee County
Lisa Shafer, *Planning/Community Development Director* cc: Gilbert Davidson, *Town Manager*	Town of Marana
Jeff Stoddard, *Building Inspector* cc: Ted Soltis, *City Manager*	City of Willcox
Paul Tice, *Planning and Development Director* cc: James Thompson, *City Manager*	City of Casa Grande
Mike Urton, *General Manager* cc: Ed Begay *Acting Project Manager* SCIP cc: John McLaughlin *Environmental Compliance* BOR	San Carlos Irrigation and Drainage District
John Vlaming, *Director Community Development* cc: Harvey Krauss, *City Manager*	City of Eloy
Dustin Welker, *Planning and Community Development Director* cc: Horatio Skeete, *City Manager*	City of Safford
John Wesley, *Planning Director*	Planning Director, City of Mesa

References

City of Coolidge. 2014. City of Coolidge General Plan

City of Eloy. 2010. City of Eloy General Plan

Cochise County. 2015. Cochise County Comprehensive Plan

Graham County. 1996. Graham County Comprehensive Plan

Greenlee County. 2003. Greenlee County Comprehensive Plan

Pinal County. 2014. Pinal County Comprehensive Plan

Pima County. 2007. Pima County Comprehensive Plan

Pima County. 2015. Pima Prospers

City of Willcox. 2009. City of Willcox General Plan

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EXHIBIT H-2– COPY OF LETTER AND WRITTEN RESPONSES

August 12, 2015

[ADDRESSEE]

RE: SunZia Southwest Transmission Project

Dear __________:

SunZia Transmission, LLC (SunZia) plans to file an application for a Certificate of Environmental Compatibility (CEC) for the SunZia Southwest Transmission Project with the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) within the next 30 days. The proposed project involves the development of two new 500 kV electrical transmission lines and associated facilities originating at a new substation (SunZia East) in Lincoln County, New Mexico, and terminating at the existing Pinal Central Substation in Pinal County, Arizona. The Arizona portion of the transmission line is approximately 200 miles in length and would cross Arizona State Trust Land administered by the Arizona State Land Department (ASLD), Bureau of Reclamation (BOR), Bureau of Land Management (BLM), and private lands located within Greenlee County, Graham County, Cochise County, Pinal County, Pima County, City of Coolidge, and within the planning boundaries of the City of Eloy, Arizona. The SunZia project application will be brought before the Siting Committee to request approval of a CEC for the proposed route, as shown on the Project map (see enclosure).

Arizona Administrative Code Rule R14-3-219 directs an applicant to include in its application an Exhibit H addressing the following:

"To the extent the applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route."

This letter is intended to offer an opportunity for your agency to provide any information or comments regarding development plans for inclusion in the application. We respectfully request your response in writing; specifically, please advise us of any existing or future plans that may have changed since the completion of our data collection.

To allow your information to be included in the CEC application, please reply to EPG, on behalf of SunZia Transmission LLC, by August 28, 2015 at the address above.

Thank you for your cooperation.

Sincerely,

Mickey Siegel, Project Manager

Environmental Planning Group

Enclosure: SunZia Southwest Transmission Project Map

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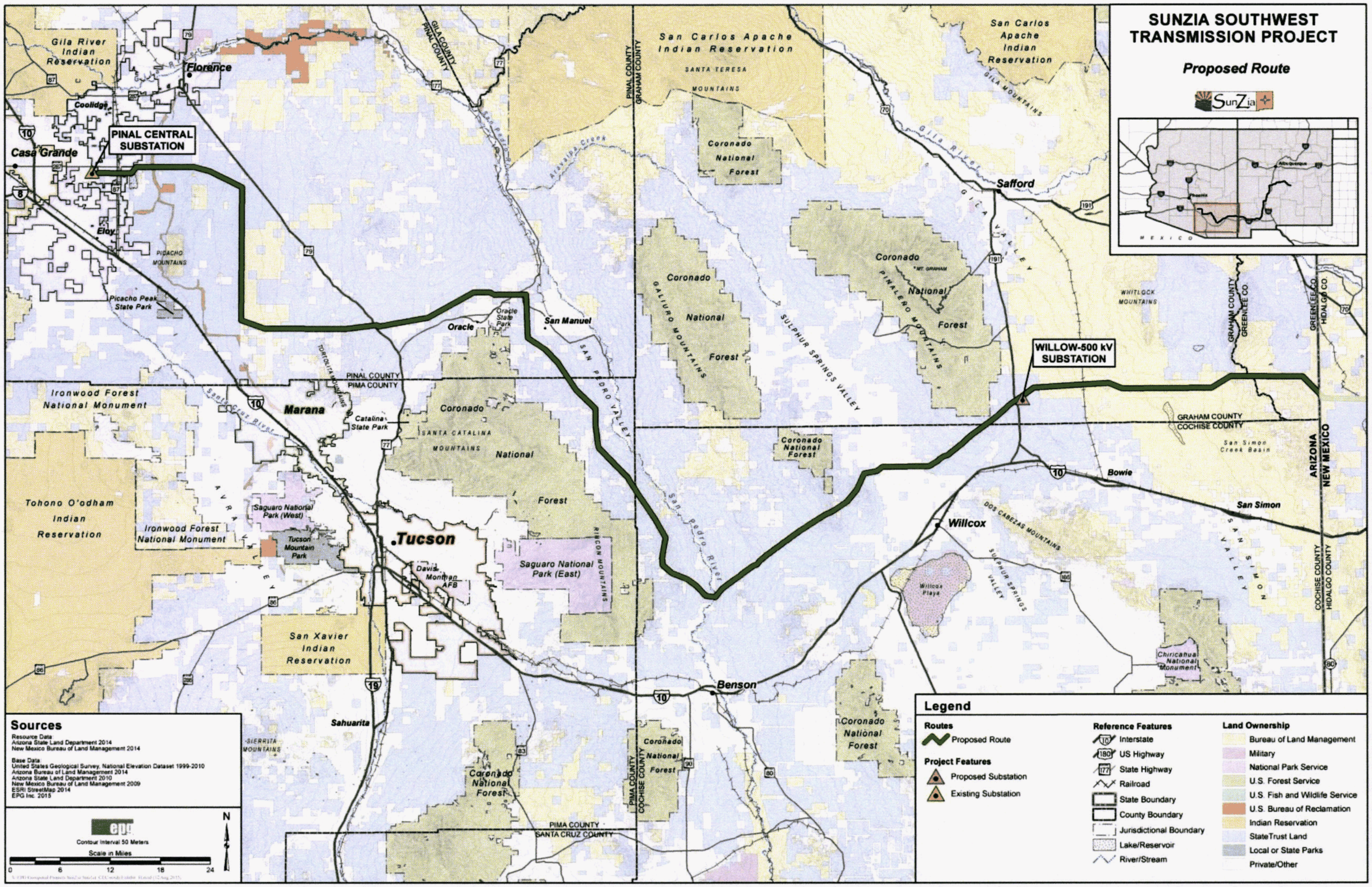
EXHIBIT H-2


SUNZIA SOUTHWEST TRANSMISSION PROJECT
Proposed Route
PINAL CENTRAL SUBSTATION
WILLOW-500 kV SUBSTATION
Casa Grande
Florence
Coolidge
Eloy
Marana
Tucson
Oracle
San Manuel
Safford
Willcox
Benson
Bowie
San Simon
Sahuarita
Gila River Indian Reservation
San Carlos Apache Indian Reservation
Tohono O'odham Indian Reservation
San Xavier Indian Reservation
Ironwood Forest National Monument
Coronado National Forest
Saguaro National Park (West)
Saguaro National Park (East)
Tucson Mountain Park
Picacho Peak State Park
Catalina State Park
Oracle State Park
Davis-Monthan AFB
Chiricahua National Monument
Willcox Playa
SULPHUR SPRINGS VALLEY
SAN PEDRO VALLEY
SAN SIMON VALLEY
GILA VALLEY
AVRA VALLEY
GALIURO MOUNTAINS
PINALENO MOUNTAINS
SANTA CATALINA MOUNTAINS
RINCON MOUNTAINS
SANTA TERESA MOUNTAINS
GILA MOUNTAINS
DOS CABEZAS MOUNTAINS
WHITLOCK MOUNTAINS
PICACHO MOUNTAINS
TORTOLITA MOUNTAINS
SIERRITA MOUNTAINS
San Pedro River
Santa Cruz River
Gila River
Aravaipa Creek
San Simon Creek Basin
PINAL COUNTY
PIMA COUNTY
GILA COUNTY
GRAHAM COUNTY
COCHISE COUNTY
GREENLEE CO
HIDALGO CO
HIDALGO COUNTY
SANTA CRUZ COUNTY
ARIZONA
NEW MEXICO
MEXICO
Sources
Resource Data:
Arizona State Land Department 2014
New Mexico Bureau of Land Management 2014
Base Data:
United States Geological Survey, National Elevation Dataset 1999-2010
Arizona Bureau of Land Management 2014
Arizona State Land Department 2010
New Mexico Bureau of Land Management 2009
ESRI StreetMap 2014
EPG Inc. 2015
epg
Contour Interval 50 Meters
Scale in Miles
0
6
12
18
24
N
Legend
Routes
Proposed Route
Project Features
Proposed Substation
Existing Substation
Reference Features
Interstate
US Highway
State Highway
Railroad
State Boundary
County Boundary
Jurisdictional Boundary
Lake/Reservoir
River/Stream
Land Ownership
Bureau of Land Management
Military
National Park Service
U.S. Forest Service
U.S. Fish and Wildlife Service
U.S. Bureau of Reclamation
Indian Reservation
State Trust Land
Local or State Parks
Private/Other

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AUG 18 2015

CITY OF ELOY
ARIZONA
COMMUNITY DEVELOPMENT DEPARTMENT

August 17, 2015

Mr. Mickey Siegel
Project Manager
Environmental Planning Group
4141 North 32nd Street, Suite 102
Phoenix, AZ 85018

RE: SunZia Southwest Transmission Project

Dear Mr. Siegel:

The City of Eloy has received your correspondence of August 12, 2015. Our staff has reviewed the proposed corridor study area on the attached map and would like to inform you that the proposed SunZia Southwest Transmission Project it is **not** currently located within our Planning Area or incorporated area. As of February 9, 2015 a portion of this area became part of the City of Coolidge through an annexation and an expanded area transitioned from our planning area to their Planning area as of August 2014.

Enclosed is a map for your review which illustrates the City of Eloy's amended Planning Area in more detail. Please feel free to contact me at (520) 466-2578 if you require additional information or have any questions.

Regards,

Jon Vlaming
Community Development Director

Cc: Harvey Krauss, City Manager

1137 W. HOUSER RD, ELOY, ARIZONA 85131
PH: 520-466-2578
FAX: 520-464-1438

"RIGHT IN THE HEART OF ARIZONA'S FUTURE"

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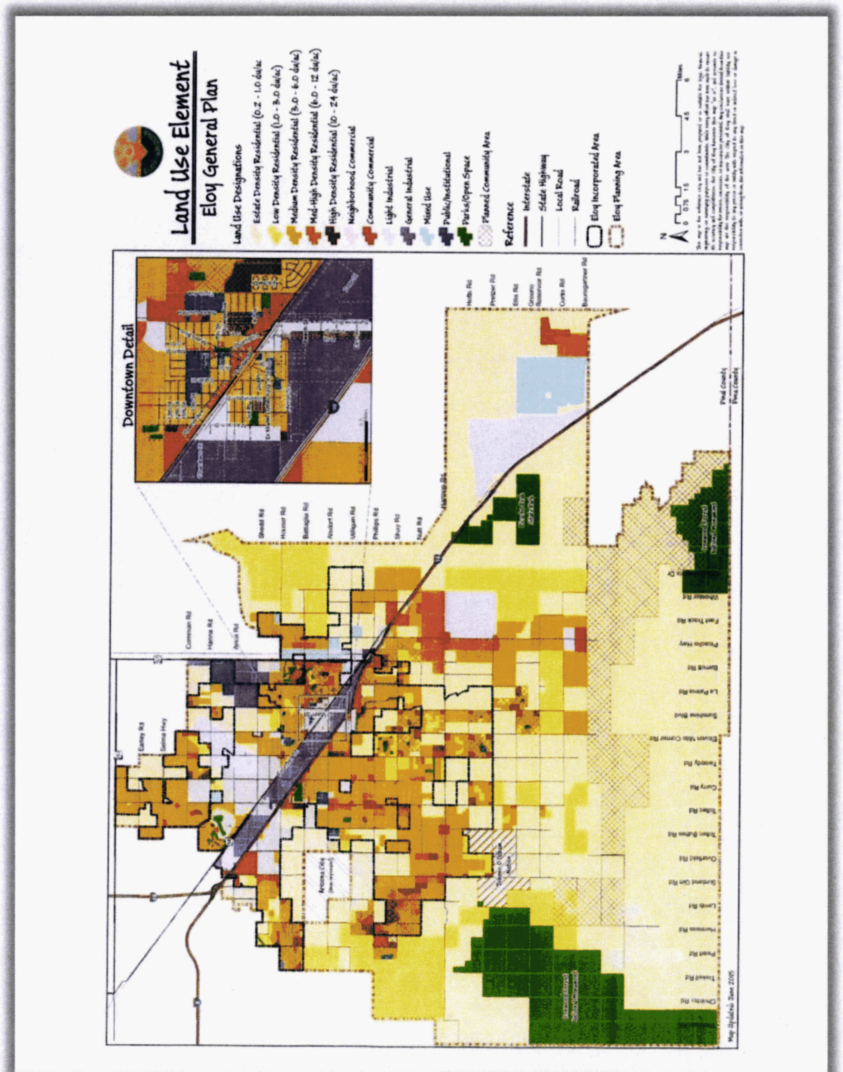
EXHIBIT H-2


Land Use Element
Eloy General Plan
Land Use Designations
Estate Density Residential (0.2 - 1.0 du/ac)
Low Density Residential (1.0 - 3.0 du/ac)
Medium Density Residential (3.0 - 6.0 du/ac)
Med-High Density Residential (6.0 - 12 du/ac)
High Density Residential (10 - 24 du/ac)
Neighborhood Commercial
Community Commercial
Light Industrial
General Industrial
Mixed Use
Public/Institutional
Parks/Open Space
Planned Community Area
Reference
Interstate
State Highway
Local Road
Railroad
Eloy Incorporated Area
Eloy Planning Area
Downtown Detail

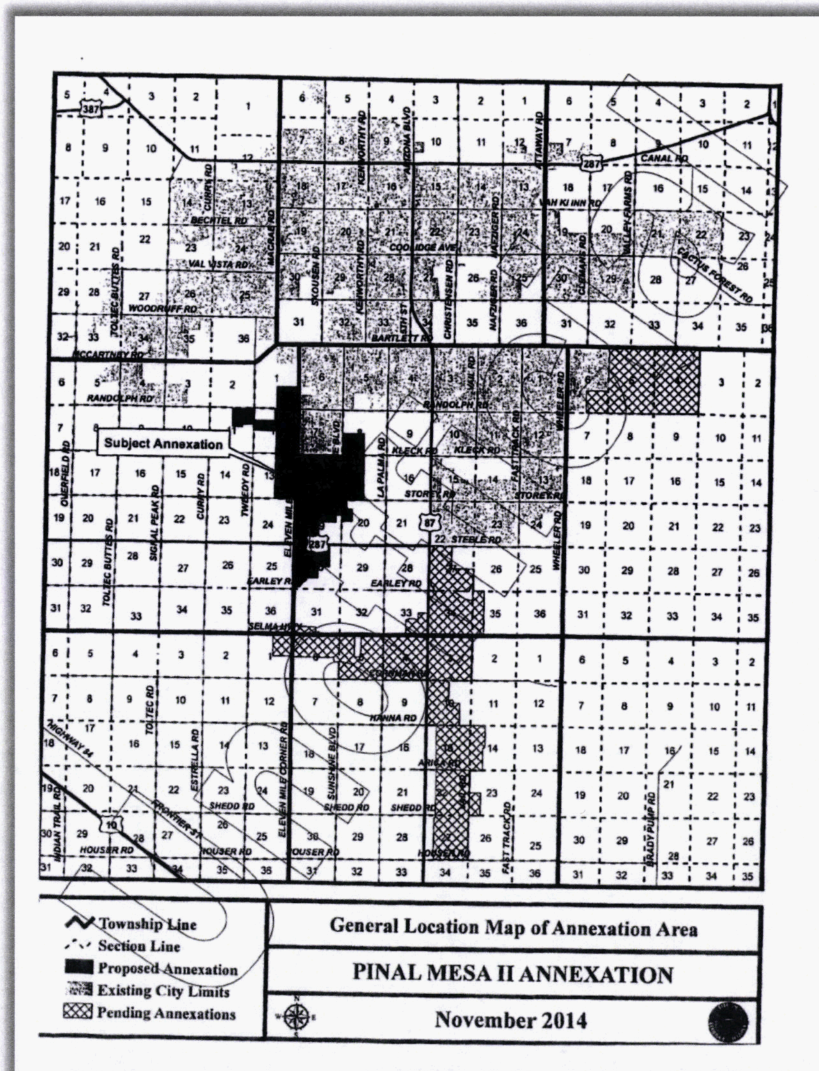

Subject Annexation
Township Line
Section Line
Proposed Annexation
Existing City Limits
Pending Annexations
General Location Map of Annexation Area
PINAL MESA II ANNEXATION
November 2014

EXHIBIT H-2

COUNTY ADMINISTRATOR'S OFFICE

PIMA COUNTY GOVERNMENTAL CENTER
130 W. CONGRESS, FLOOR 10, TUCSON, AZ 85701-1317
(520) 724-8661 FAX (520) 724-8171

C.H. HUCKELBERRY
County Administrator

August 28, 2015

Mr. Mickey Siegel, Project Manager
Environmental Planning Group
4141 N. 32nd Street, Suite102
Phoenix, Arizona 85018

Re: **Your letter of August 12, 2015 Regarding the SunZia Southwest Transmission Project**

Dear Mr. Siegel:

Thank you for your letter notifying Pima County that SunZia LLC (SunZia) plans to file an application for a Certificate of Environmental Compatibility (CEC) for the SunZia Southwest Transmission Project with the Arizona Power Plant and Transmission Line Siting Committee by mid-September 2015. The SunZia project application will be brought before the Siting Committee to request approval of a CEC for the approved route in Arizona. We understand the Bureau of Land Management (BLM) approved SunZia's application for right of way across federal property in January 2015. The 'Preferred Alternative' identified by the BLM in its Record of Decision approves 515 miles of two, single-circuit 500 kV transmission lines and is comprised of 185 miles of federal land, 220 miles of State Trust land and 110 miles of private land in Arizona and New Mexico. This selected route will impact the San Pedro River Valley, including some 20 miles in Pima County, from just north of Benson in Cochise County and running north along the west side of the San Pedro River in Pima County to the San Manuel area in Pinal County.

Construction requirements include right of way corridors for both lines up to 1,000 feet in width, depending on terrain conditions, and towers will be approximately 135 feet in height. The distance between towers will be approximately 1,400 feet, suggesting that approximately 75 towers would be constructed in Pima County. Because of the remoteness of the valley and lack of existing roads, access for construction of the line and tower locations could require up to 75 new access roads that will greatly impact and fragment the landscape and habitat and invite unwanted traffic and uses into this virtually pristine river valley. We have opposed selection of this route and have continuing concerns regarding the ability to mitigate impacts of the selected route on County lands.

EXHIBIT H-2

In this area, Pima County purchased three ranches in the San Pedro Valley area, investing just over $14 million in voter-approved bond funds for this purpose; we own 12,800 acres in fee and hold 54,100 acres in associated State lease lands; essentially creating a 66,000-acre management unit. The SunZia Transmission line would cross through the County-held State lease lands.

In light of the Bureau of Land Management's decision, we request the following:

- Pima County will have equitable status with landowners/land management agencies in the development and execution of the Plan of Development.
- When the alignment crosses lands where Pima County is not the landowner, but is the active, on-the-ground land manager, Pima County requirements for and recommendations on suitable locations for application of Standard and Selective Mitigation Measures will be accommodated.
- The project proponent and Pima County will seek mutual agreement on additional accommodations necessary to preserve the County's ability to rely on lands the County manages for purposes of accomplishing our Sonoran Desert Conservation Plan objective and providing mitigation for our Section 10 Incidental Take Permit from the United States Fish and Wildlife Service where those lands are crossed by the SunZia Transmission Line. Any agreements reached must be codified and enforceable.

We request that you, as the Project Proponent, support this request and recommend same to the Arizona Corporation Commission.

Sincerely,

C.H. Huckelberry
County Administrator

CHH/mjk
Attachment

c: The Honorable Chair and Members, Pima County Board of Supervisors
John Bernal, Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District
Chris Cawein, Director, Natural Resources, Parks and Recreation
Linda Mayro, Director, Sustainability and Conservation
Diana Durazo, Special Staff Assistant to the County Administrator

EXHIBIT H-2

PIMA COUNTY COMMENTS PER ARIZONA ADMINISTRATIVE CODE RULE R14-3-219

You have requested in your letter of August 12, 2015 that Pima County provide information under **Arizona Administrative Code Rule R14-3-219 related to Exhibit H** of the application: ***To the extent applicant is able to determine, state the existing plans of the state, local government and private entities for other developments at or in the vicinity of the proposed site or route.*** And you have requested that we identify any existing plans or future plans that may have changed. We offer the following information regarding our land use and conservation plans for inclusion in Exhibit H as well as other Exhibits required by the ACC Siting Committee under this Rule.

Pima Prospers Comprehensive Plan: Pima County Development Services Department

The proposed SunZia Southwest electrical transmission corridor, Sub-route 4C2c, is west of and roughly parallels the San Pedro River in far northeastern Pima County, about halfway between the river and Coronado National Forest (Santa Catalina Mountains) to the west. A major update to the Pima County Comprehensive Plan, Pima Prospers, was adopted by the Pima County Board of Supervisors in May, 2015. Minor changes to the land use map legend and technical corrections to mapped plan designations on developed or entitled property did not change the intent of planned uses over the previous (2001) Comprehensive Plan in this area (Table1).

Table 1. Selected Land Use and Zoning Designations
San Pedro Valley / Proposed SunZia Corridor Area August 2015

Pima County Comprehensive Plan – Pima Prospers

Low Intensity Rural (LIR)

a. Objective: To designate areas for residential uses at densities consistent with rural and resource-based characteristics.
b. Residential Gross Density: Residential gross density shall conform to the following:
    1) Minimum – none
    2) Maximum – 0.3 RAC.
c. Residential Gross Densities for Developments Using Transfer of Development Rights (TDRs): Projects within designated Receiving Areas utilizing TDRs for development shall conform to the following density requirements:
    1) Minimum – none
    2) Maximum – 0.3 RAC.

Resource Conservation (RC)

a. Objective: To designate publically-owned lands that are public resource lands and preserves that protect sensitive and high-value biological, resource value, cultural, recreational, and other sensitive resources lands. These do not include private or State Trust lands, whether or not they are leased by the County for open space purposes. If these lands become privately held during the lifespan of this plan, they will be treated as Resource Sensitive unless otherwise designated through a plan amendment process.
b. Residential Gross Density: None, other than allowances for life estates, ranch caretakers and similar uses.

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The existing zoning east of the Coronado National forest boundary is all RH-Rural Homestead, which is the dominant rural zoning on private and Arizona State Trust lands in Pima County. The RH zone allows rural residential and other related uses including agriculture on at parcels least 4.13 acres and larger (Table 2).

Table 2. Pima County Zoning Code

Chapter 18.13 - RH RURAL HOMESTEAD ZONE (Excerpt)
Sections:
18.13.010 - Purpose.
A. Purpose: This zone is intended to preserve the character and encourage the orderly growth of rural areas in the county. It is intended to encourage rural development in areas lacking facilities for urban development and to provide for commercial and industrial development only where appropriate and necessary to serve the needs of the rural area.
(Ord. 1985-187 § 1 (part), 1985)
18.13.020 - Permitted uses.
A. Uses permitted:
1. Single detached dwelling;
2. Manufactured or mobile home or trailer;
3. Guest dwelling: In accordance with Section 18.09.020(G) (General Residential and Rural Zoning Provisions) [proposed];
4. Accessory structures;
5. Crop production, used only for the purpose of propagation and cultivation and not for retail sales, including field crops, truck gardening, berry or bush crops, tree crops, flower gardening, nurseries and aviaries;
6. Reserved;
7. The raising and grazing of livestock;
8. The raising of hogs: In accordance with Section 18.12.020(A)(9) (IR Institutional Reserve Zone);
9. Hog raising projects, which exceed the permitted number of hogs, sponsored by the 4-H Club, Future Farmers of America or other similar nonprofit organization: In accordance with Section 18.12.020(A)(11) (IR Institutional Reserve Zone);
10. The raising of poultry and other small animals;
11. Private stable;
12. Commercial stable or riding school, provided:
    a. There is a minimum site of ten acres, and
    b. That all buildings be set back a minimum of one hundred feet from any property line;
13. Community stable, provided:
    a. The site is a minimum of ten acres,
    b. The stable shall be located within and not closer than two hundred feet from the boundary of the site or subdivision to be served,

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c. All roads and parking areas shall be surfaced with a dust-proof material to minimize the creation of dust, and
d. There shall be no outside audio amplification on the site;

14. Farm products stand, provided:
    a. The stand does not exceed seven hundred fifty feet, and
    b. All other requirements of Section 18.12.020(A)(15) (IR Institutional Reserve Zone) are met;
15. Animal hospital, provided no structure, shelter, animal run or fenced area be within one hundred feet of any abutting property in a rural or residential zone, and animal runs enclosed within the buildings;
16. Governmental uses;
17. Public park;
18. Public school;
19. Child care center;
20. Group foster home: In accordance with Section 18.09.020(E) (General Residential and Rural Zoning Provisions);
21. Church, provided there is a minimum eighty-foot setback from any property line;
22. Health clinic, provided:
    a. There is a minimum one hundred-foot setback from any property line, and
    b. The clinic has access onto a paved public road with "collector" classification or higher;
23. Home occupation;
24. Temporary real estate office: In accordance with Section 18.17.020(A)(8) (SR Suburban Ranch Zone);
25. Raising of ratites, subject to the following requirements:
    a. Animals shall be confined within minimum six-foot-high, stock-tight corrals;
    B Minimum setbacks for ratite corrals and shelter structures within corrals: Fifty feet from front property line and property lines which abut public maintained roads and ten feet from side and rear property lines;
26. Nature reserve.

The pattern of adopted planned land uses on the Pima Prospers planned land use maps (San Pedro Planning Area) for all of the area east of the Coronado National Forest is based on and follows the distribution of Pima County preserve lands generally as depicted on the attached map *SunZia Transmission Route in the San Pedro Valley and Conservation Lands*. Properties identified as preserve lands and owned in fee by Pima County are designated Resource Conservation (RC) on the land use plan, while the remainder, which are predominantly owned by the State of Arizona, are designated Low Intensity Rural (LIR). The RC designation furthers the conservation goals of the County-owned preserve system, while the LIR designation allows very low-intensity rural uses generally consistent with the RH zone.

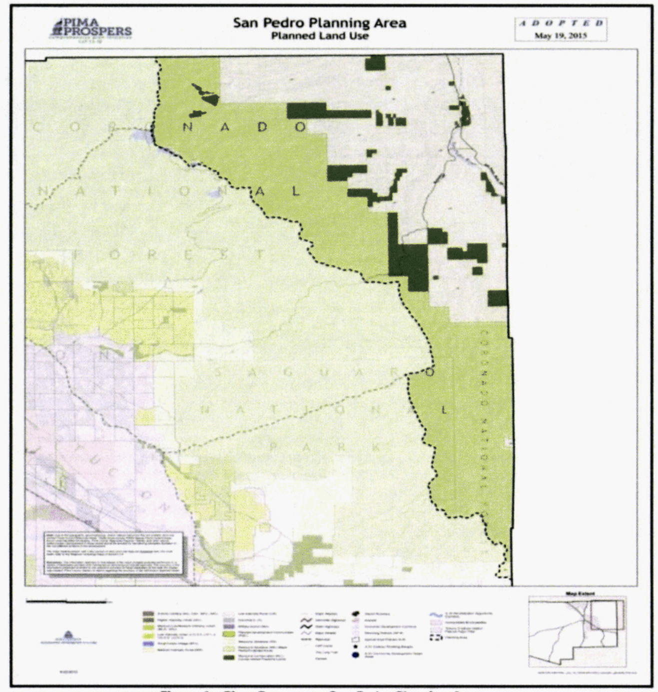

Figure 1. Pima Prospers – San Pedro Planning Area.

Pima County controls ownership or grazing rights essentially over the entire proposed SunZia route in this segment of the San Pedro River valley. East of the SunZia corridor

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there is mixed ownership, with State of Arizona and privately-owned property following the San Pedro River, much of it floodplain with partly developed agricultural uses.

The Pima County portion of the San Pedro River Valley has remained among the most purely rural areas in eastern Pima County, with ranching being the dominant land use. Over time there has been an increasing role by Pima County in preservation-related land stewardship as envisioned in the Comprehensive Plan and the Sonoran Desert Conservation Plan (SDCP). Given the ownership, zoning, planned land use patterns and County conservation goals, current patterns are likely to remain the trend for many years to come. See www.pimaprospers.com for the complete Comprehensive Plan.

Sonoran Desert Conservation Plan: Wildlife Habitat Conservation and Ranch Conservation

The SDCP identified the San Pedro Valley as highly valuable for habitat and riparian area conservation, preservation of wildlife corridors, cultural resource protection, and ranch conservation, and we have expressed previously our serious concerns regarding impacts from the SunZia Project to County owned and managed lands as show below.

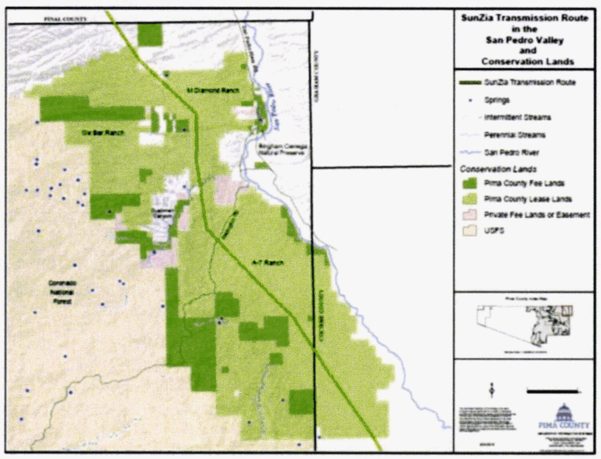

Figure 2. Pima County Conservation Lands in the San Pedro River Valley.

These lands were acquired with voter-approved bond funds with the expressed intent to protect and preserve the natural and cultural values of the San Pedro River Valley for present and future benefit to the citizens of Pima County. To date, Pima County has acquired the Six Bar Ranch, the A-7 Ranch, and the M Diamond Ranch fee lands and grazing leases. Since the date of our 2012 comments, Pima County has become aware of an area of unique biological wealth that lies near the transmission line. Springs and intermittent and perennial streams in the area are shown on the map.

As noted above, the SunZia transmission line passes through an area covered by the Sonoran Desert Conservation Plan. Guidelines that impose conservation standards for development in biologically important areas including the San Pedro Valley have been in place since 2001 when they were adopted into the County's Comprehensive Plan. These standards continue to be implemented and the most current iteration of these conservation standards – the Maeveen Marie Behan Conservation Lands System (CLS) Conservation Guidelines - can be found in the Environmental Element of Pima Prospers – Pima County's Comprehensive Plan 2015 Update.

Since the adoption of the CLS in 2001, Pima County has been acquiring land in the San Pedro River Valley. Since the date of our 2012 EIS comments, Pima County has acquired an additional 620 acres in fee and the associated 8,500-acre State grazing lease at M Diamond Ranch, essentially creating a 140,000-acre County management unit that consists of M Diamond, A-7 and Six Bar Ranches. These lands are complemented by other existing protected lands along the San Pedro and Buehman Canyon as shown on the Conservation Lands map above.

The County manages fee lands and grazing leases as part of its efforts to conserve and protect biological and ecological values of the lands. The stewardship given to the fee-owned land as well as the state grazing leases associated with each ranch will comprise the mitigation area proposed under Pima County's Multi-Species Conservation Plan as required under Section 10 of the Endangered Species Act. This Permit will cover incidental take by activities authorized by Pima County or carried out by Pima County Regional Flood Control District.

Since the date of our 2012 comments, U. S. Fish and Wildlife Service has commenced a programmatic consultation with U. S. Army Corps of Engineers for issuance of a permit under Section 10 of the Endangered Species Act to streamline certain 404 permits for activities covered under Pima County's Multi-Species Conservation Plan. Neither the County's Section 10 nor the programmatic consultation will cover SunZia's activities

The Maeveen Marie Behan CLS classifications given to the route of the transmission are depicted in the map below. The SunZia Project passes through areas of Biological Core, Multiple Use and Important Riparian Areas located largely on State Trust Land. If the County regulated development in these areas, the mitigation required to offset impacted land would range from four acres per acre for impacts in the Biological Core and Important Riparian Areas, to two acres per acre impacted in the Multiple Use area.

With their adoption of Pima Prospers on May 19, 2015, the Pima County Board of Supervisors established a County policy to seek compensatory mitigation for all activities that impact the CLS, including transmission lines, such as the SunZia Project. See Pima Prospers Environmental Element – Goal 1; Policy 1.a.

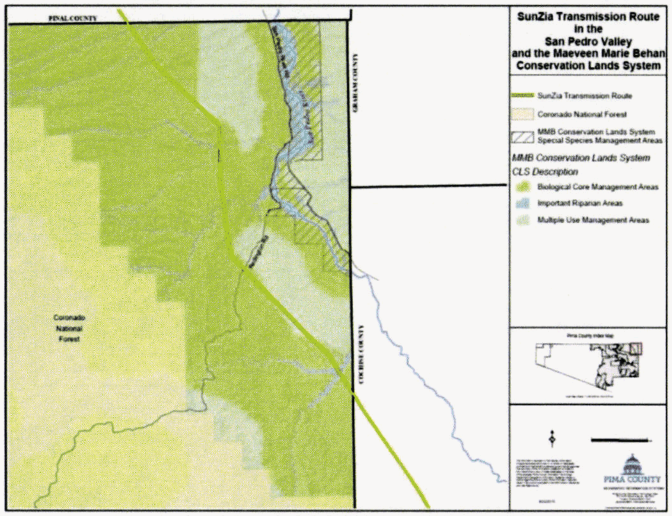

Figure 3. Pima County Conservation Lands System Impacted by the SunZia Project

Since the date of our 2012 comments, the Wildlife Linkages study sponsored by Arizona Game and Fish Department and the Pima County Regional Transportation Authority has been completed. This study was referenced in our letter, and was a basis for our request that direct and indirect impacts to wildlife linkages be considered not only for construction but also vegetation management along the transmission line.

Expected Impacts to County Conservation Planning: A great diversity of significant impacts to County conservation planning efforts are anticipated. Impacts to surface water and riparian areas are likely to result from placement of 75 or more tower structures, construction of access roads, cable pulling and tensioning stations and temporary work areas. Direct impacts to perennial, intermittent and ephemeral surface waters include sedimentation from fugitive dust, access road construction and subsequent erosion, removal of riparian vegetation during construction, or later from "vegetation management" under the constructed line, bank alteration, and contamination due to accidental spills, damage to wetlands, and introduction of invasive species either from vehicular traffic or through re-seeding efforts.

Impacts to uplands would be similar, and would include direct impacts to species covered in Pima County's Multi-species Conservation Plan such as Needle-spined Cactus, Lesser Long-nosed Bat and Desert Tortoise, as well as indirect impacts such as those resulting from vandalism and intrusion into habitat areas by of off-road vehicles. Placement of a new transmission line inevitably results in increased public access across a landscape. No matter the steps taken, the lands become much more accessible and remain open because of the need to manage and repair the transmission lines. Other impacts can include poaching of wildlife and plants, and theft of archeological resources, as well as damage to water sources that are important for wildlife and livestock.

It has been our experience that disturbances during construction that are never fully mitigated. A prime example has been the Kinder-Morgan pipeline project's ongoing impacts to the County's Cienega Creek Natural Preserve and Bar V Ranch management and protection and in the Altar Valley. Despite mitigation efforts by the company, impacts such as erosion of soil continue for the County to address with no long-term support or ability to reconfigure the impacts due to the constraints now placed by the location of the utility infrastructure corridor.

A less well-known factor that may affect our lands and waters is the need for construction water. Leo Smith, P.E. for many of our County construction projects, estimates that there is a rule of thumb that 50 gallons of water are needed per cubic yard of material to compact soil and conduct dust suppression activities during construction. It is likely that construction water needs for this project will be drawn from local sources along the route of the pipeline with certain impacts to groundwater-dependent ecosystems.

The Energy Policy Act of 2005 designated an electric reliability organization to develop and enforce compliance with reliability standards. North American Electric Reliability Corporation (NERC) is an industry organization, whose authority was conferred by the Federal Energy Regulatory Commission. NERC does not require vegetation clearing *per se*; it requires power companies to prepare, and implement, a formal transmission vegetation management program to prevent outages.

A reportable outage is caused by "grow-ins" and "fall-ins" or "flashover" which is the movement of electricity across air (see www.nerc.com). Grow-ins are outages caused by vegetation growing into lines from vegetation inside and/or outside of the right-of-way; fall-ins are defined as outages caused by vegetation falling into lines from inside or outside the rights-of-way.

Rather than selective removal, TEP and other utilities are removing woody vegetation that would never grow or fall into the lines, in order to reduce risks of fire and electrical arcs affecting the performance of transmission lines. There is no written policy requiring fuel loads to be reduced, nor are fuel loading calculations or standards used to determine the amount of clearing.

In short, more vegetation is being cleared as each utility begins implementing its plan. In practice, utilities remove far more vegetation than the minimum needed to meet NERC rules, to minimize the need for repeated mobilization of field crews. Inadequate field supervision of contractors has, at times, contributed to the expansion of the footprint of maintenance activities on the landscape.

All trees, woody shrubs and saguaros may eventually be removed along power transmission lines rated at 200kV or higher, whether situated along public or private lands, along with impacts to plants and animals associated with repeated use of mechanical or herbicide treatments. Mechanical clearings may result in significant degradation of archeological resources. The cleared areas will alter fire behavior. In montane areas, the new clearings may serve as fire breaks. In some lower elevation areas, invasion of non-native plants in the disturbed areas may actually increase the fire risk. In all locations, vegetation management will more or less permanently alter the characteristics of wildlife and vegetation habitat under power lines.

Using 2004 voter-approved bond monies, the County acquired Six Bar Ranch, M Diamond and the A-7 Ranch in the San Pedro River Valley. The BLM Preferred Alternative passes right through the County-held State grazing lease for A-7 and M Diamond Ranch and cuts through a number of important conservation areas, wildlife travel corridors and cultural resources sites on the property that are large enough that minor adjustments to the line footprint will not adequately mitigate potential impacts. This alignment would cut across nearly all of the major ranch roads, pastures and key use zones, which can hamper our operation and conservation ranching approach.

Riparian Area and Floodplain Protection Planning: Regional Flood Control District

The Pima County Regional Flood Control District (RFCD) is a regional agency whose mission is to protect the health, safety, and welfare of Pima County residents by providing comprehensive flood protection programs and floodplain management services.

These services emphasize fiscal responsibility, protection of natural resources and riparian areas, and a balanced multi-objective approach to managing regional watercourses, floodplains, and stormwater resources.

Moreover, as a co-applicant with Pima County for issuance of a Section 10 Permit under the Endangered Species Act, RFCD has been fully engaged in the development of the Multi Species Conservation Plan and is actively involved in the preservation of riparian areas and habitat as defined by the Sonoran Desert Conservation Plan Maeveen Marie Behan Conservation Lands System described above.

The depicted floodplains in Figure 4 are the regulatory floodplains as identified by the Federal Emergency Management Agency (FEMA) and are subject to regulation under the National Flood Insurance Program including administrative policies and guidance issued by FEMA. It should be noted that critical facilities which include electrical substations are required to be protected from the 500-year flood.

The riparian habitat map in Figure 5 depicts major watercourses and local tributaries and the associated riparian habitat. Disturbance in these areas should be limited and biological surveys should be conducted prior to any disturbance to avoid any impacts to threatened and endangered species. The District discourages construction of a permanent access road along the entire route. In addition to direct disturbance of riparian areas and floodplains, where access roads cross watercourses there is a potential for head-cutting and other erosion problems off of the ROW. There is evidence of this on other linear projects that have been constructed in Pima County. Furthermore, construction activities should be suspended during rainy periods.

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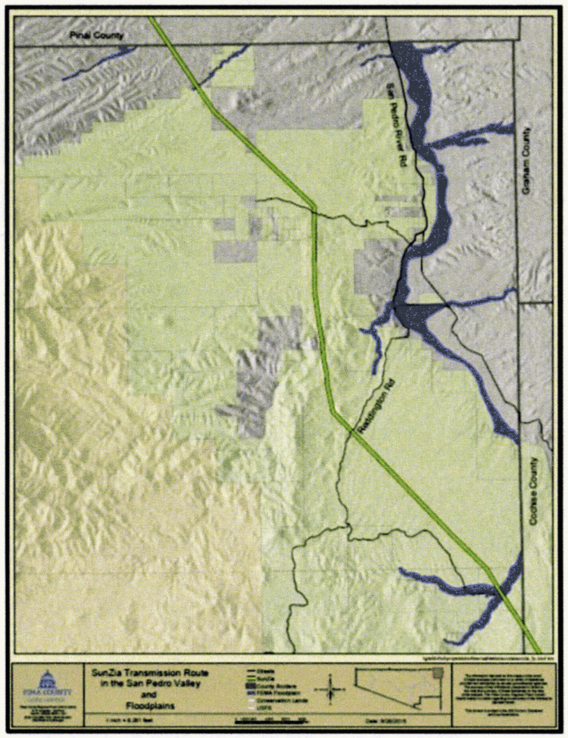

Figure 4. Regulated Floodplains in the San Pedro Valley

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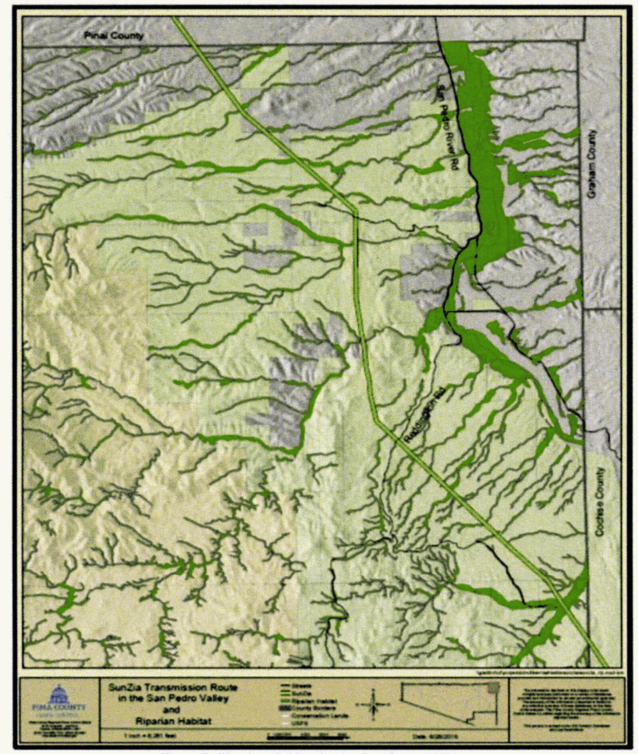

Figure 5. Riparian Habitat in the San Pedro Valley

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While electrical transmission lines are not required under Arizona statutes to receive written authorization from county flood control districts, Arizona Revised Statute 48-3616.C, requires that construction plans must be submitted for review and comment. The review would focus on avoiding the placement of transmission towers in FEMA floodplains and erosion hazard areas and minimizing the disturbance of riparian habitat. The exception to this regulatory exemption is that permits will be required for both temporary and permanent access roads to construct and maintain the SunZia Project.

Sonoran Desert Conservation Plan: Cultural Resources & Historic Preservation

Perennial rivers, such as the San Pedro, are major loci of prehistoric and historic human occupations in Pima County, where the site numbers are highest and the distribution of sites is most dense. The San Pedro Valley has been long recognized for its many significant prehistoric and historic sites, many of which are in excellent condition given their remoteness from large modern population centers.

The San Pedro Valley in Pima County is essentially undeveloped. It retains the character of landscapes in the prehistoric and historic past. As such the valley is a place where a sense of history is present today. Tohono O'odham, Apache, Hopi, and Zuni cultural advisors who have visited ancestral villages and gathering areas in the San Pedro Valley have remarked on the sense of history that is embedded in the natural and cultural landscapes. Dalton Taylor of Hopi has stated of the San Pedro Valley and ancestral archaeological sites that, "the only thing I ask for is protection, because this place is like our history books". Other cultural advisors have made similar pleas to protect and preserve the San Pedro Valley and its unique history.

Because of these high cultural values in addition to its diverse and valuable habitat for many species, the San Pedro River Valley was defined in the Sonoran Desert Conservation Plan (SDCP) as having high value for conservation. This high density of cultural resources has been identified in the SDCP as the "Redington Cultural Resource Complex" shown on the map below and is identified as such in Pima Prospers. Unfortunately, the proposed SunZia route along the west side of the San Pedro Valley in Pima County has great potential to impact significant archaeological and/or historic resources resulting from construction of the SunZia Project and from indirect impacts such as looting of sites that will result from much greater access to these heritage resources from the many new access roads that will be required for the construction of the Project.

The high archaeological sensitivity of the San Pedro valley is well documented and reflects important prehistoric occupations as well as historic homesteading and ranching. There are dozens of recorded sites in the valley near this corridor, with excellent potential for additional, as yet undiscovered resources. Well-known sites in this area include the prehistoric Reeve Ruin, Redington Ruin, and Bayless Ranch Ruin, as well as an historic cemetery near the river. Many sites are located on County-owned lands that were acquired and are managed specifically to protect and preserve the natural and cultural resources for present and future benefits to the citizens of Pima County.

The proposed SunZia alignment will irrevocably scar the San Pedro Valley, cutting a swath of destruction through many archaeological sites, diminishing cultural and traditional values held by Native American tribes, and scaring the pristine visual character of the valley, predominantly through lands that Pima County is committed to protect in accordance with the Pima County Sonoran Desert Conservation Plan and Pima Prospers.

EXHIBIT H-2

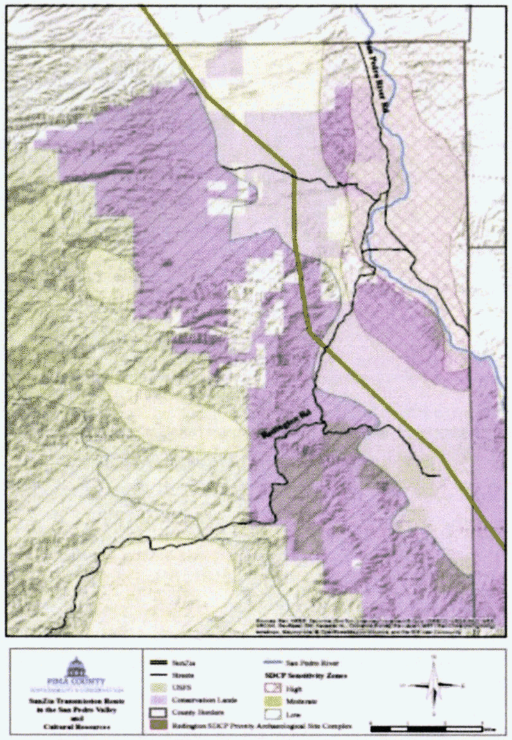

Figure 6. Cultural Resource Sensitivity in the San Pedro Valley.

In summary, Pima County has made significant investment in conservation planning and land acquisition on behalf of its citizens since 2001 to ensure that the San Pedro River Valley and its abundant natural, riparian, and cultural resource values are protected for the benefit of present and future generations. The County's holdings in the area total approximately 140,000-acres under County management that supports ongoing ranching operations, while conserving and protecting biological and ecological values of the lands.

In acknowledgement of the public's mandate, Pima County has adopted an ongoing and long-term commitment to conservation planning espoused in the Sonoran Desert Conservation Plan and Multi-Species Conservation Plan. Moreover, these lands under the County's Sonoran Desert Conservation Plan and Multi-Species Conservation Plan are intended as mitigation lands under that will serve to meet the requirements of the Section 10 Permit of the Endangered Species Act that will be issued to Pima County by the US Fish & Wildlife Service. This Permit will cover incidental take of listed species by activities authorized by Pima County or carried out by Pima County Regional Flood Control District.

These conservation goals have also been recently reaffirmed and adopted by the Board of Supervisors in its 2015 Comprehensive Plan "Pima Prospers."

Exhibits I

February 8, 2011

SOUTHWESTERN POWER GROUP

SunZia Project

Preliminary EMF and Corona Effects Study

Revision 1

PROJECT NUMBER:
116500

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1.0 INTRODUCTION

1.1 Project Discussion

Southwestern Power Group (SWPG) is the project manager for the development of the SunZia Southwest Transmission Project, which includes approximately 500 miles of 500 kV transmission lines. This project would consist of one or two 500 kV lines in parallel running from central Arizona in to central New Mexico to transport primarily renewable energy into areas of demand. The Project is being permitted to accommodate a single 500 kV AC transmission line with an expected capacity of 1,500 MW and a future second 500 kV transmission line that would be either an AC line rated at 1,500 MW or a DC line rated at 3,000 MW.

POWER Engineers, Inc.'s (POWER) engineering service for this study was to perform calculations to determine the field and corona effects of the transmission line(s) and compare the results to applicable standards and guidelines. The analysis included determining predicted electric and magnetic fields, audible noise, and AM radio and television interference.

1.2 Summary

Electric and magnetic fields (EMF) and corona effect levels have been analyzed for a variety of conductor configurations and two structure types for the first AC transmission line. In addition, the effects of increased line voltage and adding a second line in parallel were examined. Electric and magnetic fields were analyzed at a minimum conductor height. Audible noise (AN), radio interference (RI) and television interference (TVI) were analyzed at average conductor height. Values calculated are typically below common limits and guidelines for each effect. Based on the results of the analysis, radio frequency interference from the proposed 500 kV transmission lines is expected to be relatively low within a few miles of the line for frequencies near 1 MHz, and near negligible as the frequency increases. Specific frequencies of concern could be analyzed for more exact values and their behavior with varying distance from the line. Calculations were based on preliminary structure designs that may change as detailed design is performed. Any changes to the characteristics of the conductors or their arrangement could affect the results of the study and should be further investigated.

2.0 DATA

EMF, audible noise, and radio and television interference from a transmission line are based on the electrical and physical characteristics of the transmission line. Specifically, these factors are driven by: the voltage and current loading of the line; the physical conductor characteristics and bundling; relationships of each phase conductor to the other phases and shield wires; and the heights of the conductors from the ground. The following data was used for the analysis. Should any of this data change, the results will also change.

- For the 500 kV line, a maximum operating voltage of 105 % of nominal voltage was used for electric field, audible noise, radio interference and television interference analysis, except where otherwise noted.

  - Additional sensitivity cases were run for a single line to examine the change in effects at 110%, 115%, and 120% of nominal voltage as portions of these lines may experience higher voltage due to reactive compensation installed for the long lines.
- A maximum loading of 1,650 amps per phase (1,500 MVA nominal at 105% of nominal voltage) was assumed for each 500 kV AC line analysis. For DC analysis, a pole current of 3,000 amps was used. Balanced loading was assumed for all cases.
- Three conductor bundling configurations were examined on the base AC horizontal guyed V structure, all with 18 inch bundle spacing:
  - A 3-bundle 1590 kcmil ACSR Lapwing conductor (base case)
  - A 4-bundle 954 kcmil ACSR Rail conductor (as a mitigation option)
  - A 4-bundle 1590 kcmil ACSR Lapwing conductor (as a mitigation option)
- A delta structure was also examined as a mitigation option for the base AC line, using the initial 3-bundle 1590 kcmil ACSR Lapwing conductor.
- There are two shield wires on each structure:
  - One 7/16 inch EHS steel
  - One optical ground wire (OPGW) GW4830 (diameter 0.669)
- The conductor spacing and arrangement was assumed as labeled on the structure drawings provided for reference in Appendix A. The assumed phasing for this first line is A-B-C, left to right, although with one line, the actual phasing has no effect.
- The phasing of the second AC circuit was varied to show the effects of different phasing arrangements between the two circuits. The second AC line was assumed to also be a horizontal configuration as the delta configuration does not provide significant benefit.
- If the second line is DC, the positive pole is assumed to be on the inside side of the ROW (adjacent to the AC line). If the positive and negative poles are swapped, there will be slight changes in the DC fields.
- The Right-of-Way (ROW) width is assumed to be 200 feet centered on the structure. For a second line, it is assumed that an identical ROW would be located immediately adjacent, for a separation of 200 feet from centerline to centerline of the structures.
- A maximum sag value of 57.5 feet was used for the AC phase conductors, while the shield wires sag 85% of this value.
- A maximum sag value of 65 feet was used for the DC pole conductors, while the shield wires sag 85% of this value.
- Calculations were based on an assumed elevation of approximately 5,000 feet, based on the typical elevations in the area of this project of greatest concern (near the White Sands Missile Range (WSMR)). The actual elevation of the line varies from around 2,000 feet in the west to 6,000 feet in the east.

3.0 ANALYSIS

The environmental field effects analysis for AC cases was performed using the Bonneville Power Administration's (BPA) Corona and Field Effects Program (CAFEP) software on the various transmission line structure and conductor configurations. CAFEP uses the electrical and physical characteristics of the transmission line to calculate resulting fields and interference effects from the transmission lines. It should be noted that the radio interference values calculated by CAFEP are 2 dB greater than would be measured with modern equipment using the standard IEC/CISPR quasi-peak detector; therefore the RI results in this report are adjusted down by 2 dB to account for the change.

For the AC/DC hybrid transmission line corridor SESEnviroPlus (Enviro) by Safe Engineering Services & technologies ltd. was used. This software package was used due to the fact that the CAFEP is incapable of performing analysis on multiple frequencies at the same time. Enviro allows more flexibility in computation of audible noise and radio interference. For consistency BPA methods were used to produce results included in this report.

The electric fields, audible noise, and radio and television interference are all driven by the maximum operating voltage of conductors. Magnetic fields are driven by the line current loading, which varies over time, and not by the sub-conductor size or configuration. The magnetic fields calculations were performed at the maximum line loading and can be scaled down proportionally to the actual loading of the line.

The values of these effects are typically of concern at various points across the ROW. Therefore, values reported include the maximum and average values within the ROW for the given scenarios, along with the calculated values at the edge of the ROW. Also included for reference are plots of the results for all analyzed values across the entire width of the ROW and slightly beyond the ROW. Since this project will be constructed near sensitive sites, plots are also included showing the values extending approximately 5 miles to either side of the corridor.

For the analysis, electric and magnetic fields were analyzed at a minimum conductor height (mid-span, maximum sag), as this location will produce the worst case scenario. Audible noise, radio interference, and television interference were analyzed at the average conductor height along a span, as these effects are generally a concern over a larger area, and not immediately under the mid-span of the line.

Once values are calculated, they can be compared to local, statewide, or national guidelines and/or limits. However, no requirements were presented that would apply to this specific installation. Therefore, typical guidelines are presented for reference at this point. If specific limits for the WSMR or other regulatory agencies are presented at a later time, they can be examined and referenced in future versions of this report.

The two states involved in this project do not have any limits on electric or magnetic fields. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) publishes recommended limits (called reference limits) for electric and magnetic fields based on a collaboration of international scientists. The guidelines are non-binding and are more stringent than the guidelines presented by the Institute of Electrical and Electronics Engineers (IEEE). These values are expressed as reference exposure limits for both occupational and general public exposure. These limits are discussed in the results sections.

Nationally and in these states, audible noise from a transmission line has no regulated limit. However, the Environmental Protection Agency (EPA) provides a recommended limit of 55 dBA for outdoors for a day-night average sound level. Radio and television interference is driven by the signal-to-noise ratio, which depends on the broadcast source and frequencies. Some typical guidelines are discussed in the results section.

4.0 RESULTS OF VARIOUS CONDUCTOR CONFIGURATIONS

This section covers the examination of the various sub-conductor bundle configurations, as well as the alternate delta structure design. Typically, increasing the size or number of conductors will increase the electric field, have no effect on magnetic field, and will reduce the audible noise, radio interference, and television interference levels.

4.1 Electric Field

The electric field strength is a measure of the force per unit charge at a given point in space relative to a charged object. It is typically measured in kilovolts per meter (kV/m). Table 1 shows a summary of the values in the ROW for each configuration for a single transmission line. Values are calculated at the minimum conductor height (mid-span) at a height of one meter above the ground per IEEE Standard 644-1994 (R2008).

Table 1: Electric Field Results for Various Configurations [kV/m]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Horizontal 3-Bundle Lapwing	2.6	8.6	6.2
Horizontal 4-Bundle Rail	2.8	9.2	6.6
Horizontal 4-Bundle Lapwing	2.8	9.3	6.7
Delta 3-Bundle Lapwing	1.1	8.3	4.5

* Average values based on data points calculated every five feet across the ROW width.

ICNIRP reference levels for electric field strength are 8.33 kV/m for occupational exposure and 4.16 kV/m for general public exposure. Values beyond the ROW are below the ICNIRP reference level for general public exposure.

Figure 1 and Figure 2 (on the following page) respectively show plots of the electric field across the ROW and for five miles beyond the ROW for the various configurations. The red line indicates the ICNIRP reference level for the general public (beyond the ROW) as a reference. Increasing the size or number of conductors will increase the maximum electric fields, while using a delta configuration will reduce the electric fields. Once more than a few hundred feet from the edge of the ROW, the values will be practically zero.

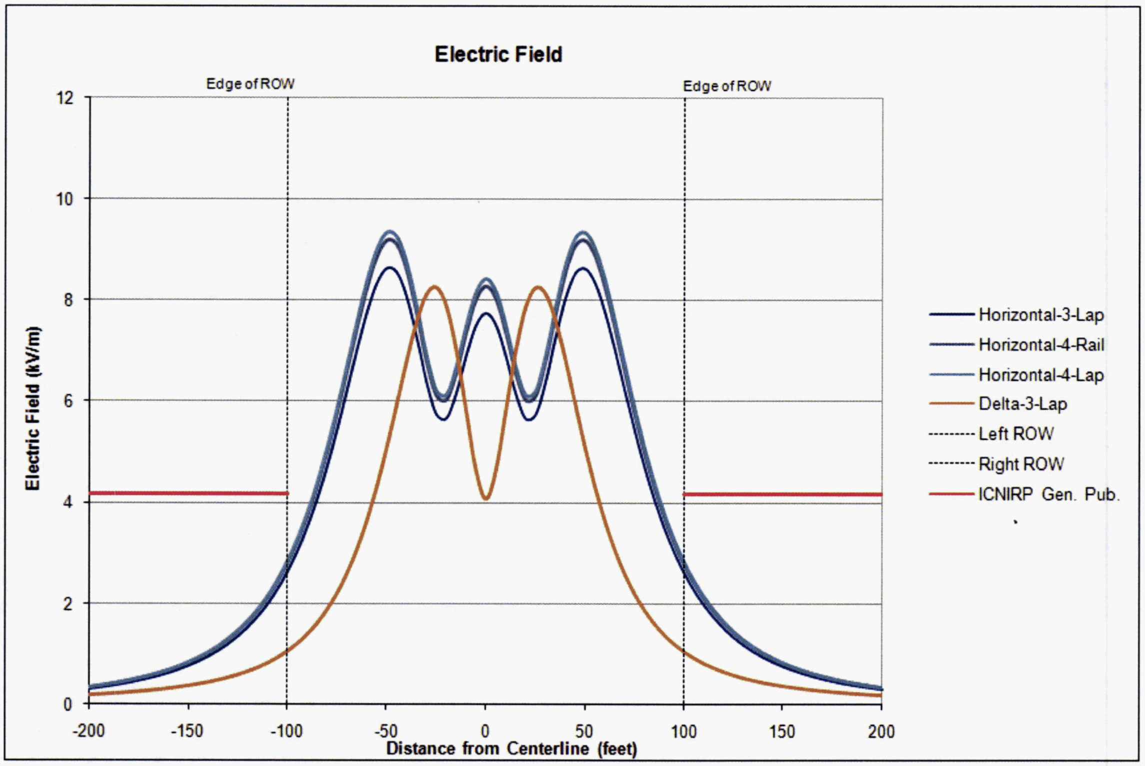

Figure 1: Electric Field Across ROW for Various Configurations

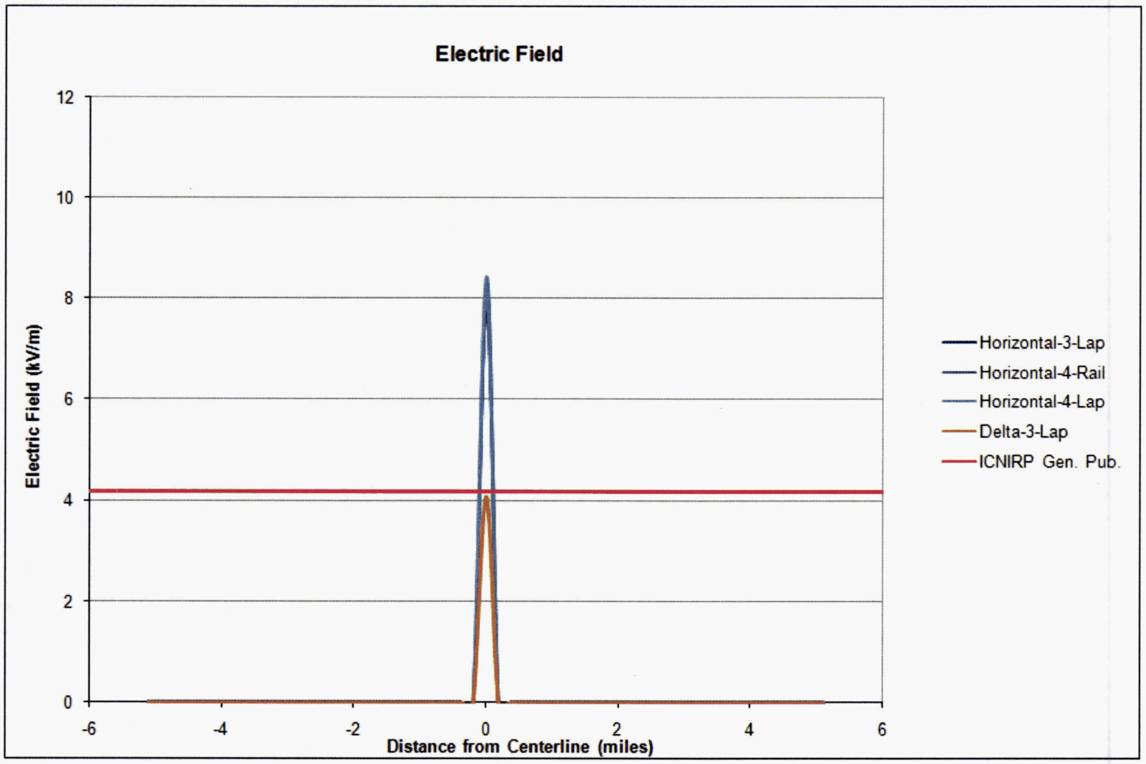

Figure 2: Electric Field for Five Miles Beyond ROW for Various Configurations

4.2 Magnetic Field

The reported magnetic field values are the magnetic flux density at a given point in space. Magnetic flux density is measured in gauss or milligauss (mG) or in micro-Teslas (μT). These values can be easily converted as one tesla equals 10,000 gauss, or simply 10 mG equals 1 μT.

Table 2 shows a summary of the resulting values in the ROW for each configuration for a single transmission line, assuming maximum current loading. All values are calculated assuming balanced loading on all three phases. The magnetic fields will vary if there is unbalance on the system; however, transmission unbalance is typically fairly low. Note that the results are directly proportional to the loading of the line; therefore, 50% loading would be exactly half of the 100% loading condition. Also note that the values are independent of the sub-conductor size. Values are calculated at the minimum conductor height (mid-span) at a height of one meter above the ground per IEEE Standard 644-1994 (R2008).

Table 2: Magnetic Field Results for Various Configurations – 100% Loading [mG]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Horizontal 3-Bundle Lapwing	89.4	294.5	217.5
Horizontal 4-Bundle Rail	89.4	294.5	217.5
Horizontal 4-Bundle Lapwing	89.4	294.5	217.5
Delta 3-Bundle Lapwing	41.0	265.3	141.3

* Average values are based on data points calculated every five feet across the ROW width.

ICNIRP reference levels for magnetic flux density are 4,167 mG for occupational exposure and 833 mG for general public exposure. None of the configurations in this analysis exceed the ICNIRP limits for general public exposure. The ICNIRP reference level for general public (beyond the ROW) is also included in the associated plots.

Figure 3 and Figure 4 (on the following page) respectively show a plot of the magnetic field at 100% loading across the ROW and extending five miles beyond the ROW, for the two structure configurations. Again, since the magnetic field is directly proportional to the line current loading, values at 50% loading will follow the same plot shape but will be 50% of the magnitude.

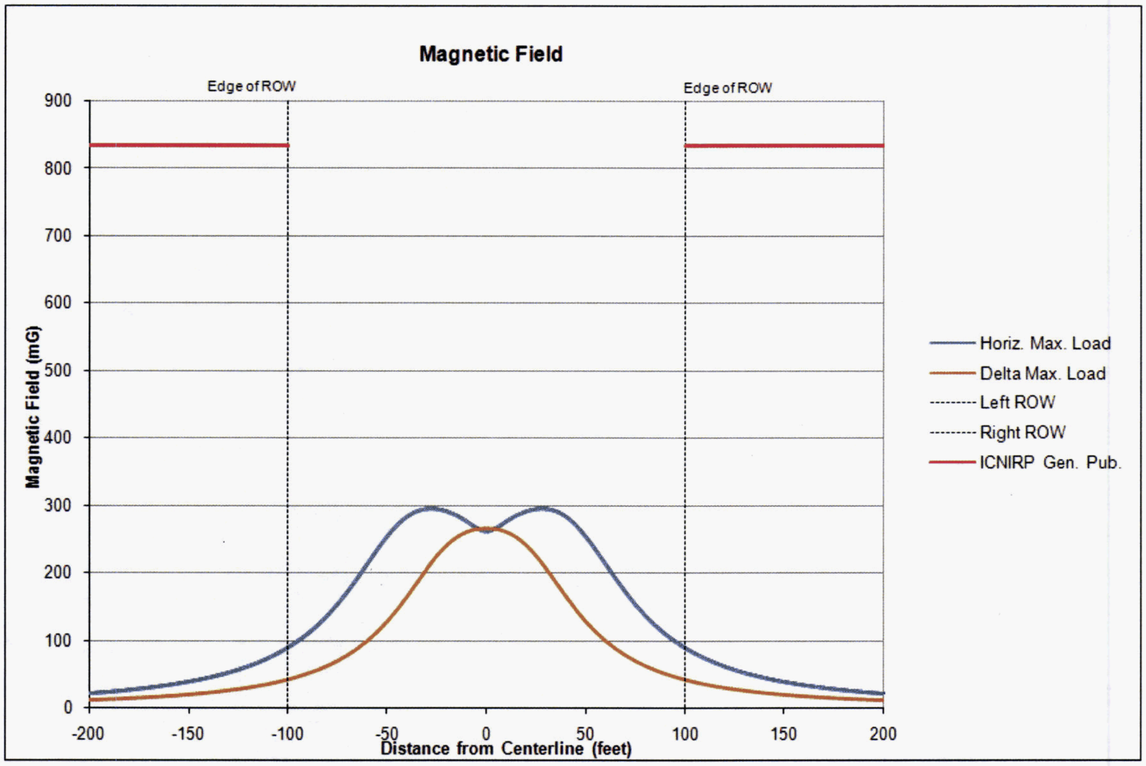

Figure 3: Magnetic Field Across ROW for Various Configurations

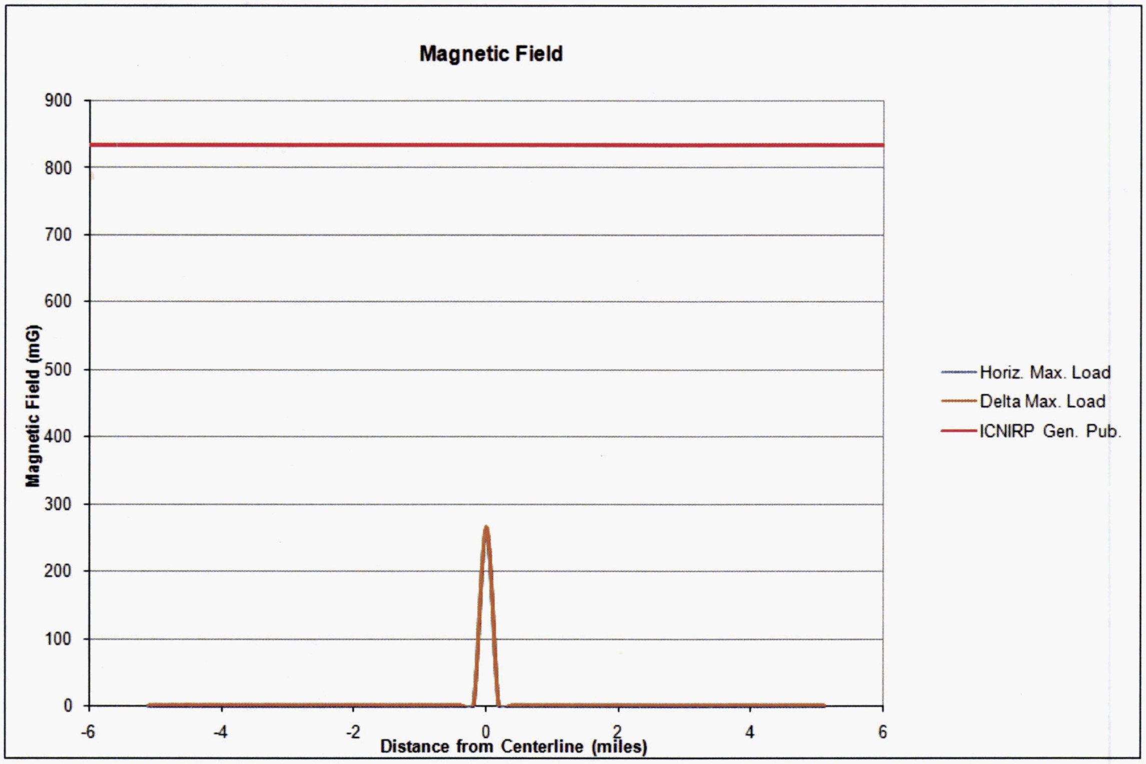

Figure 4: Magnetic Field for Five Miles Beyond ROW for Various Configurations

4.3 Audible Noise

Audible noise is measured as an equivalent A-weighted sound-pressure level in decibels (dBA). The L_{50} Audible Noise (Foul Weather) values represent a predicted average (L_{50}) noise levels present when foul weather conditions cause the conductors to become wet. The actual value is expected to be at or below this calculated L_{50} value 50% of the time, and above the value the other 50% of the time. Values are calculated at a height of five feet above the ground per IEEE Standard 656-1992, using the average conductor height to approximate the average values along the entire line.

Table 3 shows a summary of the audible noise levels in the ROW for each configuration for a single transmission line.

Table 3: L50 Audible Noise Results for Various Configurations (Foul Weather) [dBA]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Horizontal 3-Bundle Lapwing	45.0	48.1	46.8
Horizontal 4-Bundle Rail	43.3	46.4	45.1
Horizontal 4-Bundle Lapwing	38.7	41.8	40.5
Delta 3-Bundle Lapwing	47.4	50.4	49.1

* Average values based on data points calculated every five feet across the ROW width.

No guidance was provided on limits for audible noise for this line route; however, EPA guidelines recommend levels below 55 dBA for a day-night average in the outdoors. If applied to transmission lines, this is often measured at the edge of the ROW. The values across the entire ROW are all below this EPA recommendation for all configurations.

Figure 5 and Figure 6 (on the following page) respectively show a plot of the audible noise levels across the ROW and extending five miles beyond the ROW for a the various configurations. In addition, these figures show the EPA recommended level as a red line beyond the ROW.

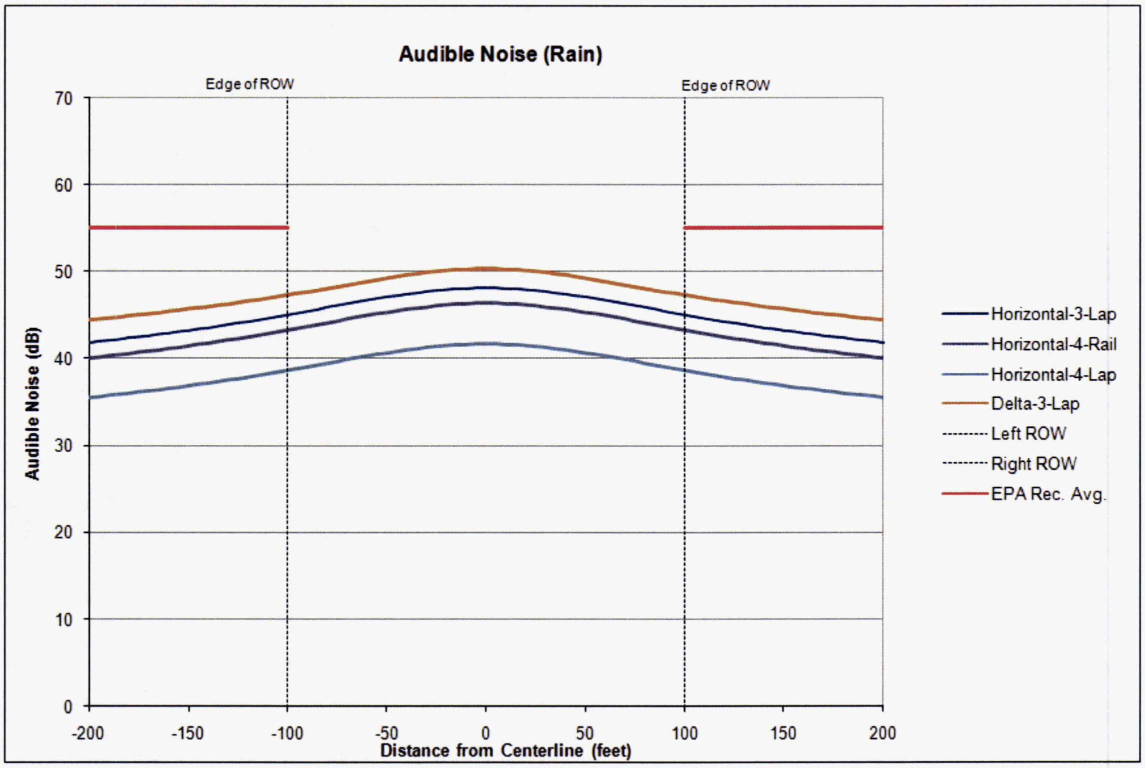

Figure 5: Audible Noise Across ROW for Various Configurations

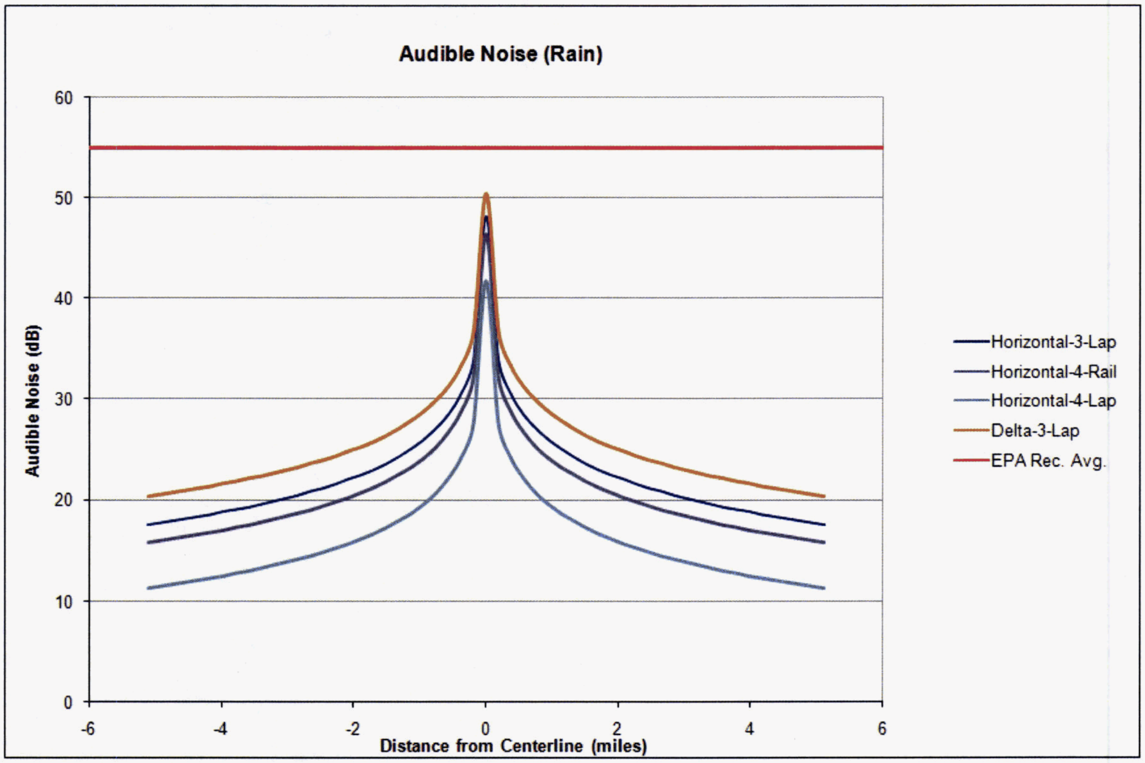

Figure 6: Audible Noise for Five Miles Beyond ROW for Various Configurations

4.4 AM Radio Interference

Radio interference is the degradation of a radio signal by radio frequency electromagnetic disturbances and is reported as the field strength of the interference. It is often measured in decibels (dB) of one microvolt per meter (μV/m), which is a logarithmic scale. The L_{50} Radio Interference (Fair Weather) values represent the predicted average levels present when conductors are dry. Note that interference values will increase during foul weather conditions; however, other atmospheric conditions will typically have a greater degradation of AM radio signals during this scenario.

The actual value of radio interference is expected to be at or below this calculated L_{50} value 50% of the time, and above the value the other 50% of the time. Values are calculated at a height of six feet above the ground and at 1 MHz, using the average conductor height to approximate the average values along the entire line. IEEE Standard 430-1986 suggests that these measurements are taken no greater than two meters above the surface.

Radio frequency and television interference is also dependent on frequency. As the frequency of desired received signal goes up the interference produced by corona goes down. This effect is most prominent in frequencies above 1 MHZ. Figure 7 below (Figure 8.5-2 from the EPRI AC Transmission Line Reference Book, Third Edition) shows the magnitude of the corona decreasing as frequency goes up. As the magnitude of the corona decreases the radio interference effects diminish as well.

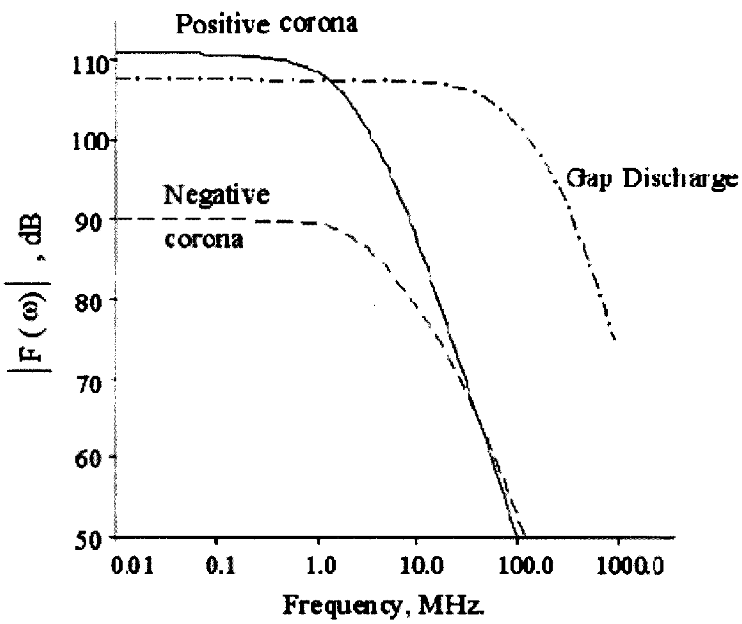

Figure 7: Corona Effects with Increasing Frequency

Radio interference is affected by both the signal strength, as well as the level of interference (noise). The signal-to-noise ratio (SNR) is simply the signal strength in dB minus the calculated interference (noise) level in dB. Depending on location, the signal strength can vary significantly; therefore the amount of interference that is tolerable varies as well. Guidance provided by the EPRI AC Transmission Line Reference Book indicates that the amount of radio interference should be below 38 dB at 100 feet from the outermost conductor (or often examined at the edge of ROW). This is only a rough guideline, and without actual signal strength measurements and data from the FCC on the protected signal contours (within which the signals are protected from interference) for radio stations in the area, can only provide a typical idea of if there may be concerns.

Table 4 shows a summary of the radio interference levels in the ROW for each configuration.

Table 4: L50 Radio Interference for Various Configurations (Fair Weather) [dBμV/m @ 1 MHz]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Horizontal 3-Bundle Lapwing	37.5	47.7	43.2
Horizontal 4-Bundle Rail	34.5	44.8	40.3
Horizontal 4-Bundle Lapwing	28.2	38.6	34.0
Delta 3-Bundle Lapwing	38.6	47.8	44.3

* Average values based on data points calculated every five feet across the ROW width.

Figure 8 and Figure 9 respectively show a plot of the radio interference levels across the ROW and extending five miles beyond the ROW for the various configurations. All configurations indicate values below the 38 dB recommendation at 100 feet from the outermost conductor, as can be seen in the following figures. In addition, all horizontal configurations are below the limit at the edge of ROW, as shown by the red line on the plots. However, as this is only a guideline, it is possible that some stations that have low signal strength in the area may suffer from some interference. Similarly, these values are calculated at 1 MHz and will decrease with increasing frequency, or increased separation between the line and antenna.

It is important to note that these values are based on a 1 MHz amplitude modulated signal. Most modern communications systems use either frequency modulation or spread spectrum techniques, and broadcast at higher frequencies. In addition, the signals are often digital which are typically more immune to interference. It is anticipated that most other communications signals would be able to function properly even with the effects of these transmission line interference results.

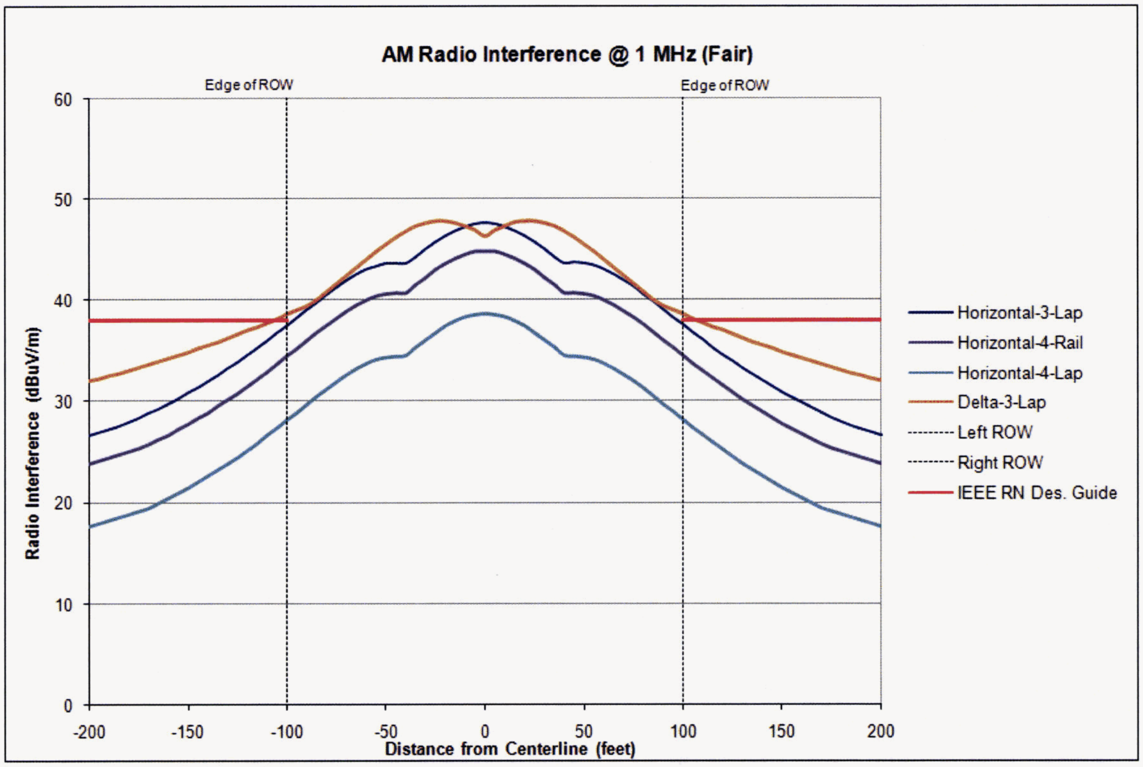

Figure 8: AM Radio Interference Across ROW for Various Configurations

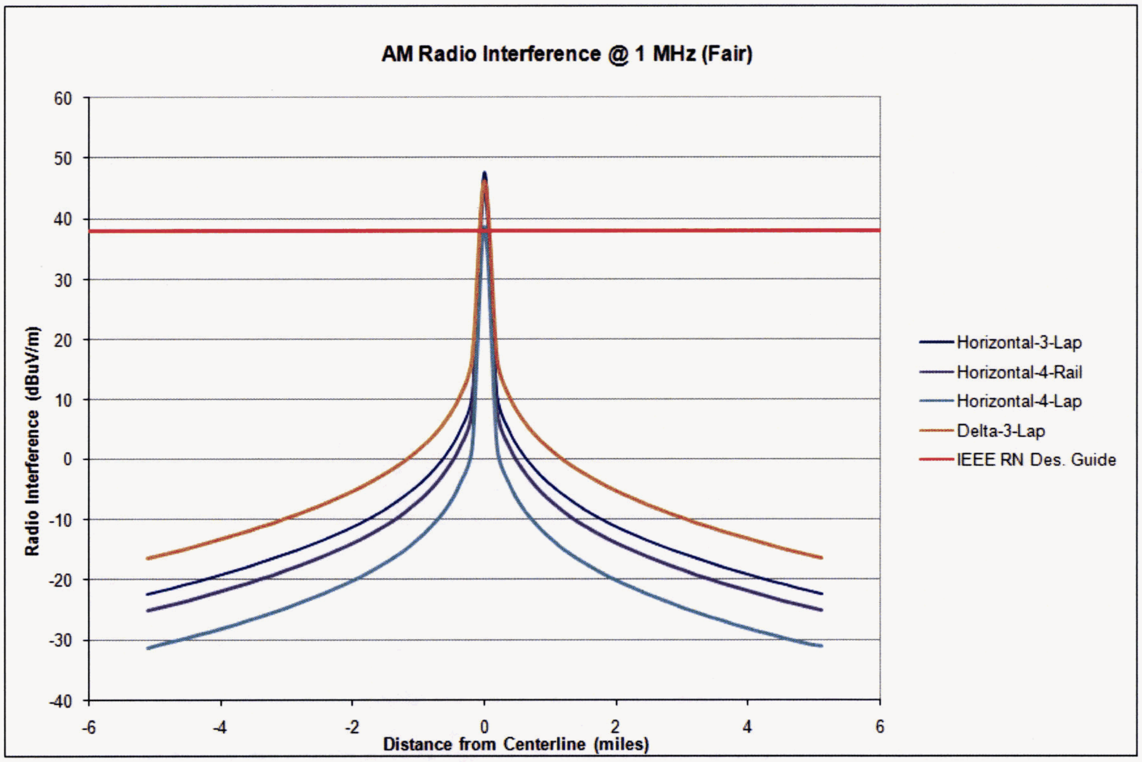

Figure 9: AM Radio Interference for Five Miles Beyond ROW for Various Configurations

4.5 Television Interference

Television interference (TVI) is the degradation of a television signal by television frequency electromagnetic disturbances and is reported as the field strength of the interference. It is often measured in decibels (dB) of one microvolt per meter (μV/m) which is a logarithmic scale. The values are reported for wet conductor conditions, as TVI is negligible during fair weather. Values are calculated at a height of ten meters above the ground per IEEE Standard 430-1986 and FCC measurement guidelines, using the average conductor height to approximate the average values along the entire line. Television signals cover multiple bands and a large range of frequencies. These calculations are made in a dead band (75 MHz) in the lower VHF band (54-88 MHz), and interference effects will decrease moving into the upper VHF (174-216 MHz) and the UHF (470-698 MHz) bands, which are the more commonly used bands.

Television interference is now less of a concern since the recent national switch to digital television. Digital television does not experience the typical TVI noise effects that analog television did, such as shadowing or snow. With digital television, there is either signal or no signal, and the signals are less susceptible to the noise due to their higher operating frequencies. However, the values are reported since there may be a few local low-strength analog stations broadcasting in the area, or for any remaining VHF digital channels on the fringe of their operating range.

There has also been no significant published research on what levels of transmission line corona TVI will cause disruption of digital television signals, therefore there are no guidelines, such as those that apply to analog television. However, the FCC has indicated that a signal-to-random noise ratio of 17 dB or greater should be sufficient for reception. Similar to radio interference, TVI needs both a signal strength and a calculated noise (interference) value to calculate a signal-to-noise ratio, which in turn would provide an idea of reception quality. Using the digital upper VHF (most stations have moved out of the lower VHF band) average signal strength for a channel of 36 dB and the signal-to-random noise ratio above, a rough limit could be approximated at 19 dB of TVI. Note that this limit is not an industry accepted limit and is only a means of rough guidance.

Table 5 shows a summary of the television interference levels in the ROW for each configuration for a single transmission line.

Table 5: Television Interference for Various Configurations [dBμV/m @ 75 MHz]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Horizontal 3-Bundle Lapwing	18.3	30.4	24.7
Horizontal 4-Bundle Rail	15.2	27.6	21.7
Horizontal 4-Bundle Lapwing	8.9	21.4	15.4
Delta 3-Bundle Lapwing	19.4	30.5	25.7

* Average values based on data points calculated every five feet across the ROW width.

Figure 10 and Figure 11 (on the following page) respectively show a plot of the television interference levels across the ROW and extending five miles beyond the ROW for each of the configurations. The rough guideline mentioned above is indicated by a red line beyond the ROW on these plots.

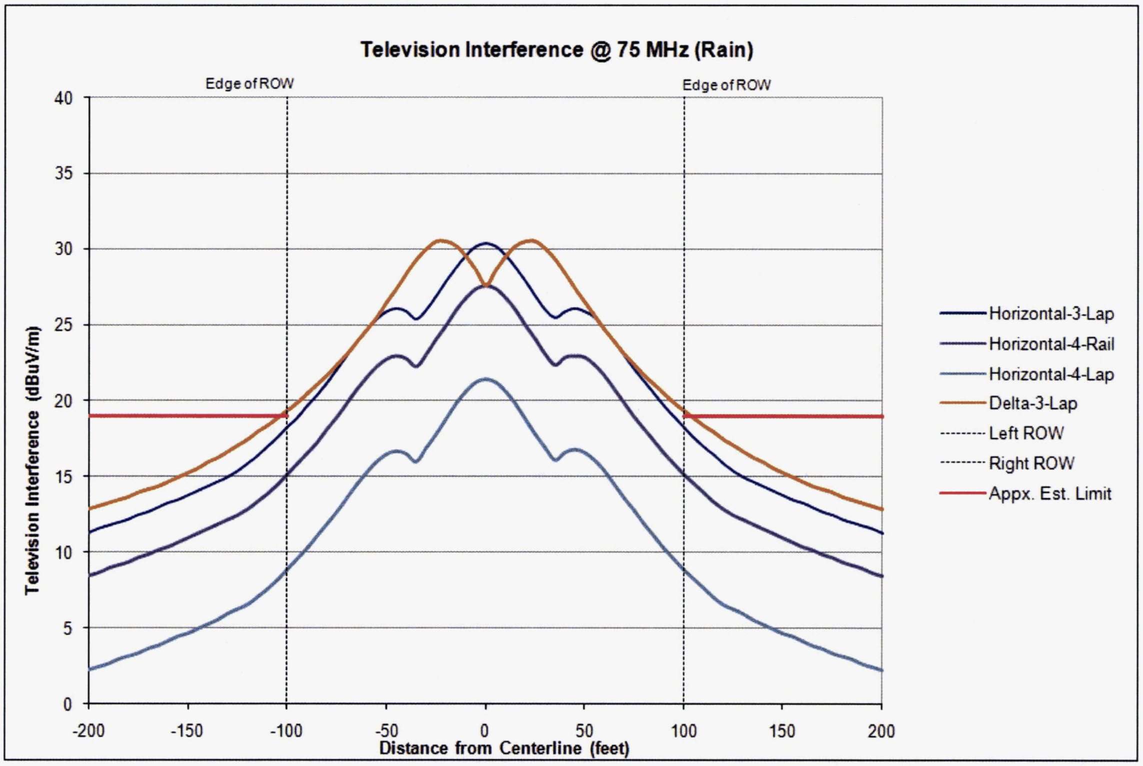

Figure 10: Television Interference Across ROW for Various Configurations

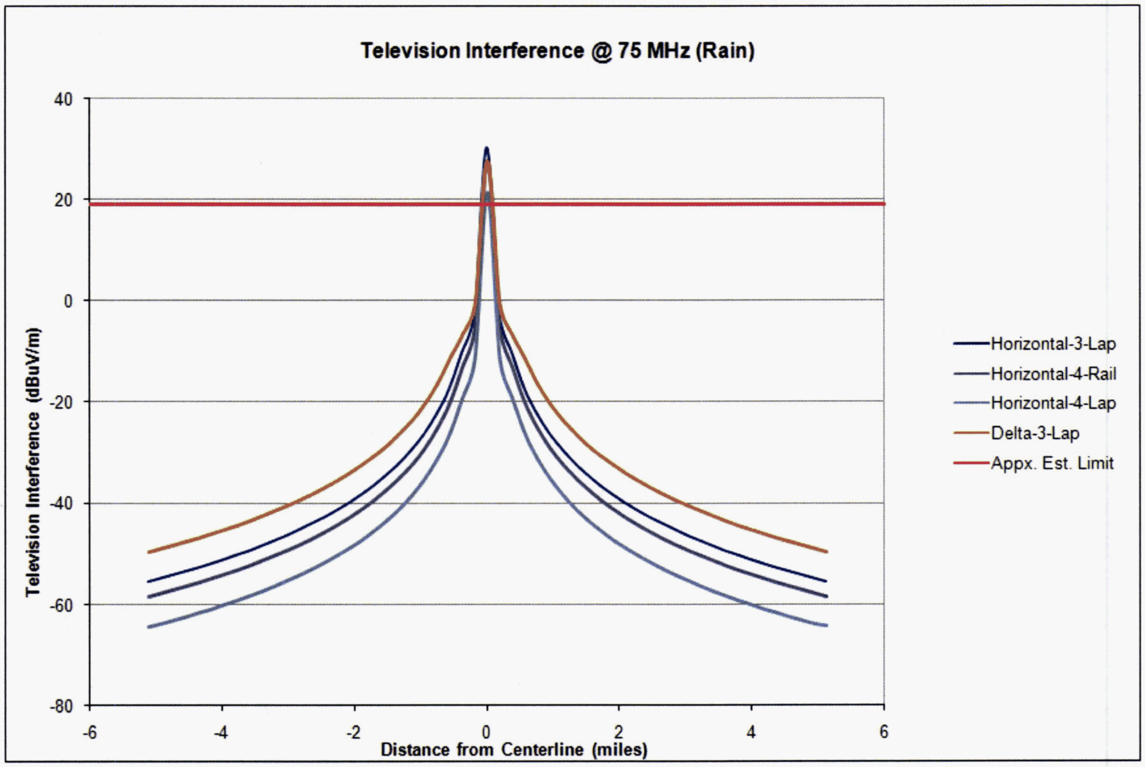

Figure 11: Television Interference for Five Miles Beyond ROW for Various Configurations

5.0 RESULTS OF INCREASING LINE VOLTAGE

This section explores the effects of increasing line voltage along the AC line. Since this transmission line will be heavily compensated with reactive power, there is a high likelihood that portions of the line will far exceed the nominal 500 kV rating. All calculations in Section 4 were based on 105% of the nominal voltage. This section extends to 110%, 115%, and 120% of nominal voltage. Increasing the voltage increases the electric field, which in turn increases the audible noise, radio interference, and television interference. Magnetic fields are driven by current and therefore are not directly affected by the system voltage.

All cases examined in this section are based on the initial design of a three conductor bundle using 1590 ACSR Lapwing conductor in a horizontal configuration. These results can be interpolated into the results of the other configurations presented in Section 4.

5.1 Electric Field

Electric fields are directly proportional to the voltage. Therefore when the voltage goes up 5%, so does the resulting electric field. Table 6 presents the increased electric fields based on the four examined scenarios.

Table 6: Electric Field Results for Different Voltages [kV/m]			
CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Max. Voltage = 105% (525 kV)	2.6	8.6	6.2
Max. Voltage = 110% (550 kV)	2.7	9.0	6.5
Max. Voltage = 115% (575 kV)	2.9	9.5	6.8
Max. Voltage = 120% (600 kV)	3.0	9.9	7.1

* Average values based on data points calculated every five feet across the ROW width.

Figure 12 shows a plot of the electric field across the ROW for the various voltages. Again, none of these changes result in exceeding the ICNIRP reference level beyond the edge of the ROW, which is shown as a red line on the plot. Since the values drop to nearly the same value just beyond the edge of the ROW, no plot to five miles was provided as the fields are negligible as before.

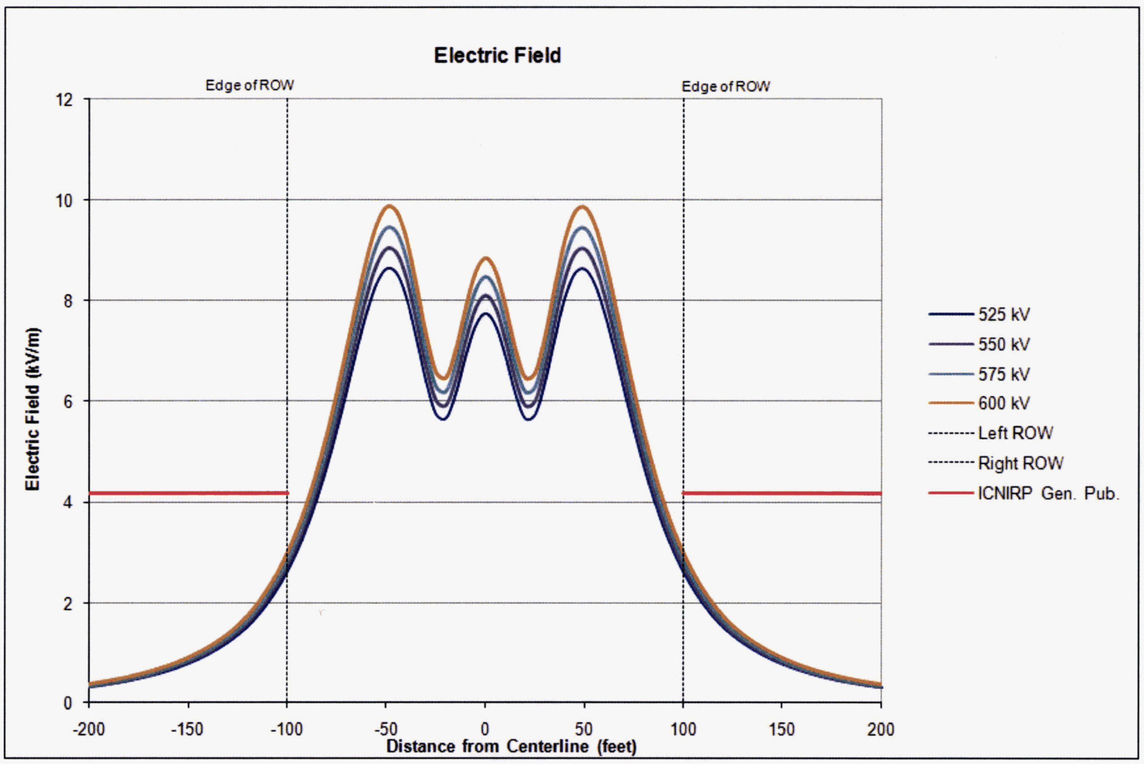

Figure 12: Electric Field Across ROW for Different Voltages

5.2 Magnetic Field

The magnetic field is independent of the system voltage and therefore is not presented in this section.

5.3 Audible Noise

Table 7 shows a summary of the audible noise levels in the ROW as the voltage increases for a single transmission line. The increases in noise are roughly proportional to the increase in voltage.

Table 7: L50 Audible Noise Results for Different Voltages (Foul Weather) [dBA]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Max. Voltage = 105% (525 kV)	45.0	48.1	46.8
Max. Voltage = 110% (550 kV)	47.4	50.5	49.3
Max. Voltage = 115% (575 kV)	49.8	52.8	51.6
Max. Voltage = 120% (600 kV)	52.0	55.0	53.8

* Average values based on data points calculated every five feet across the ROW width.

Figure 13 shows a plot of the audible noise levels across the ROW for increasing voltages. The EPA recommended average noise level shown as a red line on the plot) is not exceeded within or beyond the ROW for any of these scenarios.

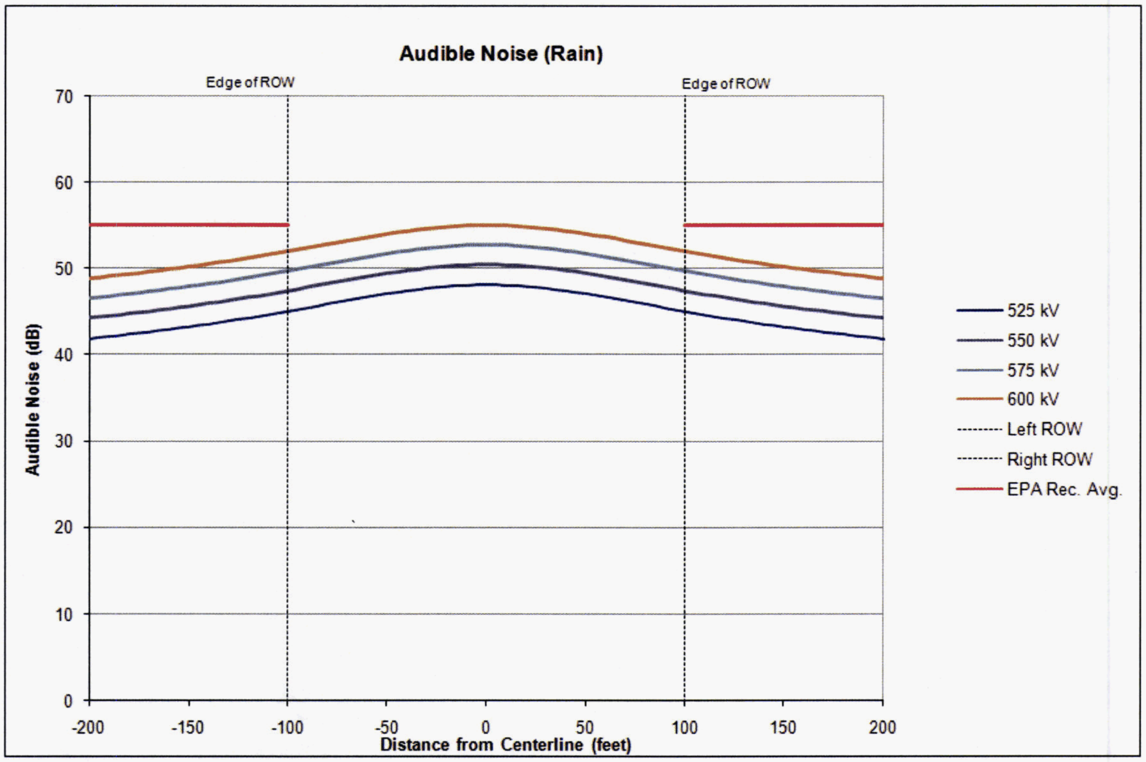

Figure 13: Audible Noise Across ROW for Different Voltages

5.4 AM Radio Interference

Table 8 shows a summary of the radio interference levels in the ROW for the increasing voltages. Again, values increase roughly proportional to the increase in voltage.

Table 8: L50 Radio Interference for Different Voltages (Fair Weather) [dBµV/m @ 1MHz]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Max. Voltage = 105% (525 kV)	37.5	47.7	43.2
Max. Voltage = 110% (550 kV)	40.0	50.1	45.7
Max. Voltage = 115% (575 kV)	42.3	52.4	48.0
Max. Voltage = 120% (600 kV)	44.5	54.6	50.2

* Average values based on data points calculated every five feet across the ROW width.

Figure 14 shows a plot of the radio interference levels across the ROW for the various voltages. Near the higher voltages, the IEEE Radio Noise Design Guide recommended limit of 38 dB (shown as a red line) is slightly exceeded, but this is only for antennas located within about 50 feet of the edge of ROW.

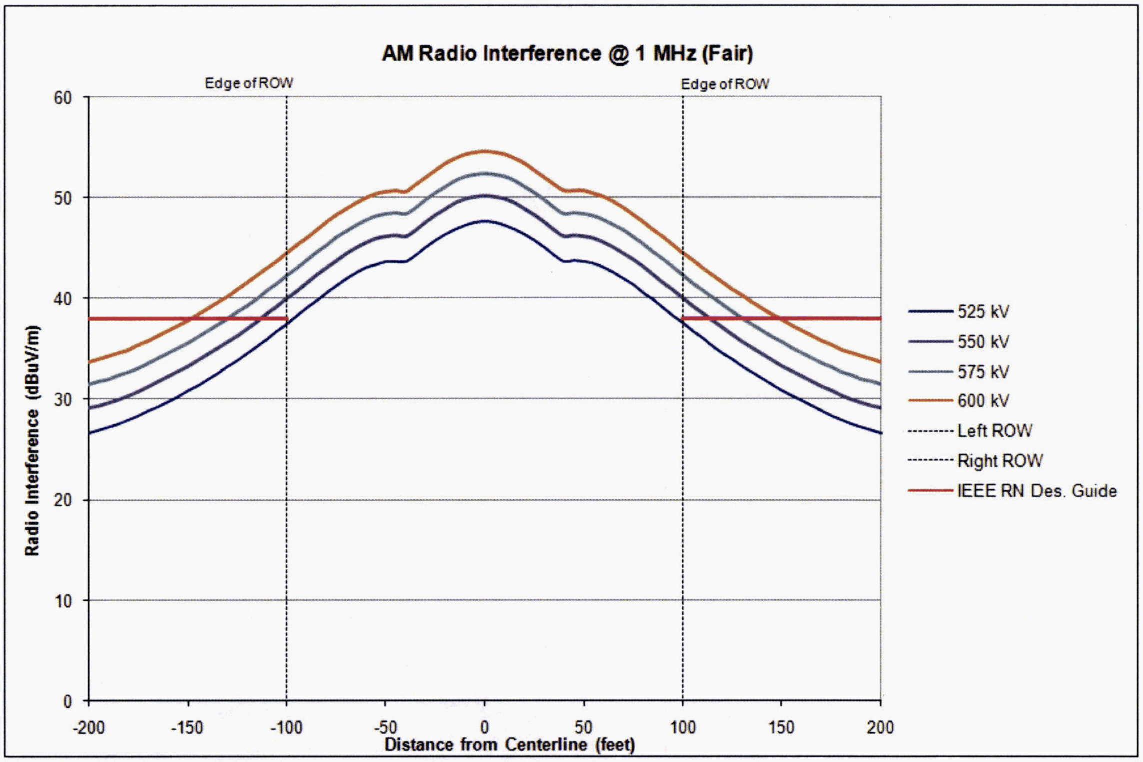

Figure 14: AM Radio Interference Across ROW for Different Voltages

5.5 Television Interference

Table 9 shows a summary of the television interference levels in the ROW for each configuration for a single transmission line. As with the other effects, TVI increases roughly proportional to the voltage.

Table 9: Television Interference for Different Voltages [dBµV/m @ 75 MHz]			
CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Max. Voltage = 105% (525 kV)	18.3	30.4	24.7
Max. Voltage = 110% (550 kV)	20.7	32.8	27.1
Max. Voltage = 115% (575 kV)	23.0	35.2	29.4
Max. Voltage = 120% (600 kV)	25.2	37.4	31.6

*Average values based on data points calculated every five feet across the ROW width.

Figure 15 shows a plot of the television interference levels across the ROW for each of the voltage scenarios.

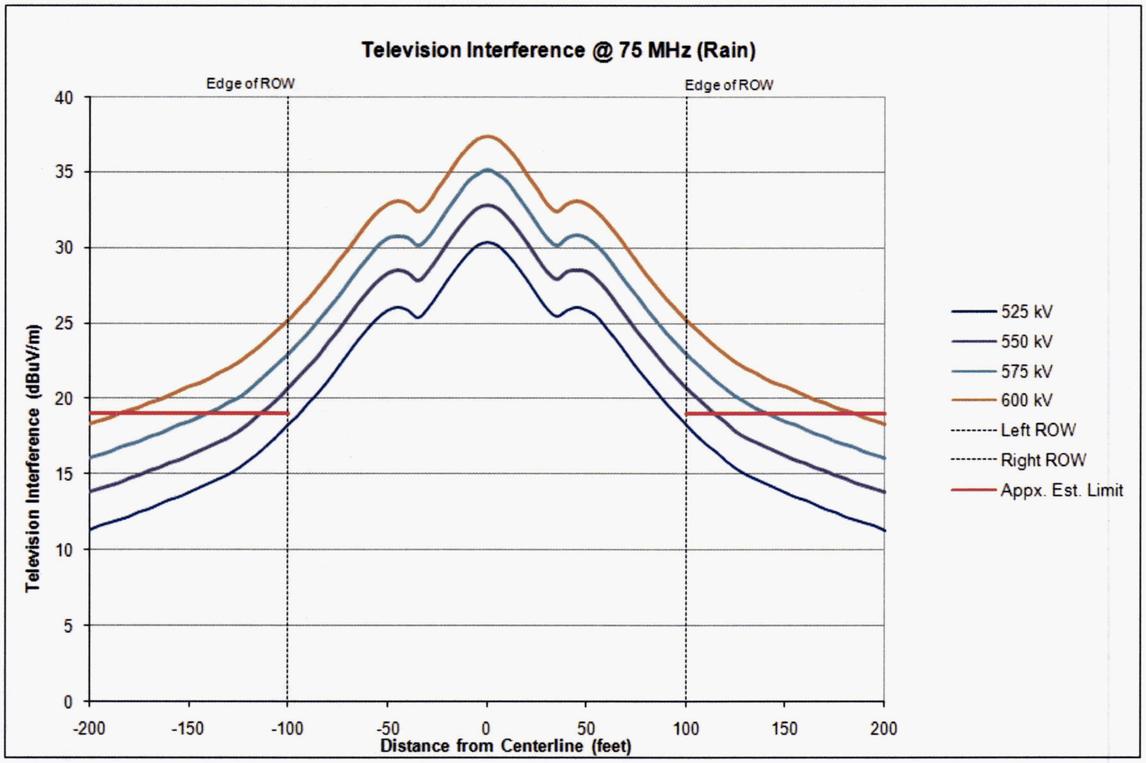

Figure 15: Television Interference Across ROW for Different Voltages

6.0 RESULTS OF ADDING A SECOND LINE

This section examines the effects of adding a second AC or DC line in parallel to the first. In addition, two phasing configurations are examined for the AC cases, the first with the phases A-B-C and A-B-C left-to-right on the two structures, the second with A-B-C and C-B-A. For some aspects one arrangement will present a slightly better configuration, and for others the opposite arrangement will be slightly better.

In general with a second AC line, values at and near the edge of ROW remain similar to that of one line, especially when examining the audible noise and radio and television interference. Values near the center of the ROW differ particularly for the electric and magnetic fields. For cases where the second line is DC, none of the values at the edge of the ROW are significantly higher. The maximum electric and magnetic fields and RI effects in the ROW are higher with DC versus AC, while the audible noise is actually lower. Once far from the line, the values are practically identical for all effects.

All cases examined in this section are based on the initial design of a three conductor bundle using 1590 ACSR Lapwing conductor in a horizontal configuration. These results can be interpolated into the results of the other AC configurations presented in Section 4.

6.1 Electric Field

Table 10 shows a summary of the values in the ROW for different configurations with two transmission lines in the corridor. These values are similar to the single line cases, although the DC values peak higher in the ROW.

Table 10: Electric Field Results for Two Circuits [kV/m]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Second Line with A-B-C and A-B-C Phasing (L to R)	2.7	8.7	4.7
Second Line with A-B-C and C-B-A Phasing (L to R)	2.6	9.1	5.3
AC-DC Hybrid	2.6	12.0	6.8

* Average values based on data points calculated every ten feet across the ROW width.

Figure 16 shows a plot of the electric field across the ROW for the configurations. Due to the arrangement of the phase conductors, the A-B-C A-B-C configuration presents a cancelation effect, reducing the electric maximum field strength near the center of the ROW. The DC line brings up the field strength on its side of the corridor due to larger phase-to-neutral voltages associated with it. Ion enhanced fields were not considered in the electric field strength of the hybrid line. This is a phenomenon where static pole conductors can actually charge the air particles in the immediate vicinity in fair low wind conditions and could cause field strengths higher than reported. These enhanced fields vary significantly with weather conditions, and are hard to predict. Other reported values do take these effects into account due to the use of empirical formulas.

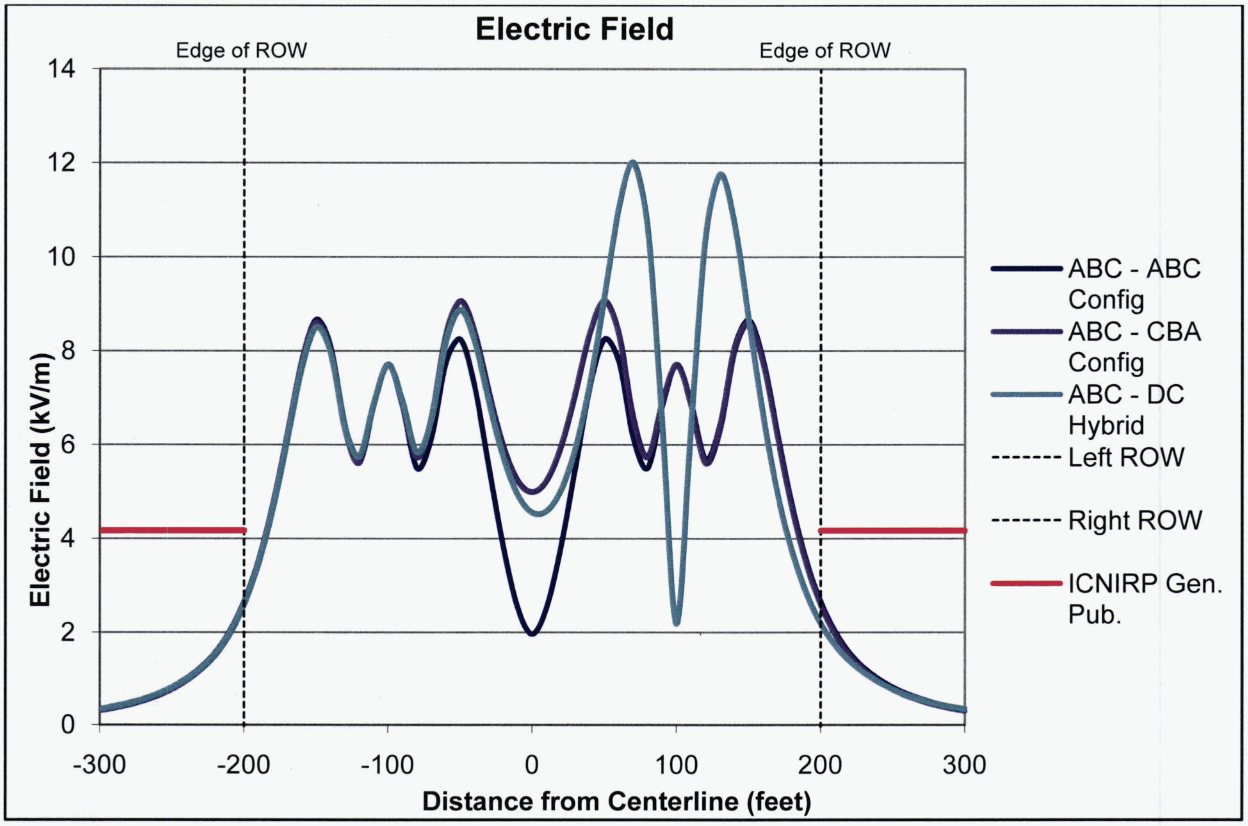

Figure 16: Electric Field Across ROW for Two Circuits

6.2 Magnetic Field

Table 11 shows a summary of the values in the ROW for the different configurations with two transmission lines in the corridor assuming maximum current loading. Again, the results are directly proportional to the loading of the line; therefore, 50% loading would be exactly half of the 100% loading condition. The values presented are similar to a single line case at the edge of ROW.

Table 11: Magnetic Field Results for Two Circuits – 100% Loading [mG]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Second Line with A-B-C and A-B-C Phasing (L to R)	97.4	284.9	171.4
Second Line with A-B-C and C-B-A Phasing (L to R)	82.1	323.2	188.0
AC – DC Hybrid	102.5	496.6	272.8

* Average values are based on data points calculated every ten feet across the ROW width.

Figure 17 shows a plot of the magnetic field across the ROW at 100% loading for the various configurations. Similar to the electric field, the A-B-C A-B-C configuration presents a cancellation effect near the center of the ROW, although the values near the edge of the ROW and beyond are actually lower with the A-B-C C-B-A configuration. However, the AC – DC hybrid corridor has much higher peak magnetic fields in the ROW due to the fact that the DC has approximately twice the current of the AC line.

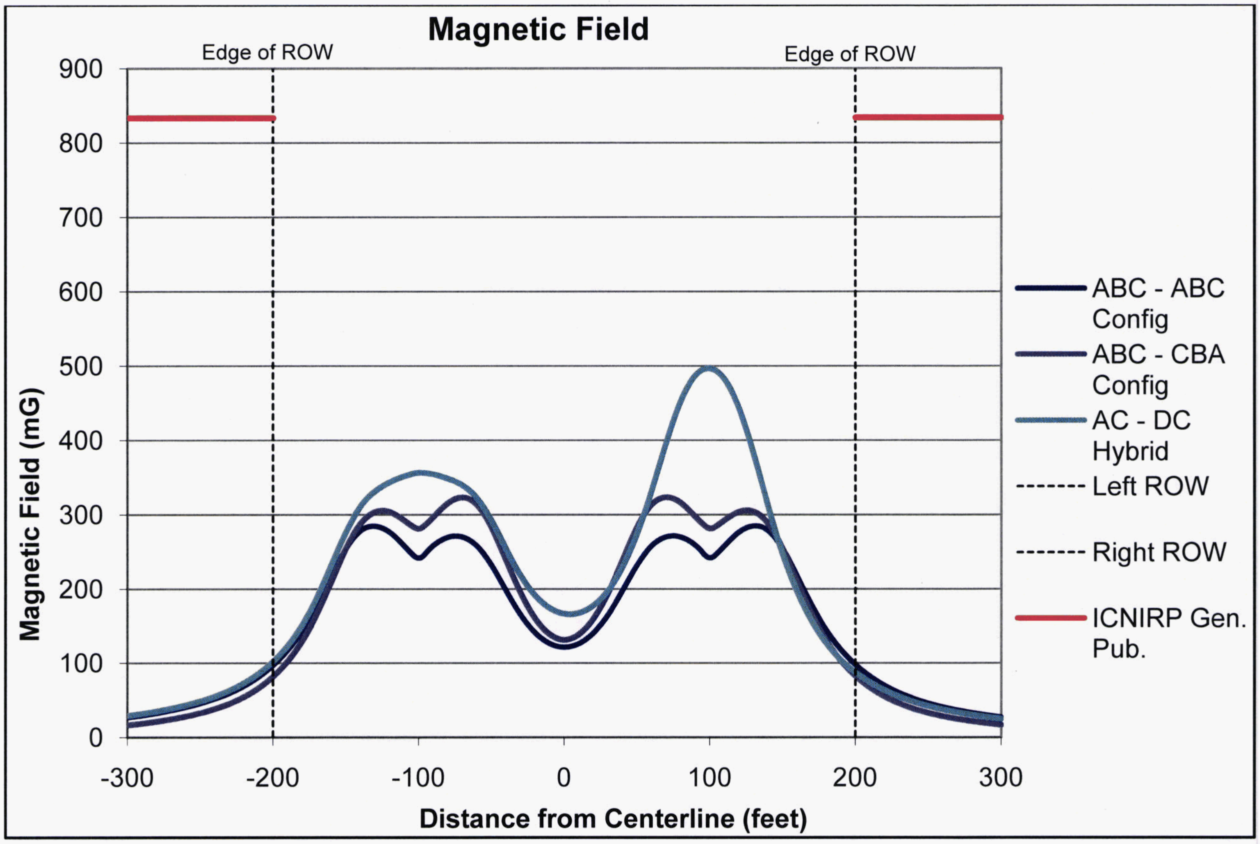

Figure 17: Magnetic Field Across ROW for Two Circuits

6.3 Audible Noise

Table 12 shows a summary of the values in the ROW for the different line configurations with two transmission lines in the corridor. These values are approximately equal to those of a single line for foul weather conditions.

Table 12: L50 Audible Noise Results for Two Circuits (Foul Weather for AC) [dBA]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Second Line with A-B-C and A-B-C Phasing (L to R)	46.4	49.3	47.7
Second Line with A-B-C and C-B-A Phasing (L to R)	46.1	48.9	47.2
AC-DC Hybrid (Foul)	46.0	48.8	46.3
AC-DC Hybrid (Fair)	37.2	41.3	38.5

* Average values based on data points calculated every ten feet across the ROW width.

Figure 18 shows a plot of the audible noise levels across the ROW for the various configurations. There is negligible difference between the configurations in areas of close proximity to the AC transmission lines. The DC transmission line is actually nosier during fair weather which is why it is included. However, the noise from the foul weather AC transmission line is greater than that of the fair weather DC line for both weather conditions and all values are below the EPA guidelines.

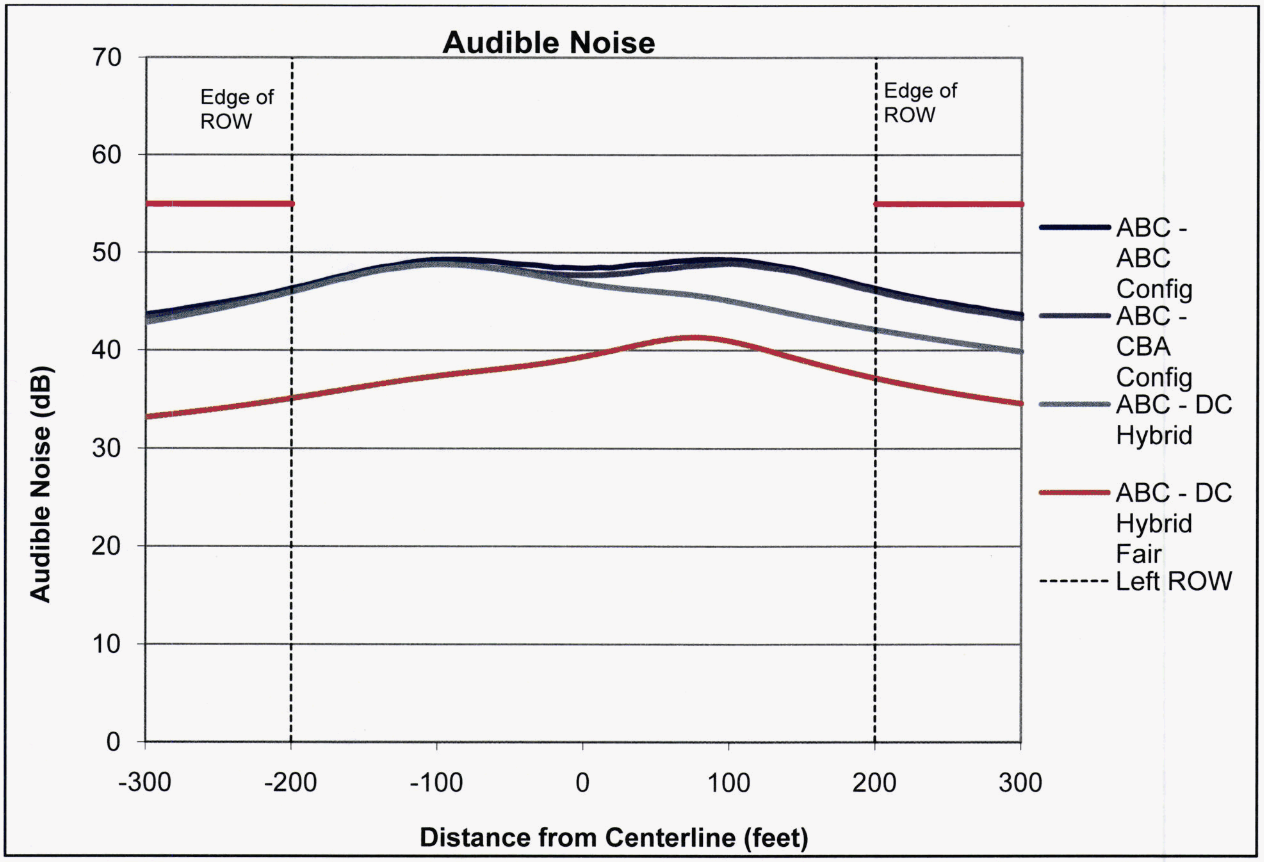

Figure 18: Audible Noise Across ROW for Two Circuits

6.4 AM Radio Interference

Table 13 shows a summary of the values in the ROW with two transmission lines in the corridor. These values are nearly identical to the single transmission line case at the edge of ROW.

Table 13: L50 Radio Interference for Two Circuits (Fair Weather) [dBµV/m @ 1MHz]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Second Line with A-B-C and A-B-C Phasing (L to R)	37.3	47.8	40.6
Second Line with A-B-C and C-B-A Phasing (L to R)	37.6	47.8	40.0
AC-DC Hybrid	38.1	50.0	41.6

* Average values based on data points calculated every ten feet across the ROW width.

Figure 19 shows a plot of the radio interference levels across the ROW for the various configurations. The values of the under the DC line increase slightly, but there is little change outside of the ROW.

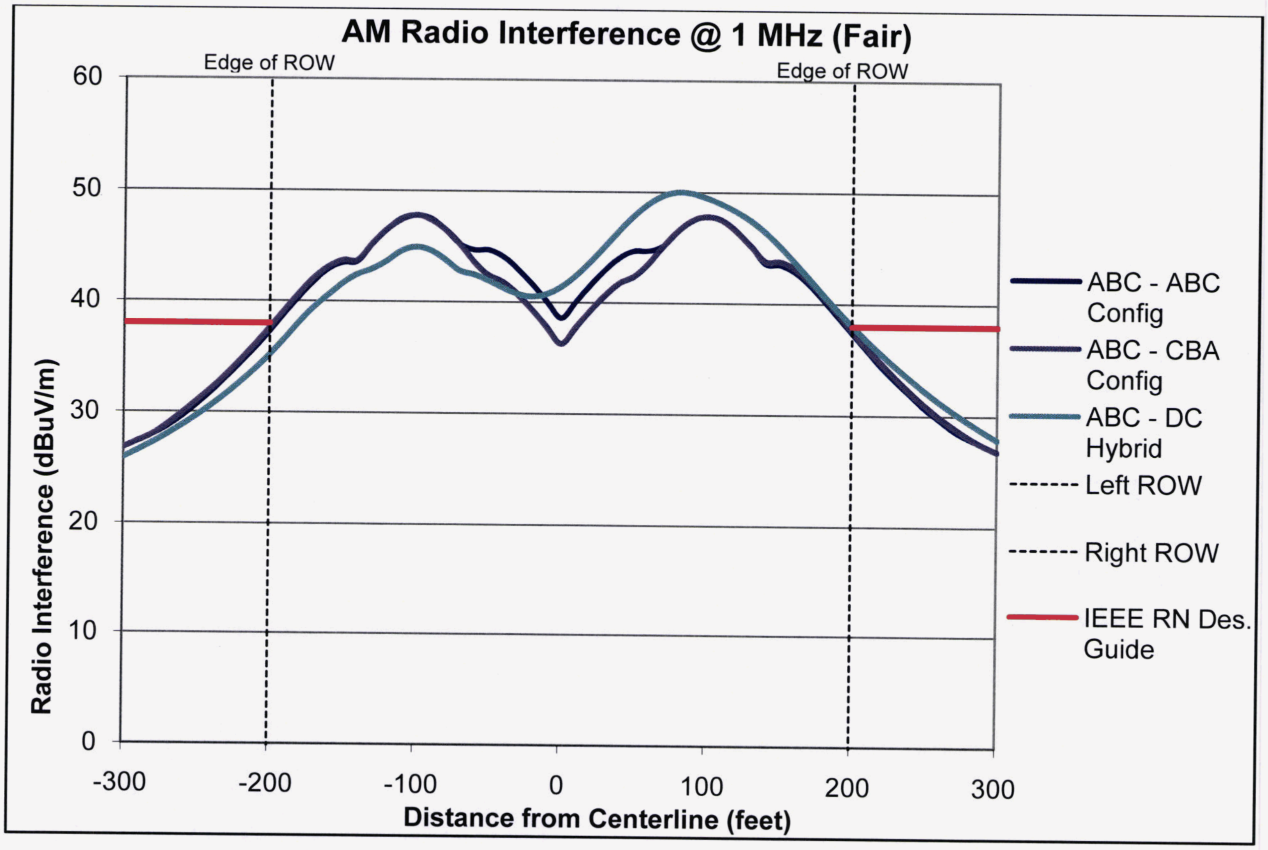

Figure 19: AM Radio Interference Across ROW for Two Circuits

6.5 Television Interference

Table 14 shows a summary of the television interference values in the ROW for the two different AC line phasing configurations with two transmission lines in the corridor. These values are nearly identical to those of a single transmission line. The Enviro software does not produce radio frequency interference results in the television band as it only goes up to 30 MHz. The DC line is not expected to produce significant interference in this frequency range. One quote from the EPRI *Transmission Line Reference Book HVDC to +/- 600 kV*, is "No significant TVI has ever been measured from DC lines during fair or foul weather; therefore, no attempt has been made to develop equations for calculating TVI from DC Lines."

Table 14: Television Interference for Two Circuits [dBµV/m @ 75 MHz]

CASE	EDGE OF ROW	MAXIMUM IN ROW	AVERAGE IN ROW*
Second Line with A-B-C and A-B-C Phasing (L to R)	18.1	30.5	22.4
Second Line with A-B-C and C-B-A Phasing (L to R)	18.3	30.5	21.8

* Average values based on data points calculated every ten feet across the ROW width.

Figure 20 shows a plot of the television interference levels across the ROW for the two configurations. Similar to radio interference, there is negligible difference between the two options outside of the ROW.

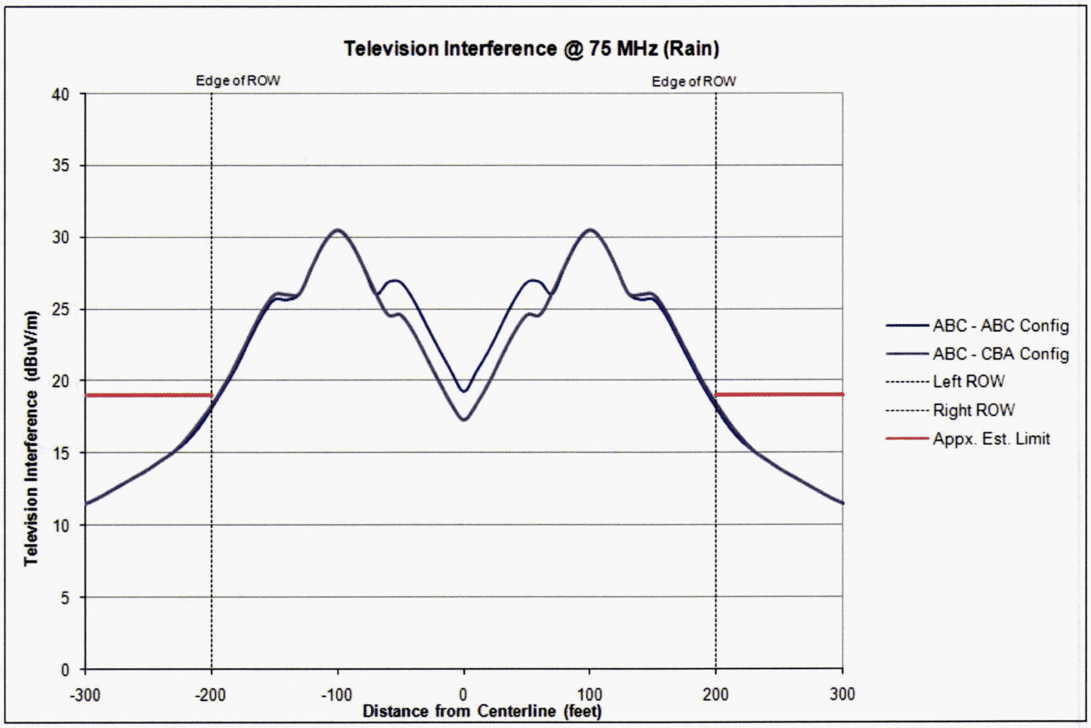

Figure 20: Television Interference Across ROW for Two Circuits

7.0 GENERAL SUMMARY OF RESULTS

This report analyzed EMF and field effects for a base case horizontal guyed V structure with a three conductor bundle, and explored the effects of modifying the bundle or structure type, increases in voltage along the line, and the addition of a second AC or DC line in parallel. In general, it appears that the base case structure and bundle configuration will be acceptable based on the discussion and results in the previous sections. Adding a future second AC or DC line will produce similar results outside of the ROW as compared to a single line.

No guidance was provided on limits that could not be exceeded for any of the field effects. These limits are typically presented by state or municipal requirements; however, Arizona and New Mexico do not have any statewide requirements. All electric and magnetic fields calculated are below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) reference exposure limits for both general public exposure off the ROW. Audible noise levels are below EPA recommended values for outdoor areas. Radio and television interference depend on the signal strength to categorize the effects of the interference on reception quality. Values for AM radio interference are approximately at or below typical guidelines and television interference has no published guidelines for digital television signals, although the interference produced by the lines is likely acceptable. Any additional radio frequency concerns were not presented at this time for other communications systems in the areas.

APPENDIX A – TRANSMISSION LINE STRUCTURE DRAWINGS

PLAN VIEW

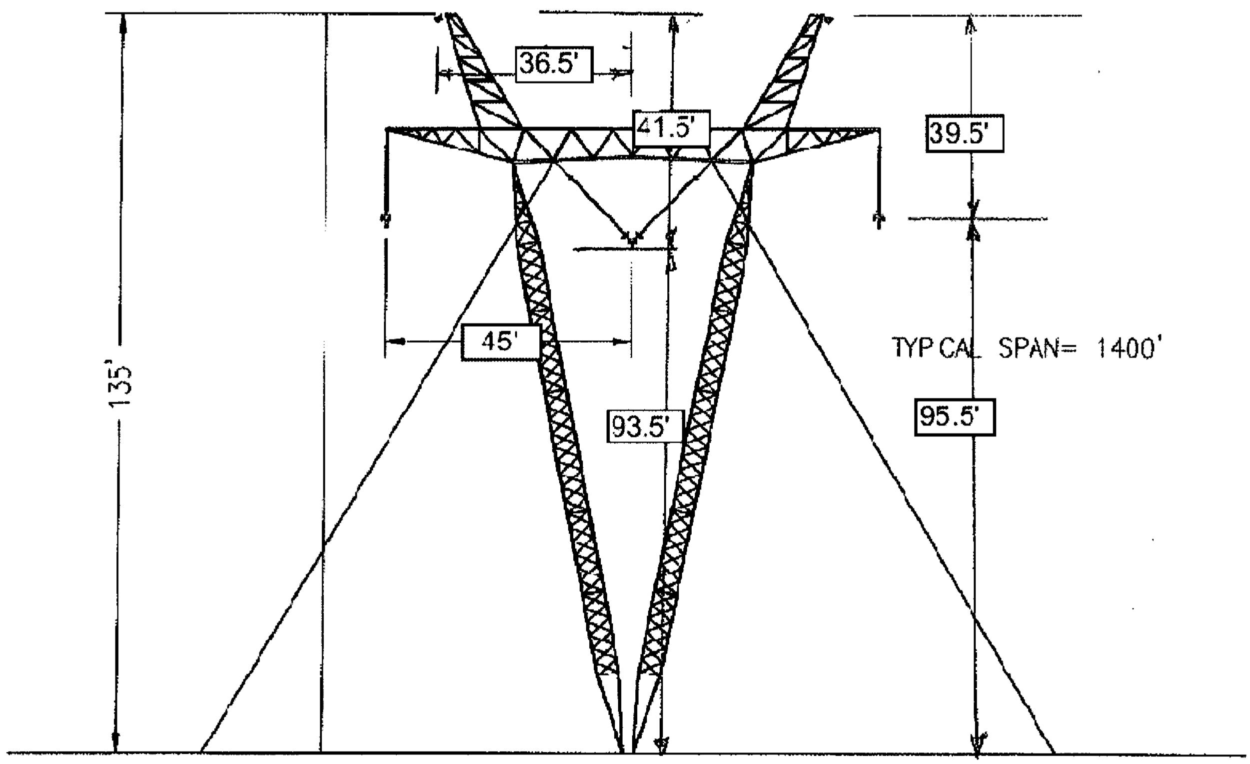

FIG. 1
LATTICE GUYED-V

Figure 21: Horizontal Transmission Structure Configuration

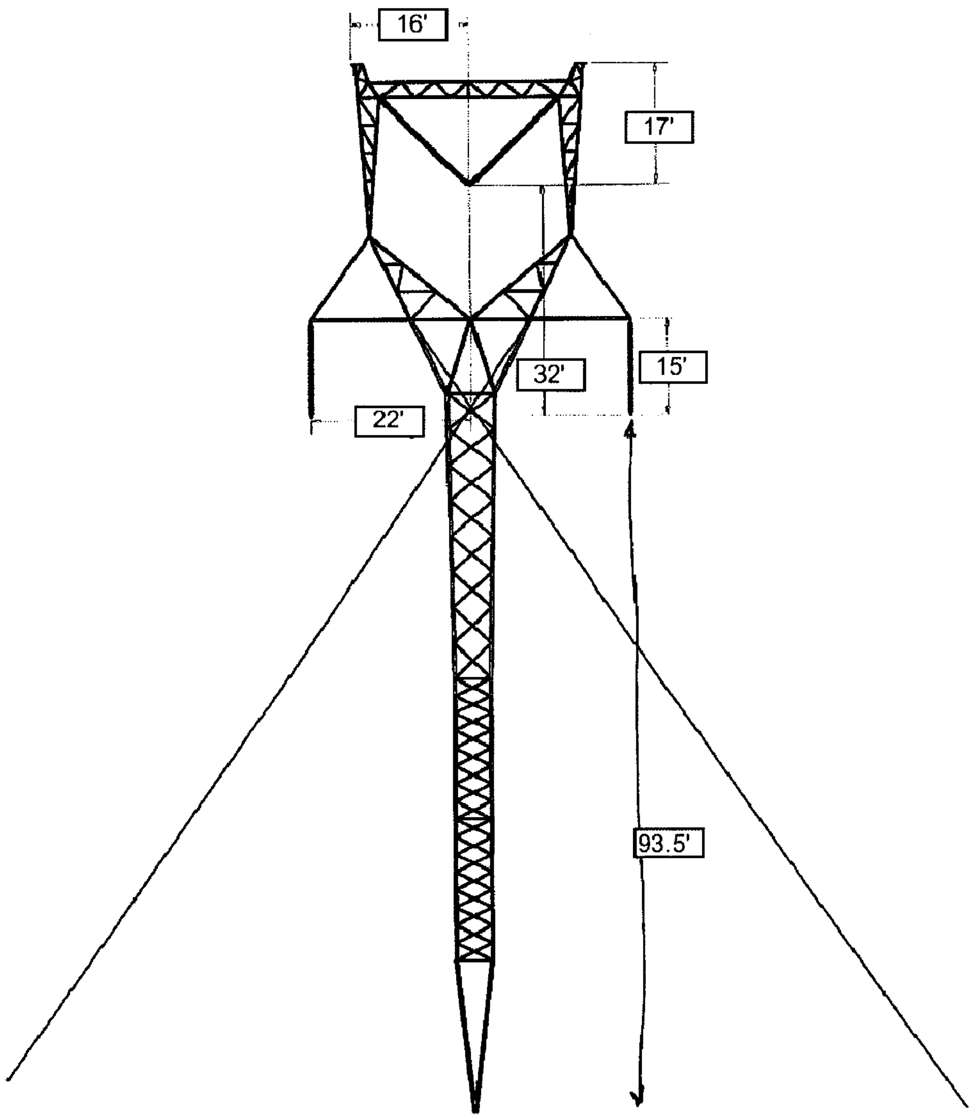

Figure 22: Delta Transmission Structure Configuration

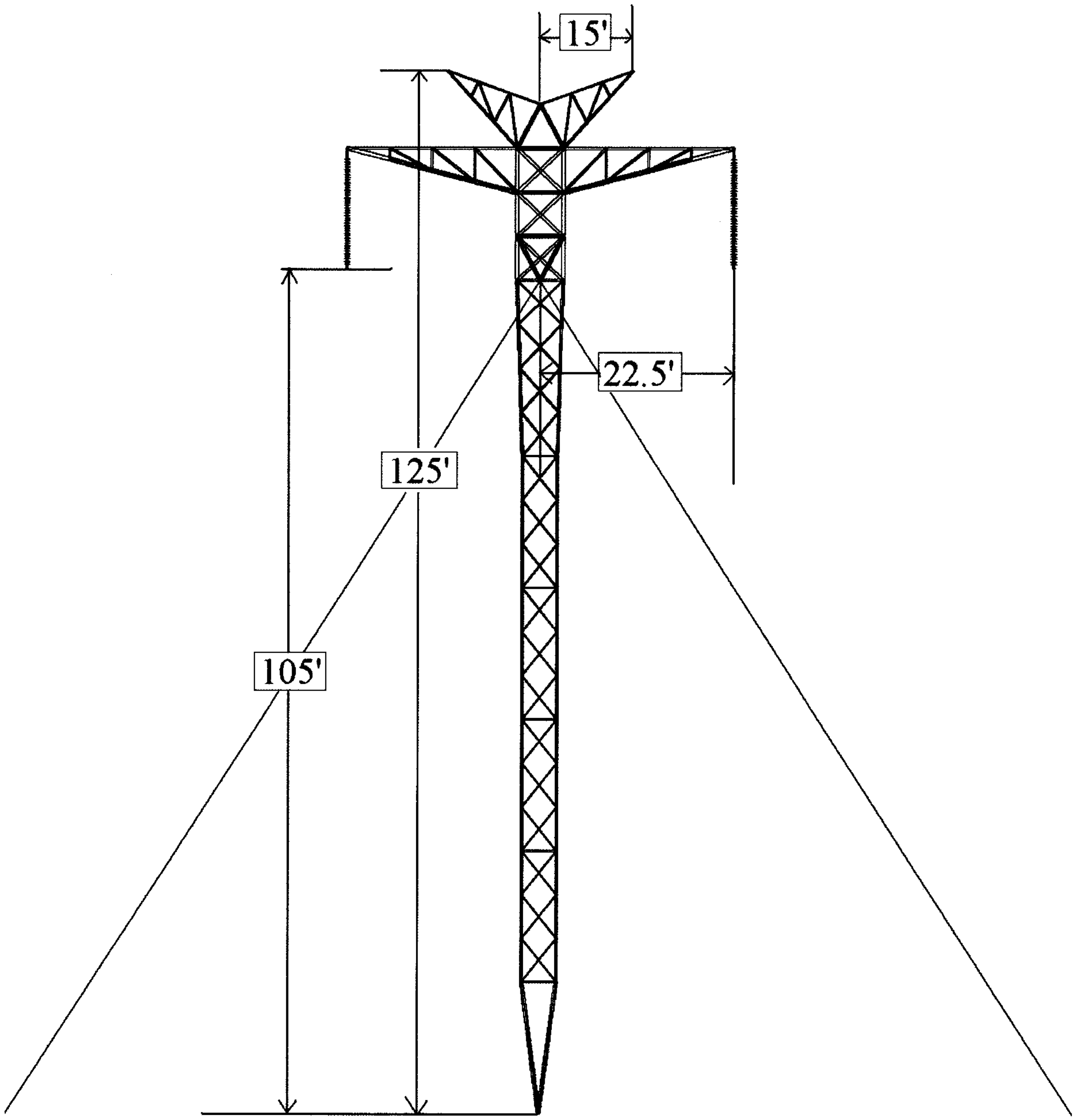

Figure 23: DC Tower Configuration

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Exhibits J

EXHIBIT J – SPECIAL FACTORS

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Describe any special factors not previously covered herein, which Applicant believes to be relevant to an informed decision on its application."

Exhibit J-1: Public Involvement Activities Summary

Exhibit J-2: Public Review of the EIS

INTRODUCTION

This exhibit includes information on the public involvement and coordination activities conducted for the SunZia Southwest Transmission Project. Coordination with federal, state and local agencies, private and public organizations, tribes, and stakeholder groups of individuals are important to ensure that the most appropriate data have been gathered for analyses, and that agency and public comments are considered as part of the decision-making process. Throughout the preparation of the Environmental Impact Statement (EIS), formal and informal efforts were made by the Bureau of Land Management (BLM) to involve these groups in the scoping process, subsequent public involvement activities, and review of the EIS.

This exhibit provides a brief description of the public involvement, consultation, and coordination efforts during the nearly six-year National Environmental Policy Act (NEPA) process, during which interested stakeholders had numerous opportunities to review and consideration information regarding the SunZia Project, and its potential impacts on the environment.

EXHIBIT J-1 PUBLIC INVOLVEMENT ACTIVITIES SUMMARY

Scoping Process

As required by the National Environmental Policy Act (NEPA), the BLM conducted scoping prior to the preparation of the EIS with cooperating agencies to encourage public participation and solicit agency and public comments on the scope and significance of the proposed action (40 CFR 1501.7). This scoping process was initiated in May 2009 with the announcement of upcoming public scoping meetings that requested comments or issues that should be addressed in the EIS.

Notice of Intent

The public was notified of the Project and upcoming scoping meetings through a Notice of Intent (NOI) published by the U.S. Department of Interior–BLM in the *Federal Register* on May 29, 2009. The NOI formally initiated a 45-day public scoping period for the Project. Comments were received during this 45-day period, which ended on July 13, 2009. The NOI also provided information, including a description of the proposed facilities, Project location, and a summary of the EIS process, and instructions on how to submit comments. The comment deadline was later extended to August 28, 2009, in response to requests from stakeholders.

In addition to the NOI, the BLM used a variety of other notification methods to announce the public scoping meetings and provide Project information. Concurrent with the release of the NOI, the BLM issued a news release to media in Arizona to announce the meetings. Paid display advertisements were placed in newspapers in Arizona, and radio announcements were made. These notifications are detailed in Section 4 of the Scoping Report (see Exhibit B2).

The BLM NOI letter and comment form were included with the first Project newsletter that was direct-mailed to the initial mailing list on June 3, 2009. This initial list comprised agencies, organizations, and individuals that were compiled by the BLM offices within the study area. Subsequent mailing lists expanded to include interested stakeholders such as agencies, special interest groups, and individuals who attended the public scoping meetings or who provided comments on the Project. Project newsletters and the announcement of scoping meetings were distributed to the mailing list. In addition, a direct mailer was sent out in July 2009 to announce the extension of the comment period (from July 2009 to August 2009). The BLM established a Project website[1] to provide information, including meeting announcements and public documents. Copies of press releases, display advertisements, and media distributions lists can be found in the Scoping Report, which are also available on the Project website.

Scoping Meetings

Four formal public scoping meetings were held in Arizona during the first scoping period in June and July 2009 (Table J-1-1). These were open-house meetings held to introduce, describe, and explain the purpose and need for the Project, and to solicit the public and stakeholder input and comments regarding the Project and potential alternatives.

Table J-1-1. Scoping Meetings – June and July 2009

Meeting Date	Location	Public in Attendance [1]
	Arizona	
June 22, 2009	Santa Cruz Valley Union High School 900 N. Main Street Eloy, AZ	16
June 23, 2009	Oracle Community Center 685 American Avenue Oracle, AZ	39
June 24, 2009	Manor House Convention Center 415 E. Highway 70 Safford, AZ	30
June 29, 2009	Valley Telephone Company 752 E. Maley Willcox, AZ	21
Total Attendees		**106**

[1] For purposes of this report, members of the public exclude Project-related individuals (e.g., BLM resource specialists, Applicant staff and engineers, EIS contractor personnel, and cooperating agency representatives.)

[1] http://www.blm.gov/nm/st/en/prog/more/lands_realty/sunzia_southwest_transmission.html

In response to comments received as a result of scoping meetings, the study area was expanded to consider additional potential alternative transmission line routes in Arizona. Meetings held during this additional Scoping Period are listed in Table J-1-2. These open house meetings presented the expanded study area and the same information used during the June and July 2009 scoping meetings to introduce, describe, and explain the purpose and need for the Project, and to solicit the public and stakeholder input and comments regarding the Project and potential alternatives.

Table J-1-2. Scoping Meetings – April 2010		
Meeting Date	**Location**	**Public in Attendance** [1]
April 29, 2010	Holiday Inn – Airport 4550 S. Palo Verde Road Tucson, Arizona	110
Total Attendees		**110**

[1] For purposes of this report, members of the public exclude Project-related individuals (e.g., BLM resource specialists, Applicant staff and engineers, EIS contractor personnel, and cooperating agency representatives.)

More than 200 people attended meetings in Arizona during the scoping periods (see Table J-1-1 and Table J-1-2). A full description of the scoping process, including the public scoping meetings, is provided in the Project Scoping Report and Addendum (see Exhibit B-1).

Comments Received during Scoping

Comments received during scoping, including the additional scoping periods to address the study area expansion in Arizona, were analyzed and documented in the Project Scoping Report and Addendum. Comments were reviewed to identify issues that should be addressed in the EIS, and to help develop a range of reasonable and feasible alternatives to the proposed action. In total, approximately 1,400 comment submittals were received. Specific issues and where they are addressed are listed in Chapter 1, Table 1-3 of the Final EIS (see Appendix B-1).

Meetings with Interested Stakeholder Groups, Organizations, and Cooperating Agencies

In addition to the public scoping meetings, the BLM attended meetings with representatives of interested stakeholder groups or other organizations during the scoping period, as listed in Table J-1-3. The BLM also attended and participated in meetings with cooperating agencies during the scoping period (Table J-1-4).

Table J-1-3. Meetings with Interested Stakeholder Groups and Organizations during Scoping Period	
The Nature Conservancy, Arizona	October 14, 2009
Winkelman Natural Resource Conservation District	January 6, 2010
Natural Resources Defense Council, The Wilderness Society, The Nature Conservancy, Center for Desert Archaeology	January 12, 2010
Pima County, Arizona, U.S. Bureau of Reclamation, National Park Service	April 2, 2010
Winkelman Natural Resource Conservation District	April 13, 2010
City of Tucson, Arizona	April 14, 2010
Redington Natural Resource Conservation District	April 15, 2010

Table J-1-3. Meetings with Interested Stakeholder Groups and Organizations during Scoping Period	
Arizona Army National Guard, Fort Huachuca, Davis-Monthan AFB, U.S. Army Regional Coordinator, Department of Defense Regional Environmental Coordinator Officer	April 29, 2010
Pima County Regional Flood Control District	May 19, 2010
Pima County Administrator, Pima County Regional Flood Control District	July 9, 2010
Redington and Winkelman Natural Resource Conservation Districts Workshop	July 28, 2010

Table J-1-4. Meetings with Cooperating Agencies, with Special Expertise Involving Arizona, during Scoping Period	
U.S Fish and Wildlife Service, Arizona Game and Fish Department	March 23, 2010
Arizona Game and Fish Department	May 13, 2010

Consultation and Coordination

Agencies, tribes, and organizations that have jurisdiction and/or specific interest in the Project were contacted at the beginning of scoping, during the resource inventory, and prior to the preparation and publication of the EIS to inform them of the Project, verify the status and availability of existing environmental data, request data and comments, and solicit their input regarding the Project. Additional contact was made throughout the scoping process to clarify or update information provided by the agencies and organizations. This section describes the consultation and coordination efforts that have occurred throughout the environmental review process.

Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or tribe that has jurisdiction by law or special expertise regarding environmental impacts of a proposed project. Those entities that chose to contribute to the preparation of the EIS as cooperating agencies are listed in Table J-1-5. Numerous meetings with the cooperating agencies were held during the scoping period (see Table J-1-4) and during preparation of the EIS.

Table J-1-5. Arizona Cooperating Agencies

Federal Agencies	State Agencies
U.S. Fish and Wildlife Service National Park Service Bureau of Indian Affairs Fort Huachuca (U.S. Army) Department of Defense Siting Clearinghouse	Arizona State Land Department Arizona Game and Fish Department Arizona Department of Transportation

Meetings with cooperating agencies included, but were not limited to, the following:

- Arizona State Land Department – September 28, 2011

- Arizona Game and Fish Department – October 5, 2011
- National Park Service, U.S. Fish and Wildlife Service, Fort Huachuca (U.S. Army), Department of Defense Siting Clearinghouse, Arizona State Land Department, Arizona Game and Fish Department, Arizona Department of Transportation – January 24, 2012
- National Park Service, U.S. Fish and Wildlife Service, Fort Huachuca (U.S. Army), Department of Defense Siting Clearinghouse, Arizona State Land Department, Arizona Game and Fish Department – February 29, 2012
- National Park Service – April 19, 2012

Tribes

In May 2009, the BLM contacted the following federally recognized tribes in Arizona to notify them of the Project, initiate government-to-government consultation, invite them to participate as cooperating agencies in preparation of the EIS, and to participate in the Section 106 consultation:

- Hopi Tribe
- San Carlos Apache Tribe
- Tohono O'odham Nation
- Salt River Pima-Maricopa Indian Community
- Gila River Indian Community
- Ak-Chin Indian Community
- White Mountain Apache
- Tonto Apache Tribe
- Yavapai-Apache Nation
- Pascua Yaqui Tribe
- Comanche Indian Tribe
- Navajo Nation (including Alamo Chapter)

A copy of the tribal consultation letter and tribal contact information are included in the Project Scoping Report and Addendum (see Exhibit B-2).

In recognition of the tribes' special relationship with the United States government, the BLM continues to consult with the appropriate tribal governments at an official executive level (government-to-government), in accordance with the National Historic Preservation Act (NHPA), EO 13175, and the NEPA. The BLM has provided opportunities for government officials and members of federally recognized tribes to comment on and participate in the preparation of the EIS, and notified consulted tribes of final decisions, and informed them of how their comments were addressed in those decisions. At a minimum, officials of federally recognized tribal governments will be offered the same level of involvement as state and county officials. Coordination addressed consistency with tribal plans, as appropriate; and the observance of specific planning coordination authorities (including Section 101[d][6] of the NHPA, American Indian Religious Freedom Act, EO 13007 [Indian Sacred Sites], EO 12898 [Environmental Justice]), and Secretarial Order 3206 (American Indian Rights, Federal Tribal Trust Responsibilities and the Endangered Species Act [ESA]). Although no tribes requested cooperating agency status for the preparation of the EIS, several tribes participated in Section

106 consultation, which will continue during the post-EIS phases of Project implementation prior to construction. Table J-1-6 shows tribal consultation meetings that have occurred to date.

Table J-1-6. Tribal Consultation Meetings

Meeting	Date
Arizona Four Southern Tribes[1]	July 21, 2009
Fort Sill, Mescalero, and San Carlos Apache tribes	October 16, 2009
San Carlos Apache and White Mountain Apache tribes	October 4, 2011
Four Southern Tribes Cultural Resource Working Group	July 20, 2012
San Carlos Apache Tribe	October 18, 2012
Tohono O'odham Nation Cultural Preservation Committee	November 27, 2012
Tohono O'odham Nation Legislative Council	December 6, 2012

[1]Tohono O'odham Nation and the Ak-Chin Indian Community representatives were present, while the Gila River and Salt River Pima-Maricopa Indian communities were not present.

Agency Communications

Communications and meetings with agencies, in addition to the cooperating agencies, continued throughout the NEPA process. Various meetings have been conducted at key milestones during the environmental studies to obtain input or refine alternatives and data prior to detailed analysis. Table J-1-7 lists the agencies that have been contacted as part of the NEPA process.

In addition to the meetings held during scoping, noted in Table J-1-3, the BLM met with the NRCD on June 14 and July 11, 2011, and December 18, 2012. As reflected in the letter from the chairpersons of the Redington and Winkelman NRCD to the DOI dated July 28, 2011, the NRCD declined an invitation to participate as a cooperating agency.

Table J-1-7. Contacts with Other Agencies

Federal Agencies	
Department of Defense U.S. Air Force – Davis Monthan AFB	Department of the Interior Bureau of Reclamation Bureau of Land Management U.S. Forest Service Cibola National Forest Southwestern Regional Office
Arizona State Agencies	
Arizona Army Air National Guard Arizona Geological Survey Arizona State Historic Preservation Officer Arizona State Land Department Arizona Department of Transportation Arizona State Museum	
Arizona – Local Agencies	
Cochise County	

Table J-1-7. Contacts with Other Agencies
City of Benson
City of Willcox
Graham County
Greenlee County
Pima County
Pima County Flood Control District
Redington Natural Resource Conservation District
Winkelman Natural Resource Conservation District

Interest Groups and Other Stakeholders

Local interest groups and stakeholders were also invited to attend the scoping meetings and provide comments (Table J-1-8). BLM representatives attended a meeting with representatives of the Natural Resources Defense Council, the Wilderness Society, and TNC on January 12, 2010, and a meeting held by the Cascabel Working Group on January 13, 2010.

Table J-1-8. Interest Groups and Other Stakeholders	
Anam, Inc.	Friends of Saguaro National Park
Apaches of Aravaipa Canyon	Friends of the Aravaipa Region
Aravaipa Property Owners Association	J-6/Mescal Community Development Organization
Arid Lands Resource Sciences	Jaguar Habitat Campaign
Arizona Archaeological Council	Lennar Corporation – Tucson Land Division
Arizona Native Plant Society	National Parks Conservation Association – Southwest
Blue Goose Alliance	National Trust for Historic Preservation
Cascabel Hermitage Association	Natural Resources Defense Council
Cascabel Working Group	Saguaro Juniper Corporation
Center for Biological Diversity	Salt River Project
Center for Desert Archaeology	Sierra Club – Grand Canyon Chapter
Coalition for Sonoran Desert Protection	Sonoran Institute
Community Watershed Alliance	Southern AZ Hiking Club – Cochise Trails Association
Continental Divide Trail Alliance	The American Consumer Institute
Duke Energy	The Gamez Cemetery
Earth Justice	The Nature Conservancy
Empire-Fagan Coalition	The Peyote Way Church
Eureka Springs Property Owner Association	The Wilderness Society
Freeport Sierrita, Inc.	

Applicant Participation

Commensurate with the memorandum of understanding and the EIS Preparation Plan, the Applicant has provided technical and clarifying information about the Project, attended and participated in meetings, and provided comments on documents prepared for the draft EIS. The Applicant has also reviewed and provided the technical, environmental, and socioeconomic information in its possession.

The Applicant has communicated extensively with representatives of various federal, state, and local government agencies and several stakeholder groups and organizations regarding the

Project plans. BLM representatives attended a meeting hosted by the Applicant, with representatives of the Cascabel Working Group on January 13, 2010.

Briefings or other meetings held with Arizona organizations and individuals are listed in Table J-1-9.

Table J-1-9. Arizona Briefings

Affiliation	Name
Access Arizona	Jim Dinkle
Arizona Congressional District #1	Congresswoman Ann Kirkpatrick (Blanca Varela)
Arizona Congressional District #2	Congresswoman Martha McSally (Sarah Pacheco)
Arizona Congressional District #4	Congressman Paul Gosar (Jim Knupp)
Arizona Corporation Commission	Commissioner Susan Bitter Smith (Laurie Woodall)
Arizona Corporation Commission	Commissioner Bob Stump (Amanda Ho)
Arizona Corporation Commission	Commissioner Bob Burns (Angie Paton)
Arizona Corporation Commission	Commissioner Doug Little (Matt Rowell)
Arizona Corporation Commission	Commissioner Tom Forese (Brandon Nelson)
Arizona Corporation Commission – Utilities Division	Tom Broderick
Arizona Governor Doug Ducey	Chris McIsaac
Arizona Governor Doug Ducey	Hunter Moore
Arizona Governor Doug Ducey	Juan Ciscomani
Arizona Legislative District #11	Senator Steve Smith
Arizona Legislative District #11	Representative Vince Leach
Arizona Legislative District #11	Representative Mark Finchem
Arizona Legislative District #14	Representative David Stevens
Arizona Legislative District #14	Representative David Gowan
Arizona Legislative District #14	Senator Gail Griffin
Arizona Legislative District #8	Representative Frank Pratt
Arizona Legislative District #8	Representative TJ Shope
Arizona Siting Committee	Tom Chenal
Arizona State Land Department	Commissioner Lisa Atkins
Benson Chamber of Commerce	Lupe Diaz
City of Benson – City Manager	Bill Stephens
City of Benson - Mayor	Mayor Toney King
City of Coolidge – City Manager	Bob Flatley
City of Eloy – City Council	Councilmember Belinda Akes
City of Eloy – City Manager	Harvey Krauss
City of Safford – City Manager	Horatio Skeete
City of Safford – Mayor	Mayor Chris Gibbs
City of Willcox – City Council	Mayor and Councilmembers
City of Willcox – City Manager	Ted Soltis
City of Willcox – Mayor	Mayor Bob Irvin

Cochise County - Board of Supervisors	Supervisor Richard Searle
Cochise County - Board of Supervisors	Supervisor Patrick Call
Cochise County - Board of Supervisors	Supervisor Ann English
Cochise County – County Administrator	Jim Vlahovich
Eastern Arizona College	Kevin Peck
Eastern Arizona Counties Organization	Pascal Berlioux
Eloy Chamber of Commerce	Mark Benner
Graham County – Board of Supervisors	Supervisor Jim Palmer
Graham County – Board of Supervisors	Supervisor Danny Smith
Graham County – Board of Supervisors	Supervisor Drew John
Graham County – County Manager	Terry Cooper
Graham County Chamber of Commerce	Laurabeth Stoner
Greenlee County – Board of Supervisors	Supervisor David Gomez
Greenlee County – Board of Supervisors	Supervisor Ron Campbell
Greenlee County – Board of Supervisors	Supervisor Robert Corbell
Greenlee County – County Administrator	Kay Gale
Greenlee County – Economic Development	Akos Kovach
Pima County – Board of Supervisors	Supervisor Ally Miller
Pima County – Board of Supervisors	Supervisor Ramon Valadez
Pima County – Board of Supervisors	Supervisor Sharon Bronson
Pima County – Board of Supervisors	Supervisor Ray Carroll
Pima County – County Administrator	Chuck Huckelberry
Pinal County – Board of Supervisors	Supervisor Pete Rios
Pinal County – Board of Supervisors	Supervisor Cheryl Chase
Pinal County – Board of Supervisors	Supervisor Todd House
Pinal County – Board of Supervisors	Supervisor Steve Miller
Pinal County – Board of Supervisors	Supervisor Tony Smith
Pinal County – County Manager	Greg Stanley
Senator John McCain	Rick Stilgenbauer
Southeast Arizona Economic Development Group	George Scott
SouthEastern Arizona Governments Organization	Larry Catten
Southern Arizona Business Coalition	Rick Grinnell
Town of Clifton – Town Manager	Ian Mcgaughey
Town of Thatcher – Town Manager	Terry Hinton
Tucson Metropolitan Chamber of Commerce	Michael Varney
Willcox Chamber of Commerce	Alan Baker

EXHIBIT J-2 PUBLIC REVIEW OF THE EIS

Concurrent with the distribution of the Draft EIS/Resource Management Plan Amendment (RMPA), a Notice of Availability (NOA) was published in the *Federal Register,* announcing the availability of the draft document for a 90-day public review and comment period that started on May 25, 2012, and ended on August 22, 2012. The Draft EIS/RMPA was sent to cooperating agencies, agencies with a potential interest in the Project, and others who requested copies. Printed versions of the Draft EIS documents were made available for review at libraries, BLM offices, and public meeting sites, and were also provided in response to individual requests.

The availability of the Draft EIS/RMPA for public review and comment, along with the locations and times of public meetings, was announced in paid newspaper legal notices and advertisements. In addition, Project newsletters were mailed to individuals, agencies, and organizations that requested notification of the availability of the Draft EIS/RMPA. During the

90-day public review period, five public open house meetings were held in Arizona in June and July 2012 for the BLM to provide information and receive public input on the Draft EIS/RMPA (Table J-2-1). These meetings were held in Cochise, Graham, Pima, and Pinal counties in Arizona.

Table J-2-1. Public Meetings – June and July 2012

Meeting Date	Location	Public in Attendance[1]
	Arizona	
July 11, 2012	Safford High School 1400 W. Bulldog Blvd. Safford, AZ	22
July 12, 2012	Benson School 360 S. Patagonia St. Benson, AZ	41
July 17, 2012	Palo Verde Magnet School 1302 S. Avenida Vega Tucson, AZ	77
July 18, 2012	San Manuel High School 711 S. Mcnab Pkwy. San Manuel, AZ	19
July 19, 2012	Eloy Junior High School 404 E. Phoenix Ave. Eloy, AZ	10
Total Attendees		169

[1] For purposes of this report, members of the public exclude Project-related individuals (e.g., BLM resource specialists, Applicant staff and engineers, EIS contractor personnel, and cooperating agency representatives.)

Comment Analysis Process

Comments on the Draft EIS/RMPA were submitted in person at the public meetings, electronically through the BLM SunZia Project website, or mailed to the BLM NM State Office. All comments received during the 90-day review period were recorded and compiled in a database, in which each comment was assigned a unique identifying number. The BLM received over 900 comment submittals (letters or other correspondence), including over 2000 individual comments. In compliance with the requirements of the Council on Environmental Quality (CEQ) for implementing the NEPA, the comments were then analyzed and responses to substantive comments were provided. Per the BLM NEPA Handbook H-1790-1, substantive comments do at least one of the following:

- question, with reasonable basis, the accuracy of information in the EIS
- question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the environmental analysis
- present new information relevant to the analysis
- present reasonable alternatives other than those analyzed in the EIS
- cause changes or revisions in one or more of the alternatives

Comments not considered substantive include those:

- in favor of or against the proposed action or alternatives without reasoning that meets the BLM's criteria for substantive comments
- only agreeing or disagreeing with BLM policy or resource decisions without justification or supporting data that meet the BLM's definition of substance
- comments that do not pertain to the Project area or the Project
- comments that take the form of vague open-ended questions

A complete list of individual letters that commented on the Draft EIS is included in Appendix J of the EIS (see Exhibit B-1).

General Summary of Comments

Comments identified during scoping were addressed in development of the Draft EIS. The key issues and concerns were related to one of the following categories:

- Project purpose and need
- Alternative development – comments indicating another alternative should be evaluated
- Alternative description and mitigation measures – comments suggesting modifications to already defined alternatives to reduce or avoid potential impacts
- Analysis of environmental effects – comments specifying concerns over resource impacts or suggesting that other effects be considered and disclosed

The Draft EIS addressed issues identified during scoping. Comments received during the public review of the Draft EIS related to these issues either raised questions, suggested other alternatives, provided new information, or expressed preferences. In the development of the Final EIS, information was added to clarify or correct the Draft EIS, and modifications to alternative transmission line descriptions were made, where warranted, to incorporate new information and requests for additional mitigation.

Responses to Key Issues and Concerns

The following comments (paraphrased and italicized) are representative of key issues and concerns raised by stakeholders in response to the Draft EIS. Summary responses to these comments are also provided below. Appendix J of the EIS provided detailed responses to the comments (see Exhibit B-1).

Purpose and Need

It was understood that a purpose of the Project was to provide new transmission to deliver electricity generated by renewable energy resources Southeastern Arizona to western power markets. Clarify the potential for interconnection with fossil fuel energy generation facilities.

As stated in Chapter 1 of the Final EIS, the BLM's purpose and need for the proposed Project is established by regulatory obligations and directives, and current energy development trends. The purpose and need is used to formulate a reasonable range of alternatives to be considered in the EIS. The need for the BLM's proposed action arises from the Federal Land Policy and Management Act (FLPMA) to consider the Applicant's right-of-way application. The Applicant's objectives as stated in Section 1.4 of the EIS include increasing "available transfer capability in an electrical grid that is currently insufficient to support the development, access, and transport of additional energy-generating resources, including renewable energy in Arizona." The range of alternatives considered included potential transmission line routes that could provide electrical interconnections with renewable energy resources located primarily within the Qualified Resource Areas for solar energy located in southeastern Arizona.

Transmission facility services are to be provided without discrimination as to the type of generation requesting interconnection and transmission service. Although Federal Energy Regulatory Commission (FERC) rules do not allow for discriminatory preference among generation subscribers to a transmission line, it is the intent of the Applicant to provide infrastructure to increase transfer capability within areas of potential renewable energy generation. Indirect and cumulative impacts associated with construction and operation of generation facilities have been analyzed and documented in Section 4.17 of the EIS.

Proposed Action and Alternatives

A preference would be to construct new transmission lines in areas where there are existing utilities and access. Avoid building new transmission lines in the San Pedro River Valley, Aravaipa/Sulphur Springs Valley, Avra Valley and particularly avoid lines crossing riparian areas along the San Pedro River and Rio Grande. Avoid building transmission lines in areas where military operations are conducted.

In order to identify potential locations for the proposed transmission line routes, information was gathered to determine environmental, engineering, and agency/public/political opportunities and constraints within the study area. Potential alternatives were reviewed based on their ability to maximize opportunities to locate the proposed transmission lines within existing corridors, while avoiding areas of higher constraint or sensitivity. Alternative transmission line routes were considered within the I-10 corridor in Arizona; it was found that there is insufficient area available for the proposed right-of-way adjacent to I-10 due to existing residential, commercial, and industrial development.

In response to information received following the Draft EIS, modifications to the alternative transmission line routes were developed and additional analysis was conducted. The alignment of the BLM preferred alternative was modified in response to substantive recommendations that provided additional information. The BLM preferred alternative was selected because it would maximize use of existing utility corridors and infrastructure, minimize impacts to sensitive resources, minimize impacts at river crossings, and minimize impacts to residential and commercial uses. Where available, portions of the route would follow existing utilities or other roads that would provide access for construction and maintenance. Approximately 117 miles (59 percent) of the Arizona portion of the BLM preferred alternative (total length is 199 miles) would be parallel to existing or designated utility corridors.

To what extent have alternative technologies or systems such as underground construction, transmission system upgrades in existing rights-of-way, alternative voltages, demand-side management or distributed generation been considered?

The BLM considered other options, including alternative transmission routes and transmission technologies, but eliminated them from consideration because they would not be practicable and feasible, as described in Section 2.3.3 of the Final EIS.

Funding

How Is the Project Being Funded?

The proposed action does not require a cost outlay by the federal government. As provided in the Memorandum of Understanding between the Applicant and the BLM, it is the Applicant's responsibility to reimburse the federal government for expenses to process the right-of-way application under a cost recovery agreement. Federal government financing for development and construction of the Project is not a condition of the proposed action.

Water and Soil Resources

Construction of transmission facilities across environmentally sensitive lands could result in soil erosion that would affect grasslands, playas, rivers and streams. Previous construction of many pipelines and roads has led to severe erosion where proper controls were not used.

Earth and water resources studies have been completed to identify specific locations of potentially high levels of wind and water soil erosion. Mitigation measures are proposed that would include Best Management Practices (BMPs) and special construction methods where needed to minimize the potential for erosion in those areas.

Biological Resources

The proposed Project route and alternatives would cross a major migratory bird corridors along the San Pedro River. Other areas of concern include the Willcox playas and Picacho Reservoir area. The proposed transmission line project would pose a collision risk to birds.

The highest risk occurs when transmission lines are sited near roosts or foraging areas, and collisions may also occur at night or in poor weather. The collision risk to migratory birds would be mitigated through the placement of bird diverters or similar devices in high-risk areas, to be specified in an Avian Protection Plan. Monitoring would take place to ensure proper function and effectiveness of the devices. Mitigation for lost productivity or habitat for migratory birds would be developed under the terms of EO 13186 according to the Migratory Bird Treaty Act (MBTA) and in cooperation with the BLM and USFWS.

The Project would result in ground disturbance that may be temporary or permanent for the life of the Project. Ground disturbance causes the direct loss of native vegetation, and may facilitate the spread of invasive plants. Linear utilities can result in wildlife habitat fragmentation, when constructed in a way that provides a physical barrier to wildlife movement or causes changes in the habitat that reduce the movement of wildlife across the utility corridor. This may include the creation of open spaces avoided by certain species, or disturbance and road mortality associated with construction and recreational traffic.

In accordance with the results of the biological resources impact analysis, mitigation measures have been proposed to avoid or minimize the loss of sensitive riparian vegetation, grasslands and other sensitive habitats. Habitat fragmentation and loss of native vegetation would be addressed through standard and selective mitigation measures during construction and maintenance, according to stipulations for reducing ground disturbance, avoiding disturbance to wildlife during sensitive seasons, and closing or reclaiming temporary roads. Site-specific mitigation would be provided in the final Plan of Development (POD) to include a biological resources protection plan, monitoring during construction, control or prevention of the spread of noxious weeds and other invasive plants, reclamation, and other measures.

The San Pedro River Valley is one of the last free-flowing rivers in the Southwest, and a major migratory bird corridor. Portions of the river that support perennial flow often have mature riparian woodlands and mesquite bosques, and tributaries to the river support threatened or endangered fish and other native aquatic species. Major tributaries of concern with perennial flow include Aravaipa, Hot Springs, Redfield, and Buehman canyons. Removal of riparian woodland and mesquite bosque, creation of new access roads, potential effects on water quality through erosion, and the collision risk for birds are noted.

The BLM preferred alternative would cross the San Pedro River at a location without perennial flow or riparian woodlands, where elevated terrain would allow transmission lines to span the floodplain and minimize the need for vegetation management. Mitigation measures have been proposed to minimize the potential for soil erosion and vegetation loss, including reclamation or closure of access roads where necessary and practicable at the discretion of the respective landowner or land management agency.

Cultural Resources and Native American Concerns

Impacts to cultural resources could result from a loss of integrity on prehistoric and historic sites. The Project could also indirectly affect traditional cultural properties such as Mt. Graham or other important sites. Types of potential impacts to cultural resources may include ground disturbance, visual and auditory intrusions, and disturbances to sites due to changes in public accessibility during and after construction.

Inventories of previously recorded sites along the alternative study corridors have been conducted. Impacts to cultural resources have been evaluated in the EIS according to potential sensitivity of known cultural resources. Intensive pedestrian surveys along the selected route, including access roads, substations, and other facilities, would be conducted prior to construction if the BLM approves an action alternative in the ROD. Direct impacts to significant cultural resources can be effectively minimized, if not eliminated, through mitigation planning. In designated areas, structures would be placed to avoid and or span sensitive cultural resource sites or features.

All cultural and historic resources identified during the inventory will be evaluated for eligibility to the National Register of Historic Places. Consultation with appropriate land management agencies, tribal governments, and State Historic Preservation Offices is ongoing and will result in a Programmatic Agreement, which establishes a project-specific procedure for complying with the NHPA, including procedures to follow during the execution of the Project.

Land Use, Property Values, and Right-of-Way Acquisition

How will the SunZia Transmission Project affect property values?

Studies regarding the effects of transmission lines on property values have been reviewed. These studies found that in cases where there is a decrease in property value, the effects would generally be 10 percent or less. The discussion of property value effects is included in Section 4.13.4.5 of the EIS.

Will I be paid for right-of-way acquisition?

On private lands, the Applicant or owners' representative would negotiate the amount and terms of compensation with individual property owners, including market value compensation for residual impacts.

Various agencies and groups fund and/or help manage conservation easements for a variety of conservation purposes, including reclamation, rehabilitation, riparian protection, habitat and species protection, and invasive species removal. The Project could impact existing and proposed conservation plans and easements located throughout the study area, as well as grazing lands that have been identified for conservation purposes in Pima County, Arizona.

There are conservation plans in several locations, including the Pima County Sonoran Desert Conservation Plan, and The Lower Sonoran Conservation Initiative. Many of these areas are state trust and private lands used for grazing and other activities (see sections 3.6.7, 3.10.1.3, 3.10.3.3, 4.6.4.5, and 4.10.5 of the Final EIS [Exhibit B-2]). Where these lands are protected by recorded easements or designations, right-of-way would be acquired on a case-by-case basis in compliance with restrictions, conditions, and mitigation requirements. Project alternatives avoid crossing conservation easements, where easements have been identified.

Visual and Scenic Resources

Visual resources are an important component of the natural landscape within large portions of the study area. The Project would cause impacts to viewers and scenic resources from locations such as rural residences, travel routes, wilderness, recreation areas and cultural resource sites.

The locations of alternative transmission line routes were identified according to the study of opportunities and constraints, which included avoidance of potential visual impacts where feasible (e.g., placing new transmission lines within existing utility corridors to reduce contrast). With respect to the Proposed Route, visual resource impacts have been thoroughly analyzed and mitigation measures have been proposed to minimize impacts to sensitive resources (see sections 3.9 and 4.9, as well as Appendix D of the final EIS).

Public Review and Comment

The public review period should have been extended beyond 90 days with opportunities for additional public meetings or hearings.

The Draft EIS was made available for public review and comment on May 25, 2012. The BLM held five public meetings in Arizona and scheduled a 90-day public comment period that ended on August 22, 2012. A 45-day public comment period is generally the time provided for a Draft EIS; however, the BLM's planning regulations and guidance require a minimum 90-day public comment period for land use plan amendments. Comments were received by the BLM New

Mexico State Office during this 90-day review period. In addition, substantive comments that were received through March 2013 were considered in preparation of the Final EIS.

In total, public involvement for the SunZia Project in Arizona included 10 public meetings (15 scoping meetings and 5 public meetings following publication of the Draft EIS), and 300 days of public comment (180 days during scoping, 90 days during Draft EIS public review, and 30 days following publication of the Final EIS).

APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

MAP VOLUME

EXHIBIT A – LOCATION AND LAND USE MAPS

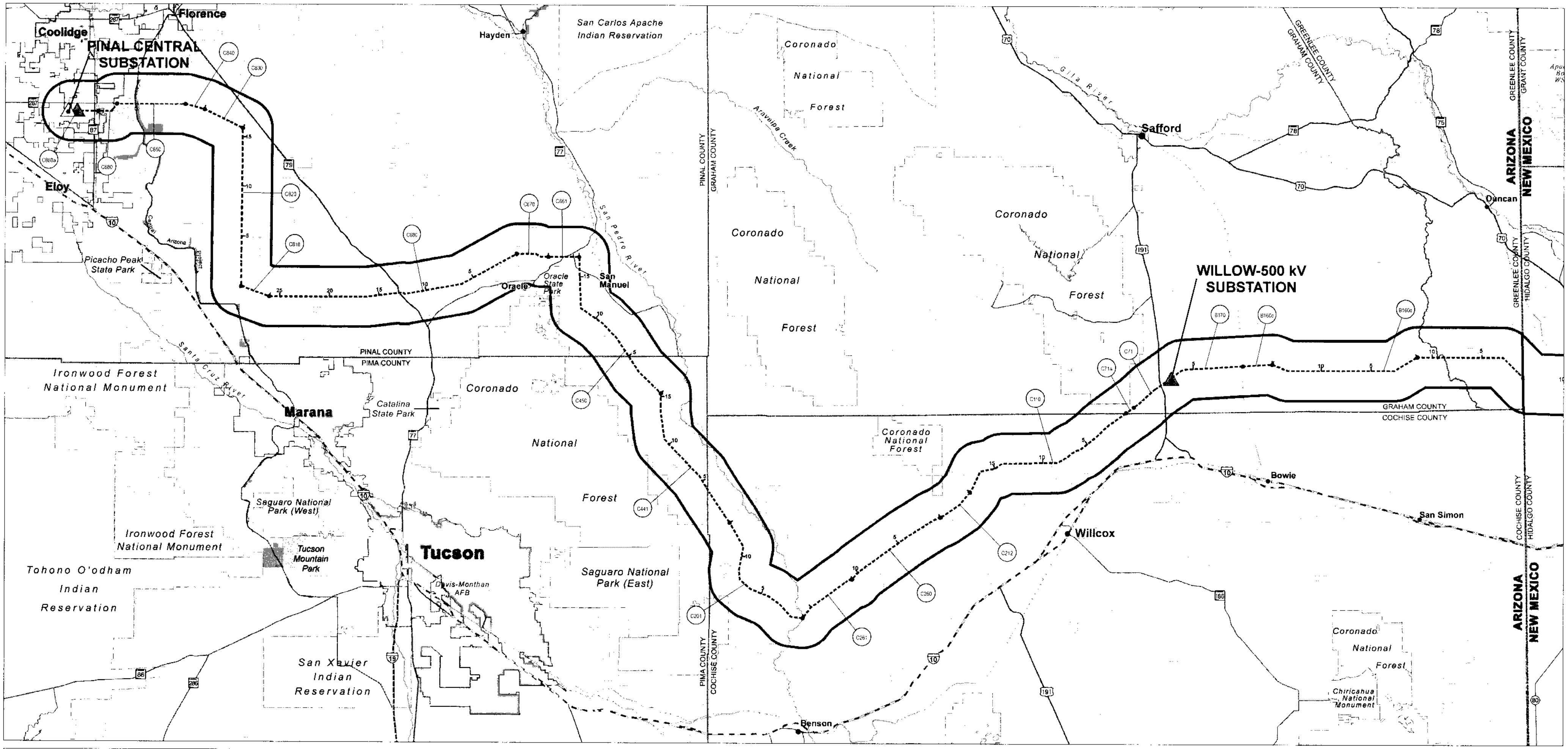


Exhibit A1

Ownership and Jurisdiction

SUNZIA SOUTHWEST TRANSMISSION PROJECT

SunZia

Ownership/Jurisdiction

Land Ownership
- Bureau of Land Management
- National Park Service
- U.S. Forest Service
- Military
- Bureau of Reclamation
- Indian Reservation
- State Trust Land
- State Park
- Arizona Game and Fish
- County/Other
- Private

City/Town Boundary
- City of Casa Grande
- City of Coolidge
- City of Eloy
- Town of Florence
- Town of Marana
- City of Tucson

Reference Features
- City/Town
- State Highway
- US Highway
- Interstate
- Railroad
- State Boundary
- County Boundary
- Jurisdictional Boundary
- River/Stream
- Central Arizona Project

Project Features
- Existing Substation
- Proposed Willow 500 kV Substation
- Proposed 500 kV DC Converter Station (option)
- Milepost Identifier
- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Sources
Arizona Bureau of Land Management 2014
Arizona State Land Department 2014
Esri StreetMap 2013
EPG LLC 2015

Scale = 1:250,000
Contour Interval = 100 Feet
0 4 8 12 16 20
Miles

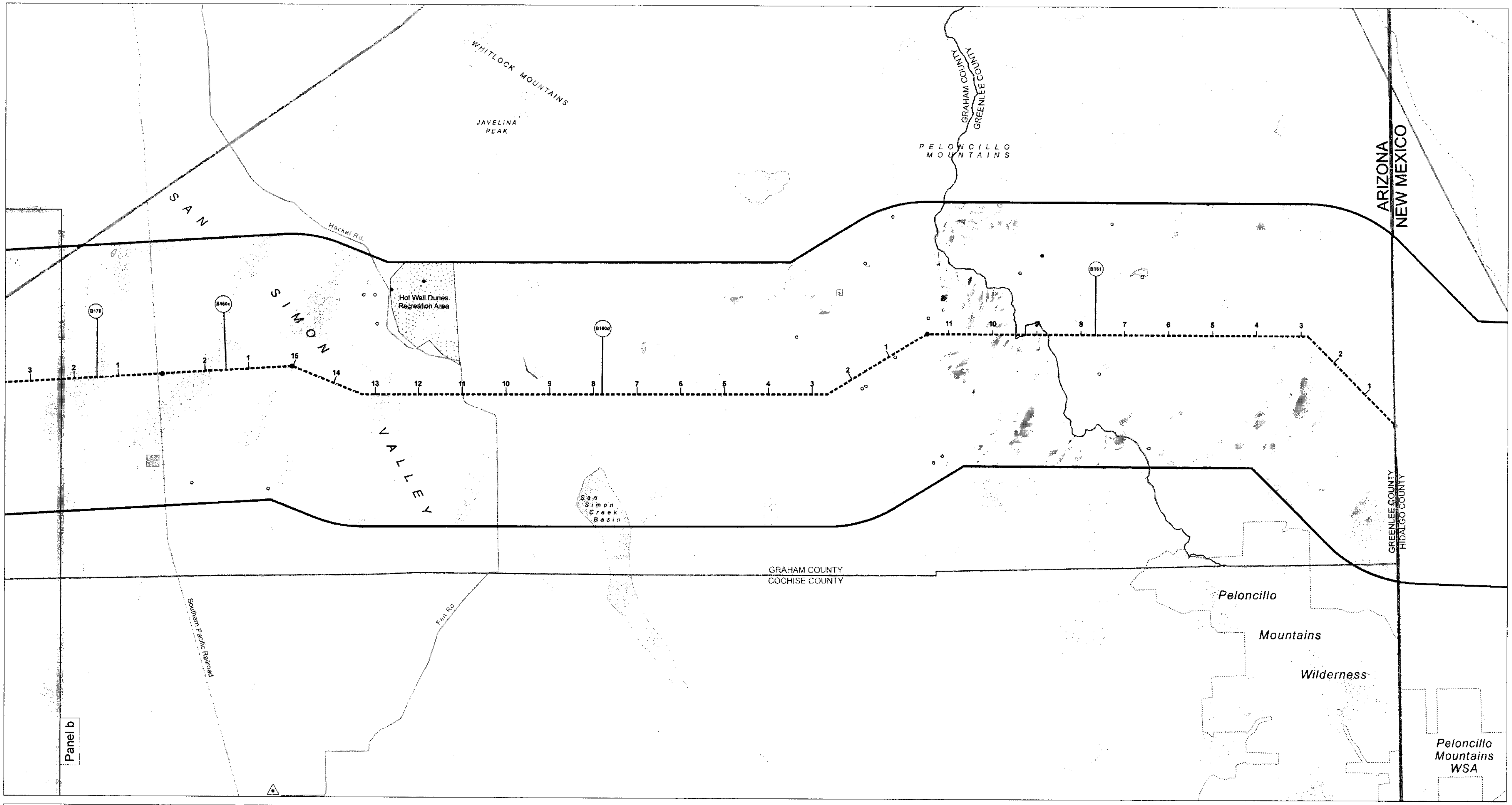
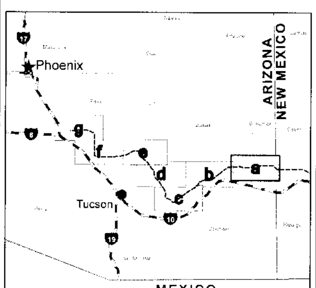


Exhibit A-2a

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Existing Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pima County

- Grazing Lease (Arizona State Trust Land)
- Conservation/Preservation (county owned)

The Nature Conservancy

- TNC Easement-Private Fee
- Conservation Lands-BLM
- Private-Full Fee
- Forest Legacy Parcels

Utilities

- Existing Substation
- Proposed Willow 500 kV Substation
- Proposed 500 kV DC Converter Station (option)
- 500 kV Transmission Line
- 345 kV Transmission Line
- 230 kV Transmission Line
- 138 kV Transmission Line
- 115 kV Transmission Line
- Future 230 kV Transmission Line (Permitted)
- Pipeline
- Canal

Reference Features

- City/Town
- Interstate
- Highway
- Local Road
- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/Wilderness Study Area
- Lake/Reservoir

Project Features

- Milepost Identifier
- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Sources

Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015

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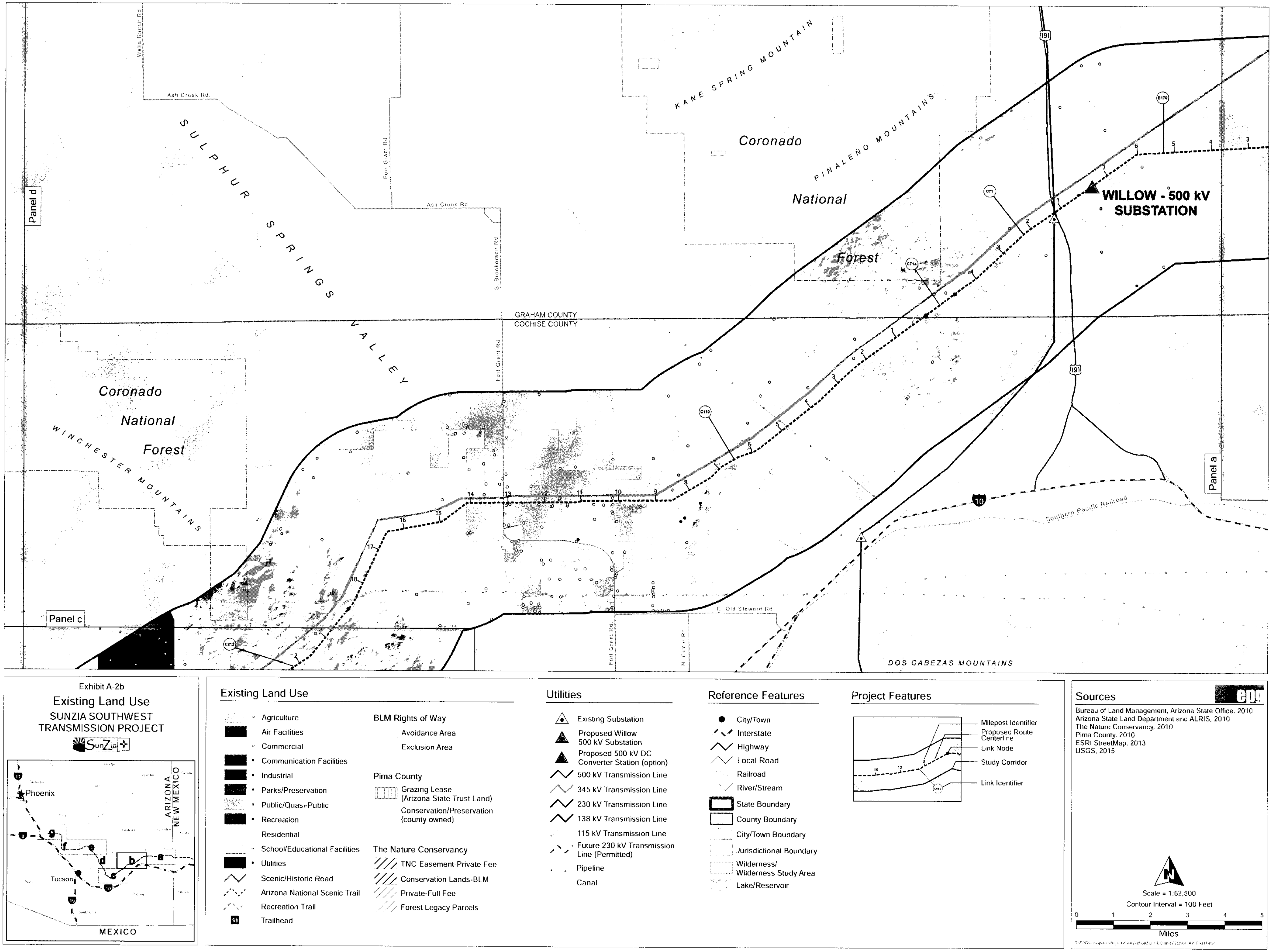
Miles

Exhibit A-2b

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



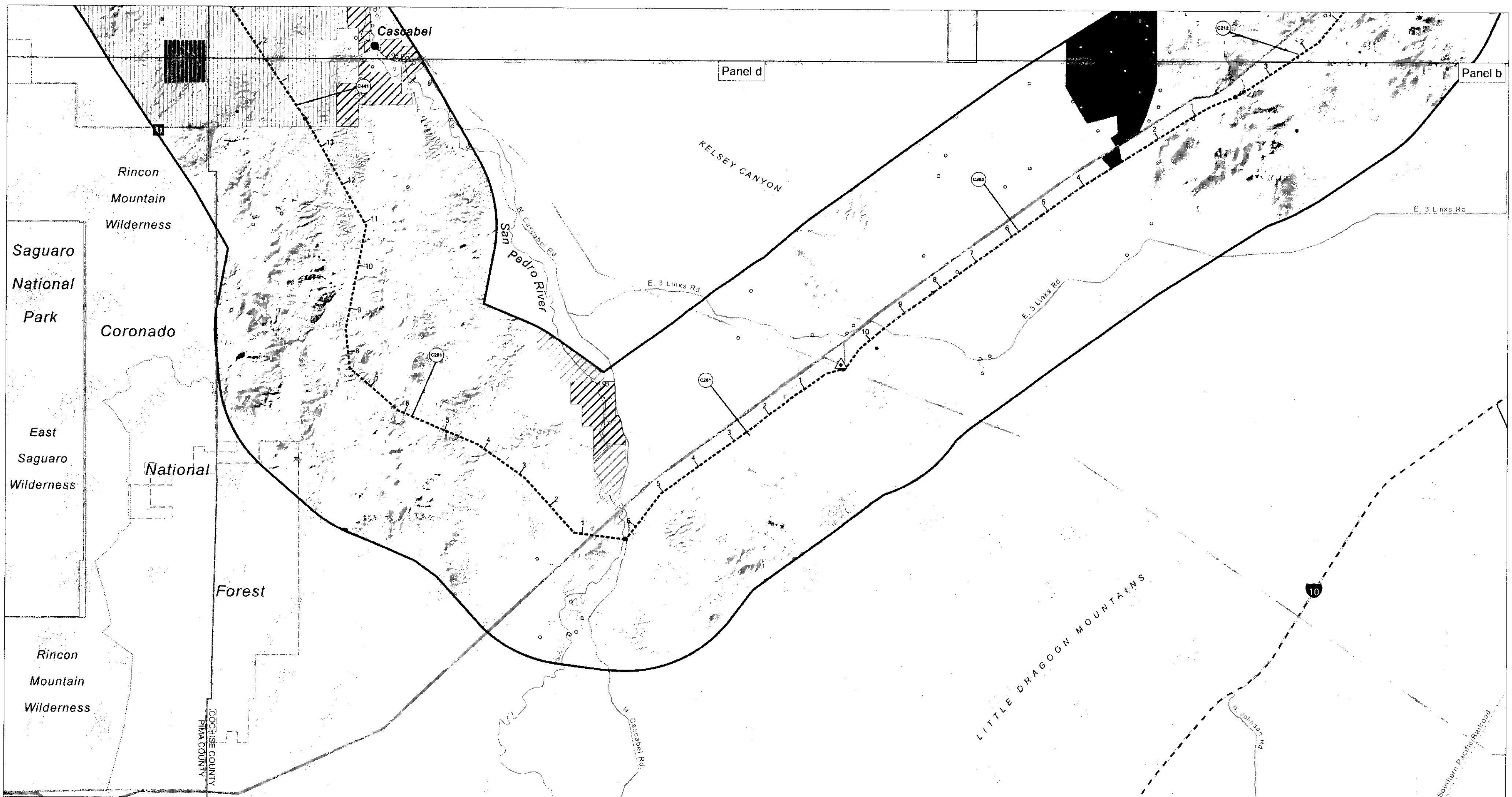


Exhibit A-2c

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT

Existing Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pima County

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- Conservation/Preservation (county owned)

The Nature Conservancy

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- Conservation Lands-BLM
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- 138 kV Transmission Line
- 115 kV Transmission Line
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- Pipeline
- Canal

Reference Features

- City/Town
- Interstate
- Highway
- Local Road
- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/ Wilderness Study Area
- Lake/Reservoir

Project Features

- Milepost Identifier
- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Sources

Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015

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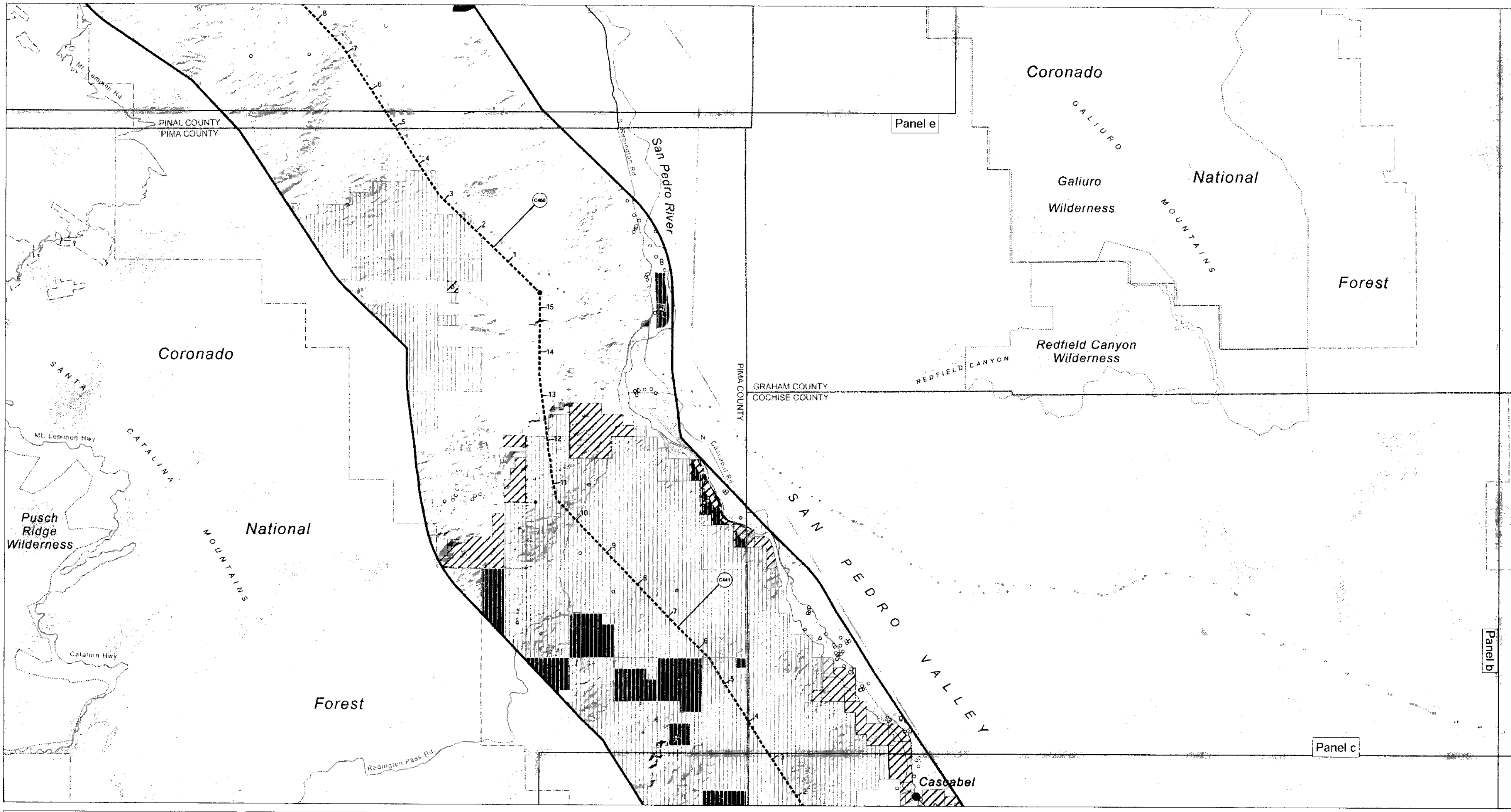
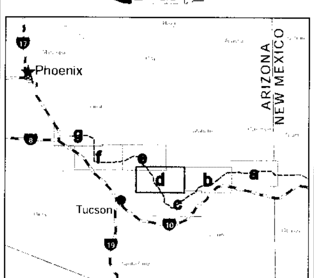


Exhibit A-2d

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Existing Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

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- 115 kV Transmission Line
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- Pipeline
- Canal

Reference Features

- City/Town
- Interstate
- Highway
- Local Road
- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/ Wilderness Study Area
- Lake/Reservoir

Project Features

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- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Sources

Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015

Scale = 1:62,500
Contour Interval = 100 Feet

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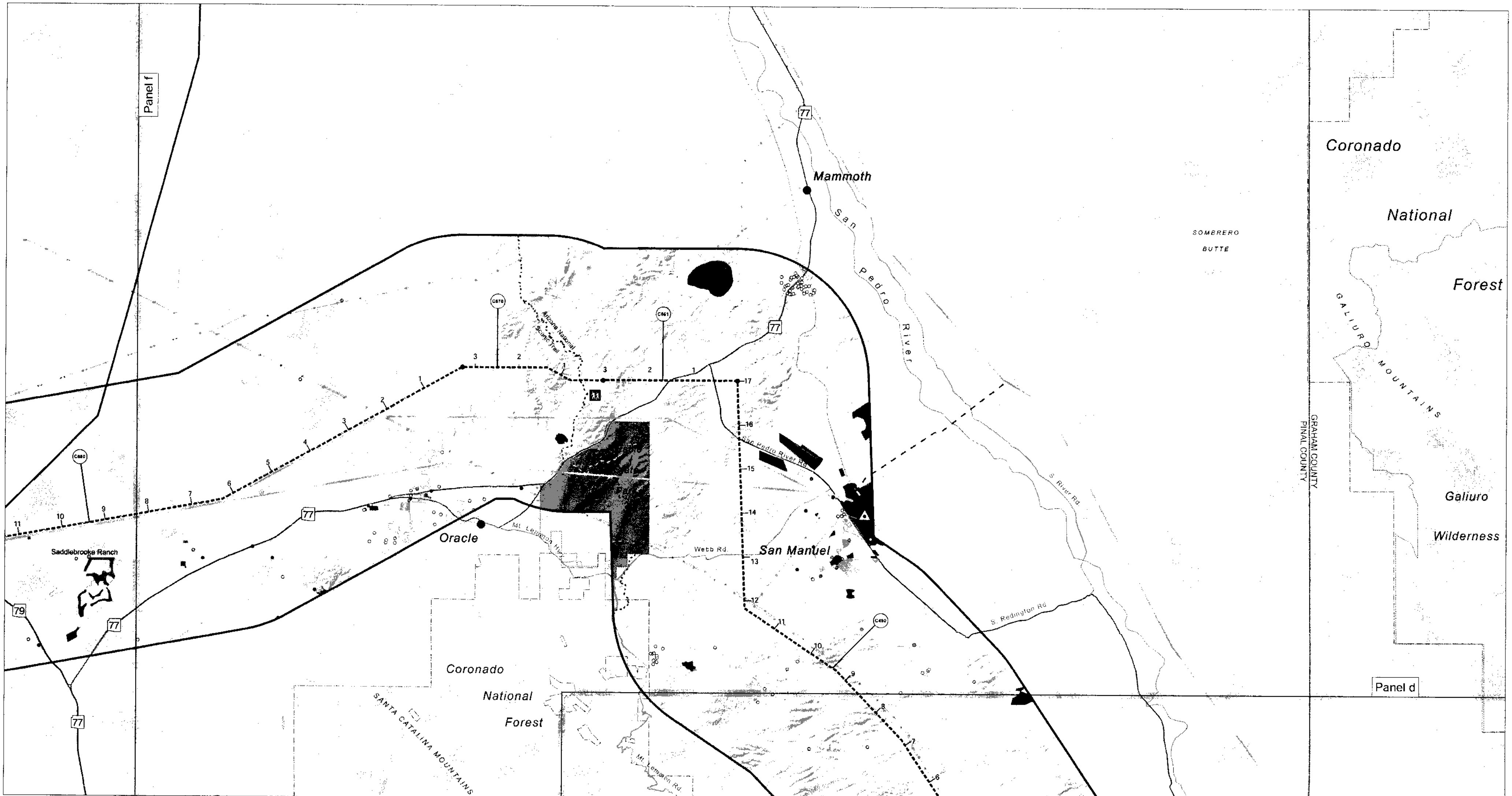
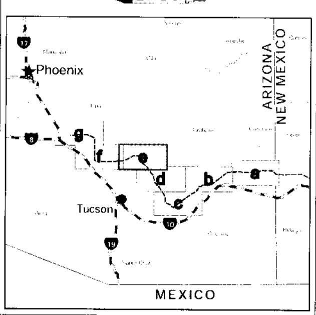


Exhibit A-2e

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Existing Land Use

- Agriculture
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- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pima County

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- Conservation/Preservation (county owned)

The Nature Conservancy

- TNC Easement-Private Fee
- Conservation Lands-BLM
- Private-Full Fee
- Forest Legacy Parcels

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- Pipeline
- Canal

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- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/ Wilderness Study Area
- Lake/Reservoir

Project Features

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- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

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Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
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Scale = 1:62,500
Contour Interval = 100 Feet
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Miles

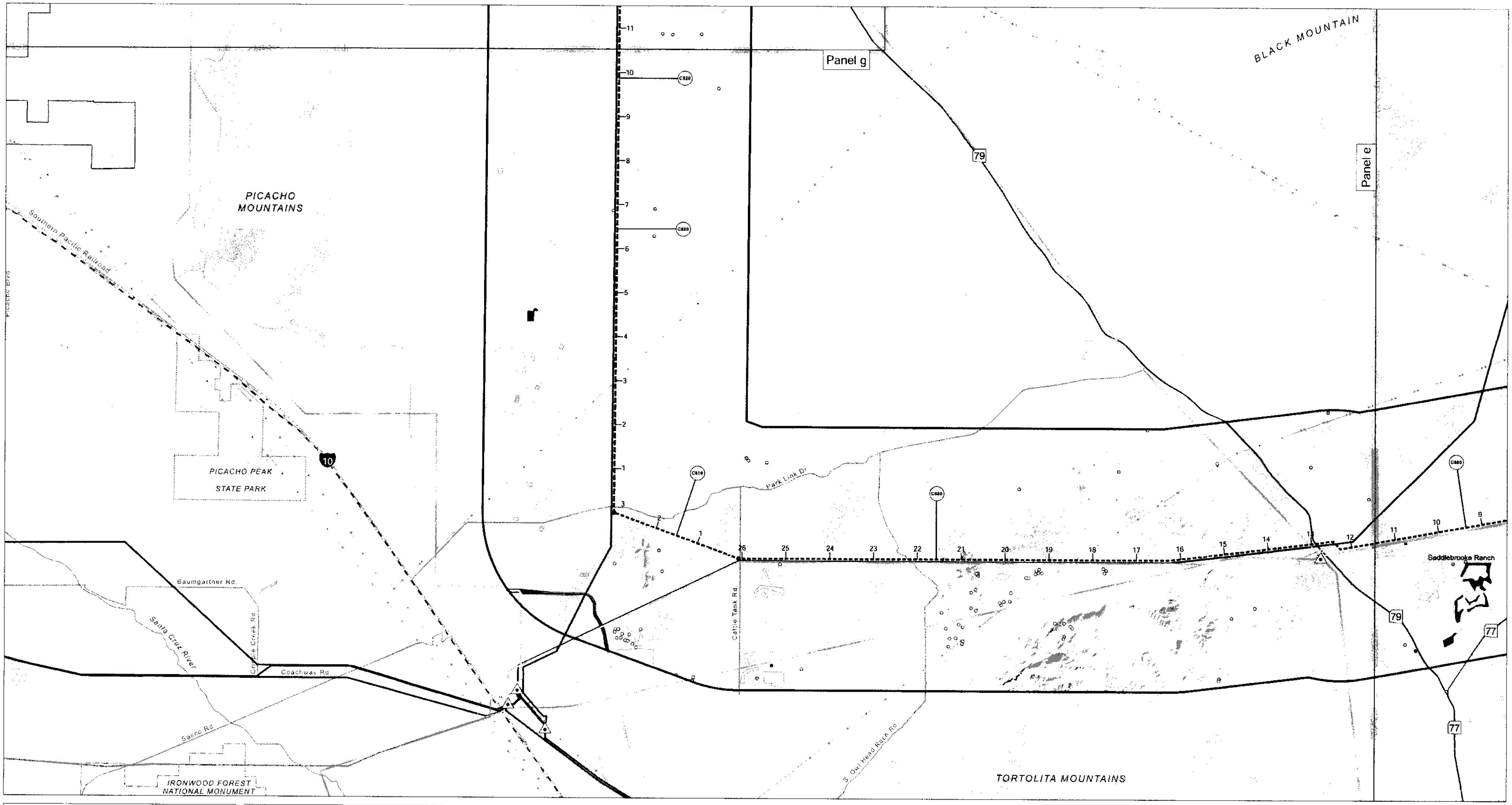
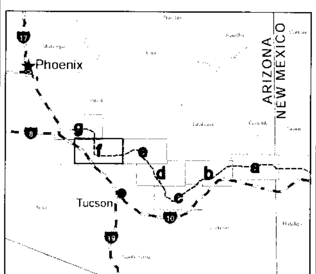


Exhibit A-2f

Existing Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT

SunZia



Existing Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pima County

- Grazing Lease (Arizona State Trust Land)
- Conservation/Preservation (county owned)

The Nature Conservancy

- TNC Easement-Private Fee
- Conservation Lands-BLM
- Private-Full Fee
- Forest Legacy Parcels

Utilities

- Existing Substation
- Proposed Willow 500 kV Substation
- Proposed 500 kV DC Converter Station (option)
- 500 kV Transmission Line
- 345 kV Transmission Line
- 230 kV Transmission Line
- 138 kV Transmission Line
- 115 kV Transmission Line
- Future 230 kV Transmission Line (Permitted)
- Pipeline
- Canal

Reference Features

- City/Town
- Interstate
- Highway
- Local Road
- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/ Wilderness Study Area
- Lake/Reservoir

Project Features

- Milepost Identifier
- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Sources

Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015

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Scale = 1:62,500
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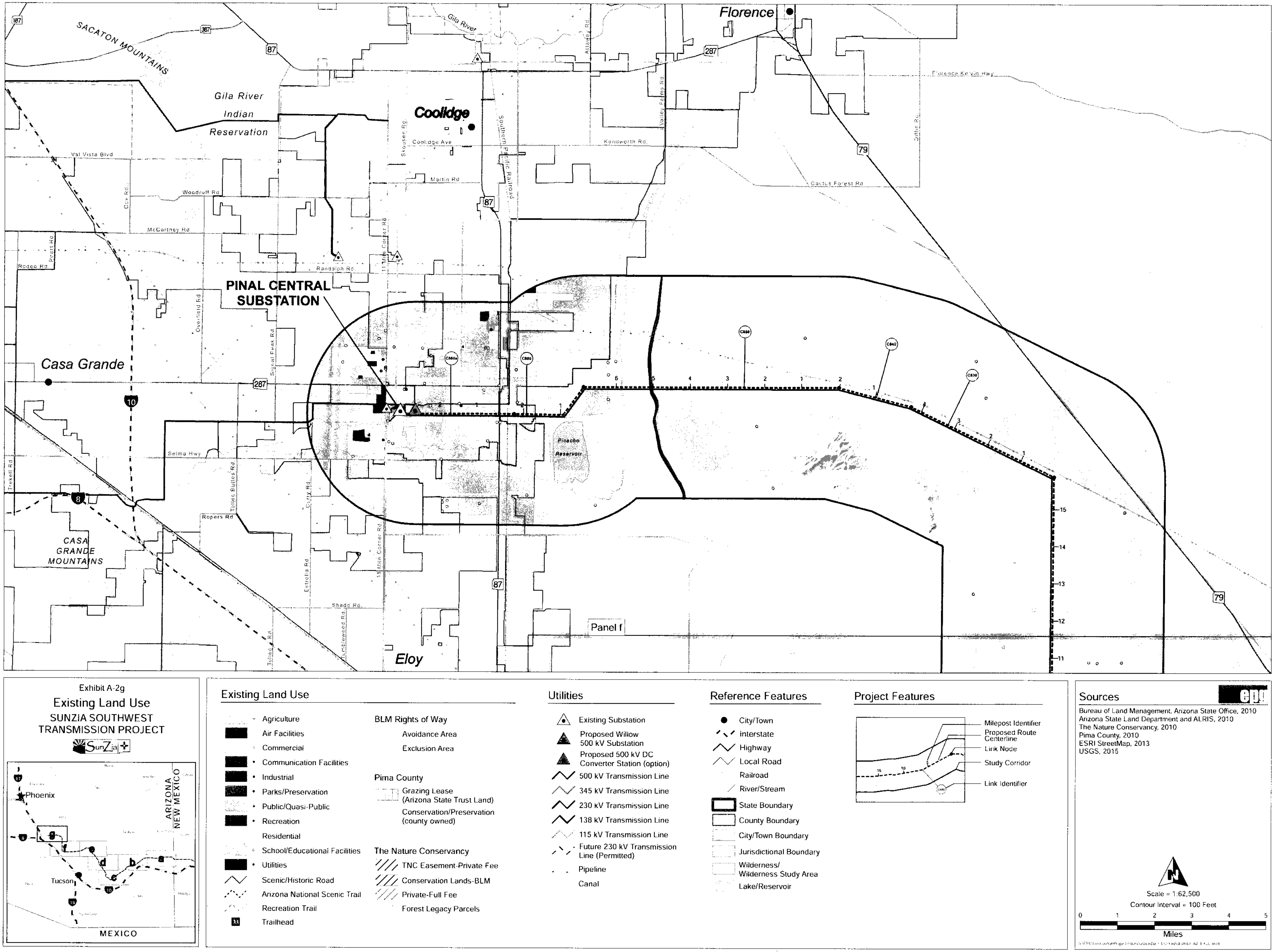
Florence
Coolidge
Casa Grande
Eloy
SACATON MOUNTAINS
Gila River Indian Reservation
CASA GRANDE MOUNTAINS
Gila River
PINAL CENTRAL SUBSTATION
Picacho Reservoir
Panel f
Southern Pacific Railroad
Florence Kelvin Hwy
Cactus Forest Rd
Kenilworth Rd
Coolidge Ave
Martin Rd
Skousen Rd
Valley Farms Rd
Attaway Rd
Dille Rd
Val Vista Blvd
Woodruff Rd
McCartney Rd
Randolph Rd
11 Mile Corner Rd
Signal Peak Rd
Overfield Rd
Selma Hwy
Toltec Buttes Rd
Ropers Rd
Curry Rd
Estrella Rd
Shedd Rd
Tumbleweed Rd
Toltec Rd
Rodeo Rd
Pearl Rd
Trekell Rd
Cox Rd
87
287
79
10
8
187
387
C660
C640
C630
C660a
C650
Exhibit A-2g
Existing Land Use
SUNZIA SOUTHWEST TRANSMISSION PROJECT
SunZia
Phoenix
Tucson
ARIZONA
NEW MEXICO
MEXICO
Existing Land Use
Agriculture
Air Facilities
Commercial
Communication Facilities
Industrial
Parks/Preservation
Public/Quasi-Public
Recreation
Residential
School/Educational Facilities
Utilities
Scenic/Historic Road
Arizona National Scenic Trail
Recreation Trail
Trailhead
BLM Rights of Way
Avoidance Area
Exclusion Area
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TNC Easement-Private Fee
Conservation Lands-BLM
Private-Full Fee
Forest Legacy Parcels
Utilities
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500 kV Transmission Line
345 kV Transmission Line
230 kV Transmission Line
138 kV Transmission Line
115 kV Transmission Line
Future 230 kV Transmission Line (Permitted)
Pipeline
Canal
Reference Features
City/Town
Interstate
Highway
Local Road
Railroad
River/Stream
State Boundary
County Boundary
City/Town Boundary
Jurisdictional Boundary
Wilderness/ Wilderness Study Area
Lake/Reservoir
Project Features
Milepost Identifier
Proposed Route Centerline
Link Node
Study Corridor
Link Identifier
Sources
Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015
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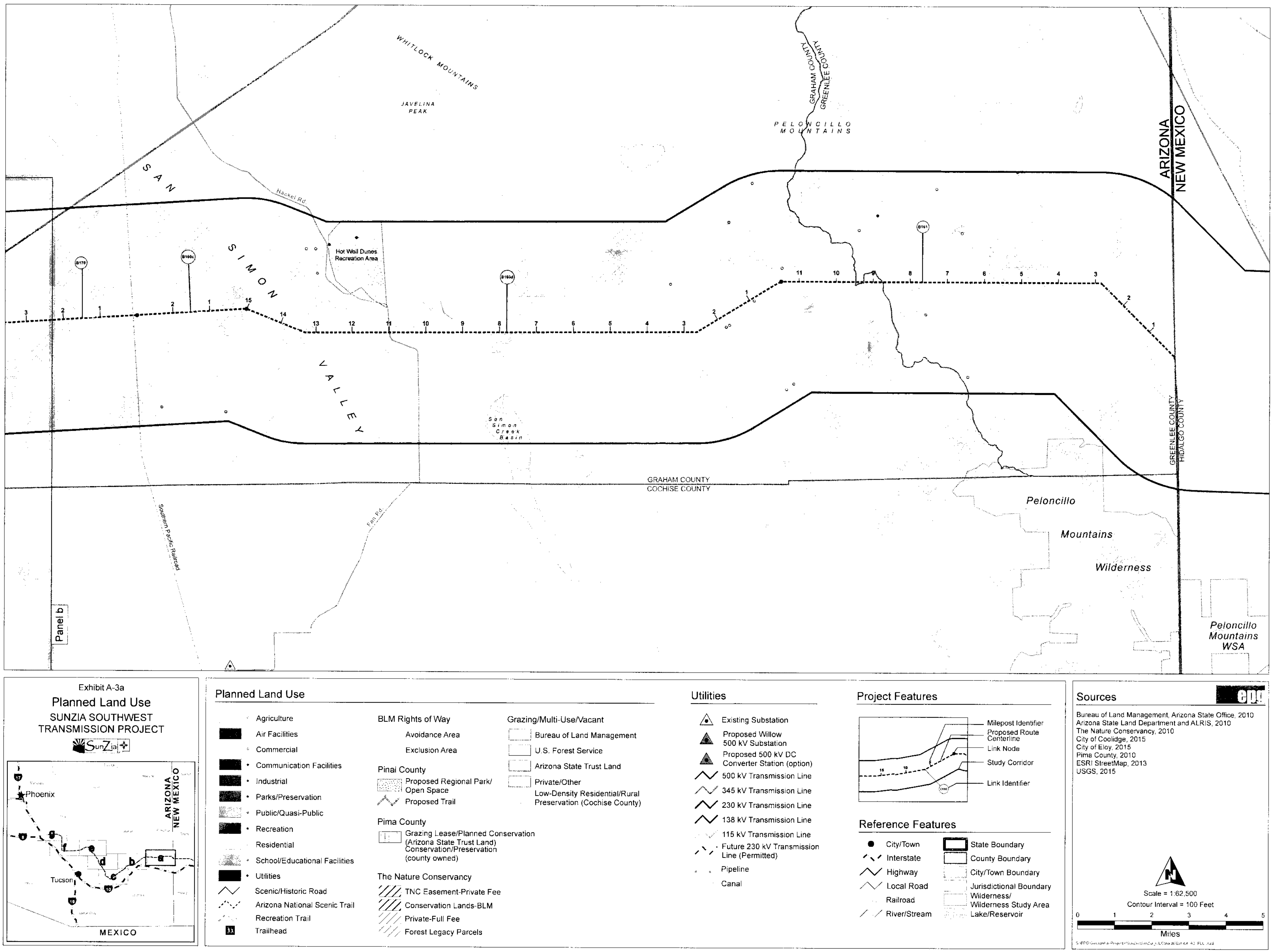
Contour Interval = 100 Feet
Miles

Exhibit A-3a

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Sources

Bureau of Land Management, Arizona State Office, 2010
Arizona State Land Department and ALRIS, 2010
The Nature Conservancy, 2010
City of Coolidge, 2015
City of Eloy, 2015
Pima County, 2010
ESRI StreetMap, 2013
USGS, 2015

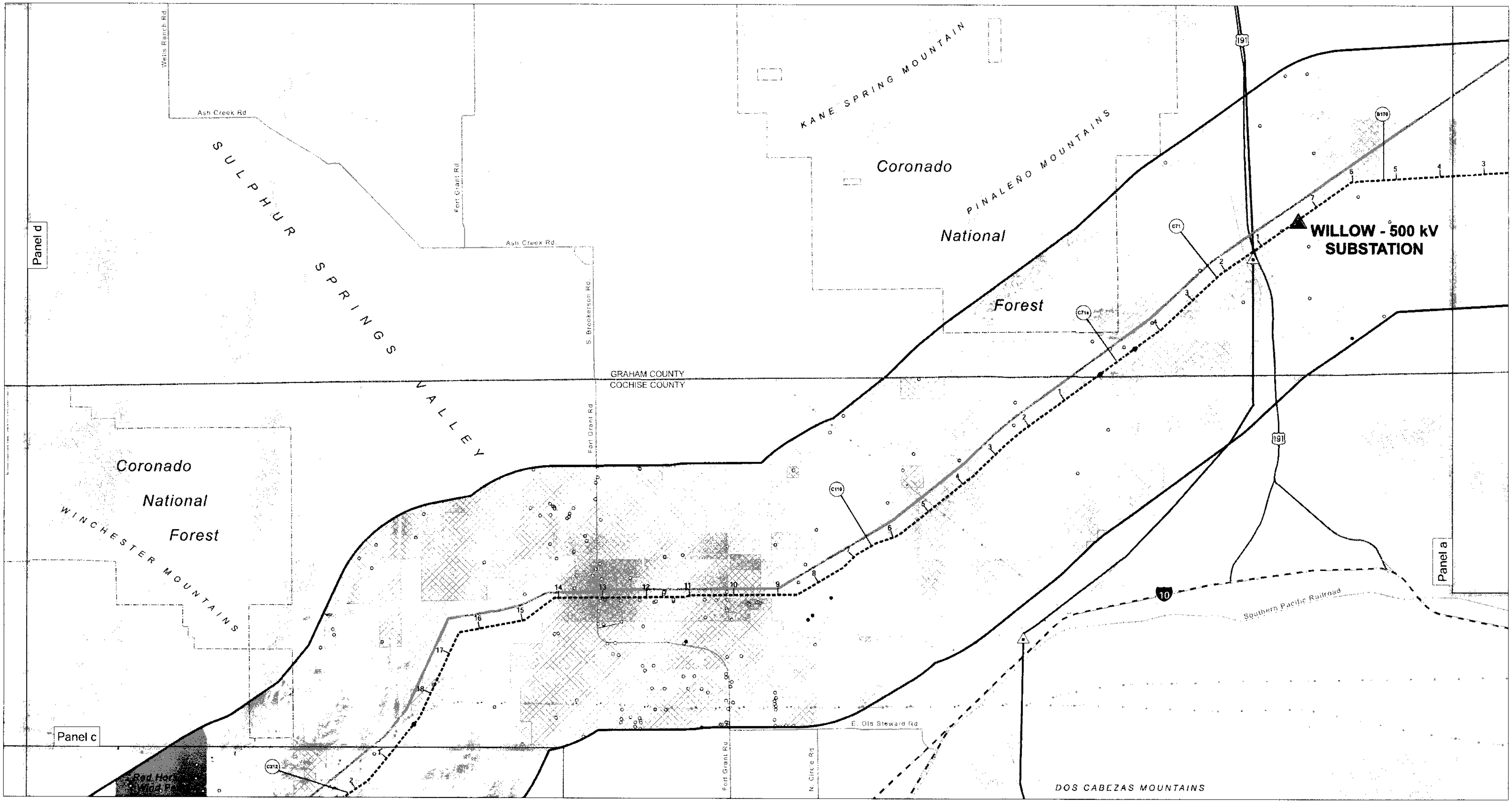
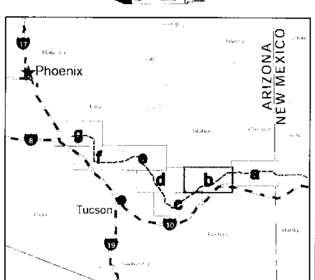


Exhibit A-3b

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way
- Avoidance Area
- Exclusion Area

Pinal County
- Proposed Regional Park/ Open Space
- Proposed Trail

Pima County
- Grazing Lease/Planned Conservation (Arizona State Trust Land) Conservation/Preservation (county owned)

The Nature Conservancy
- TNC Easement-Private Fee
- Conservation Lands-BLM
- Private-Full Fee
- Forest Legacy Parcels

Grazing/Multi-Use/Vacant
- Bureau of Land Management
- U.S. Forest Service
- Arizona State Trust Land
- Private/Other
- Low-Density Residential/Rural Preservation (Cochise County)

Utilities

- Existing Substation
- Proposed Willow 500 kV Substation
- Proposed 500 kV DC Converter Station (option)
- 500 kV Transmission Line
- 345 kV Transmission Line
- 230 kV Transmission Line
- 138 kV Transmission Line
- 115 kV Transmission Line
- Future 230 kV Transmission Line (Permitted)
- Pipeline
- Canal

Project Features

- Milepost Identifier
- Proposed Route Centerline
- Link Node
- Study Corridor
- Link Identifier

Reference Features

- City/Town
- Interstate
- Highway
- Local Road
- Railroad
- River/Stream
- State Boundary
- County Boundary
- City/Town Boundary
- Jurisdictional Boundary
- Wilderness/ Wilderness Study Area
- Lake/Reservoir

Sources

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Arizona State Land Department and ALRIS, 2010
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USGS, 2015

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Miles

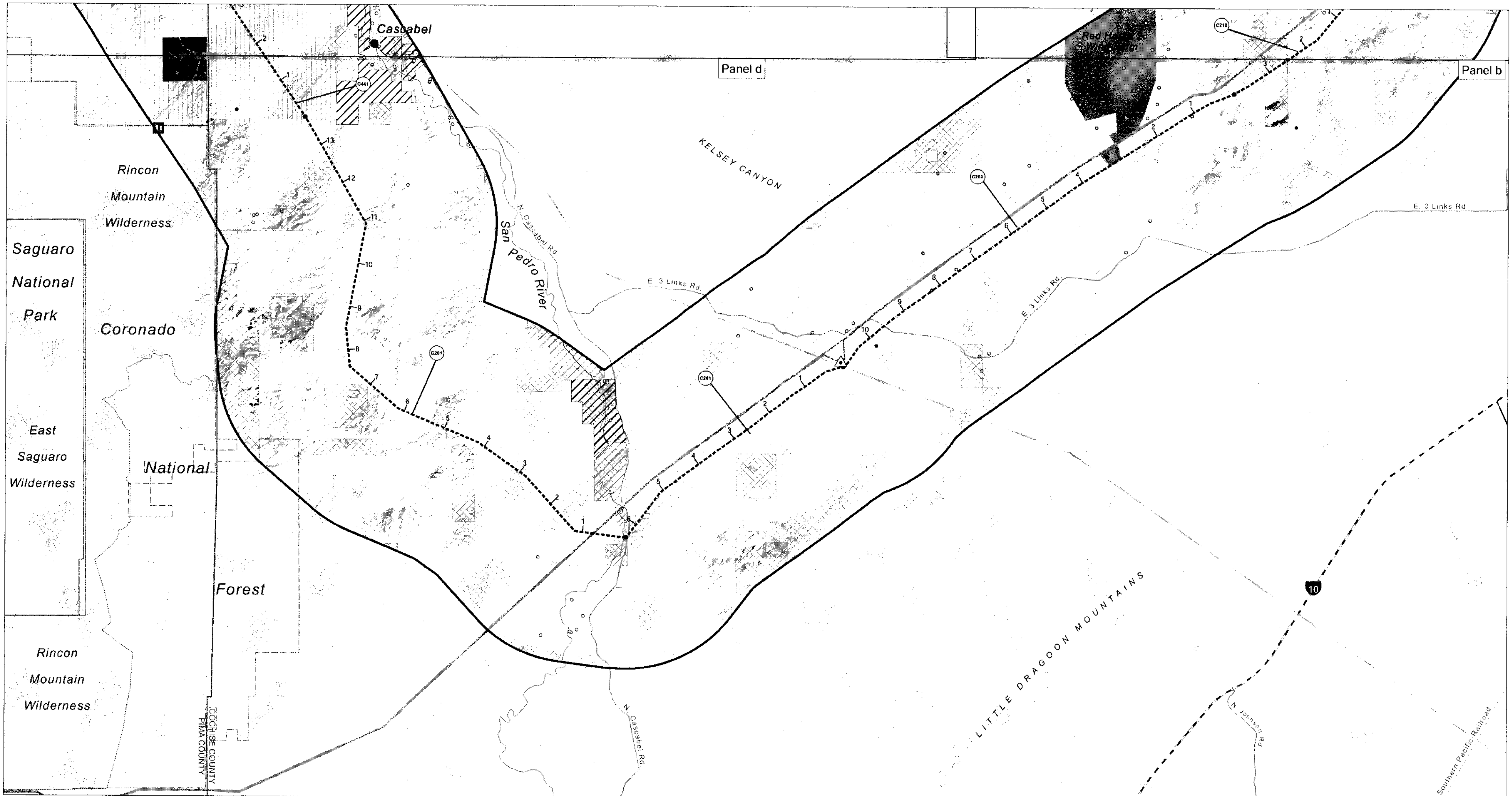
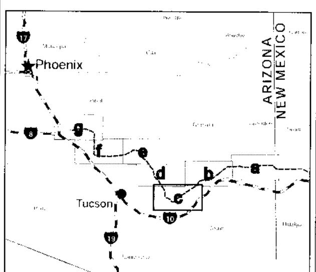


Exhibit A-3c

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pinal County

- Proposed Regional Park/ Open Space
- Proposed Trail

Pima County

- Grazing Lease/Planned Conservation (Arizona State Trust Land) Conservation/Preservation (county owned)

The Nature Conservancy

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- Conservation Lands-BLM
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- Forest Legacy Parcels

Grazing/Multi-Use/Vacant

- Bureau of Land Management
- U.S. Forest Service
- Arizona State Trust Land
- Private/Other
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Project Features

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- Link Identifier

Reference Features

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- Interstate
- Highway
- Local Road
- Railroad
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- Jurisdictional Boundary
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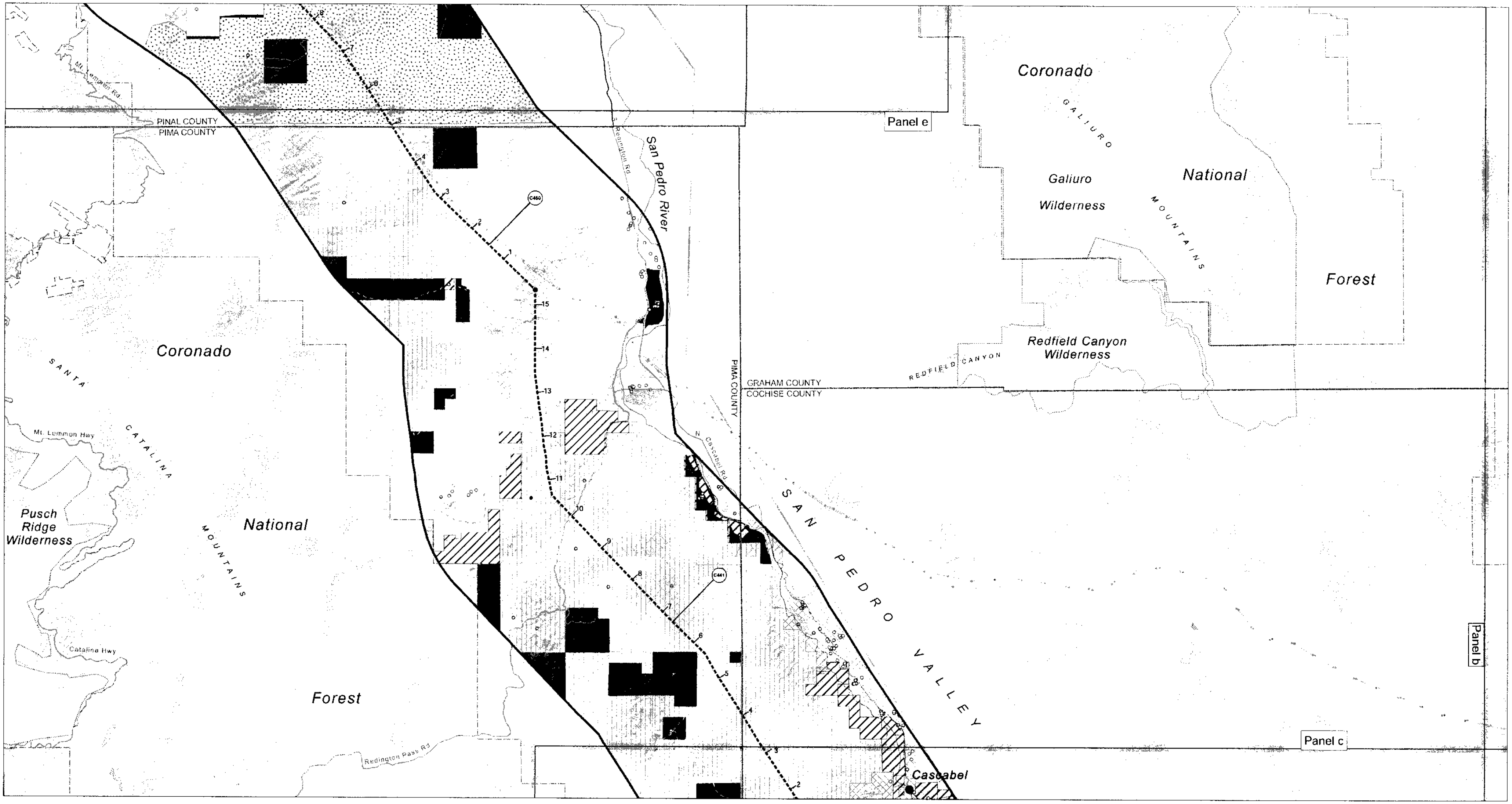

Exhibit A-3d

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT

SunZia

Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
- Scenic/Historic Road
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- Recreation Trail
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BLM Rights of Way

- Avoidance Area
- Exclusion Area

Pinal County

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Pima County

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Grazing/Multi-Use/Vacant

- Bureau of Land Management
- U.S. Forest Service
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- Private/Other
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- Jurisdictional Boundary
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Sources

epg

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Pima County, 2010
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USGS, 2015

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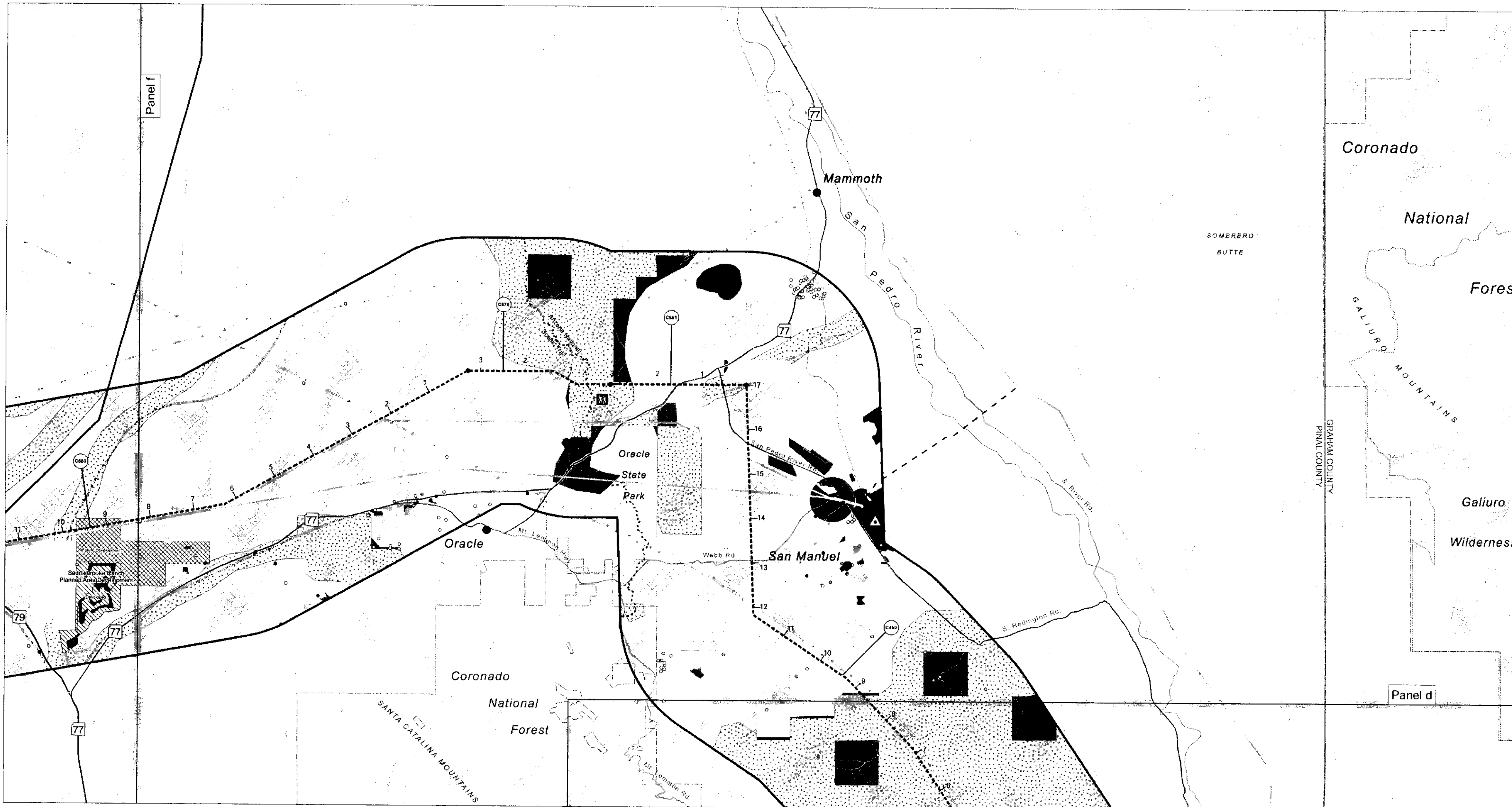
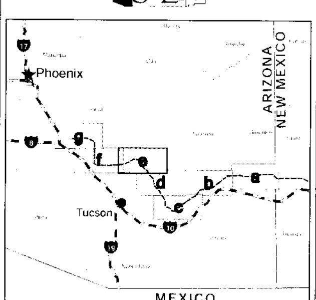


Exhibit A-3e

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
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- Recreation Trail
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Project Features

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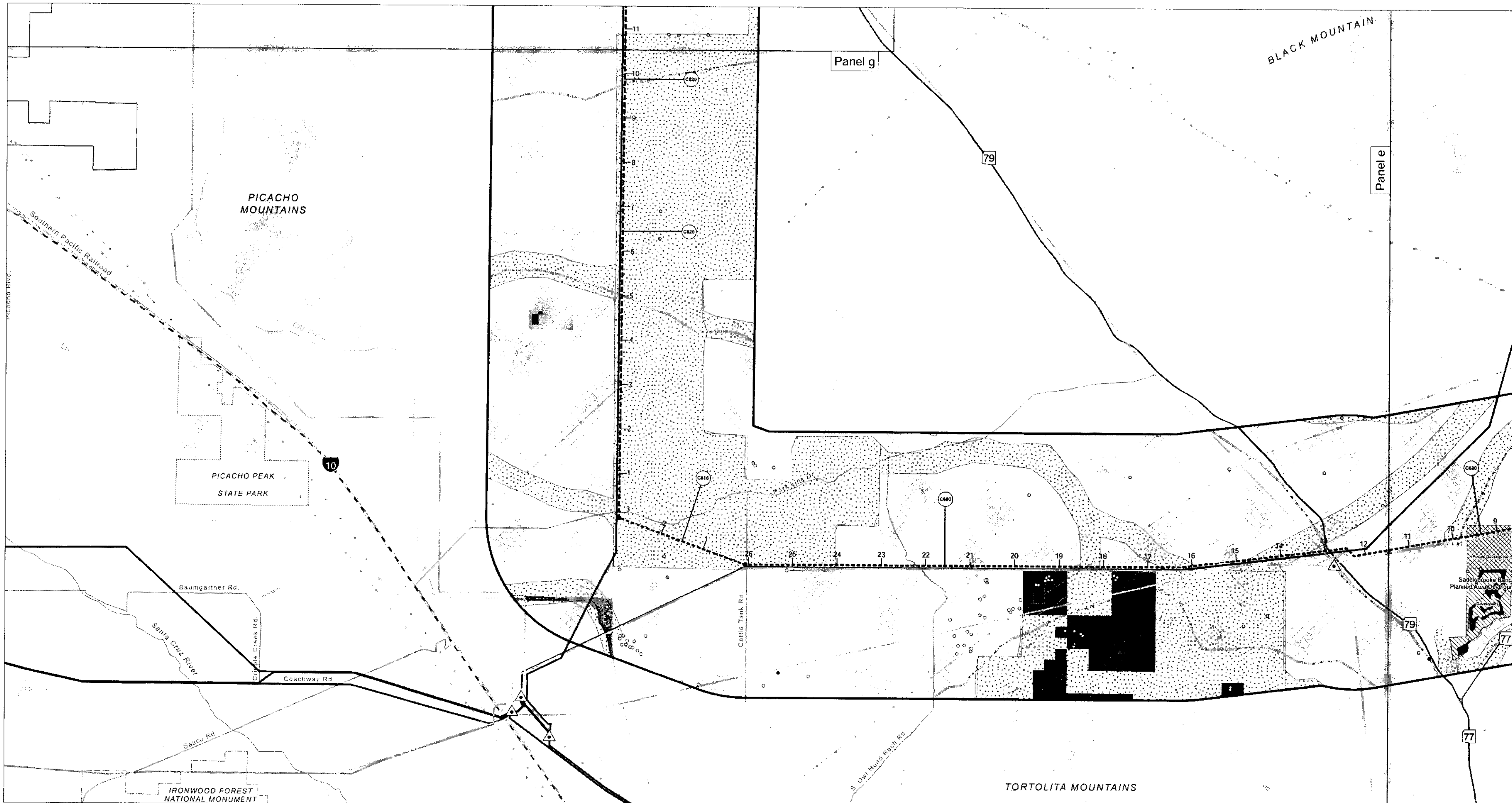
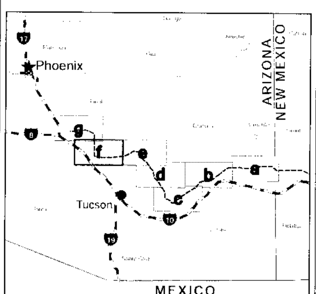


Exhibit A-3f

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT



Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
- School/Educational Facilities
- Utilities
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- Arizona National Scenic Trail
- Recreation Trail
- Trailhead

BLM Rights of Way

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Miles

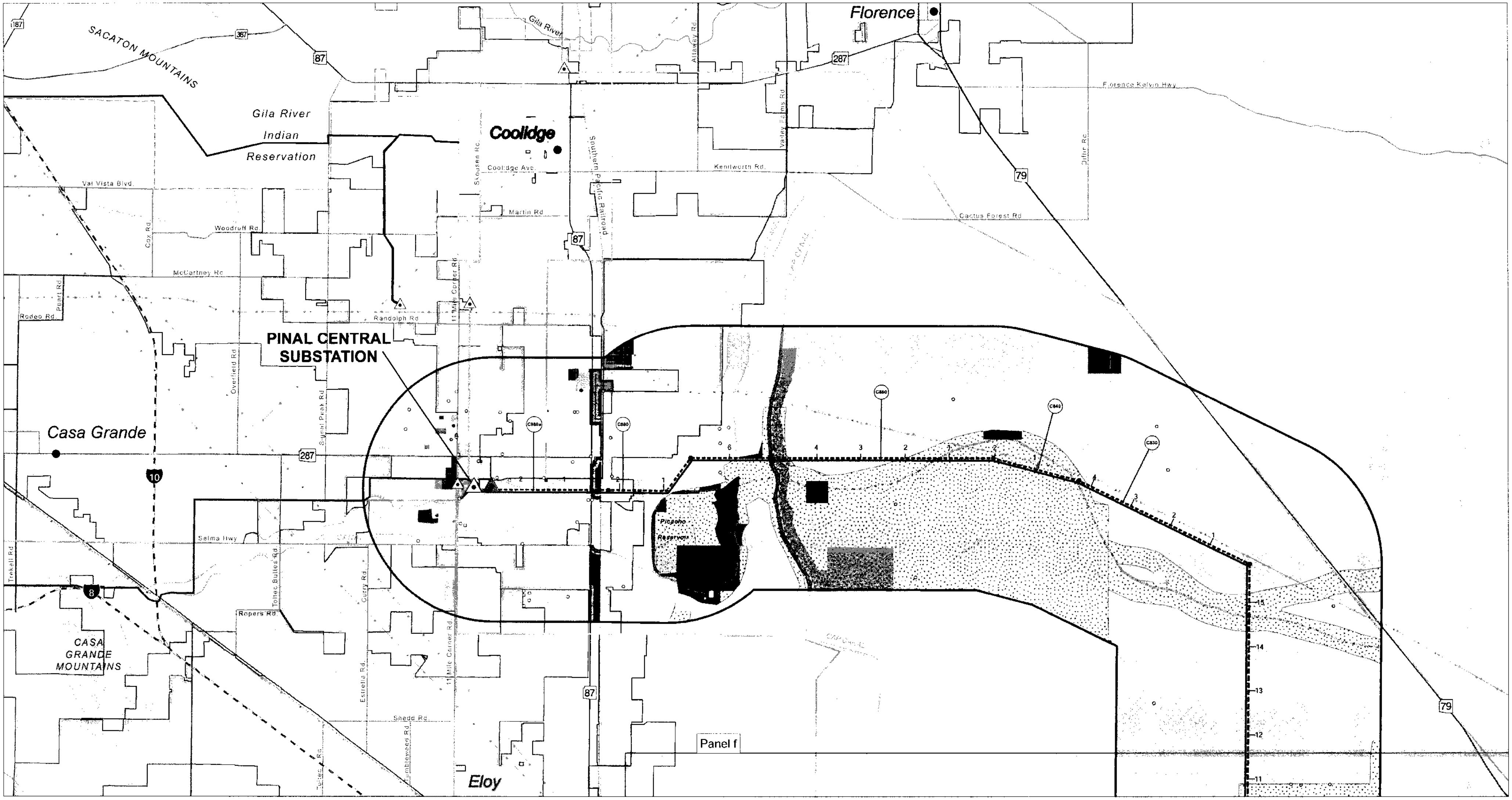

Exhibit A-3g

Planned Land Use

SUNZIA SOUTHWEST TRANSMISSION PROJECT

SunZia

ARIZONA
NEW MEXICO
Phoenix
Tucson
MEXICO

Planned Land Use

- Agriculture
- Air Facilities
- Commercial
- Communication Facilities
- Industrial
- Parks/Preservation
- Public/Quasi-Public
- Recreation
- Residential
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- Utilities
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- Recreation Trail
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Project Features

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- Study Corridor
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Reference Features

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- Highway
- Local Road
- Railroad
- River/Stream
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Scale = 1:62,500
Contour Interval = 100 Feet
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Miles

Application for a
Certificate of Environmental Compatibility

SunZia Southwest
TRANSMISSION PROJECT

New Mexico State Line to Pinal Central Substation

Exhibit B-1

SunZia Southwest Transmission Project
Final Environmental Impact Statement
Record of Decision
Preliminary Plan of Development
Scoping Report

SunZia

September 2015

SunZia Southwest Transmission Project

Docket No. L-00000YY-15-0318-00171

Case No. 171

First Witness Panel

Witness Summaries
Of
Tom Wray and Mark Etherton

The first witness panel will consist of two witnesses, Tom Wray, Project Manager, and Mark Etherton, Engineering Manager, for the SunZia Southwest Transmission Project ("SunZia Project").

Mr. Wray will describe the Applicant and its Proposed Route presented to the Line Siting Committee and the Arizona Corporation Commission ("ACC"). Review of the Proposed Route will include a 'virtual tour' that includes a fly-over of the alignment along with video footage and visual simulations of key interest areas. He will also review the history, public outreach efforts, and the need for and benefits of the SunZia Project.

Mr. Etherton will overview the SunZia Project's inclusion in the ACC's Biennial Transmission Assessment and the Commission's required Ten-Year Plans. Mr. Etherton will describe the project's technical components, benefits to Arizona's EHV system, and future interconnection agreements with Arizona's load serving entities. In addition, he will summarize the project's involvement in various regional transmission planning processes, the project's Accepted Rating from the Western Electricity Coordinating Council, and the project's adherence to the ACC's Guiding Principles for Transmission Adequacy and Reliability.

Additional details concerning the testimony of Mr. Wray and Mr. Etherton are provided in the witness presentation slides, filed concurrently.

EXHIBIT
tabbies
Sun-2
ADMITTED

SunZia Southwest Transmission Project

Docket No. L-00000YY-15-0318-00171

Case No. 171

Witness Summary
Of
Ravi Sankaran, SunEdison

The second witness panel will consist of one witness, Ravi Sankaran, Senior Director, Power Origination for SunEdison. Mr. Sankaran will describe the proposed wind farm under development by SunEdison that is located near the eastern terminus of the SunZia Southwest Transmission Project ("SunZia Project"). SunZia and SunEdison have a letter of intent to use up to 1,500 MW of SunZia's transmission capacity to deliver SunEdison's wind generation to power markets in the Desert Southwest. Mr. Sankaran will describe the benefits of New Mexico's wind resource in meeting demand for scalable renewable energy, increasing portfolio diversity, and meeting air quality mandates.

Additional details concerning the testimony of Mr. Sankaran are provided in the witness presentation slides, filed concurrently.

SunZia Southwest Transmission Project

Docket No. L-00000YY-15-0318-00171

Case No. 171

Witness Summaries of the Environmental Panel

This witness panel will consist of four witnesses, all members of Environmental Planning Group (EPG), as follows:

Michael Siegel, Project Manager; David Kahrs, Biological Services Manager; Marc Schwartz, Director of Visual Resources; and Dr. Steve Swanson, Cultural Resource Director.

Michael Siegel – Mr. Siegel is the Project Manager for EPG, environmental consultant to SunZia Southwest LLC for the SunZia Southwest Transmission Project (Project). His testimony will include a discussion of alternative routes evaluated by the BLM during the NEPA process, findings with respect to land uses and existing plans, recreation, noise and interference, and an overview of the results of the analyses to address the factors considered in issuing a CEC. More details with respect to Mr. Siegel's testimony are contained in the slide presentation, which has been filed in the docket and provided to the Line Siting Committee.

David Kahrs – Mr. Kahrs is the Manager of Biological Services in the Phoenix office at EPG. His testimony will include a discussion of biological resource studies and results. More details with respect to Mr. Kahrs's testimony are contained in the slide presentation, which has been filed in the docket and provided to the Line Siting Committee.

Marc Schwartz – Mr. Schwartz is the Director of Visual Resources for EPG, and principal investigator for scenic areas (visual resources) associated with the Project. His testimony will include a discussion of the key components of the visual resource analysis, the visual resource inventory, and anticipated effects. Mr. Schwartz will present a summary of the findings with respect to landscape scenery and to public viewing locations. More details with respect to Mr. Schwartz's testimony are contained in the slide presentation, which has been filed in the docket and provided to the Line Siting Committee.

Steve Swanson, PhD. - Dr. Swanson is the Cultural Resources Director for EPG, and is the principal investigator for cultural and historic resources associated with the SunZia Southwest Transmission Project. Dr. Swanson will provide a discussion of the historic and archaeological site and structure analysis. Dr. Swanson will describe the Programmatic Agreement prepared for the Project. More details with respect to Dr. Swanson's testimony are contained in the slide presentation, which has been filed in the docket and provided to the Line Siting Committee.