Proposed Southline Transmission Line Project

Draft Environmental Impact Statement and Draft Resource Management Plan Amendment

Volume 1 of 4

Western
AREA POWER
ADMINISTRATION

National System of Public Lands
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

March 2014

BLM
WESTERN

BLM/NM/PL-14-01-1610 · DOE/EIS-0474

MISSION STATEMENT

The Bureau of Land Management is responsible for stewardship of our public lands. The BLM is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield of our Nation's resources within the framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife habitat, wilderness, air, and scenic quality, as well as scientific and cultural values.

WESTERN MISSION STATEMENT

Western Area Power Administration's mission is to market and deliver reliable, renewable, cost-based hydroelectric power and related services.

United States Department of the Interior

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New Mexico State Office
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Western
AREA POWER
ADMINISTRATION

IN REPLY REFER TO:
NMNM124104
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1610

JAN 2 9 2014

Dear Reader:

Enclosed for your review and comment is the Draft Environmental Impact Statement (EIS) and Draft Resource Management Plan (RMP) Amendment titled "Southline Transmission Line Project Draft Environmental Impact Statement and Draft Resource Management Plan Amendment." This EIS has been prepared by the Bureau of Land Management (BLM) and Western Area Power Administration (Western) in accordance with the National Environmental Policy Act of 1969 and the Federal Land Policy and Management Act of 1976, as amended, implementing regulations, the BLM's Land Use Planning Handbook (H-1601-1), and other applicable law and policy. The BLM and Western have agreed to be joint lead agencies and have prepared this document in consultation with several cooperating agencies.

The Draft EIS/Draft RMP Amendment has been prepared to analyze the potential impacts of the BLM's granting a right-of-way (ROW) to Southline Transmission, LLC (Southline), for the purpose of constructing and operating a 345-kilovolt (kV) overhead transmission line from the Afton Substation in New Mexico to the Apache Substation in Arizona. Western must decide whether or not Western's existing Saguaro-Tucson and Tucson-Apache 115-kV transmission lines would be upgraded and whether to use Western's existing transmission easements as part of the proposed Southline Transmission Line Project (Project). Also, Western will use the document as one element to consider in determining whether to fund the proposed Project under Western's Transmission Infrastructure Program and the 2009 amendment of the Hoover Act. Southline proposes the new 345-kV transmission line and upgrade of the existing Western line to 230-kV to improve reliability in southern New Mexico and Arizona, mitigate existing congestion, improve the electric capacity of transmission system in the region, and facilitate renewable generation development.

The proposed Project would be located on a combination of BLM-administered public land, New Mexico and Arizona State Trust lands, Reclamation, DOD, tribal, and private lands in southern New Mexico and Arizona. The proposed Project would be an about 360-mile-long overhead transmission line with a 150-foot (Upgrade Section) or 200-foot (New Build Section) ROW. The BLM-administered public land within the proposed Project area is managed under the Mimbres RMP in New Mexico, and under the Safford RMP, Las Cienegas RMP, and Phoenix RMP in Arizona. Some transmission line segments of the proposed Project and alternatives are not in conformance with the Las Cruces District Office Mimbres RMP Visual Resource Management Class II objectives and one ROW avoidance area stipulation. Therefore, in conjunction with Southline's request for a ROW for the Project, the BLM is also analyzing concurrent RMP amendments that would address the identified non-conformance if the proposed

Project is approved using those segments, and would allow the BLM to grant the ROW necessary to construct and operate the proposed Project.

In the Draft EIS/Draft RMP Amendment, the BLM and Western identified the Agency Preferred Alternative route for the proposed Project. Under the Agency Preferred Alternative, no RMP Amendment would be required. The Agency Preferred Alternative would include 244 miles of new transmission line and associated facilities between the existing Afton Substation in New Mexico and the existing Apache Substation in Arizona. The Agency Preferred Alternative also includes the upgrade of 116.8 miles of Western's existing Saguaro-Tucson and Tucson-Apache 115-kV transmission lines in Arizona, with two local alternative realignments–one near Tumamoc Hill, and one near the Marana Airport.

In addition to the Agency Preferred Alternative route, the Draft EIS/Draft RMP Amendment analyzes several action alternatives, as well as the No Action Alternative. Under the No Action Alternative, Western would not participate in the proposed Project with Southline, BLM would not issue a ROW, the Mimbres RMP would not be amended, and the transmission line would not be constructed as described under the Proponent Preferred or other action alternatives. Action alternatives are organized into four route groups using major existing substations as nodes.

The Draft EIS/Draft RMP Amendment is now available for public review. The BLM and Western are seeking comments on the Draft EIS/Draft RMP Amendment to establish the adequacy of the document and to provide input into the preparation of the Final EIS/Proposed RMP Amendment. The Draft EIS/Draft RMP Amendment is being released to inform the public and interested parties of potential impacts associated with implementing Southline's proposal, as well as alternatives identified by the agencies.

Comments will be accepted for 90 days following publication of the notice of availability in the *Federal Register*. All timely comments will be considered in the preparation of the Final EIS/Proposed RMP Amendment. All substantive comments and information submitted will be summarized and addressed in the Final EIS/Proposed RMP Amendment. Substantive comments are those that, with reasonable basis, question the accuracy of the information in the Draft EIS/Draft RMP Amendment, question the adequacy of, methodology for, or assumptions used in the environmental analysis, present new information relevant to the analysis, or present alternatives other than those analyzed and cause changes or revisions in one or more alternatives. The BLM and Western can best use your comments and information if received within the review period.

Those individuals wishing to submit comments are asked to do so in writing and submit them electronically to the Project at BLM_NM_Southline@blm.gov. Please include "Southline Transmission Line Project Draft EIS/Draft RMP Amendment" in the subject line of your email message. Comments may also be submitted by mail or fax to:

BLM Las Cruces District Office
Southline Transmission Project
Attention: Frances Martinez
1800 Marquess Street
Las Cruces, New Mexico 88005
Fax: (575) 525-4412

The BLM and Western will host public hearings in Las Cruces, Deming, and Lordsburg, New Mexico, and Willcox, Benson, and Tucson, Arizona, to provide an overview of the proposed Project and to take public comments on the Draft EIS/Draft RMP Amendment. The public hearings will be announced at least 15 days in advance through public notices, local media, news releases, and mailings. These dates and places will also be posted on the project Website at: http://www.blm.gov/nm/southline.

Copies of the Draft EIS/Draft RMP Amendment are available for review on the project Website, in New Mexico at the BLM New Mexico State Office and Las Cruces District Office, and in Arizona at the Arizona State Office, Safford Field Office, and Tucson Field Office. Additional locations where hard copies of the Draft EIS/Draft RMP Amendment are available can be found on the Project Website or by contacting the BLM Project Manager.

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

Thank you for your continued interest in the Southline Transmission Line Project Draft EIS and Draft RMP Amendment. We appreciate the information and suggestions you contribute to this process.

For further information, contact Mark A. Mackiewicz, PMP, BLM, Senior National Project Manager at (435) 636-3616 or Mark Wieringa, Western Area Power Administration, NEPA Document Manager at (720) 962-7448.

Sincerely,

Mark A. Gabriel
Administrator
Western Area Power Administration

Sincerely,

Jesse J. Juen
State Director
BLM, New Mexico

1 Enclosure

SOUTHLINE TRANSMISSION LINE PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
AND DRAFT RESOURCE MANAGEMENT PLAN AMENDMENT

U.S. Department of the Interior
Bureau of Land Management
Las Cruces District Office
Las Cruces, New Mexico
BLM Publication Index No. BLM/NM/PL-14-01-1610

U.S. Department of Energy
Western Area Power Administration
Corporate Services Office
Lakewood, Colorado
DOE/EIS-047

March 2014

Lead Agencies: U.S. Department of the Interior, Bureau of Land Management
U.S. Department of Energy, Western Area Power Administration

Type of Action: ( ) Administrative Draft (X) Draft ( ) Final

Cooperating Agencies:

U.S. Army Corps of Engineers
U.S. Bureau of Reclamation
Department of Defense (DOD) Clearinghouse
U.S. Environmental Protection Agency
DOD Fort Huachuca
National Park Service
U.S. Forest Service, Coronado National Forest
U.S. Fish and Wildlife Service
Arizona Game and Fish Department
Arizona State Land Department
New Mexico Department of Game and Fish
New Mexico State Land Office
Cochise County, Arizona
Greenlee County, Arizona
Graham County, Arizona
City of Sierra Vista, Arizona.

Authorized Officers Responsible for the Environmental Impact Statement:

Bureau of Land Management:
William Childress, Las Cruces District Manager
Jesse Juen, New Mexico State Director

Western Area Power Administration:
Mark A. Gabriel, Administrator

For Further Information, Contact:

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or

Mark Wieringa
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(720) 962-7448

Abstract

This Draft Environmental Impact Statement (DEIS) and Draft Resource Management Plan (RMP) Amendment analyzes the impacts related to the development of the Southline Transmission Line Project, proposed by Southline Transmission, LLC (Southline). Southline proposes to construct approximately 240 miles of new double-circuit 345-kilovolt (kV) transmission line in a 200-foot right-of-way (ROW) between the Afton Substation, south of Las Cruces, New Mexico, and Western Area Power Administration's (Western's) Apache Substation, south of Willcox, Arizona (Afton–Apache Section or New Build Section). Southline also proposes to upgrade 120 miles of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines in a 100-foot existing ROW to a double-circuit 230-kV transmission line in a 150-foot ROW (Saguaro–Apache Section or Upgrade Section). The Upgrade Section would originate at the Apache Substation and terminate at the Saguaro Substation northwest of Tucson, Arizona. The transmission line route alternatives would pass through Doña Ana, Grant, Hidalgo, and Luna counties in New Mexico; and Cochise, Pima, Pinal, Graham, and Greenlee counties in Arizona. One proposed new substation could also be constructed in Luna County, New Mexico. The proposed transmission line route alternatives would be approximately 360 to 380 miles long and would require ROW, crossing BLM, State, or private lands, or lands managed by other entities in New Mexico and Arizona. This DEIS describes the physical, biological, cultural, and socioeconomic resources in and around the proposed transmission line. The DEIS considers the impacts of the proposed transmission line and its alternatives, including the "no action" alternative, as well as Draft RMP Amendment alternatives.

ACRONYMS AND ABBREVIATIONS

Document Abbreviations

forest plan	"Coronado National Forest Land and Resource Management Plan," as amended (U.S. Forest Service 1986a)
Las Cienegas RMP	"Approved Las Cienegas Resource Management Plan and Record of Decision" (BLM 2003)
Mimbres RMP	"Mimbres Resource Management Plan" (BLM 1993)
Phoenix RMP	"Phoenix Resource Management Plan" (BLM 1988)
POD	"Amended Plan of Development for the Southline Transmission Project" (Southline 2013)
RDEP	"Arizona Restoration Design Energy Project Final Environmental Impact Statement" (BLM 2012a)
Safford RMP	"Safford Resource Management Plan" (BLM 1991)
Solar Energy Development PEIS	"Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States" (BLM and DOE 2012)
Wind Energy PEIS	"Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States" (BLM 2005a)
WWEC PEIS	"West-wide Energy Corridor Programmatic Environmental Impact Statement" (DOE and BLM 2008)

Other Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
AAQS	ambient air quality standards
AAAQS	Arizona Ambient Air Quality Standards
AAC	Arizona Administrative Code
AC	alternating current
ACC	Arizona Corporation Commission
ACEC	Area of Critical Environmental Concern
ACGIH	American Conference of Governmental Industrial Hygienists
ACHP	Advisory Council on Historic Preservation
ACIP	Airport Capital Improvement Program
ACS	American Community Survey

ADA	Arizona Department of Agriculture
ADEQ	Arizona Department of Environmental Quality
ADOA	Arizona Department of Administration
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AFB	Air Force Base
AGFD	Arizona Game and Fish Department
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AMA	active management area
amsl	above mean sea level
ANPL	Arizona Native Plant Law
ANSI	American National Standards Institute
Anza Trail	Juan Bautista de Anza National Historic Trail
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
APS	Arizona Public Service
APZ	accident potential zone
AQRV	air quality related value
ARPA	Archaeological Resources Protection Act
ARS	Arizona Revised Statutes
Arizona Trail	Arizona National Scenic Trail
ASLD	Arizona State Land Department
ASM	Arizona State Museum
ASTM	American Society for Testing and Materials
ATC	available transfer capability
ATV	all-terrain vehicle
AUM	animal unit month
AZPDES	Arizona Pollutant Discharge Elimination System
AZGS	Arizona Geological Survey
BA	biological assessment

BEA	Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BMP	best management practice
BP	before present
BSETR	Buffalo Soldier Electronic Testing Range
Butterfield Trail	Butterfield Overland Mail and Stage Route; also referred to as the Butterfield Overland Trail National Historic Trail
CAA	Clean Air Act
CAP	Central Arizona Project
CBP	U.S. Custom and Border Protection
CCS	Center for Climate Strategies
CDNST	Continental Divide National Scenic Trail
CEAA	cumulative effects analysis area
CEC	Certificate of Environmental Compatibility
Census Bureau	U.S. Census Bureau
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CGP	Construction General Permit
CH_4	methane
CIC	construction inspection contractor
CLS	Conservation Lands System
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
CRPA	Cultural Resources Priority Area
CWA	Clean Water Act

CZ	Clear Zone
dB	decibels
dBA	A-weighted decibels (sound level measurement)
DC	direct current
DEIS	Draft Environmental Impact Statement
DOC	Department of Commerce
DOD	Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
e	eligibility multipliers
EIS	Environmental Impact Statement
EMF	electromagnetic fields
EMI	electromagnetic interference
EMNRD	New Mexico Energy, Minerals, and Natural Resources Department
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct 2005	Energy Policy Act of 2005
EPEC	El Paso Electric
EPG	Electronic Proving Ground
EPRI	Electric Power Research Institute
ERMA	extensive recreation management area
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FSM	Forest Service Manual

FTA	Federal Transit Administration
FW	Fighter Wing
FWS	U.S. Fish and Wildlife Service
g	the acceleration due to gravity equaling 32 feet per second squared
GHG	greenhouse gas
GIS	geographic information system
GLO	General Land Office
GMU	game management unit
GPS	global positioning system
HAP	hazardous air pollutant
HASP	Health and Safety Plan
HDMS	Heritage Database Management System
HMMP	Hazardous Materials Management Plan
HMP	Habitat Management Plan
HPTP	Historic Properties Treatment Plan
HS	highly safeguarded
HUC	hydrologic unit code
HUD	U.S. Department of Housing and Urban Development
I-	Interstate
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID	interdisciplinary
IEEE	Institute of Electrical and Electronics Engineers
IFNM	Ironwood Forest National Monument
IM	Instruction Memorandum
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
KGRA	known geothermal resource area
kHz	kilohertz

km	kilometer
KOP	key observation point
kV	kilovolt(s)
kV/m	kilovolts per meter
lb	pounds
L_{dn}	day-night level
LUST	leaking underground storage tank
m	meter(s)
MAG	Maricopa Association of Governments
MBTA	Migratory Bird Treaty Act
mG	milliGauss
mg/L	milligram(s) per liter
MHz	megahertz
MIS	management indicator species
MOA	Military Operations Area
MP	milepost
mph	mile(s) per hour
MSCP	Multi-species Conservation Plan
MTR	military training route
mV	millivolts
MVA	megavolt ampere
MW	megawatt(s)
mya	million years ago
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NCA	National Conservation Area
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation

NESC	National Electric Safety Code
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NGO	non-governmental organization
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NIISS	National Institute of Invasive Species Science
NLCS	National Land Conservation System
NM	New Mexico State Route
NMAAQS	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMCRIS	New Mexico Cultural Resources Information System
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMMNH	New Mexico Museum of Natural History and Science
NMOHSB	New Mexico Occupational Health and Safety Bureau
NMOSE	New Mexico Office of the State Engineer
NMRPTC	New Mexico Rare Plant Technical Council
NMSA	New Mexico Statutes Annotated
NMSLO	New Mexico State Land Office
NNL	National Natural Landmark
No.	number
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOA	notice of availability
NOI	notice of intent
NOTAM	Notice to Airmen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRCS	National Resources Conservation Service

NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NSR	New Source Review
NWI	National Wetlands Inventory
NWP	Nationwide Permit
O_3	ozone
OE/AAA	obstruction evaluation and airport airspace analysis
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Paleobiology	Paleobiology Database
Pb	lead
PCA	Pima County Priority Conservation Area
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PEIS	programmatic environmental impact statement
PFYC	Potential Fossil Yield Classification
PHMSA	Pipeline and Hazardous Materials Safety Administration
PL	Public Law
PLZ	potential wildlife linkage zone
PM	particulate matter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
POD	Plan of Development
ppm	part(s) per million
PPM	proponent proposed measure
the Project	Southline Transmission Line Project
PSD	prevention of significant deterioration
PTRCI	property of traditional religious and cultural importance
PUC	public utilities commission
Reclamation	U.S. Bureau of Reclamation

RCRA	Resource Conservation and Recovery Act of 1976
REDA	renewable energy development area
RDEP	Restoration Design Energy Project
REMA	renewable energy management area
RFFA	reasonably foreseeable future activity
RMA	recreation management area
RMP	resource management plan
RMZ	recreation management zone
RNA	research natural area
RngProdFY	Rangeland Productivity - Favorable Year
RngProdNY	Rangeland Productivity - Normal Year
ROD	Record of Decision
ROS	recreation opportunity spectrum
ROW	right-of-way
RPS	renewable portfolio standard
RV	recreational vehicle

SA	salvage assessed
SATS	Southeastern Arizona Transmission Study
SDCP	Sonoran Desert Conservation Plan
SEZ	solar energy zone
SF-	Standard Form
SF_6	sulfur hexafluoride
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SIL	significant impact level
SIP	State Implementation Plan
SLRU	sensitivity level rating unit
SMA	special management area
SO_2	sulfur dioxide
Southline	Southline Transmission, LLC
SPCC Plan	Spill Prevention, Control, and Countermeasures Plan
SQRU	scenic quality rating unit

SR	State Route
SR	salvage restricted
SRI	Statistical Research, Inc.
SRMA	special recreation management area
STIP	Statewide Transportation Improvement Plan
SunZia project	SunZia Southwest Transmission Line Project
SUP	special use permit
SSURGO	Soil Survey Geographic
SVAPD	Sonoita Valley Acquisition Planning District
SWAT	Southwest Area Transmission
SWCA	SWCA Environmental Consultants
SWReGAP	Southwest Regional Gap Analysis Project
SWPPP	Stormwater Pollution Prevention Plan
SWTC	Southwest Transmission Cooperative
t/a/y	tons per acre per year
TAA	Tucson Airport Authority
TCE	trichloroethene
TCP	traditional cultural property
TDS	total dissolved solids
TEP	Tucson Electric Power Company
T factor	soil loss factor in tons
THPO	Tribal Historic Preservation Office
TIP	Transmission Infrastructure Program
TPE	total potential effect
tpy	ton(s) per year
TSGT	Tri-State Generation and Transmission
UCMP	University of California Museum of Paleontology
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
U.S.	U.S. Route
U.S.C.	United States Code

USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
UST	underground storage tank
v/c	volume-to-capacity
VCRS	visual contrast rating sheets
VOC	volatile organic compound
VR	visual route
VRI	visual resource inventory
VRM	visual resource management
WEAP	Worker Environmental Awareness Program
WECC	Western Electricity Coordinating Council
WEG	wind erodibility group
Western	Western Area Power Administration
WIU	Wilderness Inventory Unit
WMP	Waste Management Plan
WREZ	Western Renewable Energy Zone
WSA	wilderness study area
WUS	waters of the U.S.

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EXECUTIVE SUMMARY

ES.1 Introduction

This Draft Environmental Impact Statement (DEIS) and Draft Resource Management Plan (RMP) Amendment document has been prepared to analyze and disclose the potential effects of the proposed Southline Transmission Line Project (Project). The proposed Project would include the construction of approximately 240 miles of new double-circuit 345-kilovolt (kV) transmission line, and the upgrade of approximately 120 miles of Western Area Power Administration's (Western's) existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines to a double-circuit 230-kV transmission line. The proposed Project would be on Federal, State, tribal, and private lands in New Mexico and Arizona. Southline Transmission, LLC (Southline), a subsidiary of Hunt Power, L.P., submitted Standard Form (SF-) 299, "Application for Transportation and Utility Systems and Facilities on Federal Lands," to the Bureau of Land Management (BLM) for a right-of-way (ROW) to use BLM-administered public lands for a portion of the proposed Project.

The BLM and Western have agreed to be joint lead agencies under the National Environmental Policy Act (NEPA) (40 CFR 1501.5(b)). This Environmental Impact Statement (EIS) is being prepared by the BLM and Western in compliance with NEPA, Council on Environmental Quality (CEQ) regulations for implementing NEPA, Department of Energy regulations (10 CFR 1021), the Federal Land Policy and Management Act (FLPMA), and applicable U.S. Department of the Interior and BLM policies and manuals. Sixteen agencies have participated in the preparation of this EIS, including: U.S. Army Corps of Engineers; U.S. Bureau of Reclamation (Reclamation); Department of Defense (DOD) Clearinghouse; U.S. Environmental Protection Agency; DOD Fort Huachuca; National Park Service; U.S. Forest Service (Coronado National Forest); U.S. Fish and Wildlife Service; Arizona Game and Fish Department; Arizona State Land Department; New Mexico Department of Game and Fish; New Mexico State Land Office; Cochise County, Arizona; Greenlee County, Arizona; Graham County, Arizona; and City of Sierra Vista, Arizona.

ES.2 Agency Purpose and Need

The following section describes the purpose of and need for BLM and Western's Federal actions associated with the proposed Project. The BLM and Western, serving as joint lead agencies, are both considering Federal actions that would need to be taken.

BLM must consider Southline's request to be granted a ROW on BLM-administered public lands for the construction, operation, maintenance, and decommissioning of the proposed transmission line. Western must consider the upgrading of two of its existing transmission lines. This environmental analysis supplies one element of many for Western to consider as it determines the extent and nature of its participation in Southline's proposed Project, and whether to fund the Project in whole or in part under the Transmission Infrastructure Program (TIP).

Bureau of Land Management – Purpose and Need

The BLM has received a ROW application from Southline and must determine whether to allow the use of BLM-administered public lands for portions of the proposed Project. In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1761–1771), and the BLM's ROW regulations (43 CFR 2800), the BLM must manage public lands for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs for "systems for generation, transmission, and distribution of electric energy" "over, upon, under, or through [public] lands" (43 U.S.C. 1761(a)(5)). Taking into account the BLM's multiple-use mandate, the need for the BLM action is established by the BLM's responsibility under FLPMA to respond to a request for a ROW grant while avoiding or minimizing adverse impacts to other resource values and to locate the uses in conformance with land use plans. The BLM's purpose for the proposed Project is to respond to a ROW application submitted by Southline to construct, operate, maintain, and decommission a 345-kV transmission line, substations, access roads, and associated infrastructure on public lands administered by the BLM in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws and policies.

In making its decision, the BLM must determine and consider the environmental impact on all lands crossed as a result of granting a ROW across BLM-administered public lands. The BLM must also consider existing RMPs and other BLM land use plans in its decision to issue a ROW grant (43 CFR 1610.0-5(b)). The BLM will decide whether to grant, grant with modifications, or deny the application. Modifications could include granting only a portion of the Project, modifying the proposed use, or changing the route or location of the proposed facilities if the BLM determines such terms, conditions, and stipulations are in the public interest (43 CFR 2805.10(a)(1)).

The BLM would issue a Record of Decision (ROD) with all terms and conditions deemed appropriate by the BLM. The BLM decisions to be made are to:

- decide whether to grant, grant with modifications, or deny all or part of the ROW application for the transmission line, substation expansions, and associated access roads and facilities;
- decide whether one or more RMPs would be amended to allow for a ROW for the proposed transmission line and associated facilities;
- decide whether to approve the plan amendment(s) if the proposed Project is not approved;
- determine the most appropriate route across BLM-administered public lands for the transmission line, taking into consideration multiple-use objectives; and
- determine the terms and conditions (stipulations) that should be applied to the construction, operation and maintenance, and decommissioning of the transmission line on BLM-administered public lands.

FLPMA requires that the BLM "develop, maintain, and when appropriate, revise land use plans" (43 U.S.C. 1712). As indicated in the notice of intent (NOI) published in the Federal Register on April 4, 2012, the public was notified of the potential for a plan amendment for this Project. Plan conformance for all resources is discussed in section 1.5, and an amendment to one of the four BLM RMPs discussed in section 1.5 and section 2.3 of chapter 2 could be required, depending on the route selected on public lands where current resource management objectives would not be met by construction of the Project.

Specifically, there are two conformance issues with the Mimbres RMP: (1) where portions of alternative route segments would cross visual resource management (VRM) Class II areas, and (2) where portions of the alternative route segments would cross avoidance areas designated for the Butterfield Overland Mail and Stage Route (Butterfield Trail) near Lordsburg Playa.

As a plan amendment may be required, depending on the selected alternative, the BLM is using a multistep process fully integrated with the NEPA process and CEQ guidelines (43 U.S.C. 1600); therefore, this DEIS includes an analysis of the Draft RMP Amendment. Following publication of this DEIS and Draft RMP Amendment, there will be a 90-day public review and comment period. As required for consideration of a plan amendment, during this time, the BLM plans to hold public hearings to receive comments on the DEIS and Draft RMP Amendment. Upon conclusion of the public review and comment period, letters and oral comments received on the DEIS and Draft RMP Amendment will be reviewed and evaluated. Responses will be prepared for substantive comments, and modifications or corrections will be made to the DEIS and Draft RMP Amendment as necessary. Copies of all comments, along with responses to them, will be included in the Final EIS (FEIS) and Proposed RMP Amendment.

The FEIS and Proposed RMP Amendment will be completed after consideration is given to comments received on the DEIS and Draft RMP Amendment. A 30-day availability period for the EIS, and protest period for the plan amendment, will be initiated by publication of a notice of availability for the FEIS and Proposed RMP Amendment. A concurrent 60-day Governor's Consistency Review period will begin at the same time. The Governor's consistency review would allow the Governor of New Mexico to ensure that the plan amendments are consistent with State and local plans, policies, and programs. Any protests regarding the plan amendments or responses from the Governor Consistency Review must be resolved before BLM could issue a ROD.

The BLM and Western have prepared this EIS to meet the disclosure requirements under NEPA, to facilitate public participation, to assist the BLM decision makers in determining whether to issue a ROW grant, to determine under what terms and conditions the ROW grant would be issued, and to assist Western in making its decisions regarding the proposed Project. These decisions would be documented in the agencies' RODs. The opportunity to appeal the BLM decision(s) in the ROD would be allowed as provided in 43 CFR 4 and 2801.10. Depending on the selected alternative in the ROD, if a plan amendment is needed, the New Mexico State Director would make that decision.

Western Area Power Administration – Purpose and Need

Western needs to respond to a project proposed by Southline that would, in part, include the upgrading of two existing Western lines and use of existing Western transmission easements. In addition, Southline has requested consideration of its proposed Project for funding under the amended Hoover Power Plant Act of 1984 (Hoover Act), as described in more detail below. As a result of Southline's proposal, Western needs to determine whether to allow upgrading of its existing transmission facilities, the nature and extent of its participation in Southline's proposed Project, and whether to fund the proposed Project through Western's TIP under the Hoover Act amendments. Western has a mandate to carry out Federal policy to facilitate renewable energy development and transmission expansion, as established in the 2009 amendment of the Hoover Act. Section 301 of the amended Hoover Act authorizes Western to borrow funds from the U.S. Treasury to construct, finance, facilitate, plan, operate, maintain, and/or study construction of new or upgraded electric power transmission lines and related facilities. These transmission lines and related facilities must have at least one terminus in Western's marketing area and deliver or facilitate the delivery of power from renewable resources constructed or reasonably expected to be constructed after the enactment of the amended Hoover Act.

Southline's proposal to upgrade Western's existing transmission lines as part of its overall proposed Project would strengthen the integrated transmission system, increase transmission capacity, and improve power delivery. As part of Western's own efforts to maintain the reliability of its transmission system and meet system and customer needs, the upgrade of the two transmission lines has already been identified in Western's Desert Southwest Region's 10-year plan for construction and maintenance projects. Western must also decide whether it would use its borrowing authority to finance some portion of the proposed Project. Western would need to make decisions on the amount of committed funding, associated ownership and capacity rights and conditions, repayment provisions, and other decisions related to the nature and extent of its participation in the proposed Project. Specifically, funding could be used to construct the proposed transmission line, as well as to remove the existing Western transmission lines. These decisions would be managed through contractual agreements that would include defining the respective rights and obligations associated with ownership of the Project; address construction, operation, and maintenance associated with the transmission line; and provide for acquisition of ROWs for the Project.

Before committing funds for construction, Western must determine that the proposed Project has completed the development phase, and must certify that a project is in the public interest; that it would not adversely impact system reliability, system operations, or other statutory obligations; and that it is reasonable to expect the proceeds from the Project would be adequate to make repayment of the loan from the U.S. Treasury. In addition, the Project would need to satisfy the requirements of Western's TIP and the Hoover Act. Western's decision would be partially informed by the required NEPA analysis and disclosure in this EIS.

As noted above, Western must decide whether or not Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines would be upgraded and use Western's existing transmission easements as part of the proposed Project. If Western decides in the affirmative, Western and Southline would enter into a joint project agreement, and a number of contractual, ownership, technical, and engineering decisions would be required in order to accomplish the upgrade.

Alternatively, Western could choose to participate in the upgrades to the existing Western lines proposed by the Project without using its borrowing authority. Western could participate under a trust funding agreement with the Desert Southwest Region if TIP funding is not provided. If Western did not participate under a trust funding agreement, and no TIP funding was provided, this decision would be a reliability and maintenance decision based on the existing need to upgrade the aging Tucson–Apache and Saguaro–Tucson 115-kV transmission lines. These transmission lines have been identified for upgrade in Western's 10-year construction and maintenance plan based on age, condition, loading, and future growth scenarios. In this case, funding of the upgrades would be recovered through power rates charged to Western power customers.

ES.3 Proposed Action (Proponent Preferred)

Southline worked with the Western Electricity Coordinating Council, local utilities, and other regional transmission planning groups to plan the proposed Project to help solve regional transmission needs such as congestion, reliability, capacity constraints, and limited transmission access for utilities and renewable energy zones in New Mexico and Arizona. Southline is seeking a 50-year ROW across Federal lands to accommodate the proposed Project. Southline proposes to construct a high-voltage electric transmission line and associated facilities in southern New Mexico and southern Arizona. The proposed Project would consist of two sections.

The New Build Section would entail construction of approximately 240 miles of new double-circuit 345-kV transmission line between the Afton Substation, south of Las Cruces, New Mexico, and the Apache Substation, south of Willcox, Arizona. The existing voltage in the New Mexico facilities (Afton and Hidalgo substations) is 345 kV; thus, the New Build Section is proposed as a 345-kV transmission line. Based on a typical span of 1,000 to 1,400 feet, four to five transmission line structures per mile would be required, with typical structure heights between 110 and 170 feet.

The Upgrade Section would be an upgrade of approximately 120 miles of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines to a double-circuit 230-kV transmission line originating at the Apache Substation and terminating at the Saguaro Substation, northwest of Tucson, Arizona. The Upgrade Section is proposed as a double-circuit 230-kV in order to maximize the existing ROW, particularly through the more urban Tucson area, where a 345-kV structure was determined to be too large in terms of ROW requirements. One of two methods for the Upgrade Section of the Project would be used, depending on ROW constraints: either the tear-down and rebuild-in-place method, or construction of new facilities adjacent to the existing facilities. Based on a typical span of 700 to 1,100 feet, five to six transmission line structures per mile would be required, with typical structure heights between 100 and 140 feet.

The requested ROW width for the New Build Section 345-kV double-circuit transmission line is 200 feet. The anticipated ROW width for the Upgrade Section 230-kV transmission line is 150 feet. These ROW widths have been requested to allow for the safe movement and operation of construction and maintenance equipment and to allow for sufficient clearance between conductors and the ROW edge, as required by the National Electric Safety Code. Southline is also requesting ROWs for ancillary Project facilities and for access to the transmission line. In certain areas of the Upgrade Section, development and constraints may not allow for the expansion of the existing 100-foot ROW.

The proposed Project would also involve the interconnection with and upgrades of 14 existing substations along the Project route in New Mexico and Arizona, and the potential construction of a new 345-kV substation facility proposed for Luna County, New Mexico (referred to as “Midpoint Substation”).

The Project would be located within Doña Ana, Luna, Grant, and Hidalgo counties in New Mexico and Graham, Greenlee, Cochise, Pinal, and Pima counties in Arizona.

ES.4 Alternatives

A range of alternative routes are analyzed in this DEIS, including the Agency Preferred Alternative and the no action alternative. Alternatives are organized into four route groups using major existing substations as nodes. Route group 1 includes alternatives between the Afton and Hidalgo substations in New Mexico. Route group 2 includes alternatives between the existing Hidalgo and Apache substations in New Mexico and Arizona. Route group 3 includes alternatives between the Apache and Pantano substations in Arizona. And finally, route group 4 includes alternatives between the Pantano and Saguaro substations in Arizona. Route groups 3 and 4 include the upgrade of the existing Western lines. Each of the four route groups is composed of subroutes that are formed by a series of interconnected segments, as well as local alternatives developed to route around localized resource conflicts.

ES.4.1 Route Group 1: Afton Substation to Hidalgo Substation

Route group 1 includes two subroutes (subroute 1.1 (the Proponent Preferred) and subroute 1.2 (the Proponent Alternative)) and four local alternatives. Both subroutes are roughly 140 miles long. Local alternatives range between 9 and 42 miles long. The alternatives in this route group cross portions of Doña Ana, Grant, and Hidalgo counties in New Mexico. Three of the four local alternatives (A, B, and C) were identified by Southline and represent routing options developed to avoid localized environmental conflicts along the international border. The fourth local alternative (DN1) provides a co-location option with the proposed SunZia Southwest Transmission Line Project (SunZia project).

ES.4.2 Route Group 2: Hidalgo Substation to Apache Substation

Like route group 1, route group 2 includes two subroutes (subroute 2.1 (the Proponent Preferred) and subroute 2.2 (the Proponent Alternative)). Route group 2 includes eight local alternatives. Both subroutes are roughly 95 miles long. Local alternatives range between two and 35 miles long. The alternatives in this route group cross portions of Hidalgo County in New Mexico and portions of Cochise, Greenlee, and Graham counties in Arizona. The eight local alternatives were identified by the BLM and Western and represent routing options developed to avoid localized environmental conflicts around Lordsburg and Willcox playas.

ES.4.3 Route Group 3: Apache Substation to Pantano Substation

Route group 3 includes the upgrade of the existing Western 115-kV line between the Apache and Pantano substations; the line measures approximately 70 miles between these two substations. There is one local alternative in route group 3. Route group 3 crosses portions of Cochise and Pima counties in Arizona. The one local alternative (local alternative H) was identified by Southline and represents routing options developed to avoid residential development in the Benson area.

ES.4.4 Route Group 4: Pantano Substation to Saguaro Substation

Route group 4 includes the upgrade of the existing Western 115-kV line between the Pantano and Saguaro substations; the line measures approximately 50 miles between these two substations. There are 10 local alternatives in route group 4, most of which are located on or around Tumamoc Hill in urban Tucson. Route group 4 crosses portions of Pima and Pinal counties in Arizona. Nine of the 10 local alternatives proposed by the BLM and Western in this route group are options for replacing the portion of the existing Western line that crosses over Tumamoc Hill in Tucson; the 10th local alternative is a routing option near the Marana Airport proposed by the BLM and Western to address potential conflicts with future airport expansion plans.

ES.5 Selection of the Agency Preferred Alternative Route

ES.5.1 New Build Section

The BLM and Western (Agency) Preferred Alternative for the New Build Section consists of a combination of the Proponent Preferred, Proponent Alternative, and agency local alternative segments within route groups 1 and 2. The Agency Preferred Alternative for the New Build Section would include Proponent Preferred segments P1, P2, P3, P4a, and P7 in combination with local alternatives LD3a, LD4, LD4-Option 5, for a total of 244 miles. Approximately 78 percent of the Agency Preferred Alternative would be parallel to existing or proposed linear infrastructure.

This route was selected by the BLM and Western as the Agency Preferred Alternative because it would:

- Maximize use of existing and proposed linear ROWs by paralleling existing and proposed infrastructure and transmission lines;
- Eliminate the need for plan amendments through conformance with existing land use plans;
- Minimize impacts to military operations at and near the Willcox Playa; and
- Minimize impacts to sensitive resources.

The Agency Preferred Alternative would start at the existing Afton Substation south of Las Cruces and include segments P1 and a portion of P2 between the Afton and proposed Midpoint North substations; these proposed Project segments parallel an existing El Paso Electric 345-kv transmission line. From the proposed Midpoint North Substation the Agency Preferred Alternative extends west along and parallel to an existing Public Service Company of New Mexico 345-kV line and includes proposed Project segment P3 and a portion of segment P4a to the Hidalgo Substation. Segment P1 is a short (5-mile) segment (in and out loop) between the existing Afton Substation and the existing Luna–Diablo 345-kV transmission line. Segment P3 is a 31-mile-long connector segment (for interconnection to potential future solar generation), running north-south between Interstate (I-) 10 and New Mexico State Route (NM) 9, located approximately 9 miles west of the West Potrillo Mountains Wilderness Study Area (WSA).

The Agency Preferred Alternative extends west along segment P4a from the existing Hidalgo Substation, connecting to local alternatives LD3a and LD4 north of Lordsburg Playa. LD3a parallels a portion of the existing Public Service Company of New Mexico 345-kV line. LD3a connects to LD4, which parallels the agency preferred alternative for the proposed SunZia project (portions of SunZia segments B121, B160a, B160d, and B170), as described in the SunZia FEIS (BLM 2013). The Agency Preferred Alternative from LD4 would connect south to local alternative LD4-Option 5, which connects to segment P7 around Willcox Playa. Segment P7 parallels an existing Southwest Transmission Cooperative 230-kV transmission line around the southeast side of the playa, connecting to the existing Apache Substation.

ES.5.2 Upgrade Section

The BLM and Western (Agency) Preferred Alternative for the Upgrade Section consists of a combination of the Proponent Preferred alternative and local alternatives at Tumamoc Hill and near the Marana Airport, within route groups 3 and 4. The Agency Preferred Alternative for the Upgrade Section would include Proponent Preferred segments U1a, U1b, U2, U3a, U3b, U3c, U3d, U3f, U3g, U3h, U3i, U3k, U3l, U3m, and U4, in combination with local alternatives TH1a and TH1-Option around Tumamoc Hill, and MA1 near the Marana Airport. The Agency Preferred Alternative for the upgrade would 120.3 miles, of which 116.8 miles would be the upgrade of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines.

This route was selected by the BLM and Western as the Agency Preferred Alternative because it would:

- Maximize use of the existing ROW and facilities currently utilized for Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines;
- Minimize impacts to sensitive resources at Tumamoc Hill; and
- Minimize impacts to military training operations at the Marana Airport.

The Agency Preferred Alternative would start at the existing Apache Substation south of Willcox, Arizona, and extend through Benson, upgrading the existing Western 115-kV line. The Agency Preferred Alternative between Apache and Del Bac substations includes proposed Project segments U1a, U1b, U2, U3a and U4. From the Del Bac Substation, the Agency Preferred Alternative includes upgrading the existing Western 115-kV line north along segment U3b, U3c, and U3d. From the south side of Tumamoc Hill at Starr Pass Boulevard, the Agency Preferred Alternative would then connect segment U3d to local alternative TH1a west along Starr Pass Boulevard and then north along Greasewood Road. Local alternative TH1a would then connect to TH1-Option east along St. Mary's Road, connecting back up to the existing Western line and ROW at segment U3g. The Agency Preferred Alternative would then include the upgrade of the existing Western line north to the Saguaro Substation (segments U3h, U3i, U3k, U3l, U3m, and U4), except for reroute using local alternative MA1 near the Marana Airport.

ES.6 Draft BLM Resource Management Plan Amendments

A plan amendment for the Mimbres RMP would be required for the portion of the alternative route segment (local alternative LD2 near the Lordsburg Playa) that parallels an avoidance area designated for the Butterfield Trail. A plan amendment would also be required for the Mimbres RMP that would change the VRM Class II to VRM Class III or IV for seven project segments within the New Build Section that intersect VRM Class II lands. Four plan amendment alternatives have been identified for the Mimbres RMP (table ES.6-1). These options include (1) the no action, (2) modifying VRM Class II to Class III, (3) modifying VRM Class II to Class IV, and (4) allowing a ROW to parallel the Butterfield Trail in a ROW avoidance area.

Table ES.6-1. Draft Mimbres RMP Amendments

Project Segment/ Local Alternative	Proposed Amendment
S5	Existing VRM Class II would be reclassified to either VRM Class III or IV.
S6	Existing VRM Class II would be reclassified to either VRM Class III or IV.
S7	Existing VRM Class II would be reclassified to either VRM Class III or IV.
C	Existing VRM Class II would be reclassified to either VRM Class III or IV.
D	Existing VRM Class II would be reclassified to either VRM Class III or IV.
LD2	Existing VRM Class II would be reclassified to either VRM Class III or IV. Also, special stipulations for ROWs in the Mimbres RMP would be modified from “facilities will not be located parallel to the Continental Divide National Scenic Trail or Butterfield Trail” to “facilities will not be located parallel to the Continental Divide National Scenic Trail or Butterfield Trail, except for a 9.1-mile-long linear, 200-foot-wide transmission ROW at the Lordsburg Playa.”
LD3a	Existing VRM Class II would be reclassified to either VRM Class III or IV.

No plan amendments would be required for any project segments in Arizona. Additionally, the Agency Preferred Alternative would not require a plan amendment.

ES.7 Affected Environment, Issues, and Environmental Impacts

ES.7.1 Air Quality

Because the proposed Project includes ground-disturbing activities, there is the potential for impacts to air quality during construction. Additionally, operation and maintenance of the proposed Project would result impacts to air quality from vehicle exhaust from travel to substations and the transmission line for routine inspection, as well as sulfur hexafluoride (SF_6) emissions from operation of the gas-insulated circuit breakers in the switchyards. The proposed Project would lie within the boundaries of two nonattainment/maintenance areas, regardless of the action alternative chosen: the Rillito particulate matter 10 (PM_{10}) nonattainment area and the Tucson carbon monoxide (CO) maintenance area. The closest Class I area to the Proponent Preferred route and/or local alternatives is Saguaro National Park outside Tucson, Arizona, located approximately 1 mile from the proposed route.

Construction of the transmission lines and substations would result in emissions of air pollutants from equipment exhaust, vehicle exhaust from travel to and from construction areas, and fugitive dust from soil disturbance. Construction emissions would, however, be transient, short term, and spread over large distances and multiple airsheds. Construction of any of the Project alternatives, including the Agency Preferred Alternative, would result in emissions of all regulated pollutants below the de minimis thresholds for conducting regionally significant conformity determinations in all airsheds the proposed Project would cross or that the Project would be within 31 miles of, including all nonattainment/ maintenance areas. Additionally, pollutant emissions are predicted to be within regulatory limits (below the applicable National, Arizona, and/or New Mexico Ambient Air Quality Standards) for construction of any of the Project alternatives, including the Agency Preferred Alternative. Emissions from operation and maintenance activities (e.g., vehicle exhaust from travel to substations and the transmission line for routine inspection and/or repairs) would be similar in nature to those of construction emissions but would be much lower.

There is no established method to assess the impact of greenhouse gas emissions, and in the absence of any applicable ambient standard or significance levels, an analysis of impacts to climate change is limited to quantification of the greenhouse gas emissions and a comparison against the reporting thresholds.

ES.7.2 Noise

Construction of any of the proposed Project alternatives, including the Agency Preferred Alternative, may result in audible noise from Project equipment and vehicles. Unmitigated noise levels could result as high as 83 A-weighted decibels (dBA) to sensitive receptors near proposed Project construction activities (within 100 feet) under the Agency Preferred Alternative or any other Project alternative; however, construction noise would be short term, temporary, and intermittent in nature. Both the New Build and Upgrade sections of the proposed Project would cross areas of rural and open lands, along with several small communities, including Deming, Lordsburg, Benson, in addition to the high-density areas of Tucson and surrounding communities. Residents and commercial establishments would experience short-term noise increases in these areas during construction. Corona noise for both the New Build and Upgrade sections of the proposed Project and alternatives would be highest in areas where the new lines would be constructed in close proximity to existing transmission lines. Overall, because of the relatively dry nature of the area crossed by the proposed Project, the overall level of operational noise would be minimal and would therefore represent a minor, but long-term, impact to ambient soundscapes.

Operation and maintenance activities would be similar in noise level to construction-related activities, but would be anticipated to occur less frequently, include fewer individual noise point sources such as pieces of equipment and vehicles, and would be of shorter duration.

ES.7.3 Geology and Mineral Resources

The DEIS analyzes potential impacts of the proposed Project to important geological resources, to aggravate existing hazards, and to affect access to important mineral and petroleum resources. Of these, the only potential impacts identified would be indirect impacts to mining districts during operation and maintenance. However, this impact would only have consequences in areas within active mining districts where active mines are located. No known mines, active or inactive, would be crossed by the New Build Section. Small areas of active and inactive mining districts are crossed by the New Build Section. Access to minerals can be accomplished between spans, or structures can be left on “islands,” or the mining interests can have the transmission line locally rerouted. In this case, the Project would not produce obvious changes in the baseline condition of the resource, and potential impacts would be local, short term, temporary, and minor. Therefore, no significant impacts to geological or mineral resources are expected.

No metal or nonmetallic mineral resources were specifically identified within the Upgrade Section. No known mines, active or inactive, would be crossed by the Upgrade Section. Therefore, the proposed Project would not have any direct or indirect impacts on mining in the Upgrade Section.

ES.7.4 Soil Resources

Potential impacts to the soil resources include accelerated rates of erosion by water or wind, as well as loss of soil productivity due to the removal of soils during construction of access roads, and at structure and substation sites. Limited clearing of vegetation and topsoil, as well as grading, would be required. However, these activities would result in newly exposed, disturbed soils that could be subject to accelerated erosion by wind and water. Indirect impacts associated with soil removal may include invasive plant colonization, soil erosion, and reduction of soil water retention due to compaction.

The potential for accelerated rates of erosion would in higher in areas with highly erodible soils, such as Lordsburg and Willcox playas.

Construction may also cause disturbance to fragile biological crusts, which could increase wind and water erosion and delay reestablishment of plant communities post-construction. Other indirect effects are associated with the sediment redistribution of the soil resource as a result of wind and water erosion, which could cause negatively impact WUS, prime farmlands, and air quality.

However, no significant impacts to soil resources are expected with the implementation of appropriate mitigation measures to control erosion, including best management practices (BMPs), such as stormwater run-on and runoff prevention, silt fences and/or retention basins, topsoil management and conservation practices, and revegetation activities. These mitigation measures would help minimize the effects of soil erosion during construction and operation of the proposed Project.

ES.7.5 Paleontological Resources

Potential negative impacts to paleontological resources could result from the loss of important fossils due to ground-disturbing activities during construction in sensitive geological deposits. Potential positive impacts to paleontological resources could result from the discovery of important fossils that would otherwise be unavailable for study as an inadvertent result of ground-disturbing activities. The existing Western lines between the Apache and Saguaro substations are almost entirely of Low Sensitivity (Potential Fossil Yield Classification (PFYC) 1-2) for paleontological resources. Within the New Build Section of the proposed Project, the southern route (subroute 1.2) is less sensitive for paleontological resources than subroute 1.1. Along subroute 1.1, more than 45 percent of the proposed Project crosses High Sensitivity (PFYC 4) soils, while only 26 percent of subroute 1.2 crosses PFYC 4.

If fossils are present, adverse impacts to paleontological resources would be mitigated in accordance with applicable laws and regulations. Mitigation would include paleontological surveys of sensitive geological deposits, the development and implementation of a Paleontological Resources Treatment Plan, education of construction and maintenance personnel, construction monitoring, and preparation and curation of collected fossils. Provided that appropriate mitigation methods (surveys, identification, and avoidance where feasible) are followed prior to and during ground disturbance, impacts to paleontological resources are anticipated to be minor or negligible.

ES.7.6 Water Resources

Potential impacts to water resources include the potential for discharge of pollutants, including sediment, to groundwater or surface water, the placement of larger structures within floodplains, and potential disturbance of waters of the U.S. (WUS) or wetlands. Proper implementation of BMPs and controls would prevent discharge of pollutants. Avoidance measures during final siting would prevent most disturbances of WUS or wetlands.

Minor, long-term impacts to floodplains would occur from placement of the proposed Marana Substation expansion and proposed new Midpoint North Substation. Placement of permanent structures at these two substations, which are located in a floodplain, would likely elevate flooding risk. However, permitting processes would ensure that flooding risk remains within allowable levels. Minor, long-term impacts would occur to WUS and wetland areas that are too extensive to be fully avoided: Willcox Playa (segment P7); Stein’s Creek (segment LD1); and the Santa Cruz River (segment TH3b).

ES.7.7 Biological Resources

VEGETATION

All action alternatives would involve the removal of vegetation during construction activities, resulting in the direct loss of plant communities. The primary direct and indirect impacts to vegetation and special status species during construction and operation of the proposed facilities would be associated with removal and/or crushing of vegetation communities from construction of transmission lines, substations, temporary work areas, and access roads; decreased plant productivity from fugitive dust; and plant community fragmentation. Indirectly, removal of protective vegetation would also expose soil to potential wind and water erosion. This could result in further loss of soil and vegetation, as well as increased sediment input to water resources. There would also be indirect effects resulting from the fragmentation of connected vegetation types. Edge areas have different microclimatic conditions and structure, which could lead to different species composition than in the interior area. The introduction and colonization of disturbed areas by invasive exotic plant species also would lead to changes in vegetation communities, including the possible shift to more wildfire-prone vegetation that favors invasive exotic species over native species.

Mitigation measures and proponent-proposed measures would be applied to reduce, avoid, or otherwise provide compensation for impacts to sensitive vegetation: (1) vegetation disturbance would be minimized to the extent practicable; (2) a Reclamation, Vegetation, and Monitoring Plan would be developed and implemented; (3) a Plant and Wildlife Species Conservation Measures Plan would be developed and implemented; (4) clearing of riparian vegetation would be avoided where possible; (5) Invasive Plant Species Management Plans would be developed and implemented; and (6) construction equipment would be washed prior to moving onto the construction site to limit introduction and spread of noxious weeds.

The vegetation communities impacted by the action alternatives, however, are generally common and geographically widespread, and much of the proposed Project is located within an area of existing disturbance. Therefore, impacts to vegetation communities, special status species, and noxious weeds are unlikely to be significant.

WILDLIFE

Potential Project-related impacts on wildlife include the loss, degradation, and/or fragmentation of breeding, rearing, foraging, and dispersal habitats; collisions with and crushing by construction vehicles; loss of burrowing animals in burrows in areas where grading would occur; increased invasive and noxious weed establishment and spread; increased noise/vibration levels; increased potential for migratory birds to strike transmission lines; and increased access for off-highway-vehicle (OHV) users.

The transmission line ROW would serve as a movement corridor for some species and as a barrier to others. The proposed Project would increase the amount of edge habitat along the ROW. Effects from increased amounts of edge would include decreased habitat block size. Decreased habitat block size may negatively impact those species that require large blocks of contiguous habitat and benefit other species that use edge habitats or have more general habitat requirements.

Mitigation measures to minimize impacts to wildlife habitat could include limiting the area of disturbance and restoration of disturbed areas, and avoidance of aquatic and riparian areas. Mitigation could also include pre-construction surveys, erosion control measures, a worker training program, and measures to limit invasive species establishment and spread. Line marking devices would be used to decrease the potential for birds striking transmission lines near Willcox Playa, where wintering sandhill cranes would have to cross the proposed Project during their daily migrations to the agricultural fields east of the playa to feed.

The following impacts to general wildlife and special status species may occur with construction and operation of the Agency Preferred Alternative:

- Habitat for the northern aplomado falcon (*Falco femoralis septentrionalis*), Sprague's pipit (*Anthus spragueii*), lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Mexican long-nosed bat (*Leptonycteris nivalis*), and Sonoran desert tortoise (*Gopherus morafkai*) would be impacted. Restoration of disturbed areas, measures to minimize invasive plant establishment and spread, and closure of access roads to OHV use would reduce impacts on habitat for these species.
- Increased mortality of wintering sandhill cranes (*Grus canadensis*) would occur at Willcox Playa where the species would cross the proposed Project during their daily migration to feed in agricultural fields to the east. Use of line marking devices would minimize the potential for sandhill crane collision with the transmission line.
- Impacts to northern Mexican gartersnake (*Thamnophis eques megalops*) proposed critical habitat at the Cienega Creek and San Pedro River crossings would be avoided through project siting.
- Impacts on Gila chub (*Gila intermedia*) designated critical habitat downstream from the Cienega Creek crossing would be avoided through project siting and erosion control measures.
- Habitat for BLM Sensitive Species, New Mexico Wildlife Conservation Act Species, New Mexico Species of Greatest Conservation Need, Arizona Wildlife Species of Concern, Arizona Species of Greatest Conservation Need, and migratory birds would be lost, fragmented, and degraded. Measures to limit ground disturbance, avoid aquatic and riparian habitats, limit invasive plant establishment and spread, and restore disturbed areas would reduce impacts on habitat for these species.
- Habitat for the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) would be impacted near the Santa Cruz River crossing in segment U3k.

The wildlife and special status species habitat impacted by the action alternatives is common relative to the amount of surrounding available habitat, and much of the proposed Project occurs within areas of existing disturbance. In addition, the Project has been sited to avoid ground disturbance in both designated and proposed critical habitat. Impacts to wildlife and most special status species are not expected to be significant. The potential increased mortality of sandhill cranes at the Willcox Playa from the presence of new transmission lines would be a significant impact.

ES.7.8 Cultural Resources

Potential impacts to cultural resources such as archaeological sites, historic built environment resources, trails, and American Indian traditional use areas and sacred sites could result from construction, operation, and maintenance of the proposed Project. Loss of integrity would be the primary adverse direct or indirect impact to cultural resources. In terms of historic properties, loss of integrity often stems from alterations of a resource's characteristics that make it eligible for the National Register of Historic Places. During construction, direct impacts would result from ground disturbance if resources are present and would be long term; indirect impacts would result from visual encroachment on a resource's setting during structure and facility installation and would be long term. During operation and maintenance, long-term visual impacts would occur from the presence of the transmission line if resources are present.

For this analysis, background research was conducted to assess the numbers and types of cultural resources that are present and that are likely to be present within the alternative routes. Cultural Resources Priority Area data provided by Archaeology Southwest were also used to understand culturally sensitive areas; these Cultural Resources Priority Areas were designed to encompass areas with significant archaeological sites or clusters of sites or areas with the potential to have significant resources. Once a route is selected, the route and its associated access roads and facilities would be inventoried in accordance with Section 106 of the National Historic Preservation Act. Resources would then be evaluated for their National Register of Historic Places eligibility.

The Agency Preferred Alternative could impact 136 previously recorded sites, including the following three listed properties: the Valencia Site, AZ BB:13:315(ASM), the Empirita Ranch Historic District, and the Tumamoc Hill Archaeological District and Desert Laboratory National Historic Landmark (Tumamoc Hill). The Agency Preferred Alternative would cross the Butterfield Trail and the Juan de Bautista de Anza National Historic Trail (Anza Trail). Potential impacts to both trails are also discussed in "Special Designations."

Visual impacts to Tumamoc Hill are expected; however, the Agency Preferred Alternative has been designed, in consultation with stakeholders, to go around rather than through Tumamoc Hill to minimize visual impacts. The removal of the existing line, which does run through the Tumamoc Hill property, would also help minimize the line's current visual impacts.

Mitigation of adverse direct impacts to cultural resources would be developed in accordance with BLM regulations and Southline's Plan of Development. Avoidance of resources through design and micro-siting would be the preferred mitigation measure. If avoidance is not feasible, other types of mitigation such as monitoring or data recovery would be needed. A Historic Properties Treatment Plan would be developed to outline all non-avoidance mitigation. Consultation with agencies, the New Mexico and Arizona State Historic Preservation Officers, and interested parties is ongoing, including the development of a Programmatic Agreement. The Programmatic Agreement outlines steps by the agencies, the Project proponent, and other consulting parties to be taken prior to construction and during operation and maintenance of the proposed Project to comply with the National Historic Preservation Act. The draft Programmatic Agreement is included in appendix L.

ES.7.9 Visual Resources

The visual impact analysis included the characterization of the existing landscape and an analysis of changes to the landscape that may result from the proposed Project under each alternative. Additionally, 96 key observation points (KOPs) were established along the potential Project routes and were used as representative viewpoints from which to assess whether the proposed changes to the visual landscape would meet BLM management objectives for visual resources. Coupled with scenic quality mapping, visual simulation, and field reconnaissance, each KOP was used to establish how the proposed Project would affect the existing aesthetic conditions of the landscape. The degree of change to the existing landscape was assessed in terms of visual contrast, based on 10 environmental factors for identifying and characterizing impacts related to viewer sensitivity and Project visibility.

The major visual impacts resulting from the proposed Project would include:

- Potential for dispersed recreation users associated with the Florida Mountains WSA to have clear views of the proposed structures due to unobstructed panoramic views within the area.
- Views from portions of the Continental Divide National Scenic Trail would be partially obstructed and within close proximity (less than 0.25 mile from the proposed transmission line).

- Travelers along the I-10 corridor would have sporadic views of new transmission line in some areas.
- Recreational areas such as Sentinel Peak, Anza Trail, Butterfield Trail, Arizona National Scenic Trail (Arizona Trail), Santa Cruz River Bikeway, and Saguaro National Park would have varying degrees of visual impact resulting from the introduction of the proposed Project. In most cases, the proposed corridor is sited along areas that have been previously disturbed by similar structures or would replace existing structures, giving an opportunity to implement mitigation measures and BMPs to reduce visibility.
- The analysis of the Tumamoc Hill area, located in a historic, well-maintained residential area of Tucson, included a series of working group sessions intended to derive the best alternative to avoid impacts to the aesthetic, historic, and visually sensitive features of the area. The Agency Preferred Alternative follows existing development to avoid additional visual impacts to Tumamoc Hill. Also, the existing "H" frame line that is located within the Tumamoc Hill would be removed, thus removing the visual impacts of the existing line.

In addition to implementation of BLM BMPs where feasible, six mitigation measures and four proponent proposed measures were proposed for implementation along the proposed transmission line corridor to reduce visual impacts, preserve sensitive views, and minimize visual contrast. Included are methods of micro-siting the corridor to follow landform contours, clearing trees and vegetation to reduce visual contrast and blend into adjacent landscape, and implementing tower and facility design to reduce visibility of the structures.

ES.7.10 Land Use, Including Farm and Range Resources and Military Operations

LAND USE

The proposed Project would be constructed across lands owned and managed by Federal, State, private, or other entities, under a variety of RMPs, comprehensive plans, or other land use plans. The proposed Project and alternatives cross large tracts of undeveloped land, as well as urban and suburban areas. Major portions of the proposed Project parallel existing linear facilities in disturbed corridors, including transmission and distribution lines, roads, and abandoned railroad ROWs. The eastern portion (New Build Section) of the proposed Project would be located in open range–type land uses, crossing mountain ranges (including the Continental Divide) and valley/basins. Farther west (Upgrade Section), the distance between the valley/basins and mountain ranges becomes less, and urban populations surround the Tucson metropolitan area.

Approximately 32 percent of the Agency Preferred Alternative route would cross public lands administered by the BLM; State lands in New Mexico and Arizona form approximately 41 percent of the route; and the remaining 27 percent would cross private and other non-Federal or State lands. ROW would be acquired on these lands, which 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 analysis area.

Southwestern New Mexico and southern Arizona support ranching, farming, recreation, and tourism, as well as the population centers of Deming and Lordsburg (New Mexico), and Willcox, Benson, and Tucson (Arizona).

A major interstate utility corridor that contains transmission lines, communication facilities, and pipelines is located generally along I-10 through southern New Mexico and southeastern Arizona. Other utility corridors are located within the San Simon Valley. Approximately 75 percent of the transmission line routes (alternatives) considered in detail in the DEIS would be parallel to existing transmission lines, existing pipelines, or designated utility corridors, including the Department of Energy West-wide Energy Corridor.

In general, land use impacts are minimized where linear utilities are constructed within established or designated corridors. The alignment of the Agency Preferred Alternative 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, conservation areas, densely populated areas, and military installations. Impacts to land uses would occur along portions of the route that cross undeveloped lands, 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 existing land use authorizations or ROWs, residential, business, or industrial structures.

FARMLAND AND RANGE

Construction of the transmission line would have direct effects on farmlands and rangelands by removing land acreage from productivity. Except under extraordinary circumstances, all operation and maintenance activities would occur within the transmission line ROW and access roads. These activities would not directly or indirectly impact adjacent farmlands or rangelands. No direct effect would occur on farmlands and rangelands during the operation and maintenance phase of the proposed Project beyond the long-term loss of lands resulting from Project construction. The proposed Project would not significantly reduce farmlands or rangelands in the analysis area because farming and ranching operations are still allowable uses within the transmission line ROW.

Construction of the Agency Preferred Alternative would have direct effects on farmlands and rangelands by removing land acreage from productivity. Approximately 1,178 acres of farmland of statewide importance would be impacted under the Agency Preferred Alternative. Approximately 25 acres of farmland of unique importance would be impacted under the Agency Preferred Alternative. Approximately 493 acres of prime farmland (irrigated) and 291 acres of prime farmland (other) would be impacted under the Agency Preferred Alternative.

Approximately 478 acres of existing BLM allotment acreages would be permanently disturbed within existing grazing allotments under the Agency Preferred Alternative.

MILITARY OPERATIONS

Impacts to military operations could occur from construction, operation, and maintenance of the proposed Project where the transmission line, substations, and ancillary facilities intersect with military-owned, leased, or withdrawn (including Electronic Proving Ground) facilities. This could include military training visual routes or areas where training is for electronics and communications. Ground disturbance–based impacts on military uses would not be significant, as all operations/training occurring in visual routes is aerial in nature, and the Buffalo Soldier Electronic Testing Range is used for electronics and communications testing. Further, these impacts would be below the above-ground-level thresholds since the areas that may intersect military training visual routes include existing transmission line facilities that are already below above-ground-level thresholds, and the military operations have operated in conjunction with these facilities previously.

Within the New Build Section near Fort Huachuca, the proposed Project could include changes to the “zero point” level for electronics and communications testing purposes on the Buffalo Soldier Electronic Testing Range. An upgrade of the existing line would include a higher electronic emission, however any transmission line design would use best available technology to minimize electromagnetic fields (EMF); therefore, the proposed Project could potentially reduce EMF from current emissions. Any changes to EMF would require Fort Huachuca to revise its radio frequency emitter inventory for this area to account for the new design and operation of the line. Existing transmission lines that are currently in operation within the Buffalo Soldier Electronic Testing Range are already accounted for in the existing EMF calculations.

ES.7.11 Special Designations

BLM special designations include congressionally designated national wild and/or scenic rivers; national conservation areas; national byways; and national scenic, historic, or recreation trails. The BLM may also create special designations through administrative resource inventories or during the planning process, such as cooperative management areas and protection areas, outstanding natural areas, forest reserves, wilderness study areas, areas of critical environmental concern, research natural areas, special recreation management areas, special management areas, backcountry byways, and energy zones. Other special designations considered in this DEIS include county and city parks.

Potential impacts from construction activities that would be common to all action alternatives include direct ground disturbance and temporary increases in ambient noise levels in areas where the transmission line, substations, and ancillary facilities intersect with or are adjacent to special designations. The only BLM special designations that would be intersected by the proposed Project would be National Trails and/or Trails Under Study for National Designation.

The proposed Project crosses the Continental Divide National Scenic Trail, Butterfield Trail, Arizona Trail, Anza Trail, and approximately eight county or city parks. During construction, increases in ambient noise levels, the presence of equipment, and dust would be temporary and would decrease with the completion of construction activities; therefore, the impact would be minor.

There would be no direct impacts on designated wilderness areas and WSAs, as no facilities would be sited within wilderness area or WSA boundaries. The short-term, indirect impacts to wilderness areas and WSAs during construction may include impacts to air quality, noise, visual, or other resources. Following construction, the presence of the proposed Project would have indirect but long-term impacts to views from the Peloncillo Mountains wilderness area under all action alternatives. Potential long-term, indirect impacts to wilderness areas or WSAs would include loss of outstanding opportunities for solitude or primitive and unconfined recreation as a result of changes to the visual character of the surrounding lands; these impacts are anticipated to be minor since existing facilities (e.g., transmission lines, pipelines, roads) would also be visible. Portions of the WSAs in New Mexico could be indirectly impacted by the Project, but due to the size and rugged terrain of these areas, there would still be ample opportunity for solitude.

ES.7.12 Wilderness Characteristics

The BLM Las Cruces District Office is reviewing and updating previous inventories for the Wilderness Inventory Units (WIUs) that are included in the New Build Section of the analysis area to ensure consistency with previous conclusions for wilderness characteristics (i.e., the area’s size; naturalness; outstanding opportunities for solitude or primitive, unconfined recreation; and supplemental values). Potential impacts to WIUs in terms of only the size criteria are analyzed in this DEIS. Determinations for the potential impacts to naturalness, outstanding opportunities for solitude or primitive, unconfined recreation and other supplemental values are ongoing will be provided in the FEIS.

Potential impacts from construction activities that would be common to all action alternatives include direct ground disturbance and temporary increases in ambient noise levels in areas where the transmission line, substations, and ancillary facilities intersect with lands that possess wilderness characteristics. Increases in ambient noise levels would be temporary and would decrease with the completion of construction activities. This would be a short-term, minor impact to the opportunities for solitude and primitive, unconfined recreation in the immediate area. Ground disturbance and temporary increases in ambient noise levels would be a minor, short-term impact to the naturalness of the immediate area.

However, ground disturbance would not occur across the entire ROW. Approximately 23 percent of the ROW would be disturbed throughout route groups 1 and 2. Approximately 28 percent of the ROW would be disturbed throughout route groups 3 and 4. Within route groups 3 and 4, the magnitude of impacts would be reduced, compared with those in route groups 1 and 2, as the existing line would be upgraded rather than a new build. Nonetheless, the transmission line towers, staging areas, and access roads would still be required along route groups 3 and 4; thus, surface disturbance would still occur in the Upgrade Section.

There are 17 WIUs that would be intersected by the proposed Project. Because potential impacts to WIUs are only analyzed in terms of size in this DEIS, only the Afton East WIU would be impacted. Construction, operation, and maintenance of the proposed Project would reduce the size of the Afton East WIU to less than 5,000 acres. The other 16 WIUs would be intersected, but size would not be reduced to less than 5,000 acres. As noted above, analysis of the additional three criteria (naturalness, outstanding opportunities for solitude or primitive, unconfined recreation and other supplemental values) that need to be met will be presented in the FEIS.

ES.7.13 Recreation

Construction of the Project is not expected to permanently preclude the use of or access to any existing recreation opportunities or activities, but some short-term impacts to these resources would occur during the construction phases of the Project. Similarly, the desired recreation experiences (as specified in the Mimbres, Safford, and Phoenix RMPs) would not change under any alternative, since the ROW would only preclude recreational opportunities and experiences temporarily during construction. The desired recreation experiences in areas outside the site-specific areas where the physical occupancy of the transmission line tower, substation, or ancillary facility would be located would not change. The proposed Project would result in minor changes to the recreation setting and desired recreation experiences during construction. The changes would be minor because the majority of the segments that form the proposed Project would follow existing facilities; thus, the recreation setting and desired recreation experiences would already include/anticipate the presence of transmission lines.

Where the proposed Project does not follow existing ROWs, the recreation setting and desired recreation experiences would change from the existing conditions of undeveloped landscape to a developed landscape. This change to the recreation setting is not anticipated to preclude any desired recreation experiences since recreational opportunity for all recreational pursuits in the area would still be available everywhere (where authorized) within the area except the footprints of the transmission line towers.

Short-term, minor impacts to the existing recreation settings would occur in at the intersections of the proposed Project with National Trails, Aden Hills OHV area, Bar V Ranch, Tucson Mountain Park, Tumamoc Hill, Joaquin Murrieta Park, Santa Cruz River Park, and Christopher Columbus Park during construction. These impacts would be minor due to the presence of existing transmission line ROWs at theses intersections, and would only occur during construction, when activities may change certain recreation settings. These short-term changes to the recreation setting would result from the presence construction equipment, increased noise, and fugitive dust.

Hunting opportunities (both big- and small-game) that could be disrupted by the construction of the transmission line, substations, and ancillary facilities would not represent a significant impact, since the areas within game management units (GMUs) that are outside the proposed Project footprint would remain available for hunting, subject to applicable laws and regulations. The number of New Mexico and Arizona hunting permits that are issued in individual GMUs would not change as a result of construction of the Project. The availability to hunt in GMUs that are included within the analysis area and the number of hunting permits per GMU would not be affected by the Project since the ROW, if granted, would represent less than 5 percent of the total GMU available. Hunter days would not change under any alternative, since hunting could persist elsewhere in the GMU. Impacts to hunting would be short-term and minor.
No hunting opportunities would be displaced during operation and maintenance of the proposed Project.

During operation and maintenance of the proposed Project, the sight of transmission line facilities would not affect some recreational users (e.g., hunting or OHV driving). However, those seeking the features of a natural, non-motorized setting in the analysis area would see the existing landscape change to an area characterized by transmission line development as a substantial modification of the landscape, resulting in a long-term, moderate impact.

ES.7.14 Social and Economic Conditions

In general, the proposed Project would not have a significant impact on regional population or housing as a result of construction or operation. The construction of the New Build Section would directly and indirectly support an estimated total of 481 jobs, approximately 235 of which would be expected to be filled by local workers. Construction of the Upgrade Section would directly and indirectly support an estimated total of 270 jobs, approximately 138 of which would be filled by local workers. The combined total of about 378 non-local construction workers for the New Build Section and the Upgrade Section has the potential to create isolated, short-term shortages in temporary housing. In particular, the more remote portions of the project along the western parts of the New Build Section and the eastern portion of the Upgrade Section would be the most likely to experience a temporary strain on housing resources.

The proposed Project would generate State and local tax revenues during both the construction and the continued operation/maintenance stages. The construction of the New Build Section would generate approximately $462,000 in additional sales tax and $219,000 in State and local property taxes per year. Local governments would receive approximately $150,000 and $210,000 per year in sales and property taxes respectively. Upon completion of the project, the New Build Section has the potential to initially generate approximately $4.2 million per year in additional property tax revenues for local governments.

The Upgrade Section of the proposed Project would generate approximately $309,000 in State and local sales tax and $214,000 in State and local property taxes per year. Local shares are estimated to be approximately $206,000 and $200,000 respectively. The initial property tax revenues upon completion of the proposed Project could be around $4.3 million per year.

ES.7.15 Environmental Justice Conditions

All of the census tracts that would be crossed by any of the alternatives for the New Build Section, including the Agency Preferred Alternative, can be defined as environmental justice communities. In the Upgrade Section, 26 of the 38 census tracts potentially impacted by the project can be defined as environmental justice communities. Compared with the states in which they are located, these communities have either higher minority populations or a greater proportion of residents living below the poverty line, or both. These communities may be adversely affected by localized impacts, including noise and other disruptions during the construction phase and potentially diminished property values and visual characteristics during the operations and maintenance of the project. However, few, if any, of these impacts would be characterized as "high." Environmental justice communities may also be positively affected by the benefits of the proposed Project, including the short-term economic stimulus from construction activities and expenditures, short-term and longer-term increases in tax revenues, and added capacity and reduced congestion for electricity transmission. Because these benefits are likely to be more geographically dispersed than the localized adverse effects, however, it is uncertain whether or not low-income and minority populations would receive disproportionate benefits from the proposed Project. Given the prevalence of low-income and minority residents throughout the area, impacts on these groups are likely inevitable from any feasible transmission line alignment.

ES.7.16 Public Health and Safety

Potential risks to public health and safety associated with construction activities would include, but would not be limited to, electrocution, exposure to extreme weather, falling, exposure to hazardous materials, and injury from equipment and materials. The implementation of Occupational Safety and Health Administration safety requirements through the use of BMPs, mitigation measures, and other safety requirements would minimize the chance that an accident could occur.

The potential for increased public exposure to EMFs would occur in both the New Build and Upgrade sections. In the New Build Section, transmission lines would be built in areas where no current transmission lines exist and therefore create the potential for public exposure to EMFs where they did not previously occur. In the Upgrade Section, the new proposed transmission lines would be built parallel to existing lines within the ROW, or existing lines would be upgraded. However, EMF exposure guidelines would be met within the ROW for both the New Build Section and Upgrade Section of the Agency Preferred Alternative. Therefore, the risk of increased public exposure to EMFs would be considered negligible.

The proposed Project would have both negative and beneficial long-term impacts to public health and safety. Potential long-term negative impacts could occur as a result of increase of EMFs in areas where they do not currently occur. However, with implementation of the mitigation measures, BMPs, and proponent-proposed measures, the impacts to public health and safety would be expected to be negligible. Construction of the proposed transmission infrastructure would also have a long-term beneficial impact to public health and safety by improving the reliability of electricity transmission to areas that would be served by the proposed infrastructure. In the Upgrade Section, the new facilities would be constructed to modern design standards, including modern hardware and grounding systems. These new facilities would require less frequent and less intensive maintenance work than the older facilities, resulting in decreased potential for occupational accidents to occur.

ES.7.17 Hazardous Materials and Hazardous and Solid Waste

The potential impacts to human health and the environment from preexisting hazardous materials that may be present along the proposed Project corridor, and from hazardous materials generated during construction or operation and maintenance of the Project, were analyzed. With adherence to existing laws, ordinances, regulations, and standards, implementation of the proponent-proposed environmental protection measures described in chapter 2, and implementation of safety-related plans and programs in accordance with those laws to ensure safe handling, storage, and use of hazardous materials, no effects are anticipated from preexisting hazardous materials or the use of hazardous materials under any of the action alternatives. The mitigation measures described above would be implemented to prevent spills and leaks of hazardous materials and provide for adequate containment and cleanup if spills and leaks do occur.

ES.7.18 Transportation

In general, the proposed Project would cross a sparsely populated rural area in the New Build Section and in the Upgrade Section with the exception of the Tucson metropolitan area. Traffic would be generated primarily during the construction, but also minimally during the maintenance and operation phases. However, given the existing low level of traffic on primary roadways within the New Build Section and the low level of anticipated traffic during construction, only short-term, minor impacts to traffic on primary roads would be anticipated. The additional traffic volume on primary roadways would represent a volume increase of 1 percent or less on various segments of I-10 in the New Build and Upgrade sections.

Continued coordination with Federal, State, and local transportation agencies would ensure that the proposed Project would not impact transportation plans in the New Build and Upgrade sections. Known road projects in the New Build Section would not be a factor in deciding on the location of the transmission line or access routes. The Upgrade Section would have two road projects that would require consideration during the design process and coordination with Arizona Department of Transportation: widening I-19 between State Route 86 and San Xavier Road and reconstructing North Silverbell Road to add travel lanes with curbs and a raised, landscaped median.

Continued coordination with airports would ensure that the proposed project would not interfere with flight paths or airport plans in the New Build and Upgrade sections. Given the location of the proposed Project, it appears likely that the height of the proposed transmission structures (approximately 134 feet) would be below the runway approach surface elevations for all airports in both the New Build and Upgrade sections.

The proposed project in the New Build and Upgrade sections would impact BLM roads and roadless areas by increasing opportunities for illegal access to roads/areas currently closed to public access. This impact would most likely occur from the construction of new access roads; type D and type E. Geographic information system (GIS) data and local maps show that the analysis areas has an extensive network of existing rural roads and trails (that may or may not be on BLM land) throughout the New Build Section. Thus, with minimal potential to open access to land areas where it is not currently available, no large expanses of land that are currently inaccessible would become available under the proposed Project. The impact of increasing access to BLM roads and BLM roadless areas would be considered minor.

ES.7.19 Intentional Acts of Destruction

Intentional acts of destruction could include sabotage or terrorism. Predicting the occurrence of intentional acts of sabotage or terrorism or the potential damage from these acts is not possible. By constructing and operating new transmission lines, saboteurs and terrorists would have a new potential target to carry out their acts. Historically, acts of sabotage and terrorism on transmission infrastructure have been rare, and the effects of events that have occurred have not had a significant impact to adjacent lands or public health and safety. Moreover, the addition of transmission lines and associated facilities generally strengthens the reliability of delivering electricity to the general public, because if one line is affected by an intentional act of destruction or any other disruption, other lines would be available to continue the delivery of electricity. Therefore, the potential impacts from the unlikely event of an act of terrorism or sabotage would be considered minor.

ES.7.20 Draft Resource Management Plan Amendments

As noted previously,, a plan amendment for the Mimbres RMP would be required for the portion of the alternative route segment (local alternative LD2 near the Lordsburg Playa) that parallels an avoidance area designated for the Butterfield Trail. A plan amendment would also be required for the Mimbres RMP that would change the VRM Class II to VRM Class III or IV for seven Project segments within the New Build Section that intersect VRM Class II lands. No plan amendments would be required for any Project segments in Arizona. Additionally, the Agency Preferred Alternative would not require a plan amendment.

Amending the Mimbres RMP to allow a 9.1-mile-long segment of the proposed Project to parallel the Butterfield Trail (local alternative LD2) would have long-term impacts to land use and special designations (trails). The impact to land use would be minor, but the impact to special designations (specifically the Butterfield Trail) would be moderate. Land uses surrounding the proposed Project segment acres would not change, but the impacts would be long term since the change would persist throughout the life of the planning document and the proposed Project.

Amending the Mimbres RMP to modify VRM Class II to VRM Class III or IV would be similar to the direct and indirect impacts described for visual resources. Impacts to scenic quality and viewer sensitivity would be low to be moderate and therefore would be in compliance with VRM III or VRM IV classifications. Additionally, the effect of the plan amendment to change VRM classes would not change the overall land use management of the Mimbres RMP, as described under the direct and indirect effects of land use resources.

Finally, amending the Mimbres RMP would not itself result in ground disturbance or development; this action would not directly or indirectly impact many resources beyond the direct and indirect impacts described in sections 4.2 through 4.19 of chapter 4 of this EIS. These resources would include air quality; noise and vibration; geology and mineral resources; soil resources; paleontological resources; water resources; biological resources, including vegetation and wildlife; cultural resources; farm and range resources; military operations; wilderness characteristics; recreation; socioeconomics and environmental justice; public health and safety; hazardous materials and hazardous and solid waste; transportation; or intentional acts of destruction.

ES.7.21 Cumulative Effects

The effects of the proposed Project, when taken together with past, present, and reasonably foreseeable future actions, constitute the cumulative effects of the Project and are fully analyzed in chapter 4 (see section 4.21). This analysis assumes that the proposed Project would be constructed and examines all action alternatives, including the Agency Preferred Alternative, agency local alternatives, and the Proponent Preferred and Proponent Alternative routes. Because the Project was routed, and many agency alternatives were developed, along existing and proposed linear facilities, the cumulative effects analysis considers the past, present, and reasonably foreseeable future actions that may have cumulative effects along with the proposed Southline Project. Approximately 78 percent of the Agency Preferred Alternative in the New Build Section would parallel existing or proposed linear infrastructure; virtually all of the Agency Preferred Alternative for the Upgrade Section would use Western’s existing ROW, or parallel an existing road (TH1a, TH1-Option, and MA1).

ES.8 Scoping, Consultation, and Coordination

As required under the National Environmental Policy Act of 1969, the BLM and Western (in coordination with cooperating agencies) conducted scoping in the early stages of the EIS preparation, to encourage public participation and solicit agency and public comments on the scope and significance of the proposed action (40 CFR 1501.7).

The public was informed about the formal application for the Project and public scoping period by an NOI published in the Federal Register on April 4, 2012. This initiated the NEPA process for the Project and began a 60-day public scoping period, during which the public had the opportunity to provide input on potential issues to be addressed in the EIS. As a result of public requests for an extension of the 60-day scoping comment period, the scoping comment period was extended by 30 days (ending on July 5, 2012).

Consultation and coordination with Federal and intergovernmental agencies, organizations, American Indian tribes, and interested groups of individuals are important to ensure that the most appropriate data have been gathered and employed for analyses, and that agency and public sentiment and values are considered and incorporated into decision making. Throughout the preparation of the EIS, formal and informal efforts were made by the BLM and Western to involve these groups in the scoping process and in subsequent public involvement activities, formal consultation, and review of the DEIS.

Though not part of the NEPA process, Southline also conducted a series of stakeholder meetings and workshops in 2011 prior to the formal scoping period. The goals of these meetings were to give the public early notification and to solicit public input from interested stakeholders that would help Southline develop a proposed Project that could be presented to the BLM in a formal ROW application. Southline met with local jurisdictions such as city administrators, county commissioners and supervisors, as well as State officials in both New Mexico and Arizona and representatives from local community organizations and agencies within the Project area.

ES.9 Decisions to Be Made

Approximately 35 percent of the proposed Project (including alternatives) would be located on BLM-administered public land. Other portions of the Project may be located on lands administered by the U.S. Forest Service (Upgrade Section only), Reclamation (Upgrade Section only), State (New Build and Upgrade sections), and Tohono O’odham Nation (Upgrade Section only), as well as private lands.

Where the proposed Project would cross private and State lands, it would be subject to applicable land use planning regulations, zoning ordinances, or other requirements enforced by the State, county, or local jurisdiction, and Southline would need to secure any necessary permits. Acquisition of ROW on State lands would require application to the New Mexico State Land Office or Arizona State Land Department for right-of-entry and easements. Legal access or easements crossing private lands would need to be obtained from private landowners.

ES.9.1 Bureau of Land Management

The BLM must decide whether to grant or deny the ROW on BLM-administered public land for the construction and operation of the proposed transmission facilities, access roads, or ancillary facilities. If the decision is made to grant the ROW, the BLM would also decide which alternative to select; mitigation requirements, if any; and the terms, conditions, and stipulations of the grant.

The BLM must also decide whether or not to amend any of the existing RMPs to achieve conformity with land use plans and allow for a grant of a major utility ROW for this proposed transmission line. The BLM’s decision on the ROW grant and any associated RMP amendments would be outlined in a ROD, based on the findings identified in the EIS. RMP amendments are proposed for Mimbres RMP for the Las Cruces District Office (1993).

ES.9.2 Western Area Power Administration

Western needs to respond to a project proposed by Southline that would, in part, include the upgrading of two existing Western lines and use of existing Western transmission easements. In addition, Southline has requested consideration of its proposed Project for funding under the amended Hoover Act. As a result of

Southline's proposal, Western needs to determine whether to allow upgrading of its existing transmission facilities, the nature and extent of its participation in Southline's proposed Project, and whether to fund the proposed Project through Western's TIP under the Hoover Act amendments.

Western must also decide whether it would use its borrowing authority to finance the proposed Project. Western would need to make decisions on the amount of committed funding, associated ownership and capacity rights and conditions, repayment provisions, and other decisions related to the nature and extent of its participation in the proposed Project. Specifically, funding would be used to construct the proposed transmission line, as well as to remove the existing Western transmission lines. These decisions would be managed through contractual agreements that would include defining the respective rights and obligations associated with ownership of the Project; address construction, operation, and maintenance associated with the transmission line; and provide for acquisition of ROWs for the Project.

ES.9.3 Bureau of Reclamation

A short (0.2-mile) segment of the existing Western 115-kV line, a segment of the Agency Preferred Alternative (segment U3i), as well as the existing Western owned and operated Rattlesnake Substation in urban Tucson are located on Federal lands administered by Reclamation. Upgrade of the existing line and expansion of the Rattlesnake substation on Reclamation lands would require Reclamation approval.

ES.9.4 Department of Defense

A short (0.2-mile) segment of the Proponent Preferred, as well as Agency Preferred Alternative, on the east side of Willcox Playa (segment P7) would cross DOD lands. Any applications for use of ROWs or easements on DOD lands would require DOD approval.

ES.9.5 Tohono O'odham Nation

A 2.9-mile-long segment of Western's existing 115-kV line, as well as the Agency Preferred Alternative (segment U3a), crosses lands administered by the Tohono O'odham Nation, south of the existing Del Bac Substation in urban Tucson. Upgrade of the existing line on tribal lands would require approval by the Tohono O'odham Nation. Western is currently negotiating renewal of its existing ROW and the expansion needed for the upgrade to 230-kV for that portion of the line located on allotted tribal lands.

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Chapter 1

INTRODUCTION AND PURPOSE AND NEED

1.1 PURPOSE AND NEED

1.1.1 Introduction

Southline Transmission, LLC (Southline), a subsidiary of Hunt Power, L.P., submitted Standard Form (SF-) 299, "Application for Transportation and Utility Systems and Facilities on Federal Lands," to the Bureau of Land Management (BLM) for a right-of-way (ROW) to use BLM-administered public lands for a portion of the Southline Transmission Line Project (Project) on December 4, 2009. Southline amended its application on December 22, 2010, to add an additional section to the proposed Project. The Plan of Development (POD) has also been amended in response to project changes and recommendations from the BLM, Western Area Power Administration (Western), other agencies, and public comment. The most recent POD update was in July 2013 to include proposed construction methods and mitigation measures. This application has been assigned BLM Case File No. NMNM-124104.

Southline has also filed a Statement of Interest with Western's Transmission Infrastructure Program (TIP) because it may seek to use Western's borrowing authority under the 2009 amendment of the Hoover Power Plant Act (Public Law (PL) 98-381, Title III, § 301)) ("the Hoover Act") for the proposed Project. Western needs to determine whether it will provide Hoover Act funding for the proposed Southline Project, and if it does provide funding, the nature and extent of Western's participation in the proposed Project. Western may also participate under a trust funding agreement with the Desert Southwest Region if TIP funding is not provided. In the context of making these determinations, Western will evaluate the upgrade of its existing Saguaro–Tucson and Tucson–Apache 115-kilovolt (kV) transmission lines.

The proposed Project objective is to improve reliability in southern New Mexico and southern Arizona, mitigate existing congestion, increase the ability to meet increasing demand for electricity, and facilitate generation and public policy goals by increasing the capacity of the existing electric transmission grid initially by about 1,000 megawatts (MW). The ultimate capacity could be 1,500 to 2,000 MW.

The proposed Project would consist of two sections. The first section would entail construction of approximately 240 miles of new double-circuit 345-kV transmission line in a 200-foot ROW between the Afton Substation, south of Las Cruces, New Mexico, and Western's Apache Substation, south of Willcox, Arizona (Afton–Apache Section or New Build Section). The second section would entail the upgrade of approximately 120 miles of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines in a 100-foot existing ROW to a double-circuit 230-kV transmission line (Saguaro–Apache Section or Upgrade Section). The Upgrade Section would originate at the Apache Substation and terminate at the Saguaro Substation northwest of Tucson, Arizona (figure 1-1). Both new permanent ROW and temporary construction ROW would be required in the New Build Section and in some portions of the Upgrade Section for the transmission line, substations, access roads, and other permanent and temporary Project components; the anticipated ROW width for the Upgrade Section 230-kV transmission line would be 150 feet where expansion to that width is feasible.

The New Build Section (Afton–Apache) would include construction and operation of:

- 205 miles of 345-kV double-circuit electric transmission line in New Mexico and Arizona with a planned bidirectional capacity of up to 1,000 MW. This section is defined by endpoints at the existing Afton Substation, south of Las Cruces in Doña Ana County, New Mexico, and Western's existing Apache Substation, south of Willcox in Cochise County, Arizona;

- 5 miles of 345-kV single-circuit electric transmission line between the existing Afton Substation and the existing Luna–Diablo 345-kV transmission line;
- 30 miles of 345-kV double-circuit electric transmission line between New Mexico State Route 9 (NM 9) and Interstate 10 (I-10) east of Deming in Luna County, New Mexico, to provide access for potential renewable energy generation sources in southern New Mexico. This segment of the proposed Project is included in the analysis, but development of this segment would be determined at a later date;
- a new substation in Luna County (proposed Midpoint Substation) to provide an intermediate connection point for future interconnection requests; and
- installation of new communications equipment at, and connection to, two existing substations in New Mexico and one in Arizona.

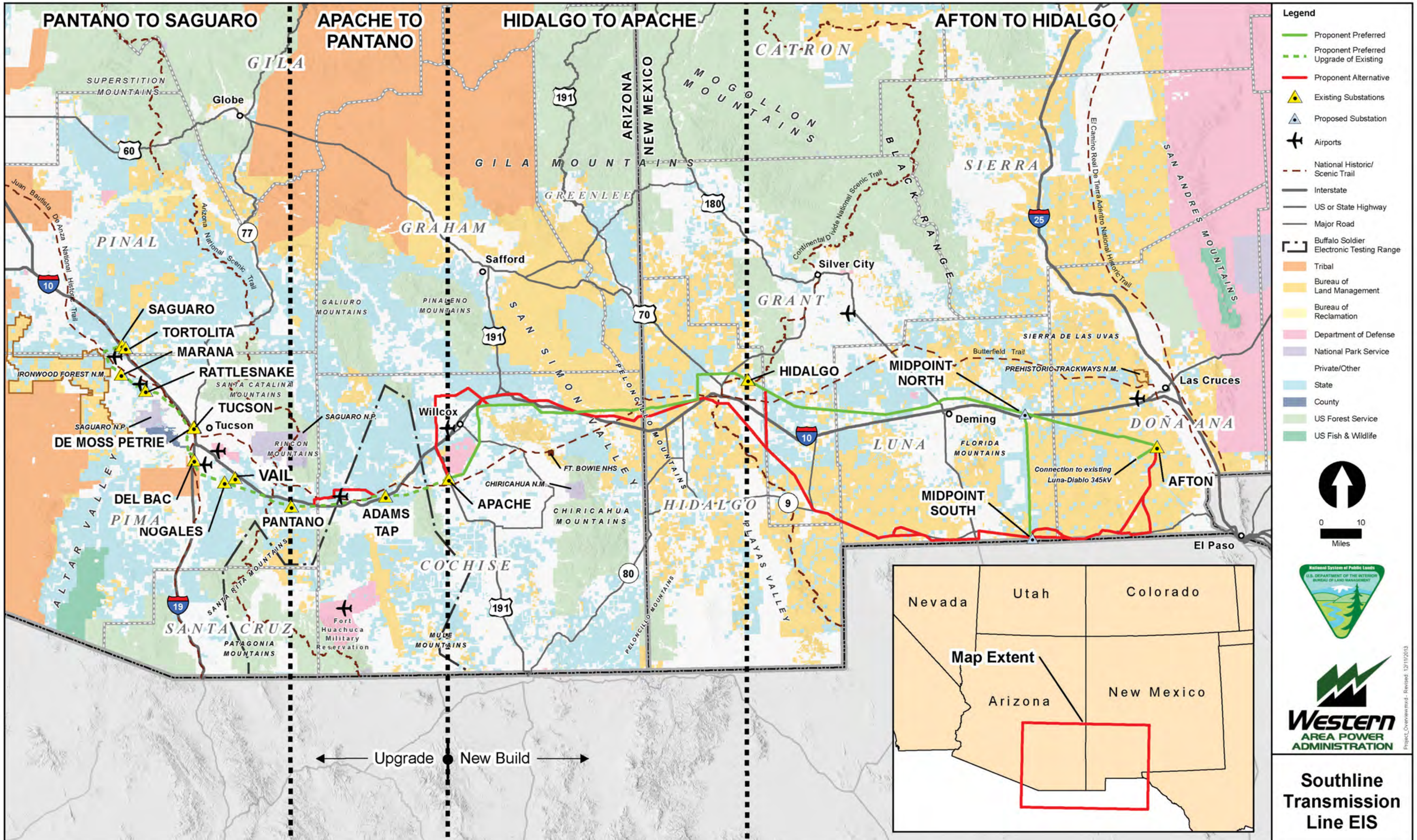
The Upgrade Section (Apache–Saguaro) would include:

- replacing 120 miles of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV single-circuit electric wood-pole H-frame transmission lines, which date to 1951, with a 230-kV double-circuit electric steel-pole transmission line. This section is defined by endpoints at the existing Apache Substation, south of Willcox in Cochise County, Arizona, to the existing Saguaro Substation, northwest of Tucson in Pima County, Arizona;
- 2 miles of new build double-circuit 230-kV electric transmission line to interconnect with the existing Tucson Electric Power Company (TEP) Vail Substation, located southeast of Tucson and just north of the existing 115-kV Tucson–Apache line; and
- installation of new communications equipment at, and connection to, 11 existing substations in Arizona.

Under the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1761–1771), the BLM is considering Southline's SF-299. The BLM is authorized to grant a ROW for electrical transmission lines under Title V of FLPMA. The BLM's decision would constitute a Federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321–4347). This environmental impact statement (EIS) has been prepared to analyze and disclose the potential effects of the proposed Project and to help inform the BLM's decision. As explained in section 1.2.1, certain transmission line segments of the proposed Project and alternatives are not in conformance with the Las Cruces District Office "Mimbres Resource Management Plan" (Mimbres RMP) (BLM 1993) and Visual Resource Management (VRM) Class II objectives and one ROW avoidance area stipulation. Therefore, in conjunction with Southline's request for a ROW for the Project, the BLM is also analyzing concurrent Resource Management Plan (RMP) amendments that would address the identified non-conformance if the proposed Project is approved, and would allow the BLM to grant the ROW necessary to construct and operate the proposed Project.

The BLM and Western have agreed to be joint lead agencies under NEPA regulations at 40 Code of Federal Regulations (CFR) 1501.5(b). As a land management agency, BLM administers public lands to sustain their health, diversity, and productivity. BLM manages public land surface resources for a variety of uses as well as subsurface mineral estate. Western is a power-marketing administration within the U.S. Department of Energy (DOE) that operates power transmission facilities in 15 states within the Central and Western United States, including New Mexico and Arizona. Western delivers power from U.S.

Figure 1-1. Project overview.



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Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers (USACE), and International Boundary and Water Commission hydropower generation facilities through a transmission system that it owns and operates.

The BLM New Mexico State Office has been designated the lead BLM office and will use this analysis to assist in its decision whether or not to grant a ROW on BLM-administered public lands for the proposed Project. The BLM New Mexico State Office has delegated the decision to grant the ROW to the Las Cruces District Manager. An RMP amendment, if needed, would be approved when the State Director also signs a record of decision (ROD) adopting the RMP amendment.

Western is a joint lead agency with the BLM because Southline proposes to upgrade 120 miles of existing electric transmission lines owned and operated by Western. Western will use the analysis in this EIS to determine whether to permit Southline to upgrade its transmission facilities. Western will also use this analysis as one element to consider as Western determines the nature and level of its participation in the proposed Project under the TIP, which could include joint ownership of the entire Project. These decisions will be made by Western's administrator in the Corporate Services Office in Lakewood, Colorado.

The majority of the public lands the proposed Project would cross are administered by the BLM and State land departments in Arizona and New Mexico. The existing ROW for the upgrade portion of the proposed Project lies only in Arizona and crosses short sections of BLM, U.S. Forest Service (Coronado National Forest), Reclamation, and Tohono O'odham Nation allotment lands, as well as private and State-owned lands. The proposed Project would cross both public and private lands located in Doña Ana, Luna, Grant, and Hidalgo counties in New Mexico; and Cochise, Pima, and Pinal counties in Arizona. Southline's proposed route follows existing linear corridors (such as existing power lines, roads, and highways) to the maximum extent possible with the intent of minimizing the impacts of new disturbance caused by construction of new access roads and feeder lines to connect to substations.

Southline's proposed route takes into consideration work previously done by the BLM and others in studying potential renewable energy zones in the "Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States" (Solar Energy Development PEIS) (BLM and DOE 2012), the "Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States" (Wind Energy PEIS) (BLM 2005a), and "Arizona Restoration Design Energy Project Final Environmental Impact Statement" (RDEP) (BLM 2012a). For example, the 30-mile segment proposed between NM 9 and I-10 in New Mexico could be used as a way to provide interconnection for potential solar generation that could be developed in the area along the segment.

1.2 AGENCY PURPOSE AND NEED

The following section describes the purpose of and need for BLM and Western's Federal actions associated with the proposed Project. The BLM and Western, serving as joint lead agencies, are both considering Federal actions that would need to be taken.

BLM must consider Southline's request to be granted a ROW on BLM-administered public lands for the construction, operation, maintenance, and decommissioning of the Project. Western must consider the upgrading of two of its existing transmission lines. This environmental analysis supplies one element of many for Western to consider as it determines the extent and nature of its participation in Southline's proposed Project, and whether to fund the proposed Project in whole or in part under the TIP.

1.2.1 Bureau of Land Management – Purpose and Need

The BLM has received a ROW application from Southline and must determine whether to allow the use of BLM-administered public lands for portions of the proposed Project. In accordance with the FLPMA and the BLM's ROW regulations (43 CFR 2800), the BLM must manage public lands for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs for "systems for generation, transmission, and distribution of electric energy" "over, upon, under, or through [public] lands" (43 U.S.C. 1761(a)(5)). Taking into account the BLM's multiple-use mandate, the need for the BLM action is established by the BLM's responsibility under FLPMA to respond to a request for a ROW grant while avoiding or minimizing adverse impacts to other resource values and to locate the uses in conformance with land use plans. The BLM's purpose for the proposed Project is to respond to a ROW application submitted by Southline to construct, operate, maintain, and decommission a 345-kV transmission line, substations, access roads, and associated infrastructure on public lands administered by the BLM in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws and policies.

In making its decision, the BLM must determine and consider the environmental impact on all lands crossed as a result of granting a ROW across BLM-administered public lands. In its decision to issue a ROW grant, the BLM must also consider existing RMPs and other BLM land use plans in terms of how the authorizations and actions proposed either conform or require an RMP amendment (43 CFR 1610.0-5(b)). The BLM will decide whether to grant, grant with modifications, or deny the application. Modifications could include granting only a portion of the Project, modifying the proposed use, or changing the route or location of the proposed facilities if the BLM determines such terms, conditions, and stipulations are in the public interest (43 CFR 2805.10(a)(1)). The decisions to be made are summarized below in table 1-1.

Table 1-1. Decisions to Be Made by the BLM

Land Use Planning Decision
Amend the Mimbres RMP to change the VRM Class of the affected area.
Do not amend the Mimbres RMP to change the VRM of the affected area.
Amend the Mimbres RMP to change the stipulations of the affected ROW avoidance area.
Do not amend the Mimbres RMP to change the stipulations of the affected ROW avoidance area.
Site-Specific Decision
Grant ROW as applied for
Grant modified ROW
Deny ROW Request

The BLM would issue a ROD with all terms and conditions deemed appropriate by the BLM. The BLM decisions to be made are to:

- decide whether to grant, grant with modifications, or deny all or part of the ROW application for the transmission line, substation expansions, and associated access roads and facilities;
- decide whether one or more RMPs would be amended to allow for a ROW for the proposed transmission line and associated facilities;
- decide whether to approve the plan amendment(s) if the proposed Project is not approved;

- determine the most appropriate route across BLM-administered public lands for the transmission line, taking into consideration multiple-use objectives; and
- determine the terms and conditions (stipulations) that should be applied to the construction, operation and maintenance, and decommissioning of the transmission line on BLM-administered public lands.

FLPMA requires that the BLM "develop, maintain, and when appropriate, revise land use plans" (43 U.S.C. 1712). As indicated in the notice of intent (NOI) published in the Federal Register on April 4, 2012, the public was notified of the potential for a plan amendment for this Project. Plan conformance for all resources is discussed in section 1.5, and an amendment to one of the four BLM RMPs discussed in section 1.5 of this chapter and in section 2.3 of chapter 2 could be required, depending on the route selected on public lands where current resource management objectives would not be met by construction of the Project.

Specifically, there are two potential conformance issues with the Mimbres RMP: (1) where portions of alternative route segments would cross VRM Class II areas, and (2) where portions of the alternative route segments would cross an avoidance areas designated for the Butterfield Trail near Lordsburg Playa. Section 2.3 of chapter 2 describes in detail which project segments have potential conformance issues with the Mimbres RMP and whether or not these conformance issues would require a plan amendment.

If a plan amendment is needed, the New Mexico State Director would make the decision. The public may protest the proposed RMP amendment(s) during a 30-day protest period following the publication of the notice of availability (NOA) and final EIS (FEIS) and RMP amendment, and the BLM would resolve protests prior to issuing a ROD. A plan amendment would also require a 60-day Governor's consistency review concurrent with the 30-day protest period. This would be required to allow the Governor of New Mexico to ensure consistency with state and local plans, policies, and programs.

Portions of the proposed Project may affect floodplains and wetlands. In accordance with DOE floodplain and wetland environmental review requirements (10 CFR part 1022), this draft EIS (DEIS) includes a floodplain and wetlands assessment (see the "Water Resources" section in chapters 3 and 4). A floodplain statement of findings will be included in the FEIS (10 CFR 1022.14(c)).

The BLM, along with Western, has prepared this EIS to meet the disclosure requirements under NEPA, to facilitate public participation, to assist the BLM decision makers in determining whether to issue a ROW grant, and to determine under what terms and conditions the ROW grant would be issued. The BLM Las Cruces District Office Manager is the agency official who will be making the decision whether or not to grant the ROW in BLM's ROD. The opportunity to appeal the BLM decision(s) in the ROD (on granting the ROW) would be allowed as provided in 43 CFR 4 and 2801.10.

1.2.2 Western Area Power Administration – Purpose and Need

Western needs to respond to the Project proposed by Southline, which would, in part, include an upgrade of two existing Western lines and use of existing Western transmission easements. In addition, Southline has requested consideration of their proposed Project for funding under the amended Hoover Act of 1984, as described in more detail below. Western needs to determine the nature and extent of Western's participation in the proposed Southline Project, and whether it will provide Hoover Act funding for the proposed Project. In the context of making these determinations, Western will evaluate the upgrade of its existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines.

Western has a mandate to carry out Federal policy to facilitate renewable energy development and transmission expansion as established in the 2009 amendment of the Hoover Act. The amended Hoover Act authorizes Western to borrow funds from the U.S. Treasury to construct, finance, facilitate, plan, operate, maintain, and/or study construction of new or upgraded electric power transmission lines and related facilities. These transmission lines and related facilities must have at least one terminus in Western's marketing area and deliver or facilitate the delivery of power from renewable resources constructed or reasonably expected to be constructed after the enactment of the amended Hoover Act.

The Arizona Corporation Commission (ACC) commissioned a study that identified the need to improve system reliability in southern Arizona and facilitate the delivery of substantial amounts of power from renewable energy generation projects anticipated to be developed in south-central Arizona ("Final Report of the Arizona Renewable Resource and Transmission Identification Subcommittee," September 2009 (ACC 2009)). Southline's proposal to upgrade Western's existing transmission lines as part of its overall proposed Project would meet some of the needs identified in this report by strengthening the integrated transmission system, increasing transmission capacity, and improving power delivery. As part of Western's own efforts to maintain the reliability of its transmission system and meet system and customer needs, the upgrade of the two transmission lines has already been identified in Western's Desert Southwest Region's 10-year plan for construction and maintenance projects.

Western must also decide whether it would use its borrowing authority to finance the proposed Project. Western would need to make decisions on the amount of committed funding, associated ownership and capacity rights and conditions, repayment provisions, and other decisions related to the nature and extent of its participation in the proposed Project. Specifically, funding would be used to construct the proposed transmission line, as well as to remove the existing Western transmission lines. These decisions would be managed through contractual agreements that would include defining the respective rights and obligations associated with ownership of the Project; address construction, operation, and maintenance associated with the transmission line; and provide for acquisition of ROWs for the Project.

Before committing funds for construction, Western must determine that the proposed Project has completed the development phase, and must certify that a project is in the public interest; that it would not adversely impact system reliability, system operations, or other statutory obligations; and that it is reasonable to expect the proceeds from the Project would be adequate to make repayment of the loan from the U.S. Treasury. In addition, the Project would need to satisfy the requirements of Western's TIP and the Hoover Act. Western's decision would be partially informed by the required NEPA analysis and disclosure in this EIS.

As noted above, Western must decide whether or not Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines would be upgraded and use Western's existing transmission easements as part of the proposed Southline Transmission Line Project. If Western decides in the affirmative, Western and Southline would enter into a joint project agreement, and a number of contractual, ownership, technical, and engineering decisions would be required in order to accomplish the upgrade.

Alternatively, Western could choose to participate in the upgrades to the existing Western lines proposed by the Project without using its borrowing authority. Western could participate under a trust funding agreement with the Desert Southwest Region if TIP funding is not provided. If Western did not participate under a trust funding agreement, and no TIP funding was provided, this decision would be a reliability and maintenance decision based on the existing need to upgrade the aging Tucson–Apache and Saguaro–Tucson 115-kV transmission lines. These transmission lines have been identified for upgrade in Western's 10-year construction and maintenance plan based on age, condition, loading, and future growth scenarios. In this case, funding of the upgrades would be recovered through power rates charged to Western power customers.

1.2.3 Role of Bureau of Land Management and Western Area Power Administration

This EIS is being prepared by the BLM and Western in compliance with NEPA, Council on Environmental Quality (CEQ) regulations for implementing NEPA, DOE 10 CFR parts 1021 and 1022, FLPMA, and applicable U.S. Department of the Interior (DOI) and BLM policies and manuals. Other applicable authorizing Federal laws, regulations, and guidelines are described in sections 1.5 and 1.6. Southline would be responsible for obtaining all permits and approvals required to complete the proposed Project, regardless of whether they are listed in this document. Southline is working directly with the Western Electricity Coordinating Council (WECC) to establish path ratings for their proposed Project and integrate their Project with regional transmission efforts. The BLM is not involved in the transmission planning process, nor is it the responsibility of BLM or Western to make any determination of regional transmission infrastructure needs, system requirements, or system rating with regard to the Southline Project. Western is a member of WECC, however, and does participate in regional transmission planning.

In the Upgrade Section, as a co-lead on the EIS Western would need to revise, amend, and/or file new applications with the BLM and other Federal and State agencies. Western would need to update existing transmission line authorizations for those portions of the line where additional ROW would be needed owing to substantive changes in the proposed facility that are inconsistent with the original ROW grant. Western would also need to update rights and make payments for updated rights where the proposed facility would cross private lands. Western is currently negotiating renewal of its existing ROW with the Tohono O'odham Nation tribal allottees for that portion of the line located on allotted tribal lands. Western would also need to revise and reissue the existing special use permit (SUP) on the portions of the Project that cross U.S. Forest Service lands.

1.3 OBJECTIVES OF SOUTHLINE TRANSMISSION, LLC

Southline worked with WECC,[1] local utilities, and other regional transmission planning groups to design the proposed Project to help solve regional transmission needs such as congestion, reliability, capacity constraints, and limited transmission access for utilities and renewable energy zones in New Mexico and Arizona. Southline's objectives are to satisfy four primary needs; these are summarized below and described in more detail in sections 1.3.1 through 1.3.4.

1.3.1 Improve Reliability of the Electric Transmission Grid in Southern New Mexico and Arizona

Reliability of the electrical grid in southern New Mexico and Arizona is affected by load growth, inadequate electrical transmission capacity, limited electrical connections in the area, and many older electrical transmission lines that are approaching the end of their useful lives.

In recent years, key transmission lines across southern New Mexico and Arizona have experienced unanticipated outages that triggered load-shedding actions by the utilities and prompted investigation

[1] WECC and the nine other regional reliability councils were formed due to national concern regarding the reliability of the interconnected bulk power systems, the ability to operate these systems without widespread failures in electric service, and the need to foster the preservation of reliability through a formal organization. The Western Interconnection encompasses a vast area of nearly 1.8 million square miles. It is the largest and most diverse of the eight regional councils of the North American Electric Reliability Corporation (NERC). WECC's territory extends from Canada to Mexico. It includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 western states in between (WestConnect 2012b).

by the Federal Energy Regulatory Commission (FERC) and NERC (FERC and NERC 2011). The transmission system in Cochise County has had reliability issues in the past, including the outages in 2007 that led to the ACC's requests for focused technical studies and mitigation (ACC 2008). In addition to these events, the existing Western line termination at Apache Substation is the outer edge of the Southeastern Arizona transmission system, which has several radial lines that lack redundancy (e.g., there are no other lines that would provide backup in the event of a line failure).

The condition and limited amount of the existing electrical infrastructure leads to highly utilized sections of the electrical system operating with low levels of redundancy to withstand unanticipated outages. In addition, utilities in the area have limited interconnections to hub power markets because of their location on the periphery of the WECC's grid and because of the limited existing electrical transmission capacity in the region. Therefore, access to and delivery of electricity to end users in southern New Mexico and Arizona is inadequate.

There are many older lines in the region that are reaching or beyond the end of their original design lives but that are still in service through the use of heavy maintenance regimes. For example, the Upgrade Section of the proposed Project is part of Western's South of Phoenix H-frame wood pole 115-kV transmission system, which was built in the early 1950s and is well past its engineered lifespan (Western 2012a). The wood poles have been subjected to advanced external shell rot, weathering, decay, and large cracks—conditions that can lead to reduced pole integrity and reduced ability to bear the load of mounted conductors and hardware, especially under severe weather conditions.

The proposed Project would improve system reliability in several ways. In particular, the Project would add bulk electric infrastructure to the existing grid, which would build redundant systems to resolve and allow flexibility for unanticipated and scheduled grid outages, respectively. The upgrading of the existing 115-kV lines and addition of new transmission and substation facilities would create additional connections and would increase import capability for regional utilities. Replacing aging wooden structures with steel structures would reduce the incidence of failures. Adding new equipment, including new conductors and insulators, would increase reliability. The proposed Project would also improve voltage limitations and reduce curtailment for local utilities.

1.3.2 Mitigate Existing Congestion

Existing transmission capacity in southern New Mexico and southern Arizona is presently fully utilized and congested. PL 109-58, the Energy Policy Act of 2005 (EPAct 2005), required that studies be completed detailing national electrical transmission congestion as well as areas where renewable energy development has been inhibited by a lack of sufficient transmission facilities or capacity. Consequently, the DOE produced the "National Electric Transmission Congestion Studies" in 2006, 2009, and 2012. The 2006 and 2009 DOE studies identified Path 47 – Southern New Mexico as one of the top congested paths, out of more than 20 paths in the West (DOE 2006, 2009). This congestion is demonstrated through the available transfer capability (ATC), which is a measure of the contractual transfer capability remaining in a transmission network for further use over and above those already committed uses (WestConnect 2012a) (table 1-2). Operators of the electrical grid in southern New Mexico and Arizona rely on a bilateral, contractual system to reserve transmission capacity and schedule operations that is indicated by the ATC. Path 47 (the import path to southern New Mexico) is reported to be fully committed, with zero ATC,[2] and the existing lines in the upgrade portion of the Project (which are not included in Path 47) are also fully committed, with near zero ATC.[3] This lack of available contractual capacity results in a congested condition, regardless of the electrical grid's physical state.

[2] Available at: http://www.oasis.oati.com/EPE/EPEdocs/Narrative_Explanation_for_Zero_ATC.pdf (Western 2013).
[3] Available at: http://www.oasis.oati.com/EPE/EPEdocs/Narrative_Explanation_for_Zero_ATC.pdf (Western 2013).

The electrical grid across southern New Mexico, southeast Arizona, and west Texas faces challenges from severe demand spikes resulting from large temperature swings—especially during hot summer months. Because loads on power lines are constantly changing and utilities need to reserve capacity to meet required levels of reliability, the congested state of the electrical grid exacerbates the difficulties of local utilities to provide reliable service, even when increased electrical load can be anticipated. The poor physical condition of certain components of the transmission grid, coupled with this current state of congestion, makes the entire system itself vulnerable to cascading outages and potential regional blackouts.

The proposed Project would mitigate existing and predicted future congestion, in both the east-to-west and west-to-east directions, by adding up to approximately 1,000 MW of bidirectional capacity to the electric grid. Table 1-2 demonstrates the existing transmission capacity in southern New Mexico and southern Arizona, including Path 47, compared with the transmission capacity that would exist at each stage of the WECC process (Phase 1 and Phase 2) if the proposed Project were built.

Table 1-2. Existing and Planned Transmission Capacity in Southern New Mexico and Southern Arizona

Southline Project Section	Existing ATC	Proposed Southline Rating (WECC Project Coordination Review Group)	Planned Southline Rating (WECC Phase 1)	Accepted Southline Rating (WECC Phase 2)
Afton to Apache (E-W)	151 MW (4 rates)	1,000 MW	1,038 MW	In process TBD
Apache to Saguaro (E-W)	0 MW	1,000 MW	1,001 MW	In process TBD
Saguaro to Apache (W-E)	0 MW	1,000 MW	418 MW	In process TBD
Apache to Afton (W-E)	0 MW	1,000 MW	957 MW	In process TBD

Source: WestConnect (2012a).

1.3.3 Increase the Ability to Meet Electrical Demand Growth in the Region

Southern New Mexico and Arizona have seen increased growth in recent years, according to the U.S. Census Bureau (Census Bureau). In the Afton–Apache Section, the average population growth in Doña Ana, Grant, Hidalgo, Luna, and Cochise counties was 12.9 percent between 2000 and 2010. In the Apache–Saguaro Section, the average population growth in Cochise, Pima, and Pinal counties was 15.6 percent between 2000 and 2010 (Census Bureau 2010a). Major load centers in the region (Tucson, Las Cruces, El Paso, and Phoenix) have grown by as much as 20 percent between 2000 and 2010 (Census Bureau 2013a). This increased growth has increased the demand for electricity and contributed to the congested state of the electrical grid in southern New Mexico and Arizona. In addition, the grid itself was designed for load conditions that existed more than 60 years ago that have since been far exceeded. Most of the area is expected to continue to grow at a faster rate than the United States overall (Arizona Department of Administration (ADOA) 2013).

The proposed Project would help meet future electric demand (or load growth) by adding 1,000 MW of capacity to the electric grid, which would improve regional transmission reliability and relieve congestion while improving access to energy sources. This would alleviate three of the primary factors that inhibit the local utilities' ability to meet future electrical demand.

1.3.4 Facilitate Renewable Generation Development and Achievement of Public Policy Goals

Demand for transmission capacity to serve renewable resources will increase as western states attempt to meet their renewable portfolio standards (RPSs). Mandatory RPSs have been established to encourage the development of renewable energy sources and mandate that electricity producers obtain a minimum percentage of power from renewable energy resources before a certain date. New Mexico's RPS is 20 percent by 2020, and Arizona's RPS is 15 percent by 2025 (BLM and DOE 2012). The Public Regulation Commission of New Mexico and the ACC have specific incremental goals and timetables planned so as to be able to meet their respective 2020 and 2015 RPSs (DOE 2013a).

Two Federal planning efforts identified specific locations that are well suited for renewable energy and established design features that would apply to these types of projects on BLM-administered lands. These two efforts overlap the Southline project area in Arizona and New Mexico, and include the Arizona BLM's RDEP (BLM 2012) and the Solar Energy Development PEIS (BLM and DOE 2012).

The RDEP ROD established 192,100 acres of renewable energy development areas (REDAs) on BLM land throughout Arizona. In addition, the ROD established the Agua Caliente Solar Energy Zone (SEZ) near Dateland in western Arizona. The BLM amended eight land use plans across Arizona to include the REDAs and RDEP SEZ. While these amendments only apply to BLM-managed lands, the RDEP examined all lands in Arizona.

The Solar Energy Development PEIS identified priority areas for utility-scale production of solar energy (i.e., SEZs), including the Afton SEZ in New Mexico; exclusion areas for utility-scale solar energy development; and areas potentially available for utility-scale solar development outside exclusion areas and SEZs (variance areas). Land use plans in six western states (Arizona, California, Colorado, Nevada, New Mexico, and Utah) were also amended to establish programmatic and SEZ-specific design features for solar energy development on public lands.

The fully utilized and congested condition of the transmission grid limits the development of renewable energy generation projects. For example, the available transmission capacity for the Afton SEZ is only a small fraction of the 6,900-MW nameplate development potential for the zone and would not currently enable the export of electricity to load centers. Similarly, in Arizona in 2008, the Southeast Arizona Transmission Group described many of the local systems' needs and limitations and suggested the benefits of upgrading Western's existing 115-kV lines between Apache and Saguaro. TEP and Southwest Transmission Cooperative (SWTC) further reinforced this in 2009, identifying this upgrade as one of the top three potential renewable transmission projects in their planning area.

The proposed Project would add up to about 1,000 MW of bidirectional capacity to the existing electrical grid in southern New Mexico and Arizona and relieve congestion by adding bulk electric infrastructure, including connection with up to 14 existing substations spread across the area, which would improve the local utilities' ability access to energy sources. In doing so, the proposed Project would be consistent with public policy goals promoting the increased use of renewable energy to meet RPSs.

1.4 ELECTRIC TRANSMISSION REGULATION AND PLANNING

Traditionally, local utilities owned and controlled the electrical transmission network, but today's regulatory framework allows for third-party non-utility ownership, or independent transmission. In North

America, there are four large geographic areas or “interconnections” that operate as interconnected systems in the lower 48 states, as well as the Canadian Provinces, along with a portion of northern Mexico. These are the Eastern Interconnection, Western Interconnection, and Electric Reliability Council of Texas, along with a fourth interconnection that links Québec to the Eastern Interconnection (National Renewable Energy Laboratory 2011). The proposed Project would be a third-party, non-utility independent transmission project located within the Western Interconnection.

The electric utility industry currently operates under a variety of statutes that include the system reliability oversight provisions of the EPAct 2005. Generally, industry regulatory oversight can be separated into three main categories: interstate electricity sales, bulk electric system reliability, and physical construction of facilities. The FERC oversees interstate electricity transmission and wholesale sales, NERC oversees bulk electric system reliability, and State public utilities commissions (PUCs) or their equivalent organizations oversee physical construction of facilities. In general, each state in the United States has a PUC or like organization charged with regulating in-state investor-owned electric utilities, municipal utilities, rural electric cooperatives, and other electricity generators. In New Mexico, the New Mexico Public Regulation Commission oversees electrical utilities, and in Arizona, the ACC Power Plant and Line Siting Committee provides oversight. Western, as a Federal agency, is not subject to State oversight even though it performs utility functions.

1.4.1 Federal Energy Regulatory Commission

At the national level, the FERC has regulatory authority over the interstate transmission and wholesale sale of electricity and operation of regional markets. FERC is an independent regulatory agency within DOE, charged with regulating interstate electricity sales and wholesale electricity rates. Independent transmission projects typically receive authority from FERC to enter into negotiated transmission rates. In January 2013, FERC released a policy statement (Docket Nos. AD12-9-000 and AD11-11-000) that now allows for independent transmission developers to enter into bilateral negotiations directly with potential customers to reach an agreement on rates, terms, and conditions, as long as the FERC process criteria are followed.

1.4.2 North American Electric Reliability Corporation

NERC has the responsibility, under FERC authority, to oversee power system reliability, operating, and planning standards in the United States. Every transmission utility in the United States and Canada participates in the NERC reliability assessment process to ensure that their transmission and generation systems meet industry standards and will perform reliably. Most of the criteria for transmission planning are based on NERC standards.

NERC oversees and works with eight regional entities to improve the reliability of the bulk power system. Each regional entity has been delegated authority from NERC for the purpose of proposing and enforcing reliability standards within their region. These entities were formed in response to national concerns regarding the reliability of the interconnected bulk power system and the ability to operate these systems without widespread service failures. The eight entities consist of the Florida Reliability Coordinating Council, Midwest Reliability Organization, Northeast Power Coordinating Council, ReliabilityFirst Corporation, SERC Reliability Corporation, Southwest Power Pool, Texas Reliability Entity, and WECC. WECC oversees Arizona and New Mexico.

1.4.3 Western Electricity Coordinating Council

WECC is the regional entity responsible for coordinating and promoting bulk electric system reliability in the Western Interconnection. WECC also provides an environment for coordinating the operating and planning activities of its members as set forth in the WECC bylaws, including oversight of the WECC Project Coordination and Path Rating Process. WECC's region encompasses all or portions of 14 western states and extends into portions of Canada and Mexico. WECC produces a 10-year regional transmission plan that is approved by its Board of Directors and provides an interconnection-wide perspective on expected future transmission and generation. In an effort to help ensure the reliability and efficiency of the Western Interconnection, the 10-year plan is meant to support decision makers in determining where and when to build new transmission or other related actions. In September 2013, WECC published its first 20-year plan (WECC 2013), which primarily uses a top-down process analyzing a broad range of strategic scenarios that cover economic conditions, technological change, environmental issues, regulatory policy, etc.

1.4.4 WestConnect

WestConnect members consist of utility companies with transmission assets in eight different states in the western United States that collaboratively assess stakeholder needs and develop cost-effective transmission enhancements. Members participate in organized subregional planning groups whose activities promote effective, open, and transparent transmission planning and assist WECC in its regional planning efforts.

1.4.5 Southwest Area Transmission

Southwest Area Transmission (SWAT) is a volunteer subregional planning organization that is supported by WestConnect. SWAT was created to provide support for the coordination, planning, and implementation of transmission throughout New Mexico and Arizona and in portions of Colorado, west Texas, southern Nevada, and the Imperial Valley area of California. SWAT operates in a public forum, performs study work cooperatively with stakeholders, and develops plans in a collaborative fashion while disseminating study results to a broad spectrum of interested and affected parties.

SWAT consists of transmission regulators/governmental entities, transmission users, transmission owners, transmission operators, and environmental entities. The goal of SWAT is to promote regional planning in the desert Southwest. The SWAT planning group includes transmission planning subcommittees and workgroups that evaluate future transmission needs and are overseen by the SWAT Oversight Committee. Specifically, the New Mexico Transmission Subcommittee oversees the New Mexico and Southwest Texas region; participants include the Public Service Company of New Mexico, El Paso Electric (EPEC), Tri-State Generation and Transmission Association, and others. The Southeastern Arizona Transmission Study (SATS) Subcommittee oversees the Southeastern Arizona Region, including the Southline Transmission Line Project. SATS participants include Arizona Public Service (APS), Central Arizona Project (CAP), EPEC, Public Service Company of New Mexico, TEP, Western, SWTC, and Reclamation.

1.5 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS

The following section describes the proposed Project's relationship to applicable Federal, State, and local policies, plans, and programs. Where the Project would cross other Federal lands or private and State lands, it would be subject to applicable land use planning regulations, zoning ordinances, or other requirements enforced by the Federal, State, county, or local jurisdictions. Southline would need to secure necessary local permits and legal access, and ROW would also need to be obtained from private owners where applicable.

1.5.1 Bureau of Land Management Resource Management Plans

The BLM manages public land for both multiple use and sustained yield, as directed by FLPMA, to ensure that present and future needs are considered in the management of resources. The BLM develops land use plans, or RMPs, that describe the goals and management objectives needed to achieve the multiple-use and sustained-yield objectives.

A list of BLM RMPs with BLM-administered public lands potentially crossed by the proposed Project is provided below in table 1-3. Where possible, the proposed Project has been designed to conform to existing plans. Although BLM and Western would prefer to maintain consistency with the RMPs, a plan amendment could be required in the event that BLM and Western select an alternative that does not conform to resource management objectives or decisions.

Plan conformance was reviewed for all resources in each of the applicable BLM land use plans listed in table 1-3. As discussed in section 1.2.1, there are two potential conformance issues with the Mimbres RMP: (1) where portions of seven alternative route segments would cross VRM Class II areas; and (2) where portions of one of the seven alternative route segments would also cross a ROW avoidance area designated for the Butterfield Trail near Lordsburg Playa and would not meet the ROW avoidance area stipulations. No plan amendments are required or proposed for any portions of the Project in Arizona.

- A plan amendment would be required for the Mimbres RMP that would change the VRM Class II to VRM Class III or IV where the proposed Project intersects VRM Class II areas. Seven Project segments, totaling approximately 30 miles within the New Build Section, intersect VRM Class II lands (see chapter 2, “Action Alternatives Requiring BLM Plan Amendments”).
- A plan amendment for the Mimbres RMP would be required for the portion of the alternative route segment (an agency local alternative near the Lordsburg Playa) that parallels an avoidance area designated for the Butterfield Trail. There is a special stipulation in the Mimbres RMP that “facilities will not be located parallel to the Continental Divide National Scenic Trail or Butterfield Trail” (BLM 1993:2-17). Avoidance areas may be available for location of ROW with special stipulations, design features, and/or mitigation measures. The special stipulations would be required to reduce or mitigate impacts to the values for which the area is being avoided.

Table 1-3. Applicable BLM Land Use Plans

Resource Management Plan	Plan Date	Lead Office	Project Applicability
Mimbres Resource Area*	December 1993	Las Cruces District Office	Apache–Afton
Safford District RMP	August 1991	Safford District Office	Apache–Afton
Las Cienegas RMP	July 2003	Tucson Field Office	Afton–Saguaro
Phoenix RMP	December 1988	Phoenix District Office, Tucson Field Office, Safford Field Office	Afton–Saguaro
Restoration Design Energy Project	January 2013	Arizona State Office	Arizona
Solar PEIS	October 2012	BLM DOI	Arizona, New Mexico
West-wide Energy Corridor PEIS	November 2008	BLM DOI	Arizona, New Mexico

* The TriCounty RMP is in progress. When approved, the TriCounty RMP would amend the portion of the 1993 Mimbres RMP (BLM 1993) that covers Doña Ana County.

FLPMA requires that the BLM prepare and maintain on a continuing basis an inventory of visual values on all public lands. This inventory is described in BLM Manual 8400 – "Visual Resource Management", and BLM Instruction Memorandum (IM) 2009-167, "Application of Visual Resource Management Program to Renewable Energy." The BLM VRM system requires a visual resources inventory (VRI) and the establishment of land management objectives (VRM classes) designated in the RMPs for all BLM Field Offices.

The TriCounty RMP is currently in progress and when approved would amend a portion of the Mimbres RMP. A review of the TriCounty RMP DEIS and the BLM preferred alternative (Alternative C) has identified that portions of the proposed Project would not be in conformance with the proposed TriCounty RMP where it would cross VRM Class II land. An analysis of Project conformance with the preferred alternative for the TriCounty RMP DEIS is discussed in cumulative impacts in chapter 4 of this DEIS.

As discussed previously, two Federal planning efforts resulted in the amendment of RMPs: the Restoration Design Energy Project (RDEP) amended plans in Arizona, and the Solar Energy Development Project amended plans in both New Mexico and Arizona. These planning documents and associated RODs identified specific locations that are well suited for renewable energy and established design features that would apply to these types of projects on BLM-administered lands. These are also listed in table 1-3.

1.5.2 Coronado National Forest Plan

The "Coronado National Forest Land and Resource Management Plan," as amended (forest plan) (U.S. Forest Service 1986a), governs overall management of the Coronado National Forest. A 0.5-mile of segment of Western's existing 115-kV line crosses the Coronado National Forest. If the line is upgraded as described herein, Western would need to revise or reissue the existing SUP.

Because the proposed Project would include the upgrade of an existing line, this portion of the Project would be consistent with various aspects of the forest plan. In accordance with management direction under "Management Prescriptions Applicable to All Areas of the Forest" (U.S. Forest Service 1986a:41),

> existing utility and transportation corridors will continue to be used for those types of uses. Every attempt should be made to locate new utilities within those existing corridors that meet the visual quality objective. Existing corridors that do not meet the visual quality objective should be relocated when construction becomes necessary. New corridors shall be located so that the visual quality objectives are met.

As discussed in chapters 3 and 4 (sections 3.10 and 4.10 for visual resources), the portion of the proposed Project that would cross Coronado National Forest lands meets the visual quality objective for these lands. Amendment(s) to the forest plan would not be needed to ensure forest plan consistency.

1.5.3 Local Jurisdiction Plans

Each of the jurisdictional plans reviewed for this EIS are discussed in detail in Chapter 3, Section 3.11.1, "Land Use." The proposed Project would cross lands under the planning jurisdictions of Doña Ana, Luna, Grant, and Hidalgo counties in New Mexico and Graham, Greenlee, Cochise, Pima, and Pinal counties in Arizona. Table 1-4 lists the relevant local jurisdictions in the analysis area; the actual planning jurisdiction crossed by the Project would vary based on the selected route and final ROW if approved. As discussed in Chapter 4, Section 4.11.1, "Land Use," there are no requirements in any of the local jurisdictional plans that would limit the proposed Project.

Table 1-4. Summary of Local Jurisdiction in the Analysis Area

State	Municipality
New Mexico	**Doña Ana County,** including: *Unincorporated Community of Doña Ana*
New Mexico	**Luna County,** including: *City of Deming* *City of Columbus*
New Mexico	**Grant County,** including: *Unincorporated Community of Hachita*
New Mexico	**Hidalgo County,** including: *City of Lordsburg*
Arizona	**Cochise County,** including: *Unincorporated Community of San Simon* *Unincorporated Community of Bowie* *Unincorporated Community of Cochise* *Unincorporated Community of Pomerene* *City of Benson* *City of Willcox*
Arizona	**Pima County,** including: *City of Tucson* *Town of Marana* *Census Designated Place of Avra Valley*
Arizona	**Graham County**
Arizona	**Greenlee County**
Arizona	**Pinal County**

1.5.4 Permits Required or Potentially Required

Table 1-5 provides a list of major Federal, State, and local permits and approvals that could be required for construction and operation of the proposed Project. Note that this list is not exhaustive.

1.6 FEDERAL AND STATE LAWS AND REGULATIONS

The section below describes the laws, regulations, and guidelines that support the need for energy generation and development of transmission infrastructure.

1.6.1 Key Agency Planning Orders and Statutes

Executive Order 13212

Executive Order (EO) 13212, dated May 18, 2001, mandates that agencies act expediently and in a manner consistent with applicable laws to increase the “production and transmission of energy in a safe and environmentally sound manner.” Furthermore, agencies are directed to expedite projects that would increase the transmission of energy and expedite their review of permits to accelerate the completion of such projects.

Table 1-5. List of Required Federal and State Permits and Approvals*

Regulatory Authority/Agency	Permit/Approval	Project Trigger	Relevant Law/Regulation
Federal			
BLM	ROW grant, land use plan amendment	Request for ROW across BLM lands	43 U.S.C. 1761–1771
BLM	Permit for archaeological investigations	Federal undertaking with the potential to affect historic properties	Archaeological Resources Protection Act (ARPA), Antiquities Act of 1906, FLPMA
BLM	Permit for collection of paleontological resources	Potential for disturbance of paleontological resources and need for collection	Paleontological Resources Preservation Act, FLPMA
BLM *In consultation with Western, State Historic Preservation Offices (SHPOs), Advisory Council on Historic Preservation, tribes, other Federal, State, and local agencies and consulting parties*	Compliance with Section 106 of the National Historic Preservation Act (NHPA)	Potential to disturb historic properties	NHPA (16 U.S.C. 470); 36 CFR 800
Western	Determine whether Southline can upgrade Western's lines and use existing transmission easements as part of the proposed Project; determine the amount of committed funding, associated ownership and capacity rights and conditions, repayment provisions, and other decisions related to the nature and extent of its participation in the proposed Project	Request to consider upgrading Western's system and the possibility of using TIP authority for funding	Hoover Power Plant Act 98-381, as amended Reclamation Law, including but not limited to the Reclamation Act of 1902, 43 U.S.C. 391, Hayden O'Mahoney Amendment, 43 U.S.C. 391a-1 and 392a; the Reclamation Project Act of 1939, Section (c) 43 U.S.C. 485h(c); Flood Control Act of 1944, Section 5, 16 U.S.C. 825s; Department of Energy Organization Act, 42 U.S.C. 7152a; Energy Policy Act of 1992, 16 U.S.C. 796, 824j, 824k, and 824l; Energy Policy Act of 2005 Contributed Funds Act, 43 U.S.C. 395; Antideficiency Act, 31 U.S.C. 1341; the Hoover Act; and associated regulations, orders and policies

Table 1-5. List of Required Federal and State Permits and Approvals* (Continued)

Regulatory Authority/Agency	Permit/Approval	Project Trigger	Relevant Law/Regulation
Federal, cont'd.			
Reclamation	Easement or ROW use authorization	Substation expansion	The Reclamation Act of June 17, 1902, 32 Stat. 388, 43 U.S.C. 371, et seq., specifically 32 Stat. 389, 43 U.S.C. 421 and the Flood Control Act of 1944, 58 Stat. 887, 890, 16 U.S.C. 825s, as amended and supplemented by subsequent acts or enactments; the Reclamation Project Act of 1939, 53 Stat. 1187, 43 U.S.C. 485; the Rivers and Harbors Act of August 30, 1935, 49 Stat. 1028, 1039, 33 U.S.C. 540; the Act of May 28, 1954, Ch. 12, 68 Stat. 143, and other acts specifically applicable to this project; the Act of August 1, 1888, 25 Stat. 357, 40 U.S.C. 257, repealed and reenacted as 40 U.S.C. 3113; the Act of February 26, 1931, 46 Stat. 1421, 40 U.S.C. 3114; the Department of Energy Organization Act of August 4, 1977, 91 Stat. 565, 42 U.S.C. 7101, specifically 91 Stat. 578, 42 U.S.C 7152; and the Omnibus Appropriations Bill of FY 2009, PL 111-8
Bureau of Indian Affairs	ROW Easement	Upgrade of existing Western line across tribal land	
U.S. Forest Service	SUP	Upgrade of existing Western line across Coronado National Forest	36 CFR 212.51(a)(8)
U.S. Forest Service – Coronado National Forest	SUP	Potential for disturbance of cultural resources on the Coronado National Forest	ARPA, FLPMA
USACE	Section 404 permit	Impacts to jurisdictional waters of the U.S.	Clean Water Act, 33 U.S.C. 1251, et seq.
U.S. Fish and Wildlife Service	Biological opinion, concurrence, or incidental take permit	Potential impact to threatened or endangered species	Endangered Species Act, 16 U.S.C. 1531–1544
U.S. Environmental Protection Agency	National Pollutant Discharge Elimination System (New Mexico)	Stormwater management from potential discharges greater than 5 acres	40 CFR 122.26
DOD	Easement or ROW use authorization	Construction, operation, and decommissioning of transmission line across DOD-administered land	10 U.S.C. 2668
Federal Aviation Administration (FAA)	A "No-hazard Declaration" required if structure is more than 200 feet high	Location of structure relative to airports and airspace if structure is more than 200 feet high	FAA Act of 1958, 14 CFR 77

Table 1-5. List of Required Federal and State Permits and Approvals* (Continued)

Regulatory Authority/Agency	Permit/Approval	Project Trigger	Relevant Law/Regulation
New Mexico			
New Mexico Public Regulation Commission	Application for approval of location of transmission line and certificate of public convenience and need	Construction of a transmission line greater than 230 kV	New Mexico Statutes Annotated (NMSA) 62-9-3; 17.9.592 New Mexico Administrative Code (NMAC), and NMSA 62-9-1; 17.1.2.9 NMAC
New Mexico Department of Transportation (DOT)	Access or public highway utility accommodation permit	Upgrading access roads or installation of transmission lines within DOT ROW	18.31.6 NMAC, and 17.4.2 NMAC
New Mexico State Land Office	ROW or easement permit	Construction, operation of a transmission line on State lands	NMSA 19-7-57
New Mexico SHPO		Federal undertaking with the potential to affect historic properties	NHPA, Section 106 (36 CFR 800)
New Mexico State Historic Preservation Division	Permit for archaeological investigations	Potential for disturbance of cultural resources on State land	NMSA 18-6
New Mexico Department of Energy, Minerals, and Natural Resources Forestry Division	Collection permit	Displacement or removal of any State endangered plant species	NMSA 75-6-1; 19.21.2 NMAC
Arizona			
ACC	Certificate of Environmental Compliance	Construction of a transmission line greater than 115 kV	Title 40 Arizona Revised Statutes (ARS) Chapter 2, Article 6.2 (40-360–40-360.13)
Arizona State Land Department	ROW/right-of-entry permit	Survey, construction, operation of a transmission line on State lands	ARS 37-461
Arizona DOT	Crossing or encroachment permit, permit for use of highway ROW	Construction, operation, abandonment of transmission lines within State highway ROW	ARS 28-7053, Arizona Administrative Code R17-3-501–509
Arizona SHPO		Federal undertaking with the potential to affect historic properties	NHPA, Section 106 (36 CFR 800)
Arizona State Museum (ASM)	Arizona Antiquities Act (AAA) blanket permit or Project-specific permit	Potential for disturbance of cultural resources on State land	AAA ARS 41-841 through 41-847
ASM	Permission to disturb human remains	Potential for disturbance of human or funerary objects remains on State or private land	AAA ARS 41-844 and ARS 41-865
ASM	AAA blanket permit	Potential for disturbance of paleontological resources on State land	AAA ARS 41-841
Arizona Department of Environmental Quality	Arizona Pollutant Discharge Elimination System (New Mexico)	Stormwater management from potential discharges greater than 5 acres	ARS 49-255.01

Table 1-5. List of Required Federal and State Permits and Approvals* (Continued)

Regulatory Authority/Agency	Permit/Approval	Project Trigger	Relevant Law/Regulation
Arizona, cont'd.			
Tohono O'odham Nation	Permit to conduct archaeological work	Potential for disturbance of cultural resources on Tohono O'odham Nation land	Title 8, Chapter 1, "Archaeological Resources Protection" (Ordinance No. 06-84) of the Tohono O'odham Nation Tribal Code
Arizona Department of Agriculture	Application for Arizona native plant and wood removal	Displacement or removal of any listed native plant species	Native Plant Law, ARS article 11 (R-3-110–R3-3-111 and appendix A)
Local†			
Development Services, Public Works, DOT	ROW use permit, encroachment permit	Potential encroachment onto County/City ROW	Varies; County/local ordinance or municipal code
Planning and Zoning, Community Development	Special use, conditional use permits	Change zoning or land use to allow construction of the transmission line and associated facilities	Varies; County/local ordinance or municipal code
Floodplain Departments	Floodplain use permit	Construction of project facilities in flood-prone areas as defined by Federal Emergency Management Agency	Varies; County ordinance
Public Works Department	Grading/excavation/building permit	Construction	Varies; County/local ordinance or municipal code
Department of Environmental Quality, Air Quality Districts	Fugitive dust control permits	Construction	Varies; County ordinance

* Note that this list is not exhaustive.

† Local permits are only examples of permits that may be required by various local agencies (County/City).

Energy Policy Act of 2005

The Federal EPAct of 2005 requires the DOI to approve at least 10,000 MW of renewable energy on public lands by 2015; BLM is an agency under the DOI. The proposed Project would allow for the transmission and distribution of energy from potential renewable generation facilities across southern New Mexico and Arizona; however, use of the transmission line would not be limited to power from renewable generation.

Section 368 of the Energy Policy Act of 2005

Section 368 of the EPAct 2005 requires the DOI, in conjunction with the U.S. Department of Agriculture (USDA), Department of Commerce (DOC), DOE, and Department of Defense (DOD), to designate pipeline and electric transmission corridors for the 11 contiguous western states and establish procedures to expedite the review of projects that would be located within established energy corridors. Section 368 specifically notes the need for upgraded and expanded electric transmission infrastructure in the western United States to improve reliability, relieve congestion, and improve the capacity of nationwide electric transmission.

In response to Section 368 of the EPAct 2005, the BLM and the DOE prepared the "West-wide Energy Corridor Programmatic Environmental Impact Statement" (WWEC PEIS), with the USDA, U.S. Forest Service, DOD, and the U.S. Fish and Wildlife Service (FWS) participating as cooperating agencies (DOE and BLM 2008). The PEIS establishes energy corridors on public lands in the western United States and serves as an amendment to existing RMPs, including the Mimbres RMP (BLM 1993), "Safford Resource Management Plan" (Safford RMP) (BLM 1991), and "Phoenix Resource Management Plan" (Phoenix RMP) (BLM 1988a).

Corridors established by the WWEC PEIS were developed by Federal agency staff and informed by the comments and suggestions of the public. The corridors met specific criteria, including location on Federal lands, ability to establish connectivity with the energy grid, feasibility, legal and regulatory compliance, and compatibility with local BLM land use plans. As corridors were not established on private or State lands, the corridors are not continuous but are segments of greater or lesser length located on Federal lands only.

The WWEC PEIS designates corridors, provides guidance, best management practices (BMPs), and mitigation measures for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities. For corridors identified in the WWEC PEIS, each agency ROD amends relevant land use plans to include the new corridors; however, these modifications also designate underground-only corridors that do not necessarily allow for transmission lines or facilities. Use of the corridors identified in the PEIS is not required under land use plan modifications. Federal agencies are required to evaluate the environmental effects of projects in the newly established corridors.

The Final WWEC PEIS reviewed a number of documents to establish the need for expansion of and improvements to the existing western electricity grid and discussed the particular difficulties of reliably meeting the increasing electricity demands in the western United States. The WWEC PEIS cited the Western Governors' Association in recognizing that supply centers in the western United States are often located far from load centers (such as cities) and in discussing the difficulty of transmission planning when multiple agencies and/or States are involved. The difficulty of planning and permitting long-distance transmission was also discussed in the NERC forecasts. These forecasts highlighted the deficiencies of the existing transmission infrastructure and stressed that the need for long-distance transmission is of particular importance for renewable energy resources and for western states' ability to meet their RPSs (discussed above in section 1.3.4). The WWEC PEIS (DOE and BLM 2008) also cited the DOE's "National Electric Transmission Congestion Study" (2006), which was prepared in response to section 1221(a) of the EPAct 2005 and analyzed the transmission grid to determine locations in which reliability and capacity were being impacted by congestion. The report cited several factors as contributing to congestion, including increased energy demands and lack of planning and investment in the transmission grid over the past decade.

Four action alternatives fall within a West-wide Energy Corridor; these include segments of the Proponent Preferred and Proponent Alternative routes within the New Build Section and two agency local alternatives. These are discussed in more detail in chapter 2.

Secretarial Order 3285

Secretarial Order 3285, issued by the Secretary of the Interior on March 11, 2009, under the authority of section 2 of the Reorganization Plan No. 3 of 1950, as amended, and pursuant to the provisions of section 211 of the EPAct 2005, establishes the DOI's policy of "encouraging the production, development, and delivery of renewable energy" as one of the its "highest priorities." Under this order, agencies and bureaus within the DOI are directed to work collaboratively together and with other Federal agencies, departments, States, local communities, and private landowners to encourage the timely and responsible development of renewable energy and associated transmission while protecting sensitive environmental resources.

Under section 5 of the order, a task force was developed and assigned to identify and prioritize locations in the United States best suited for large-scale production of renewable energy. In conjunction with that assignment, the task force was to identify, in cooperation with other Federal and State agencies, the electric transmission infrastructure and transmission corridors needed to deliver renewable energy to load centers and prioritize the permitting and environmental review of the associated transmission ROW applications.

1.7 MAJOR FEDERAL CONSULTATIONS

In recognition of the special relationship with the U.S. Government, the BLM and Western will continue to consult with the appropriate tribal governments at an official, executive level (government-to-government), in accordance with the National Historic Preservation Act of 1966, as amended (NHPA), EO 13175, and NEPA. The BLM and Western will continue to provide opportunities for tribal involvement throughout the NEPA and Project development processes and will consult with the tribes during the development of the Project-specific NHPA programmatic agreement (PA).

The BLM is the lead Federal agency for compliance with the NHPA. Section 106 of the NHPA (36 CFR 800) requires the Federal agency to evaluate the potential effects of an undertaking on historic properties (cultural resources that have been determined to be eligible for or listed in the National Register of Historic Places (NRHP)). This process requires consultations with each state's State Historic Preservation Office (SHPO), tribes, State and local governments, and other parties that may have a concern with a project's effects on historic properties. Since the BLM made an "adverse effect" determination and since a PA will be prepared, the agency was required to notify and invite the Advisory Council on Historic Preservation (ACHP) to join the consultations to resolve the adverse effects of the proposed Project. A PA will be prepared because the effects of this proposed Project cannot be fully determined prior to the approval of the Project (800.14(b) (1) (ii)) since BLM will be using a phased approach to the identification process. The PA stipulates the process necessary to comply with Section 106 obligations for construction, operation, maintenance, and decommissioning of the proposed Project. Consulting parties for the Section 106 process include SHPOs (New Mexico and Arizona), the ACHP, other Federal agencies like Reclamation and DOD, State and local governments, tribes, and public groups.

Consultation with the FWS is required to comply with the Section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1536(a)(2)), for species listed as threatened or endangered. The BLM and Western must analyze the effects of the proposed Project on the species and on their designated critical habitat, if present. A biological assessment (BA) would identify the nature and expected extent of impacts and recommend mitigation measures to reduce potential impacts. If the BLM concludes that there could be an effect on a listed or candidate species, it would submit the BA to the FWS with a request for concurrence with the impact assessment in either informal or formal consultation.

1.8 STATE CONSULTATION

1.8.1 New Mexico Public Regulation Commission

Pursuant to section 8-8-12 of the New Mexico Statutes Annotated (NMSA), the Utility Division of the New Mexico Public Regulation Commission is tasked with enforcing rules, orders, and tariffs governing New Mexico utility providers. The Utility Division serves the commission in the regulation of a variety of utilities, including electric and renewable energy resources. It also represents the public in utility matters and present testimony and exhibits to the commission supporting adequate utility services at fair, just, and reasonable rates. Within the Utility Division, it is the Electrical Engineering Bureau that is involved with the development of regional transmission and reliability issues and that interacts with agencies and organizations such as DOE, FERC, NERC, and WECC.

1.8.2 Arizona Corporation Commission

Under article 15 of the Arizona Constitution, the ACC has jurisdiction over the regulation of public service utilities in Arizona and the quality of service and rates they charge. The ACC created an independent forum, the Arizona Power Plant and Transmission Line Siting Committee, to evaluate applications to build power plants of 100 MW or more and transmission projects of 115 kV or more. The committee provides stakeholders, government bodies, private groups, and other interested parties with the opportunity to participate in the decision to locate a specific power plant or transmission line.

1.9 RIGHT-OF-WAY EASEMENT ACQUISITION PROCESS FROM NON-FEDERAL OWNERS

Although Southline has applied for a ROW across BLM-administered public lands, this EIS analyzes potential impacts on all lands potentially affected by the proposed Project. Fee ownership would only be considered for substations or substation expansions. All other land rights acquired would be easements or leases. For land rights needed on non-Federal property for a substation or substation expansion, a fee ownership would be negotiated (as needed) with individual landowners. If the Project would be acquiring the land rights, it would compensate landowners for use of their land in exchange for the right to construct, operate, and maintain the transmission line and associated facilities. Negotiations between the landowner and the Project could include compensation for loss of use during and after construction, loss of nonrenewable or other resources, the restoration of unavoidable impacts, and unintended damages to property during construction. If Western would be acquiring the land rights, it would compensate the landowner based on an appraisal in accordance with the Uniform Relocation Assistance and Real

Property Acquisition Policies Act of 1970. State statutes have been enacted that define the acquisition process on private and non-Federal public lands for utilities. Western may impose stipulations in easements on private lands. Additionally, other regulatory authorities at the State and/or local level may have jurisdictions over private land and may elect to impose certain stipulations as part of their permitting approval process(es).

For the Upgrade Section, Western would obtain ROW, permanent and temporary, as needed. This could also include acquiring access right-of-entry, in addition to the transmission line ROW. Western is presently negotiating with the Tohono O'odham Nation to renew the existing ROW across tribal allotment lands. On Coronado National Forest lands, Western would need to revise the existing SUP and file other necessary documentation as needed. Western's existing ROW would be used as a foundation for any proposed lands expansion. Western would also obtain any necessary lands expansion which may include the use of its Federal land acquisition authority.

For the New Build Section, Southline and/or Western would obtain the necessary ROW, using the contracts, terms, conditions, and other requirements in coordination with Western. If Southline is unable to negotiate an easement or obtain clear title for the land right, Western may negotiate the easement, or obtain the necessary rights through condemnation proceedings, in accordance with Federal law. Western's policy is to avoid condemnation if at all possible. Compensation for all ROWs would be based on the fair market value of the lands. Landowners would retain ownership of the property and the right to use their property, except for a few uses that could conflict with access to or the safe operation of the transmission line or the safety of the landowner.

1.10 SCOPE OF THE ANALYSIS

The following section describes the geographic and temporal bounds of the analysis in the following document, including a description of connections, if any.

1.10.1 Geographic Scope

The geographic scope of the analysis area is shown in figure 1-1 and is based on the overall analysis area used by Southline during their initial siting and routing process. As previously noted, Southline proposes to provide interconnection to several existing substations. Four key substations in particular form the endpoints (Afton and Saguaro substations) and midpoints (Hidalgo and Apache substations) of the Project. The Afton and Saguaro substations serve as the end points of the analysis area as well (see figure 1-1).

The geographic scope of this analysis (analysis area) varies by resource and is different between the New Build Section and the Upgrade Section. At a minimum, the analysis area for the New Build Section is a 2-mile-wide corridor, and for the Upgrade Section, it is a 500-foot-wide corridor. Each resource section in chapter 3 identifies the geographic area relevant to the analysis of that resource.

1.10.2 Temporal Scope

The temporal scope of this analysis addresses both the short- and long-term effects of the proposed Project, including the no action alternative, and route alternatives. Short-term effects, like those associated with construction, would occur within a 5-year time frame from the beginning of the proposed Project. Operation, maintenance, decommissioning, and abandonment effects are analyzed in the long term, which for transmission projects of this type is considered to be 50 years.

1.10.3 Connected Action Consideration

Connected actions are those that are closely related to the proposed Project and should therefore be discussed in the same impact statement (40 CFR 1508.25). These actions are those projects that cannot or would not proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for their justification. There are no actions currently proposed that are connected actions to this proposed Project.

No proposed generation sources have been identified that would intend to connect to the proposed Project. If any such projects did exist, they would need to be ripe for NEPA analysis in order to be considered a connected action for purposes of this EIS. Although some electrical generating sources are likely to connect to the proposed Project to transmit power, the proposed Project would proceed independently of any generation project, and no generation project, proposed or existing, is required for the proposed Project to be feasible. Therefore, the generation sources are not considered connected actions and are not included in the direct and indirect effects analysis of this document. To the extent that they can be identified at this time, they are considered in the cumulative impacts analysis in this EIS.

Other electrical transmission lines, both local and regional, are considered part of the larger regional planning efforts to meet the transmission system needs throughout the desert Southwest. The proposed Project is a separate and distinct project from any of those discussed in other planning efforts; any other proposed new transmission lines can and would be built and operated independently. While these other proposed transmission lines are not connected actions, they will be considered as part of the cumulative impacts analysis in this EIS.

1.11 COOPERATING AGENCIES

Cooperating agencies includes those Federal, State, tribal, and local agencies that have jurisdiction by law and/or special expertise (40 CFR 1508.5). Those with jurisdiction by law will make their own decisions to approve or deny all or part of the Project. Those with special expertise or information have assisted and will continue to assist in development of the analysis. BLM sent letters to 21 tribes and to 33 agencies at the Federal, State, and local level inviting participation as a cooperating agency in preparation of the EIS. Sixteen agencies accepted invitations to participate: USACE; Reclamation; DOD Clearinghouse; U.S. Environmental Protection Agency (EPA); DOD Fort Huachuca; National Park Service (NPS); U.S. Forest Service (Coronado National Forest); FWS; Arizona Game and Fish Department (AGFD); Arizona State Land Department (ASLD); New Mexico Department of Game and Fish (NMDGF); New Mexico State Land Office (NMSLO); Cochise County, Arizona; Greenlee County, Arizona; Graham County, Arizona; and City of Sierra Vista, Arizona. Chapter 5, “Consultation and Coordination,” includes a list of those agencies invited to participate as cooperating agencies.

1.12 SCOPING AND PUBLIC INVOLVEMENT

As discussed in section 1.2.1, BLM purpose and need, an NOI to prepare this EIS and the potential plan amendment was published in the Federal Register on April 4, 2012. Publishing the NOI initiated a 60-day public and agency scoping period, during which the public had the opportunity to provide input on potential issues to be addressed in the EIS. The BLM and Western held two agency scoping meetings for the EIS and six public meetings at the locations listed in table 1-6.

Table 1-6. Locations of Agency and Public Scoping Meetings

Date	Location
Agency Scoping Meetings	
May 8, 2012	Las Cruces, New Mexico
May 17, 2012	Tucson, Arizona
Public Scoping Meetings	
May 8, 2012	Las Cruces, New Mexico
May 9, 2012	Deming, New Mexico
May 10, 2012	Lordsburg, New Mexico
May 15, 2012	Willcox, Arizona
May 16, 2012	Benson, Arizona
May 17, 2012	Tucson, Arizona

The public scoping period was scheduled to close after 60 days, but as a result of public requests for an extension, the BLM and Western extended the scoping comment period by 30 days. Comments received before the July 5, 2012 deadline were used to help formally scope the proposed Project. All comments that were received became a part of the administrative record and were included in the scoping comment analysis. All comments were entered into an interactive, searchable database and coded to reflect the subject matter of concern, sorted, and summarized. A detailed analysis of the scoping comments is presented in the "Scoping Summary Report" (SWCA Environmental Consultants (SWCA) 2012) available at the BLM Project website: http://www.blm.gov/nm/st/en/prog/more/lands_realty/southline_transmission.html. Issues were identified that could be used for consideration in alternatives and the development of the EIS; these are presented in the following section, in table 1-8.

Though not part of the NEPA process, Southline also conducted a series of stakeholder meetings and workshops in 2011 prior to the formal scoping period. The goals of these meetings were to give the public early notification and to solicit public input from interested stakeholders that would help Southline develop a proposed Project that could be presented to the BLM in a formal ROW application.

Southline met with local jurisdictions such as city administrators, county commissioners and supervisors, as well as State officials in both New Mexico and Arizona and representatives from local community organizations and agencies within the Project area. Table 1-7 is a list of these pre-NEPA stakeholder meetings.

Table 1-7. Locations of Pre-NEPA Meetings with Jurisdictions and Agencies

Date	Jurisdiction/Agency
July 6, 2011	City of Deming
July 6, 2011	Luna County
July 11, 2011	Las Cruces Chamber of Commerce
July 18, 2011	Southwest Transmission Cooperative
July 18, 2011	Fort Huachuca
July 19, 2011	Cascabel Working Group Tucson Audubon Community Watershed Alliance Empire-Fagan Organization
July 20, 2011	City of Willcox

Table 1-7. Locations of Pre-NEPA Meetings with Jurisdictions and Agencies (Continued)

Date	Jurisdiction/Agency
July 26, 2011	New Mexico Non-governmental Organizations
July 27, 2011	New Mexico Public Regulation Commission
August 2, 2011	Arizona State Land Department
August 2, 2011	Tucson Metropolitan Chamber of Commerce
August 3, 2011	Cochise County
August 4, 2011	Arizona Non-governmental Organizations
August 5, 2011	Arizona Department of Environmental Quality
August 17, 2011	City of Columbus, New Mexico
August 22, 2011	Natural Resource Defense Council
September 12, 2011	Pima County
September 13, 2011	Hidalgo County

In addition, Southline hosted pre-NEPA public meetings in Deming and Lordsburg, New Mexico (September 21–22, 2011); in Willcox, Tucson, and Marana, Arizona (September 27–29, 2011); and in Benson, Arizona (November 10, 2011). Routing workshops were hosted in Deming (September 22, 2011) and Tucson (September 28, 2011).

As a result of the Southline public outreach, the public was informed about the proposed Project, had participated in the preliminary routing process, understood Southline's approach to routing, and were familiar with the goals of the proposed Project prior to the formal agency public scoping process.

1.13 ISSUES TO BE ANALYZED

As a result of the scoping process, a number of issues to be analyzed were identified and served as the basis for the development of project alternatives (see table 1-8).

1.13.1 Resource Issues

Table 1-8 provides a summary of the issues identified during the scoping process, as well as where the issues have been addressed in the EIS. Issues for each resource are discussed in detail in Chapter 3, "Affected Environment," and in Chapter 4, "Environmental Consequences."

Table 1-8. Summary of Issues Identified During Scoping

Issues	Where Addressed in EIS
PURPOSE AND NEED - Purpose and need statement should be clear and broad and reflect potential benefits of the project, public interest in cleaner energy economy, and potential alternative means of achieving that goal. - Purpose and need should provide a clear explanation in the context of the electrical power system reliability and need for additional transmission line to supply power.	Chapter 1, sections 1.2 and 1.3

Table 1-8. Summary of Issues Identified During Scoping (Continued)

Issues	Where Addressed in EIS
PROJECT DESCRIPTION - Need more detail regarding the conditions for the new substations, detailed construction, operation and maintenance plans, descriptions of how the proposed transmission line fits into the regional renewable energy development and transmission in the West, and the extent to which the proposed transmission line would carry renewable energy versus fossil fuel–based energy.	Chapter 2, section 2.4
ALTERNATIVES - Transmission line should be routed to the west/southwest of Willcox Playa in areas that are already disturbed, farmed, or have existing utility features, largely to avoid avian concerns. - Transmission line should be located in open valleys rather than against hills and facility siting should consider avoiding or minimizing impacts to wildlife corridors and landscape connections. - Transmission line siting should consider completely avoiding Gila, Mimbres, San Francisco, and Animas watersheds. - Transmission line siting should consider locating underground. - Transmission line siting should consider locating on State lands rather than private lands, and existing lines in the Benson area should be upgraded. - Transmission line should be located near existing lines and in existing ROWs where possible. - The Nature Conservancy’s “Ecoregional Assessment” and the “Sonoran Desert Conservation Plan” should be referenced during siting.	Chapter 2, sections 2.6 and 2.7
AIR QUALITY AND CLIMATE CHANGE - Impacts on air quality from construction and maintenance emissions. - Additional impacts on non-attainment from carbon monoxide and smaller particulate matter in the air such as particulate matter 10 (PM_{10}). - Analysis of how climate change could exacerbate project impacts.	Chapter 3, section 3.2 Chapter 4, section 4.2

BIOLOGICAL RESOURCES
- Impacts of the proposed structures on avian resources, including but not limited to:
    - Migrating birds and raptors between Whetstone and Rincon mountains;
    - Migrating birds along the east side of the Willcox Playa;
    - The avian protection area along the Lordsburg Playas;
    - The sandhill crane winter use site and migration corridor east of Columbus, New Mexico, and at the Apache Substation;
    - Suitable habitat for the northern aplomado falcon;
    - Crossings of riparian corridors;
- Benefits to sensitive resources of using existing ROWs;
- Impacts to natural open space and vital biological corridors, including but not limited to, Tumamoc Hill and Tucson Mountain Park;
- Consider the Pima County “Sonoran Desert Conservation Plan” (Pima County 2009) and “Hidalgo County Land Use Plan” (Hidalgo County 2011) for natural resources;
- Impacts of new project access roads resulting in the introduction and spread of invasive species;
- Impacts of the proposed Project on native habitat and sensitive vegetative resources, including playas, riparian areas, Pima pineapple cacti, saguaro, and ironwood;
- Impacts of the proposed Project on Federal and State lists of special status wildlife species;
- Impacts of the proposed Project on wildlife travel corridors resulting from fragmentation;
- Impacts of the proposed Project on mule deer, bighorn sheep, and pronghorn antelope habitat;
- Impacts of construction activities on sewer conveyance facilities;
- Impacts to the accessibility for maintenance and repair of the line during times of flooding;
	Chapter 3, section 3.8
	Chapter 4, section 4.8

Table 1-8. Summary of Issues Identified During Scoping (Continued)

Issues	Where Addressed in EIS
- Cumulative impacts of the proposed Project on water as a result of potential development - Impacts of the proposed Project on water quality; - Impacts of the proposed Project on the hydrologic balance of depressions or playa basins and ephemeral aquatic habitat; - Impacts of the proposed Project on riparian species, habitats, and wetlands that function as corridors from the Animas drainage to the Gila and Mimbres drainages.	
CULTURAL RESOURCES - Potential impacts on cultural resources, including but not limited to: the Butterfield Overland Mail Trail, Tumamoc Hill, Camino Real de Tierra Adentro National Historic Trail, and the Juan Bautista de Anza National Historic Trail in Arizona; - Potential visual impacts to cultural resource sites, including but not limited to: Juan -Bautis - Need for a Class I and Class III inventory to identify impacts to cultural resources; - Need for a Historic Properties Treatment Plan prior to construction.	Chapter 3, section 3.9 Chapter 4, section 4.9
TRIBAL CONCERNS - Potential impacts on physical integrity, accessibility, and use of existing sacred sites; - Explanation of government-to-government consultation and how issues were addressed in the selection of the preferred alternative; - Potential physical, visual, and social/psychological impacts to Native American traditional cultural properties and sacred landscapes.	Chapter 3, section 3.9 Chapter 4, section 4.9
FARMLANDS AND RANGELANDS - Impacts to range livestock operations associated with grazing allotments in the project area; - Impacts to pasture layout and proximity to range improvements from infrastructure placement; - Impacts to Pima County–owned preserves.	Chapter 3, section 3.11 Chapter 4, section 4.11
GEOLOGY AND MINERALS - Impacts to geology and mineral resources.	Chapter 3, section 3.4 Chapter 4, section 4.4
HUMAN HEALTH AND SAFETY - Impacts of electromagnetic field from transmission lines on natural resources, humans, and Fort Huachuca's Electronic Proving Ground; - Potential increase in transmission lines in a congested area would be an easy target for a terrorist attack.	Chapter 3, section 3.16 Chapter 4, section 4.16
HAZARDOUS MATERIALS AND WASTE - Plans to reduce impacts of hazardous waste volumes and expected storage, disposal, and management plans.	Chapter 3, section 3.17 Chapter 4, section 4.17
LAND USE - Identify ASLD conceptual planning areas; - Consider co-location of compatible land use; - Consider the objectives of Federal, State, tribal, or local land use plans, policies, and controls in the project area, including but not limited to the "Pinal County Comprehensive Plan" (Pinal County 2010a) and the "Airport Master Plan for Marana Regional Airport" (Coffman Associates Airport Consultants 2007); - Impacts to private landowners, including eminent domain actions, land usage, fair market–based compensation, financial value of existing and future neighborhoods along Silverbell Road, landowners in Hidalgo County, value of homes in the Mescal area (Interstate 10 and Pima County and Cochise City); - Impacts of increased structure height on military training flight routes and effects on a proposed drone program near Benson;	Chapter 3, section 3.11 Chapter 4, section 4.11

Table 1-8. Summary of Issues Identified During Scoping (Continued)

Issues	Where Addressed in EIS
- Impacts to the uses and existence of recreation areas, including but not limited to: the Continental Divide National Scenic Trail, the Arizona National Scenic Trail, and Pima County's Tucson Mountain Park; - Impacts to State and Federal special use and designated lands in the proposed analysis area; - Impacts to wilderness qualities of BLM lands to the southeast of Fort Bowie National Historic Site; - Impacts to airspace; - Potential increase in undocumented access through implementation of the Project.	
MILITARY USES - Potential electromagnetic interference with the mission of and use of the Buffalo Soldier Electronic Testing Range in southeastern Arizona. Also, concern regarding enabling renewable energy projects in the region, resulting in siting of renewable projects in the Buffalo Soldier Electronic Testing Range; - Potential interference with flight paths in southwestern New Mexico and southeastern Arizona.	Chapter 3, section 3.11 Chapter 4, section 4.11
SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE - Impacts to the economy of southern Arizona through deleterious impacts on recreation and the tourism industry; - Regional and local economic benefits in the form of job creation and substantial tax base, including new lines near existing or potential clean energy generation projects; - Impacts to rural areas where population growth may not occur; - Impacts of the Project on power rates, including the total cost per kilowatt-hour of electricity delivered, compared with the cost of renewable generation; - Impacts to communities of rebuilding existing transmission lines; - Increased auditory impacts from the Project.	Chapter 3, section 3.15 Chapter 4, section 4.15
SOILS - Impacts of sedimentation and erosion on downstream habitat from construction vehicle traffic and road maintenance; - Impacts of construction vehicle traffic and road maintenance on soils and erosion.	Chapter 3, section 3.5 Chapter 4, section 4.5
VISUAL RESOURCES - Visual impacts of existing and proposed structures on residential areas and natural preservation areas, including the desert floor and scenic areas west of Mescal Road; - Impacts to the viewshed of Saguaro National Park; - Impacts of the proposed structures versus shorter structures with longer span lengths.	Chapter 3, section 3.10 Chapter 4, section 4.10

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Chapter 2

PROPOSED PROJECT AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides a description of the proposed Project and includes information on how alternatives were developed. Following the proposed Project description is a discussion of how alternatives generated from Southline's routing efforts and in response to internal and external scoping comments. The alternatives discussion describes alternatives evaluated within this DEIS, including the proposed Project and action alternatives, no action, and those that were considered but not included for detailed analysis, and also identifies the Agency Preferred Alternative and the Environmentally Preferred Alternative.

2.2 ROUTE SELECTION PROCESS

2.2.1 Southline Transmission's Routing Study

Southline began investigating route alternatives for the proposed Project in 2009, and its efforts are documented in the April 2012 routing report (Southline 2012a); the routing report is available online.[4] As part of the routing process, Southline first identified the geographic study area within which feasible routes could be considered between the identified connection points at the Afton, Apache, and Saguaro substations. Southline then performed siting studies in consultation with stakeholders, such as State and Federal agencies, county commissioners, tribal officials, local utilities, and private landowners, to identify routing opportunities and constraints, and determine the most feasible routes within the study area.

Southline hosted a series of meetings and workshops with stakeholders between June and December 2011. Southline's public outreach efforts were conducted to understand initial public concerns from a wide range of project stakeholders so these concerns could be integrated into Southline's routing process from the outset. Initial outreach efforts focused on defining the study area, followed by meetings with stakeholders, which reviewed a number of potential route corridors. The route corridors were high-level route alignments looking at all potentially viable options (figures 2-1a and 2-1b). These corridors were presented at a round of public information meetings, and stakeholders had an opportunity to provide feedback directly onto high-resolution maps regarding potential resource and land use conflicts to guide Southline's route selection.

Finally, Southline received additional feedback from stakeholders, including feedback received from a public informational meeting in Benson, Arizona, and simultaneously winnowed the potential route corridors into a select group of potential and alternative routes to submit to the BLM and Western to use in the environmental review process. This final set of potential and alternative routes submitted to BLM and Western for consideration in the NEPA process reflects a significant amount of feedback from stakeholders.

All routing efforts prior to the publication of the NOI were conducted in order to define the proposed Project and develop the basis for the proposed Project and associated NEPA analysis. The BLM and

[4] http://southlinetransmissionproject.com/files/Routing_Report_AppA_and_Figures_042412_final.pdf

Western used Southline's routing efforts as the basis of the agency alternatives development process (see section 2.6).

The focus of the routing effort was to identify potentially viable options within the analysis area that would use previously disturbed areas by following existing linear features. Previously disturbed areas, such as those along existing linear features, were identified as an opportunity for siting the proposed Project. Using previously disturbed areas minimizes new ground disturbance and new access road construction, reduces potential adverse environmental and social impacts, and concentrates development in previously developed areas. Linear features considered reasonable routing options included roads and highways, transmission and distribution lines, railroads, pipelines, Section 368 energy corridors, and cadastral or property boundaries.

As discussed in chapter 1, the proposed Project would consist of two sections. The New Build Section would entail construction of approximately 240 miles of new double-circuit 345-kV transmission line to mitigate existing congestion by providing more transmission capacity between the Afton Substation, south of Las Cruces, New Mexico, and the Apache Substation, south of Willcox, Arizona. The existing voltage in the New Mexico facilities (Afton and Hidalgo substations) is 345-kV; thus, the New Build Section is proposed as a 345-kV transmission line. The Upgrade Section would be an upgrade of approximately 120 miles of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines to a double-circuit 230-kV transmission line originating at the Apache Substation and terminating at the Saguaro Substation, northwest of Tucson, Arizona (see figure 1-1). The Upgrade Section is proposed as a double-circuit 230-kV line in order to maximize the existing ROW, particularly through the more urban Tucson area, where a 345-kV structure was determined to be too large in terms of ROW requirements. One of two methods for the Upgrade Section of the Project would be used, depending on ROW constraints: either the tear-down and rebuild-in-place method, or construction of new facilities adjacent to the existing facilities.

Using the existing voltage at substations along the proposed Project route (both New Build and Upgrade sections) optimizes Project performance and minimizes Project costs. The existing high-voltage system in southern New Mexico is 345 kV. The network of existing transmission lines in southern New Mexico does not include 500-kV or 230-kV voltage; therefore, the addition of a new voltage would increase construction, operational, and maintenance costs for the proposed Project. Maintaining 345-kV voltage also provides technical benefits, as the proposed Project could use a double-circuit structure since it could more readily be absorbed into the existing system on a contingency. Higher voltages like 500 kV would require a greater project footprint, requiring two separate sets of structures as opposed to one double-circuit on a single set of structures. The Upgrade Section was designed as double-circuit 230 kV in order to maximize the existing ROW as much as possible. Further, 230 kV is also a standard voltage upgrade for Western, and therefore would minimize operational and maintenance costs.

For the New Build Section routing effort, two general types of routing criteria were considered: opportunities and constraints. Routing opportunities consisted primarily of existing linear features, existing access, and existing disturbed areas. Constraints consisted primarily of avoidance areas or sensitive areas including wilderness areas, areas of high residential development, military reservation/installations, tribal lands, and sensitive lands (e.g., ecologically, visually, and/or culturally). Through an iterative process, more than 1,300 miles of potentially viable routing options were identified. Through early input from the BLM, Western, and other stakeholders, those routing options were further assessed to determine whether they should be retained for detailed study by Southline or eliminated from further consideration. Following that assessment, before submittal of the SF-299 application, Southline selected the proposed and alternative routes for the New Build Section.

Figure 2-1a. Potential routing options identified in 2011 by Southline and considered for New Build Section. SOURCE: Southline Trasmission Project Routing Report, April 2012.

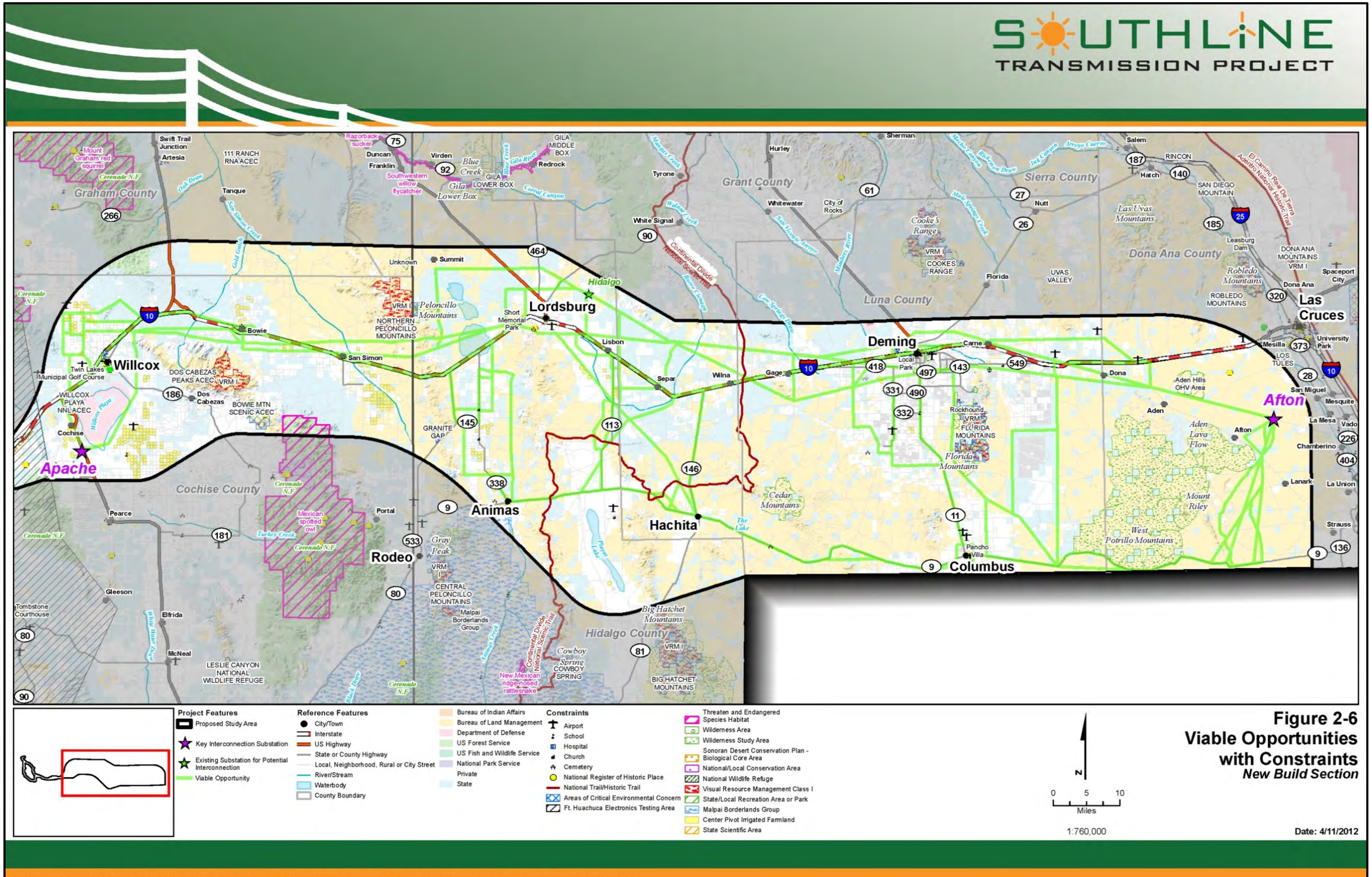
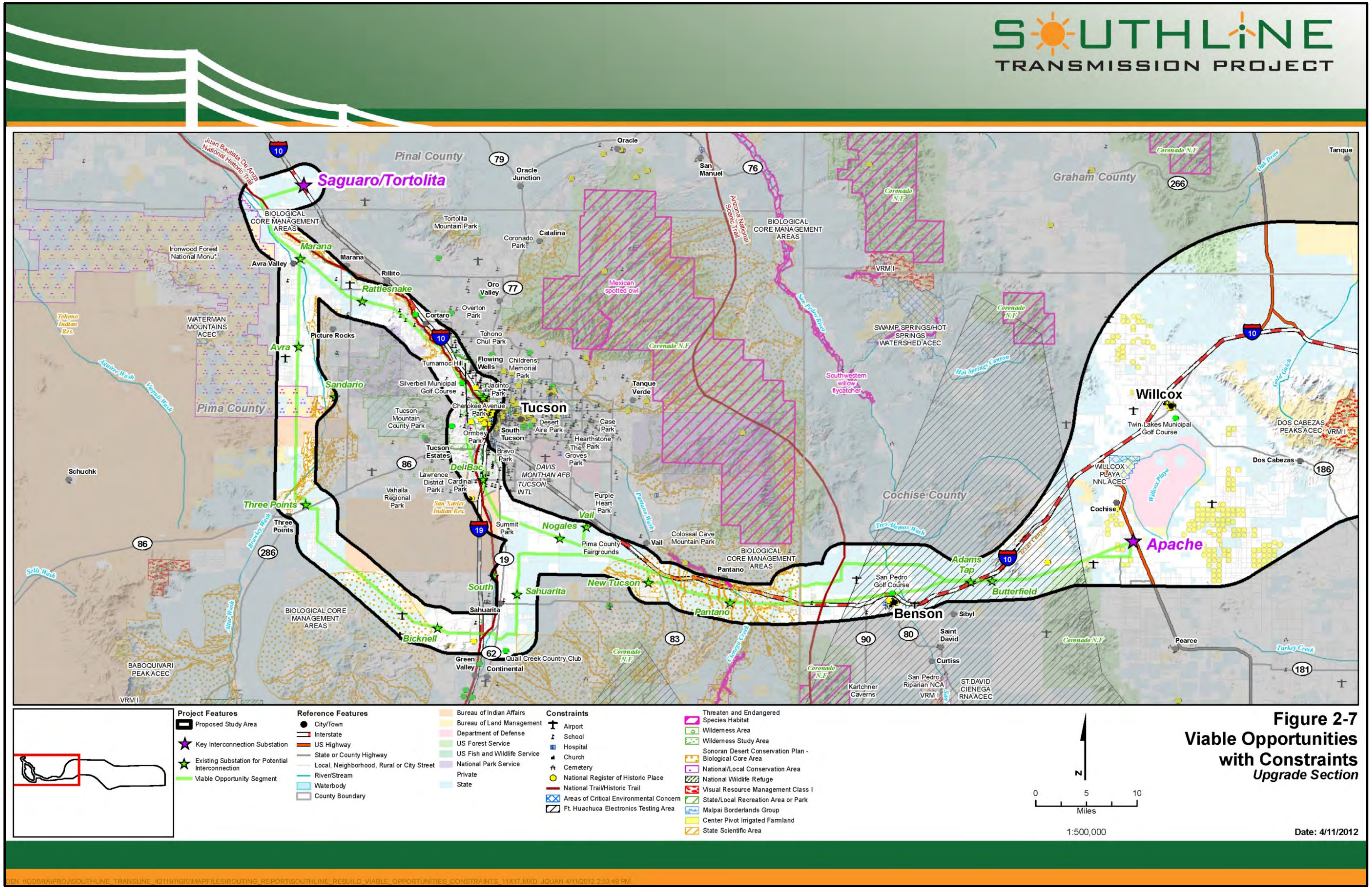


Figure 2-1b. Potential routing options identified in 2011by Southline and considered for Upgrade Section. SOURCE: Southline Trasmission Project Routing Report, April 2012.



Because the Upgrade Section of the proposed Project focused on upgrading an existing line, routing options were limited. Only two existing transmission lines between the Apache and Saguaro substations are available to be upgraded to a capacity that would allow transmission of up to 1,000 MW: the existing Western Saguaro–Tucson and Tucson–Apache 115-kV lines, and an SWTC 230-kV line. The routing process for the Upgrade Section included review of the existing facilities and the land use constraints in the immediate vicinity of the existing lines. This resulted in an evaluation of approximately 200 miles of viable routing options for the Upgrade Section. The SWTC route was eliminated from further consideration because of highly restrictive land uses along portions of the ROW and less access to existing substations in the area.

2.3 LAND USE PLAN CONFORMANCE

As stated in the NOI to prepare the EIS (published April 4, 2012), the proposed Project has the potential to require plan amendments. The principles of multiple-use management for the BLM are established through the FLPMA. Depending on the action alternative selected, the BLM may need to amend one of the RMPs that provide guidance for the planning areas crossed by the proposed Project. There are four RMPs considered for plan conformance, one in New Mexico and three in Arizona:

1. New Mexico:
    a. Mimbres Resource Area RMP[5] (December 1993); Las Cruces District Office.
2. Arizona:
    a. Final Safford District RMP and EIS (August 1991); Safford District Office.
    b. Phoenix RMP and EIS (December 1988); Tucson Field Office.
    c. “Approved Las Cienegas Resource Management Plan and Record of Decision” (BLM 2003) (Las Cienegas RMP) (July 2003); Tucson Field Office.

If a proposed project is not in conformance, the BLM can either choose to deny the proposed Project, adjust the project to conform to the RMP, or amend the plan to address the issue of nonconformance.

As discussed in chapter 1, there are two potential conformance conflicts with the Mimbres RMP that may require a plan amendment: (1) where portions of seven alternative route segments would cross VRM Class II areas; and (2) where portions of one of the seven alternative route segments would cross a ROW avoidance area designated for the Butterfield Trail near Lordsburg Playa. As part of the ROD, the BLM would decide whether to approve the amendment analyzed in this EIS. Detailed descriptions of proposed RMP amendments can be found in section 2.10.7.

No plan amendments are required or proposed for any portions of the proposed Project in Arizona.

2.4 PROPOSED PROJECT (PROPONENT PREFERRED)

Southline is seeking a 50-year ROW across Federal lands to accommodate the proposed Project. Southline proposes to construct a high-voltage electric transmission line and associated facilities in southern New Mexico and southern Arizona (see figures 2-2a and 2-2b). The proposed Project would cross private, State, and public lands, including lands managed by the BLM (New Build and Upgrade

[5] The TriCounty RMP is currently in draft form; when approved, it will amend a portion of the 1993 Mimbres RMP in Doña Ana County.

sections), U.S. Forest Service (Upgrade Section only), Reclamation (Upgrade Section only), State (New Build and Upgrade sections), and Tohono O'odham Nation (Upgrade Section only). Additional ROW may be required along the upgrade of the existing Western lines (see "Upgrade of the Existing Western Transmission Line" in section 2.4.3).

Project facilities, design characteristics, construction activities, and mitigation measures would be expected to be the same for all action alternatives. Following is a discussion of the site preparation and preconstruction activities, Project components, and construction, operational activities, and decommissioning of the proposed Project.

2.4.1 Site Preparation and Preconstruction Activities

If the BLM and Western issue their respective RODs, the ROW would be granted and the application would be finalized with the Project design details, including finalization of the "Amended Plan of Development for the Southline Transmission Project" (POD) (Southline 2013) and associated framework plans, mapping and access road planning, ROW acquisition, geotechnical investigations, centerline surveys, preconstruction resource surveys, and preconstruction meetings. For a given Project segment, no construction would begin until these Project tasks are complete and the BLM and Western have given formal notice to proceed. It is expected that all these activities and their effects are analyzed within the bounds of this EIS analysis. However, if a new element is outside an area covered within the EIS and addressed in the ROW grant, approval from the authorized officer would be required and may require additional environmental analysis if changes to the proposed Project are substantive (see Section 2.4.7, "Project Design Requirements (Variance Process)."

Plan of Development

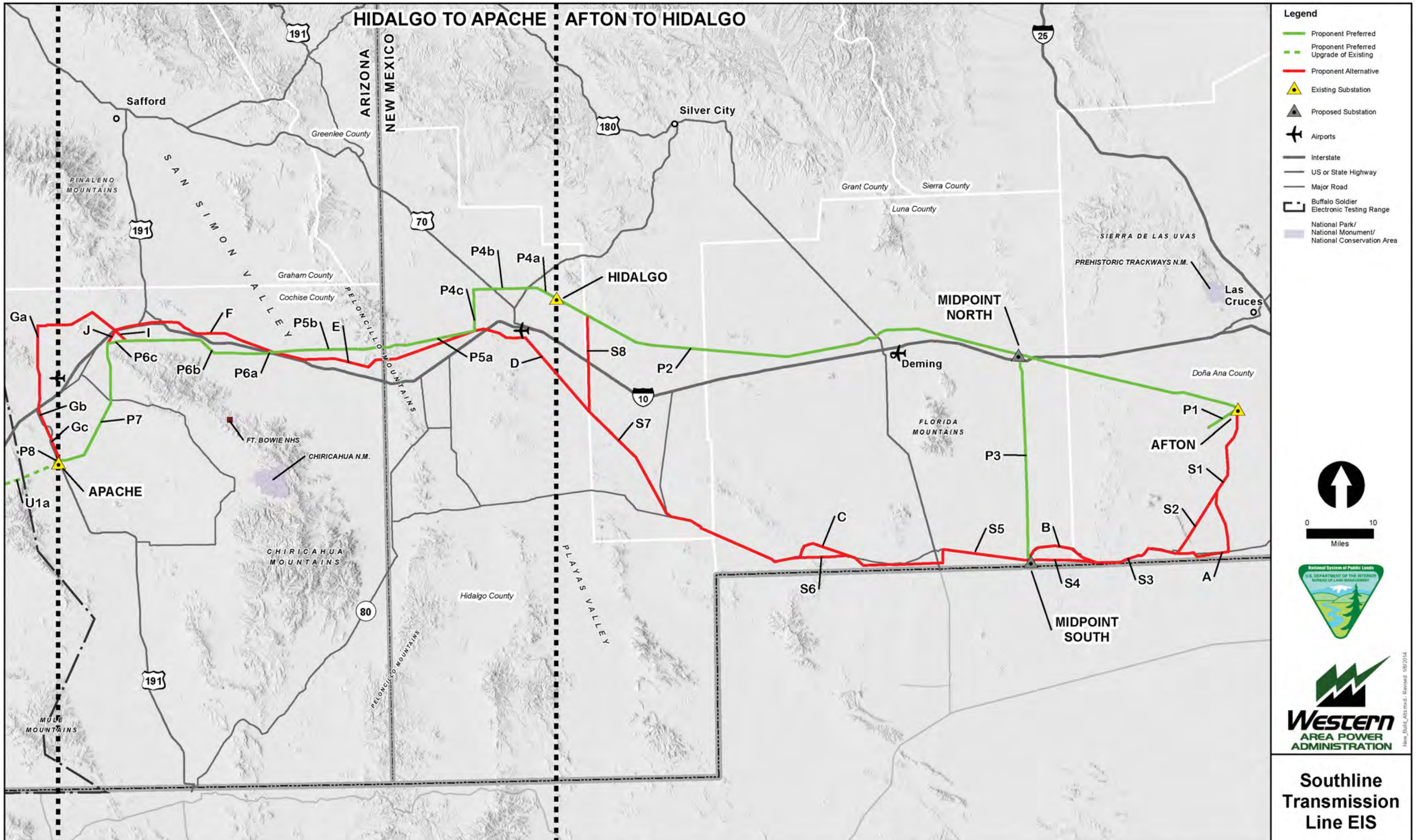
A draft POD was submitted to the BLM, along with the SF-299, and it has been updated (April 2012 and July 2013) for use in developing this DEIS. The POD, available online,[6] presents Southline's purpose of and need for the proposed Project, the ROW location, facility design factors, additional components of the ROW, agencies involved, facility construction details, preliminary assessment of resource values and environmental concerns, proposed stabilization and rehabilitation measures, operation and maintenance details, and termination and restoration techniques. PODs typically evolve over time.

The final POD would be the responsibility of Southline and would outline in detail how the Project would be constructed, operated, and maintained. The final POD would need to include all details, mitigation, and ROW grant stipulations and would need to be approved by the BLM and Western. The final POD would be based on the FEIS and would be a condition of the ROW grant. If a grant is issued, it would be the reference document for agency personnel, environmental compliance monitors, construction contractor management, and construction inspectors, etc.

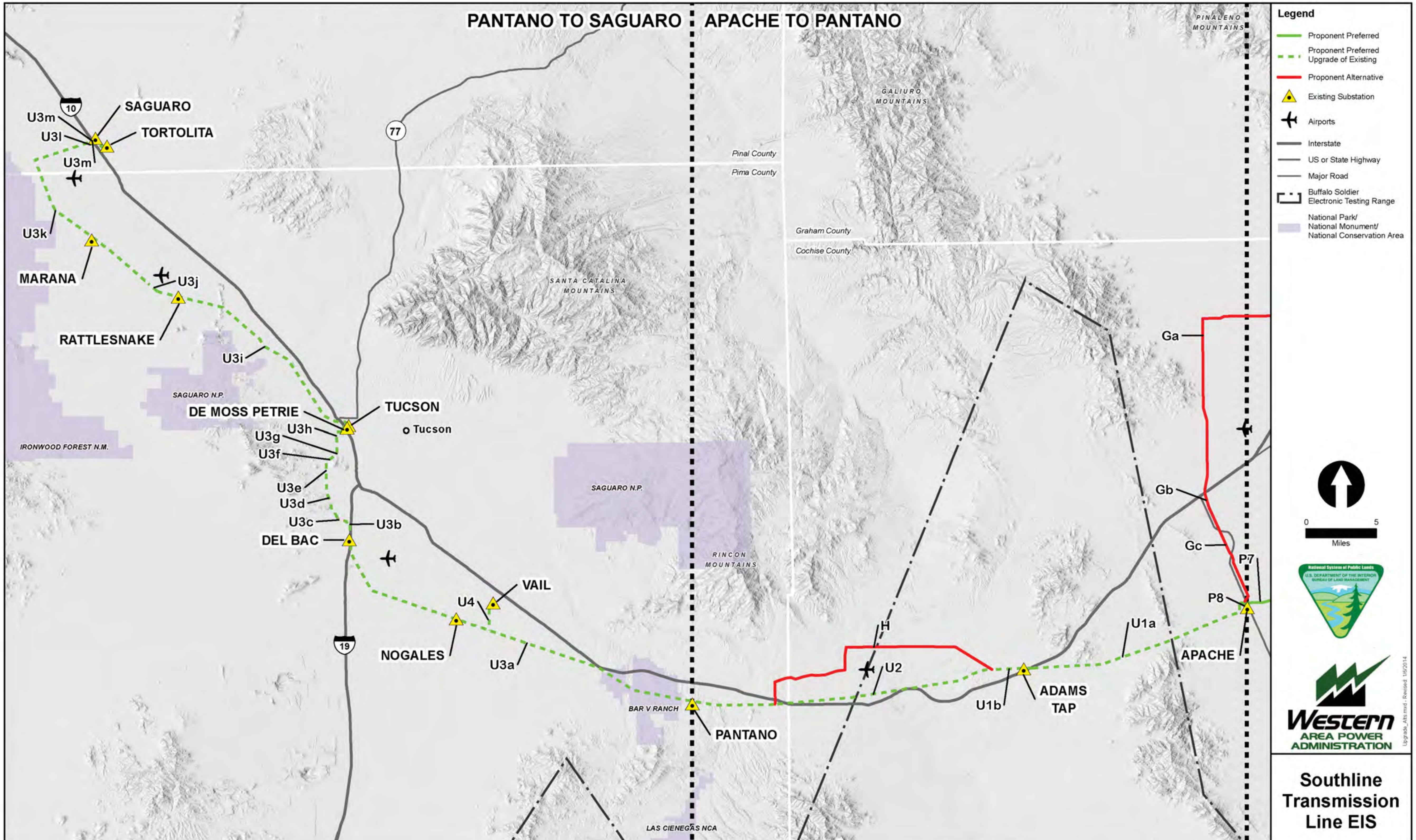
References to the final POD are made throughout the Project description that follows. The final POD would include the final design details, if the proposed Project is approved and once the final route is selected. Because the detailed design process is not initiated before a project is approved, many details are not known before the final design is completed. Assumptions based on known requirements and typical transmission facility design and construction are made for the purposes of analysis in this DEIS where details are not finalized.

[6] Available at: http://southlinetransmissionproject.com/files/Southline_POD_042012.pdf.

Figure 2-2a. Project overview of the New Build Section.



1 **Figure 2-2b.** Project overview of the Upgrade Section.



2

BLM REGIONAL MITIGATION

The BLM may require mitigation measures and conservation actions to achieve land use plan goals and objectives and provide for sustained yield of natural resources on public lands, while continuing to honor the agency's multiple-use missions. The sequence of mitigation action would be the mitigation hierarchy (avoid, minimize, rectify, reduce or eliminate over time, or compensate) identified by the CEQ (40 CFR 1508.20) and BLM's "Draft Regional Mitigation Manual," Section 1794. Certain alternatives also may identify compensatory mitigation requirements for those implementation-level activities whose impacts the agency(s) cannot adequately avoid, minimize, rectify, or reduce or eliminate over time (i.e., residual impacts).

The priority is to mitigate impacts at the site of the activity in conformance with the land use plan goals and objectives through impact avoidance, minimization, rectification, or reduction over time of the impact, including those measures described in laws, regulations, policies, and land use plans. When these types of mitigation measures are not sufficient to ameliorate anticipated direct, indirect, and cumulative impacts and substantial or significant residual impacts remain, additional measures to reduce these residual impacts to meet applicable land use plan goals and objectives would be required (compensatory mitigation).

The Project would apply the mitigation hierarchy and would identify or incorporate by reference applicable land use plan mitigation measures for:

- Avoiding
  - Identification of avoidance areas and/or measures (e.g., ROW avoidance areas, no surface occupancy areas) already included in laws, regulations, and/or governmental decision documents (e.g., BLM RMPs, state, tribal, or county plans that govern site or permit authorizations)
  - Identification of additional avoidance measures for the BLM to consider (e.g., additional avoidance BMPs)
- Minimizing
  - Identification of minimization measures (e.g., surface-use controls, conservation measures, BMPs) already included in BLM decision documents (e.g., RMPs; FWS Biological Opinions, other Project decision documents and ROW authorizations)
  - Identification of additional minimization measures for the BLM to consider (e.g., Proponent- proposed design features)
- Rectifying
  - Identification of measures for the BLM to consider, including repairing, rehabilitating, or restoring affected landscapes
- Reducing or eliminating
  - Identification of measures for the BLM to consider for reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
- Compensating
  - Identification of measures for the BLM to consider for compensating for the impact by replacing or providing substitute resources or environments

When applying mitigation at any level of the mitigation hierarchy, there would be requirements for monitoring the effectiveness of the mitigation as well as the durability of the mitigation. This monitoring is necessary, especially in relation to durability for compensatory mitigation to identify when it may be appropriate to consider applying adaptive management concepts to ensure continued durability for the life of the Project.

Two important concepts related to durability are: (1) ecological durability, or the length of time the benefits from mitigation measures persist on and influence the landscape and meet or exceed the length of time that projected impacts would affect resources; and (2) protective durability, or ecological values in compensatory mitigation Project areas that are unaffected by future and conflicting land uses or disturbances.

The ecological durability of compensatory mitigation is greatest if the projects are large enough or properly located so that they would, either in themselves or in conjunction with other projects, adjacent landscape conditions, or climate change predictions, provide the targeted conservation benefits.

Ecological durability may be compromised when the benefits of compensatory mitigation do not persist for the full duration of the impact intended to be offset (i.e., from initial surface disturbance to final reclamation, rehabilitation, or restoration). Damage to functioning compensatory mitigation measures may be caused by natural disturbances (such as wildfire) or anthropogenic disturbances (such as other authorized development), which shorten the intended duration of applicable mitigation.

The BLM would require that mitigation measures have a degree of protective durability. Financial protections (e.g., bonding for construction, endowment for mitigation management) are an important tool to achieve protective durability. The BLM would expressly condition its approval of the Project on the Proponent’s commitment to perform or cover the costs of mitigation, both onsite and outside the area of impact.

Examples of compensatory mitigation include offsite vegetation treatments to improve migratory bird habitat; purchase of property or conservation easements to provide long-term protection for migratory bird habitats; purchase of conservation credits at an FWS-approved conservation bank to offset impacts to Pima pineapple cactus; or appropriate mitigation for impacts to designated National Scenic and/or Historic Trails or those trails recommended suitable for Congressional designation.

FRAMEWORK PLANS

In addition to the detailed Project description, the POD includes BMPs, mitigation measures, and compliance activities that must be achieved for the proposed Project. As part of this compliance effort, several framework plans would be included as appendices to the final POD to detail the construction, operation and maintenance conditions of the ROW grant. The final POD would also include specifics on how compliance activities will be managed, and the roles and responsibilities of individual parties for oversight and monitoring to ensure that the framework plans are appropriately and completely implemented. Preliminary BMPs and mitigation efforts are considered in the analysis in this DEIS (see section 2.4.6) and would be finalized in the final POD and associated plans. These framework plans would include:

- Access Road Plan
- Traffic and Transportation Management Plan
- Stormwater Pollution Prevention Plan (SWPPP)
- Spill Prevention, Control, and Countermeasures (SPCC) Plan
- Historic Properties Treatment Plan (HPTP)
- Blasting Plan
- Plant and Wildlife Species Conservation Measures Plan
- Erosion, Dust Control, and Air Quality Plan

- Hazardous Materials Management Plan (HMMP)
- Emergency Preparedness and Response Plan
- Noxious Weed Management Plan
- Fire Protection Plan
- Stream, Wetland, Well, and Spring Protection Plan
- Soil Management Plan
- Reclamation, Vegetation, and Monitoring Plan
- Health and Safety Plan (HASP)
- Avian Protection Plan (APP)
- Waste Management Plan (WMP)
- Helicopter Flight Plan/Flight and Safety Plan
- Decommissioning Plan

Following are descriptions of these framework plans and what each plan would include in terms of typical requirements.

Access Road Plan

Access road planning would be finalized if the proposed Project is approved. With the approved route known, the exact location of all access roads would be refined through detailed engineering. Once road locations are known, cultural resource and biological surveys would be conducted and road locations adjusted to avoid sensitive resources discovered during the surveys. No field disturbance would occur before the completion of these surveys. Although the exact locations of final access roads are not known, the general location of needed access is known and is used to define the potential environmental impacts for purposes of the EIS. Access road construction and improvement would include erosion, stabilization/reclamation/revegetation, and dust control measures, as described in section 2.4.6. Access roads would be designed to ensure that slopes do not cause erosion and that turning radii are sufficient. The road locations would also be georeferenced and the location recorded, and appropriate access rights would be obtained from the landowner.

A preliminary estimate of the location and extent of potential access roads needed for the proposed Project is described later in this chapter in Section 2.4.2, “Project Components.” All roads would be constructed in accordance with Western and BLM standards for access roads and specified in the Access Road Plan, to be included as a framework plan in the POD.

Traffic and Transportation Management Plan

The purpose of a Traffic and Transportation Management Plan is to describe how roads would be improved and maintained for construction of the proposed Project; and to minimize the potential impacts of construction traffic at staging areas, work areas, and other places where traffic may increase. The plan would address equipment access to and from the proposed Project ROW, drainage improvements, dust control and maintenance measures, and reclamation and abandonment of roads. This plan is generally required by the BLM as a condition of the ROW grant and sometimes is required by State or local departments of transportation.

Stormwater Pollution Prevention Plan

Stormwater discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb one or more acres are regulated under the National Pollutant Discharge Elimination System (NPDES) stormwater program. Prior to discharging stormwater, construction operators must obtain coverage under an NPDES permit, which is administered by either EPA (as is the case in New Mexico) or the State (as in Arizona). Construction stormwater discharges are normally permitted under the Construction General Permit (CGP), which requires compliance with effluent limits and other standard permit requirements, such as the development of a SWPPP.

A SWPPP for the proposed Project would identify sources of pollutants associated with construction activity that may affect the quality of stormwater as well as stormwater management practices to abate pollutants in stormwater discharges from the construction site both during and after construction. The SWPPP would detail structural and non-structural controls that would be put in place to minimize negative impacts caused by offsite storm water discharges, to the environment. BMPs in the plan would include specific stabilization measures and structural controls, spill prevention containment and controls, final stabilization measures to be implemented after construction, and requirements for maintenance and inspection.

Spill Prevention, Control, and Countermeasures Plan

The SPCC Plan would address requirements for petroleum spill prevention, preparedness, response, and notification to prevent oil discharges to navigable waters and adjoining shorelines. The EPA's SPCC rule 40 CFR 112 is part of the Oil Pollution Prevention regulation, which requires specific facilities to prepare, amend, and implement SPCC Plans. The plan would addresses prevention and remediation of oil, hydraulic fluid, and petroleum fuel spills, including spills that could enter navigable waters of the U.S. (WUS).

Historic Properties Treatment Plan

Section 106 of the NHPA requires Federal agencies to consider the effects of their undertakings on historic resources (those cultural resources presently listed or determined to be eligible for listing in the NRHP). The PA, and the HPTP developed pursuant to the PA, would be incorporated into the POD. The HPTP provides a framework for conducting historic resource testing and data recovery for the proposed Project. It would describe measures that would be implemented to address the avoidance of impacts, minimization of impacts, and mitigation of possible impacts to historic resources.

Blasting Plan

A Blasting Plan would outline the procedures and safety measures that the proposed Project contractor would adhere to while implementing blasting activities during construction. It would identify blasting requirements and procedures such as safety, use, storage, and transportation of explosives. These procedures must be consistent with the minimum safety requirements defined by Federal, State, and local regulations. This plan would also identify and address areas of potential environmental concern as related to blasting along the proposed Project route.

Plant and Wildlife Species Conservation Measures Plan

Federal agencies are required to consider the effects of their activities on protected species. The Plant and Wildlife Species Conservation Measures Plan would outline the avoidance and minimization of impacts to special status plant and wildlife species as related to proposed Project construction activities. It would summarize the avoidance and minimization measures taken during route selection of the proposed Project and describe specific measures to be implemented in the event that State or federally listed species, BLM sensitive species, or Forest Service special status species or their habitats are identified within or adjacent to the proposed Project ROW.

Erosion, Dust Control, and Air Quality Plan

In order to maintain air quality in the vicinity of construction areas, the Erosion, Dust Control, and Air Quality Plan would identify sources of fugitive dust, such as grading activities, driving on dirt roads, or wind-driven dust from exposed soil; and then provide appropriate dust mitigation measures such as application of water or soil additives, control of vehicle access, vehicle speed restrictions, or even work stoppage during extreme wind. The plan would also identify sensitive receptors that could be affected by dust from work areas, and outline dust monitoring and recordkeeping responsibilities.

Hazardous Materials Management Plan

The purpose of the HMMP would be to reduce the risks associated with the storage, use, transportation, and disposal of hazardous materials anticipated to be used during the construction phase of the proposed Project. The HMMP would be required to meet BLM ROW grant conditions to provide a basic understanding of the hazards and techniques associated with the handling of hazardous materials so that the proposed Project personnel would be better able to protect their personal health, prevent damage to the environment, and comply with applicable laws, regulations, and policies.

Emergency Preparedness and Response Plan

The purpose of the Emergency Preparedness and Response Plan would be to help prevent emergencies, to assure preparedness in the event emergencies do occur, and to provide a systematic and orderly response to emergencies. Emergencies may include be medical, fire, hazardous materials, extreme weather, or acts of sabotage. The plan would provide project-specific details regarding steps for various types of emergencies, including emergency notification and evacuation procedures, and would take into account the level of severity of each event.

Noxious Weed Management Plan

The primary focus of the Noxious Weed Management Plan would be to minimize the introduction of any noxious weed infestations, as well as the spread of weeds, during construction of the proposed Project and to eradicate noxious weeds following construction. Regulatory authority and requirements are provided by Federal regulations, including the EO on Invasive Species and the Plant Protection Act, plus State regulations on noxious weeds. The plan would outline that invasive weeds are not controlled to the same standards as noxious weeds and would specifically address the elimination of buffelgrass from area disturbed by the proposed Project to ensure that it does not spread to adjoining lands.

Fire Protection Plan

A Fire Protection Plan would help reduce the risk of fires and minimize the dangers posed by fires during construction and operation phases of the proposed Project. Because the proposed Project would be located in remote and isolated locations, the dangers posed by fire may be increased. The objective of this plan would be to eliminate causes of fire, minimize the potential loss of life and property by fire, and comply with Occupational Safety and Health Administration (OSHA) standards on fire prevention. It also would provide information and guidelines to assist in recognizing, reporting, and controlling fire hazards.

Stream, Wetland, Well, and Spring Protection Plan

General water quality is protected under the Federal Clean Water Act (CWA), and a permit may be required if a project would result in discharges to regulated WUS. The purpose of a Stream, Wetland, Well, and Spring Protection Plan would be to describe measures to protect those resources from potential impacts during construction, operation, and maintenance activities. The plan would describe avoidance, minimization, and mitigation measures and would be intended for use as a guide to determine the appropriate site-specific measures to be implemented during construction activities. The goals of the plan would be to prevent and control the proposed Project-related erosion and sedimentation into streams and wetlands, minimize disturbance and erosion of streambeds and banks, and protect springs and wells from Project impacts due to blasting and hazardous materials contamination.

Soil Management Plan

A Soil Management Plan would define procedures for managing soils that are excavated during construction, along with plans for their storage and later reuse. This plan is often an appendix to a SWPPP. In addition to clean soil excavation, the plan would outline procedures for segregation of potentially contaminated soils, sampling and analysis of those soils, and disposal options if that becomes necessary. It also would define how topsoil would be segregated and stored, how stockpiles will be managed and protected, and used in site restoration. Use of topsoil for restoration activities would be described in the Reclamation, Vegetation, and Monitoring Plan. Erosion and sediment controls for excavated soil would also be discussed.

Reclamation, Vegetation, and Monitoring Plan

The Reclamation, Vegetation, and Monitoring Plan would be prepared for the BLM and Western to address the reconstruction of disturbed ecosystems by returning the land to a stable and productive condition. It would describe reclamation, revegetation, native plant management, and noxious and invasive weed control, with the purpose of restoring areas impacted by construction, operation and maintenance, and decommissioning. The plan would distinguish between Interim Reclamation Activities and Final Reclamation Activities with corresponding goals and objectives. Such plans typically include predisturbance site characterization, waste material management, site preparation and seeding, the use of native seeds, invasive species management, and compliance and effectiveness monitoring. Plan elements would help protect subsurface integrity and eliminate sources of ground and surface water contamination. Implementation of these elements would also maintain the biological, chemical, and physical integrity of the topsoil and subsoil, and reestablish slope stability and surface stability.

Health and Safety Plan

A HASP is not typically required by Federal law; however, section 18 of the Occupational Safety and Health Act of 1970 encourages States to develop and operate their own safety and health programs in the workplace. In New Mexico, the Occupational Health and Safety Bureau, part of the New Mexico Environment Department (NMED), has the responsibility of enforcing Occupational Health and Safety Regulations. In Arizona, the Arizona Division of Occupational Safety and Health is responsible for enforcement and voluntary compliance.

The purpose of a HASP would be to ensure the safety of the proposed Project employees, construction personnel, and the public. The HASP would be tailored specifically for the proposed Project, and would include a description of hazards that may be encountered during the life of the proposed Project. The HASP would detail employee safety training procedures that would be used, structural and non-structural safety controls that would be put in place, personal protective equipment that would be required, emergency response procedures, protocols for project-specific procedures such as confined space entry, and applicable standards, practices, and procedures specified by OSHA (29 CFR 1910).

Avian Protection Plan

An Avian Protection Plan would be a project-tailored plan designed to reduce avian electrocution and collision mortality that result from avian interactions with electric utility facilities. The overall goal of an APP is to reduce avian mortality. The 2005 Avian Power Line Interaction Committee (APLIC) and FWS APP Guidelines (APLIC 2005) provide a framework, along with principles and examples of APPs.

The APP would be designed as a living document to be continually evaluated and refined over the life of the proposed Project. The elements of the APP would include training, permit compliance, construction design and siting standards, nest management, a reporting system, risk assessment for evaluating the risks posed to migratory birds. The plan would also identify areas and issues of concern, mortality reduction measures, and avian enhancement options.

Waste Management Plan

The purpose of the WMP would be to outline non-hazardous waste handling procedures to be used during the construction, operation, and maintenance phases of the proposed Project and to identify expectations for minimizing waste and recycling processes. Waste addressed in this plan would include all non-hazardous waste resulting from construction and land clearing, as well as material that is recycled, reused, salvaged, or disposed of as garbage.

The WMP would attempt to predict the quantities and types of waste that will be generated during the construction, operation, and maintenances phases of the proposed Project, identify the final destination of that waste, and estimate waste management costs. The WMP would consider waste diversion goals and objectives, and would explore recycling and reuse alternatives.

Helicopter Flight Plan/Flight and Safety Plan

The Helicopter Flight and Safety Plan would describe the hours and estimated number of days that a helicopter would operate for construction of the proposed Project, the type and number of helicopters that would be used, and the kind of work to be performed. Additional information presented in this plan would include the location, size, and number of staging areas for helicopter takeoffs and landings, and safety measures to be implemented during helicopter operations. This plan would be reviewed and approved by the Federal Aviation Administration (FAA) prior to the commencement of helicopter operations.

Decommissioning Plan

The Decommissioning Plan would detail how the structures and facilities of the proposed Project would be removed after the useful life of the Project is reached, and how the affected properties would be reasonably restored in accordance with the BLM ROW grant. This plan would be a general outline of how the proposed Project would be decommissioned and how land would be restored to its original condition. Decommissioning procedures described would include the removal of structures, disposal of waste, and identification of what, if anything, may remain on the land upon completion. Restoration would include the stabilization and revegetation of the disturbance area to minimize erosion and return the land to productive use.

MAPPING AND ENVIRONMENTAL AWARENESS PROGRAM

The final POD would include a map package of sensitive resources to be considered during construction, operation and maintenance. The map package would be used to support a Worker Environmental Awareness Program (WEAP). All construction crews and contractors would be required to participate in WEAP training prior to starting work on the proposed Project. The WEAP training would include a review of the map package, which would depict special status species, WUS, riparian habitat, culturally sensitive areas (though not site locations), paleontological resources, and other sensitive resources that could be impacted by the proposed Project, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained during the construction period.

Right-of-Way and Land Acquisition

New permanent and temporary ROW land rights would be required for the New Build Section components and may be required in areas along the Upgrade Section, depending on the final construction approach for upgrading the existing Western line.

The requested ROW width for the New Build Section 345-kV double-circuit transmission line is 200 feet. The anticipated ROW width for the Upgrade Section 230-kV transmission line is 150 feet. These ROW widths have been requested to allow for the safe movement and operation of construction, operation, and maintenance equipment and to allow for sufficient clearance between conductors and the ROW edge, as well as equipment like bucket trucks, as required by the National Electric Safety Code (NESC). Southline is also requesting ROWs for ancillary Project facilities and for access to the transmission line.

Temporary ROWs are also being requested for construction of the proposed Project facilities. These temporary use areas would include access to work areas at transmission line structure locations, material laydown yards, and staging areas. Construction activities would be expected to occur over a 24-month period. Permanent ROWs for access roads to structure sites are also being requested in order to conduct maintenance throughout Project operation.

Before the start of construction of a project element, Southline would obtain a complete project element ROW through a combination of a ROW grant, SUP, and easements from applicable Federal, State, and local governments, tribes, and private landowners. As necessary, Southline would coordinate with agencies and landowners to obtain right-of-entry permissions for preconstruction environmental and engineering surveys and geotechnical drilling at selected locations. Geotechnical drilling on Federal lands may require additional environmental analysis and field clearance under NEPA.

Additional ROW may be required, depending upon site geography and terrain. These areas are identified to the extent possible during the NEPA process; however, some needs might be identified during the final engineering, preconstruction, or construction phases of the proposed Project. In some areas, longitudinal access roads would be sited within the transmission line ROW. In other areas, spur roads would connect existing roads to the transmission line ROW. Specific access road locations would be identified in the POD and subject to BLM approval through the ROD, as well as through the issuance of notice to proceed from the BLM. These areas would be subject to field surveys for cultural and biological resources, including native plant surveys and salvage prior to any disturbance. Planned access roads would be surveyed and ROW easements obtained from the landowners. All applicable BMPs and mitigation would apply.

Geotechnical Studies

Preconstruction foundation testing/geotechnical investigation activities would take place along the ROW before the start of construction. Geotechnical testing would test conditions at structure foundation locations and would involve soil borings. It is estimated that two 3-men crews equipped with a drill truck and a pick-up truck would perform the borings, which are typically 6 to 8 inches in diameter and 3 to 40 feet deep. These activities are not anticipated to be needed at every structure location. It is anticipated that 1 boring per mile would be required on average, with special emphasis given to major angle points and apparent changes in geology. Existing access would be used wherever possible to facilitate these surveys; however, cross-country travel may be necessary. In areas where cross-country travel is needed, this access would be designed to follow future access road routes to minimize disturbance. All preconstruction activities on public land would be authorized by the BLM before implementation.

Surveying

Land survey for engineering and staking of Project facilities would occur on public and private lands before construction. The land surveys would mark authorized boundaries for all Project elements, including the transmission line ROW, transmission line structures, access roads, etc. The ROW and access roads would also be flagged before the start of construction to indicate areas approved for activity and ground disturbances and to minimize impacts to surrounding areas. All flagging, fencing, and other markings, if used, would be maintained until postconstruction final cleanup and/or reclamation is complete. Once complete, all marking materials would be removed.

Preconstruction Resource Surveys

Before starting construction, Southline would be required to conduct resource surveys. These include both surveys performed to identify locations of sensitive resources where mitigation measures, including marking exclusion areas, would be applied to reduce impacts, and clearance surveys, which must be performed within a specified amount of time before construction begins. These latter could include surveys for listed species or for nesting birds, depending on season.

Preconstruction Meetings

Preconstruction meetings between Southline, BLM, Western, Coronado National Forest, Reclamation, NMSLO, and ASLD would be held before issuance of a formal notice to proceed and before any surface-disturbing activities take place. These meetings would serve as an introduction for all the appropriate parties to understand their roles and responsibilities on the proposed Project, and would provide an understanding of Project procedures and protocols, environmental constraints, and the construction schedule.

2.4.2 Project Components

Overhead Transmission Line and Ancillary Facilities

The design characteristics for the proposed Project are described in the following sections. Project design, construction, operation, and maintenance, and decommissioning would meet or exceed current NESC requirements for safety.

TRANSMISSION LINE STRUCTURES

New Build Section 345-kV Structures

Two types of galvanized steel structures could be potentially used for the 345-kV transmission line: these include self-supporting lattice and monopole tubular structures, as shown in figures 2-3 through 2-7 (see also table 2-1).

Table 2-1. Typical Design Characteristics of the Proposed New Build Section 345-kV Transmission Line

Feature	Proposed (Description)	Option (Description)
General Description		
Structure type	Self-supporting steel lattice structures (see figures 2-3 through 2-5)	Tubular steel poles (see figures 2-6 and 2-7)
Structure height	110–170 feet	90–150 feet
Span length	1,000–1,400 feet	800–1,100 feet
Number of structures per mile*	4–5	4–6
ROW width[†]	200 feet	
Electrical Properties		
Normal voltage	345,000 volts (345 kV)	
Capacity	1,000 MW (initial) 2,000 MW (ultimate)	
Circuit configuration	Double-circuit	
Conductor size[‡]	792–1,272 kcmil ACSR (two subconductors per phase)	
Shield wire size[‡]	7/16-inch extra-high-strength steel wire	
Ground clearance of conductor[§]	30 feet	

Notes: ASCR = aluminum conductor steel reinforced; kcmil = a thousand circular mils (a unit used to express large conductor sizes).
* Variable, depending on structure type and terrain.
[†] During design, a wider temporary and/or permanent ROW may be needed only in specific locations to accommodate rough terrain or long spans.
[‡] Shield wire size: one shield wire position to be occupied by optical ground wire about 0.5 inch in diameter with 48 optical fibers.
[§] Design minimum at temperature of 100 degrees Celsius.

The use of either a lattice structure or tubular steel structure would be primarily based on site-specific engineering design needs, as well as economic and visual considerations, or delivery timing.

The lattice structures would be constructed of galvanized steel with a height ranging from 110 to 170 feet and a width at the base of approximately 25 feet. The exact height of the structure would be determined by topography and design requirements for conductor clearance. The distance between each structure would depend on site-specific characteristics but would generally be an average of 1,200 feet (or approximately 4 to 5 structures per mile). Spacing between structures would be designed to allow for the longest spans practical for this type of construction. Each structure would have four legs, each set on concrete foundations placed in the ground. Foundation depths would be consistent with geotechnical conditions at each structure site, and the lattice structure holes would, on average, be approximately 4 feet in diameter each and would range from approximately 18 feet deep up to 50 feet deep, depending on the structure type and geological conditions. See discussion below for temporary and permanent disturbance estimates for structure foundations.

Figure 2-3. Typical 345-kV tangent lattice structure diagram.

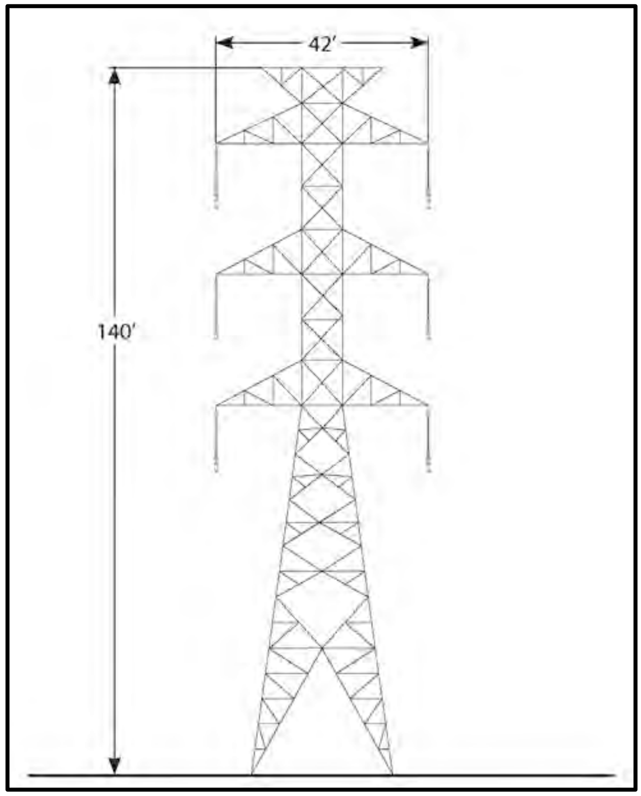


Figure 2-4. Typical 345-kV angle lattice structure diagram.

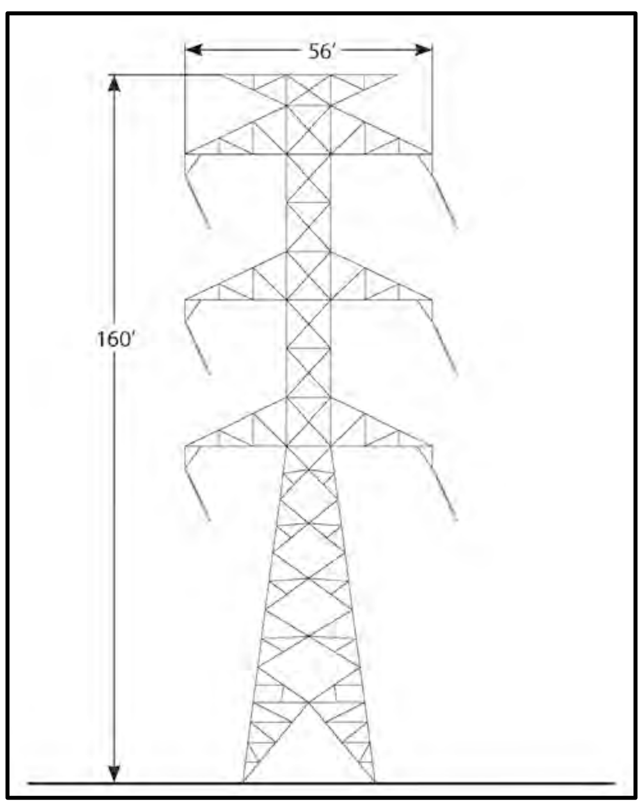


Figure 2-5. Typical 345-kV dead-end lattice structure diagram.

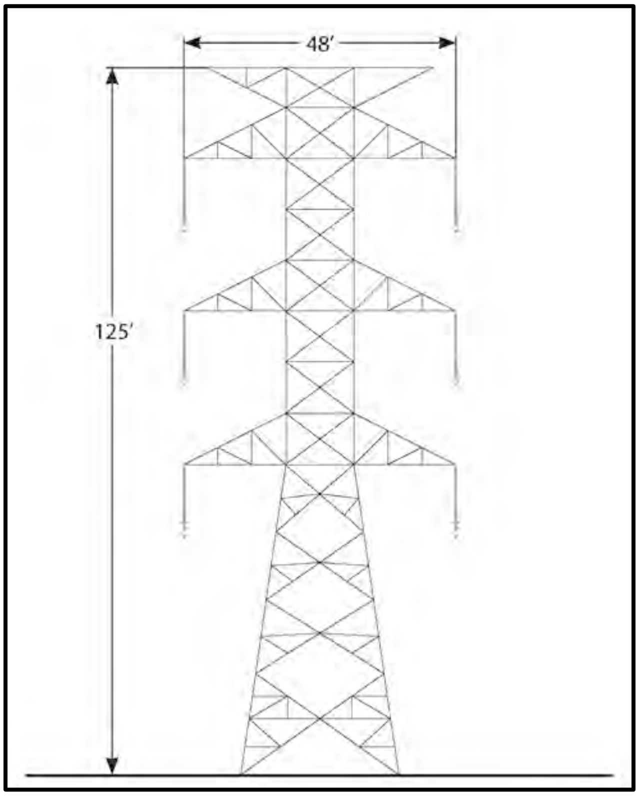


Figure 2-6. Typical 345-kV tangent tubular steel pole diagram.

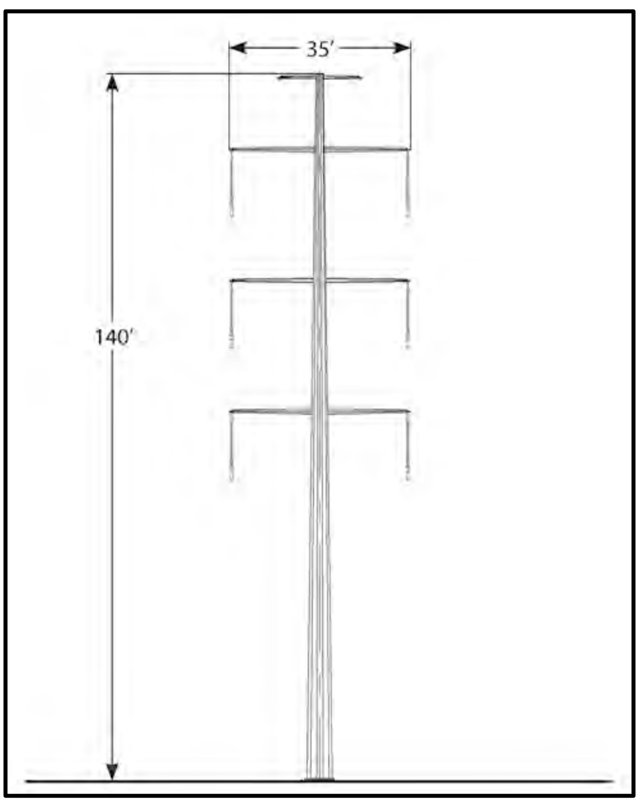
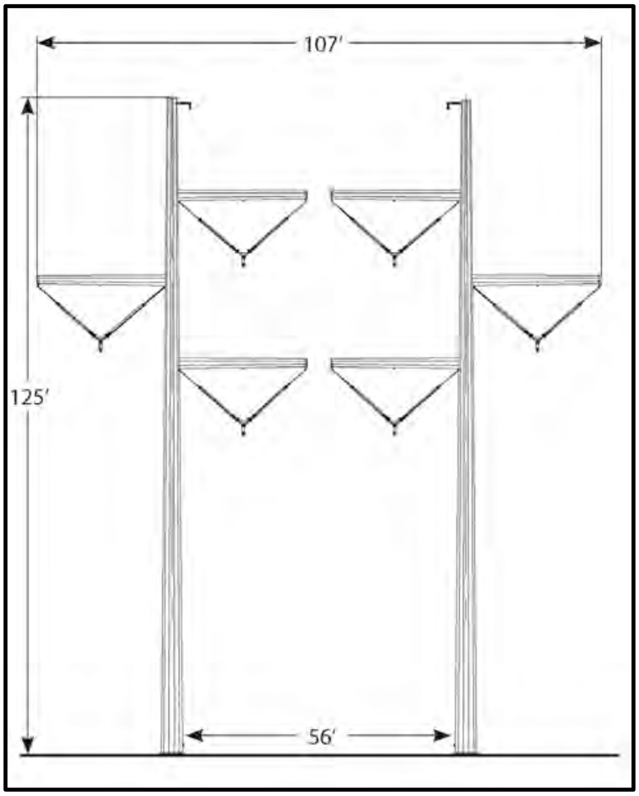


Figure 2-7. Typical 345-kV transposition tubular steel pole diagram.



To accommodate the 345-kV line, the tubular steel poles are expected to be constructed of galvanized or self-weathering steel and would range in height from 90 to 150 feet. The exact height of the structure would be determined by topography and design requirements for conductor clearance. The tubular steel poles would have an approximate diameter at the structure base of 7 to 8 feet and would range from approximately 18 feet deep up to 50 feet deep, depending on the structure type and geological conditions. Foundation depths would be consistent with geotechnical conditions at each structure site. The distance between each structure would depend on site-specific characteristics but is expected to be an average of approximately 900 feet (or approximately 5 to 6 structures per mile). Spacing between structures would be designed to allow for the longest spans practical for this type of construction. Tubular steel poles would be set on a concrete foundation placed in the ground. See discussion below for temporary and permanent disturbance estimates for structure foundations.

Structure selection and individual structure placement would be determined during the final design phase of the Project. The height and spacing of each structure would also be determined during the final design phase of the plan and profile drawings, would be based on detailed engineering, and would depend on the type of terrain. Aerial marker spheres or aircraft warning lighting may be required in certain locations in accordance with FAA requirements. Structure height and proximity to airports are the main factors in determining whether FAA regulations would apply. It should be noted that the Department of Homeland Security, U.S. Customs and Border Protection (CBP), and/or DOD may have additional requirements. Electrical properties, as described in table 2-1, indicate that the initial capacity on the New Build Section line would be 1,000 MW, but could ultimately be up to 2,000 MW. The proposed Project has been designed to meet a proposed WECC path rating of 1,000 MW in each direction. Studies conducted to date in support of the WECC path rating indicate that the proposed Project would be limited to approximately 1,000 MW to ensure a high degree of reliability in the transmission system. If the existing system is improved and the elements limiting the proposed Project's rating are upgraded, then the Project could potentially have a higher rating in the future based on its physical capacity, which would need to be confirmed with new WECC studies.

Upgrade Section 230-kV Structures

The 230-kV double-circuit transmission line is proposed to be tubular steel structures (figures 2-8 through 2-11; see also table 2-2). To accommodate the 230-kV line, the tubular steel structures are expected to be constructed of galvanized or self-weathering steel, with a height ranging from 100 to 140 feet. The exact height of the structure would be determined by topography and safety requirements for conductor clearance. Most tubular steel poles would have an approximate diameter at the structure base of 6 feet or less.

Table 2-2. Typical Design Characteristics of the Proposed Upgrade Section 230-kV Transmission Line

Feature	Proposed (Description)
General Description	
Structure type	Tubular steel poles (see figures 2-8 through 2-11)
Structure height	100–140 feet
Span length	700–1,100 feet
Number of structures per mile*	5–6
ROW width†	150 feet
Electrical Properties	
Normal voltage	230,000 volts (230 kV)
Capacity	1,000 MW (initial) 1,500 MW (ultimate)
Circuit configuration	Double-circuit
Conductor size	1,272–kcmil ACSS (1 subconductor per phase)
Shield wire size‡	7/16-inch extra high-strength steel wire
Ground clearance of conductor§	28 feet

Notes: ACSS = aluminum conductor steel reinforced; kcmil = a thousand circular mils (a unit used to express large conductor sizes).
* Variable, depending on structure type and terrain.
† During design, a wider temporary and/or permanent ROW may be needed only in specific locations to accommodate rough terrain or long spans.
‡ Shield wire size: one shield wire position to be occupied by optical ground wire about 0.5 inch in diameter with 48 optical fibers.
§ Design minimum at temperature of 200 degrees Celsius.

The distance between each structure would depend on site-specific characteristics but is expected to be an average of 900 feet (or approximately 5 to 6 structures per mile). By comparison, the distance between existing structures averages approximately 700 feet. Therefore, although the proposed new structures that would be replacing the old structures would be taller, there would be fewer structures per mile. Spacing between the proposed structures would be designed to allow for the longest spans practical for this type of construction. Each structure would be either directly embedded or foundation mounted in concrete. See discussion below for temporary and permanent disturbance estimates.

Electrical properties, as described in table 2-2, indicate that the initial capacity on the Upgrade Section of the proposed line would be 1,000 MW, but could ultimately be up to 1,500 MW. The proposed Project has been designed to meet a proposed WECC path rating of 1,000 MW in each direction.

Figure 2-8. Typical 230-kV direct embedded tangent tubular steel pole diagram.

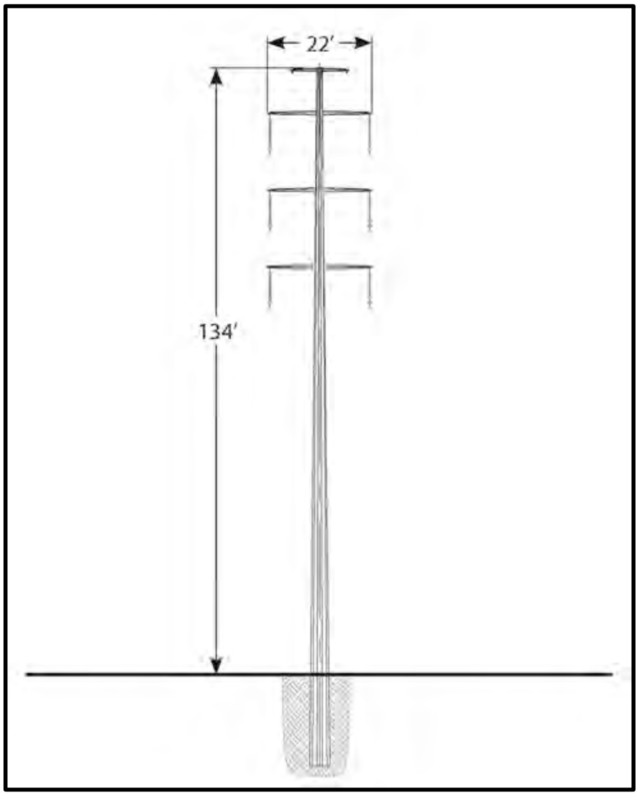


Figure 2-9. Typical 230-kV tangent tubular steel pole diagram (foundation type).

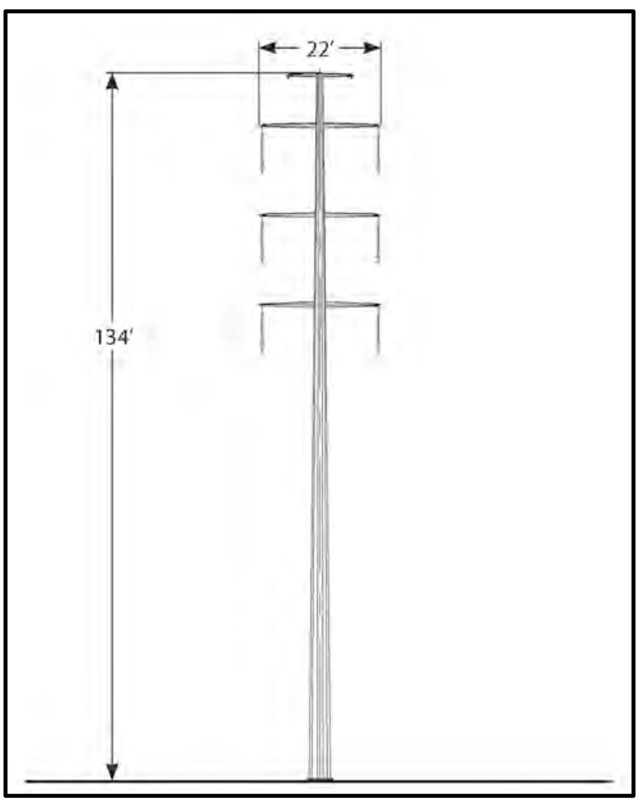


Figure 2-10. Typical 230-kV suspension angular tubular steel pole diagram.

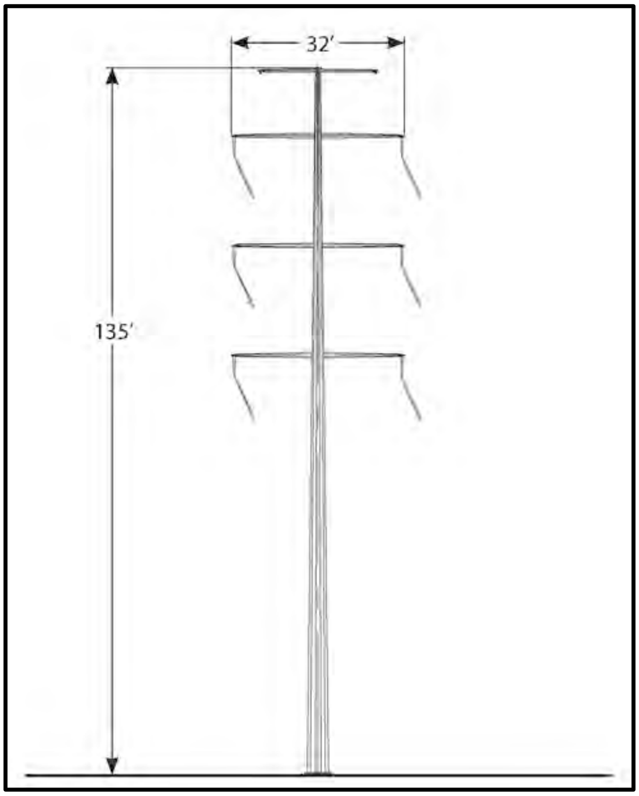
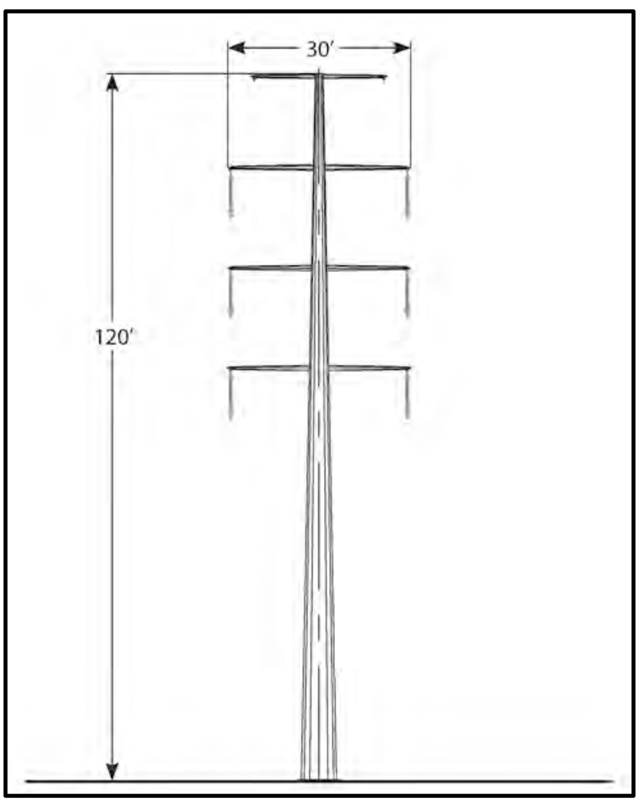
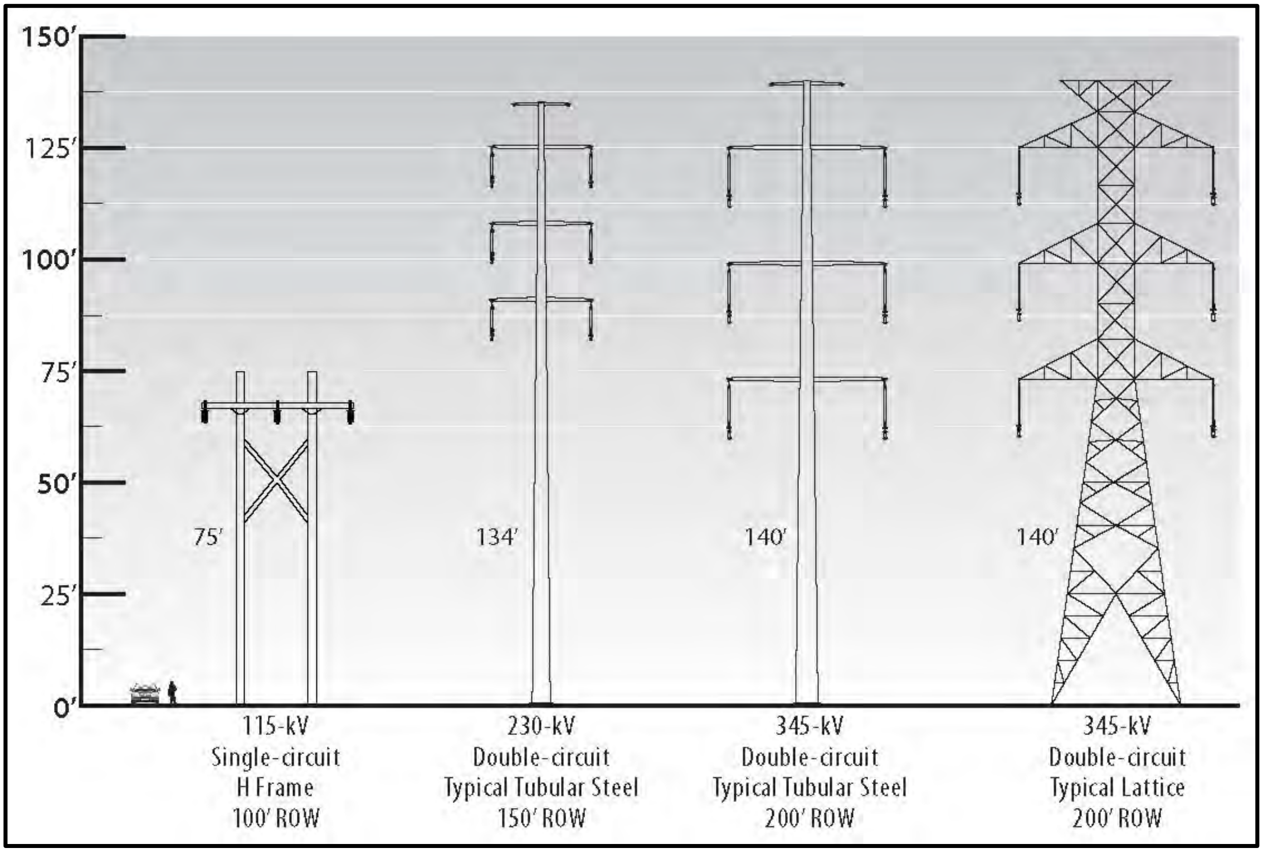


Figure 2-11. Typical 230-kV dead-end tubular steel pole diagram.



See figure 2-12 for a comparison of existing and proposed structure types.

Figure 2-12. Comparison of typical existing and proposed structure types.



Typical Structure Foundations

Depending on soil and structure type, lattice structures and tubular steel structures are typically supported by cast-in-place drilled concrete pier foundations with detailed design to be completed once site-specific soil conditions can be evaluated. For lattice structures, steel reinforcing cages and stub angles would be installed. For tubular steel structures, either steel reinforcing cages with anchor bolts would be installed or the poles would be embedded directly into the ground. In rocky areas, foundation holes may be excavated by drilling or blasting methods, or by installing special rock anchor or micro-pile type foundations. The rock anchoring or micro-pile system would be used in areas where site access is limited or where adjacent structures could be damaged as a result of blasting or rock hauling activities.

Each structure location would be evaluated individually during final engineering design to determine the recommended foundation dimensions and types. Anticipated structure type and associated foundation disturbance identified during final engineering would be accounted for in the final POD. However, for the purposes of analysis in this EIS, the number of each structure type that would be used for both the New Build and Upgrade sections was estimated in order to approximate total foundation disturbance.

Temporary and permanent land requirements for the foundations of the various types of both lattice structures and single-pole tubular steel structures for the 345-kV and 230-kV transmission lines are presented in table 2-3.

Table 2-3. Typical Structure Foundations – Temporary and Permanent Land Requirements

New Build Section	Disturbance Area
Temporary	
Structure work area	100 x 200 feet (20,000 square feet)
Wire pulling and tensioning (dead-end/angle)	200 x 500 feet (110,000 square feet)
Permanent	
Lattice (tangent)	1,225 square feet 35 x 35–foot structure base
Lattice (angle)	1,600 square feet 40 x 40–foot structure base
Lattice (dead-end)	2,025 square feet 45 x 45–foot structure base
Single-pole tubular steel pole (tangent)	40 square feet 7-foot-diameter foundation
Single-pole tubular steel pole (dead-end/angle)	100 square feet 2 poles x 8-foot-diameter foundation
Upgrade Section	
Temporary	
Structure work area	100 x 200 feet (20,000 square feet)
Wire pulling and tensioning (dead-end/angle)	150 x 500 feet (75,000 square feet)
Permanent	
Single-pole tubular steel pole (tangent)	30 square feet 6-foot-diameter foundation
Single-pole tubular steel pole (dead-end/angle)	50 square feet 8-foot-diameter foundation

Conductors

Conductor is the wire cable strung between transmission line structures through which the electric current flows. The New Build Section 345-kV double-circuit transmission line would consist of a double-conductor bundle with two subconductors per phase; there would be three phases. The subconductors are typically spaced approximately 18 inches apart in a vertical configuration. For the 230-kV transmission line Upgrade Section, it is anticipated that one conductor per phase would be used. The conductor would be sized to provide adequate current-carrying capacity while minimizing interference from audible noise and to radio operations.

To minimize wind vibration flowing over the conductors, vibration dampers would be used. The type and number of dampers needed would be determined during final design. Each conductor span is anticipated to have two stockbridge type vibration dampers per wire; each shield wire/optical ground wire is anticipated to have four spiral dampers per wire for the 345-kV lines and two spiral dampers per wire for the 230-kV lines. Vibration dampers could also act as bird diverters by making the conductors and shield wires more visible.

The minimum design height of the conductor aboveground at the maximum operating temperature would be 30 feet on the New Build Section and 28 feet on the Upgrade Section. Conductor phase-to-phase and phase-to-ground clearance parameters are determined in accordance with NESC American National Standards Institute (ANSI) C2. This code provides guidelines for the minimum distances between the conductors and ground, crossing points of other lines and the transmission support structure and other conductors, and minimum working clearances for personnel during energized operation and maintenance activities (Institute of Electrical and Electronics Engineers (IEEE) 2007).

APLIC standards—discussed later in Section 2.4.6, “Typical Design Features (Proponent Committed Environmental Measures and Best Management Practices)”—would be used in final design to minimize avian conflicts. The configuration of the bundle would be designed to provide adequate current-carrying capacity while minimizing interference from audible noise and to radio operations. Additionally, aerial marker spheres or aircraft warning lighting may be required for the conductor on certain spans in accordance with FAA guidelines.

Other Hardware

The transmission line structures would require the installation of insulators, overhead shield wires, grounding systems, and other minor hardware.

Insulators, which are made of an extremely low-conducting material, such as porcelain, glass, or polymer, are used to suspend the conductors from each structure. Insulators inhibit the flow of electrical current from the conductor to the structure. The assemblies of insulators are designed to maintain appropriate electrical clearances between the conductor, the ground, and the structure. The New Build Section would have insulator assemblies that consist of single string or two strings of insulators, predominantly in the form of a “V.” The Upgrade Section would have insulator assemblies that consist of suspension strings or braced post insulators.

Overhead shield wires and optical ground wires would be installed between each structure for lightning protection. Current from lightning strikes would be transferred through the ground wires and structures into the ground.

For the New Build and Upgrade sections, a grounding system would be installed at the base of each transmission structure that would consist of copper or copper-weld ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by buried copper or other suitable conductor.

Alternating current (AC) transmission lines have the potential to induce currents on adjacent metallic structures. To address induced-current effects on metallic facilities or structures within 200 feet of the proposed Project centerline, these structures would be properly grounded as needed. This would eliminate the electric shock potential a person may experience when touching a metallic object near the proposed Project. Typically, the NESC determines what structures beyond 200 feet or more from the centerline would require grounding. If grounding were required outside the ROW, a temporary use permit would be obtained, as needed.

In addition to the conductors, insulator, and overhead shield and optical ground wires, other associated hardware would be installed on the structure as part of the insulator assembly to support the conductors and shield wires. This hardware might include clamps, shackles, links, plates, and various other pieces composed of steel and aluminum.

Substations

The proposed Project involves interconnection with and upgrades of 14 existing substations along the Project route in New Mexico and Arizona, and the potential construction of a new substation facility proposed for Luna County, New Mexico (referred to as “Midpoint Substation”). A summary of substations associated with the proposed Project, land ownership, and the respective owner/operator is provided in table 2-4. Of the existing substations, there are two on BLM lands (Afton and Nogales), three on State lands in Arizona (Adams Tap, Pantano, and Tortolita), and eight on private land (Hidalgo, Apache, Vail, Del Bac, Tucson, DeMoss Petrie, Marana, and Saguaro).

Depending on the transmission line route, there are two options for the proposed Midpoint Substation: Midpoint North, along the Proponent Preferred; and Midpoint South, along the southern Proponent Alternative. The Midpoint North Substation would be on NMSLO State and private lands, whereas Midpoint South would be located on BLM land.

Table 2-4. Project Interconnection Substations (Existing and Proposed)

Interconnection Substation	Owner/Operator	Section	Land Status
Afton	EPEC	New Build	BLM
Midpoint*	Southline (owner); operator TBD	New Build	North: NMSLO and private South: BLM
Hidalgo	EPEC	New Build	Private
Apache	SWTC	Upgrade	Private
Adams Tap	Western	Upgrade	ASLD
Pantano	SWTC	Upgrade	ASLD
Vail	TEP	Upgrade	Private
Nogales	Western	Upgrade	BLM
Del Bac	Western	Upgrade	Private
Tucson	Western	Upgrade	Private
DeMoss Petrie	TEP	Upgrade	Private
Rattlesnake	Western	Upgrade	Reclamation
Marana	SWTC	Upgrade	Private
Tortolita	TEP	Upgrade	ASLD
Saguaro	APS	Upgrade	Private

* The Midpoint Substation is the only substation that is proposed; all other substations in this table are existing substations.

As shown in table 2-4, substations along the New Build Section include the existing Apache and Hidalgo substations, as well as the proposed Midpoint Substation in New Mexico. Substations along the Upgrade Section include Apache, Adams Tap, Pantano, Vail, Nogales, Del Bac, Tucson, DeMoss Petrie, Rattlesnake, Marana, Tortolita, and Saguaro. Substation expansions and upgrades vary by substation and are described below.

SUBSTATION FACILITIES: NEW BUILD SECTION

Three substations are included in the New Build Section. These include the existing Afton and Hidalgo substations, as well as the proposed Midpoint Substation (table 2-5). As noted above, there are two options for the proposed Midpoint Substation: Midpoint North and Midpoint South. The two Midpoint substations are options; only one would be built if the Project were approved.

Estimates for temporary and permanent disturbance at each substation are described below. Permanent disturbance estimates at the existing Afton and Hidalgo substations are areas where new facilities would be constructed outside the existing perimeter of the existing substations. Additional temporary disturbance areas would be used as a work area and/or laydown yard for the substation or transmission line construction. Total permanent disturbance area for the New Build Section substations would be approximately 60 acres plus 30 acres of temporary disturbance.

Disturbance from existing substations is quantified, along with proposed permanent and temporary disturbance for each substation, as described below. An analysis of all proposed disturbance is presented in detail in chapter 4.

Table 2-5. Project Substation Expansions and Additions, New Build Section

Substation	Permanent Disturbance (acres)	Additional Temporary Disturbance (acres)	Land Ownership
Afton	10	10	BLM
Midpoint North*	25	10	NMSLO and private
Midpoint South (alternative)*	25	10	BLM
Hidalgo	25	10	Private

* Proposed (new) substation.

Afton

The Afton Substation is an existing substation owned and operated by EPEC and is located southwest of Las Cruces, New Mexico. An additional 10 acres would be required to construct a new yard to accommodate the new 345-kV lines. Existing access to the site would be used for construction, operation, and maintenance. The new yard would be built adjacent to the existing switchyard on the west side. Within the existing substation, the control building would be used and existing main buses expanded to accommodate additional two line positions.

Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus supports, and transformers. Two line positions would be terminated in the existing switchyard. In addition, two line positions from the Luna and Diablo substations would be looped into the new yard. The maximum takeoff transmission line structure height would be 80 feet. If additional equipment is needed for technical reasons, such as line and/or bus compensation equipment, shunt reactor, or shunt capacitor, they would be located within the footprint of the new yard.

There would be approximately 20 acres of disturbance, 10 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 10 acres of which would be the permanent disturbance for the substation expansion. The majority of this proposed substation expansion area has been previously disturbed.

Hidalgo

The Hidalgo Substation is an existing substation owned and operated by EPEC and is located north of Lordsburg, New Mexico. An additional 25 acres would be required to construct a new yard to accommodate the new 345-kV transmission lines (four new line positions as well as a connection to the existing substation). Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus supports, and transformers. The existing substation buses would be expanded to accommodate an additional line position for connection to the new yard. A new control building would be required.

Transmission lines from the Midpoint (described below) or Afton substations and the Apache Substation would be terminated at Hidalgo. The maximum takeoff transmission line structure height would be 80 feet. Additional equipment like line and/or bus compensation equipment, shunt reactor, or shunt capacitor would be located within the footprint of the new yard.

There would be approximately 35 acres of disturbance, 10 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 25 acres of which would be the permanent disturbance for the substation expansion. The existing substation is located on private land but is surrounded by NMSLO lands. As a result, depending on the final footprint of the expansion and disturbance, portions of the substation expansion and construction yard could be located on NMSLO lands. Approximately 6 acres of this proposed substation expansion area have been previously disturbed; the remainder is undisturbed lands.

Midpoint

A new substation in New Mexico is proposed as part of the Project. Depending on the transmission line route, there are two options for the proposed Midpoint. The Midpoint North Substation would be located near I-10 east of Deming, New Mexico. The Midpoint South Substation would be located south of NM 9 and east of Columbus, near the U.S.–Mexico border in southern New Mexico.

The new substation would include approximately 25 acres for the facility; five to six transmission lines would be terminated at the substation. Equipment installed would include 345-kV circuit breakers, disconnect switches, bus supports, transformers, transmission line termination structures, and line reactors. See figure 2-13 for an example of a 345-kV substation and what the Midpoint Substation could look like.

Figure 2-13. Example of a 345-kV substation.

The maximum takeoff transmission line structure height would be 80 feet. A small control building would be constructed to accommodate necessary system communications and control equipment. Additional equipment like line and/or bus compensation equipment, shunt reactor, or shunt capacitor would be located within the footprint of the new yard.

There would be approximately 35 acres of disturbance, 10 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 25 acres of which would be the permanent disturbance for the substation construction. Neither of the proposed Midpoint Substation locations has been previously disturbed; both are located on undisturbed lands.

SUBSTATION FACILITIES: UPGRADE SECTION

Twelve existing substations would be improved as part of the Project Upgrade Section (table 2-6; see figures 2-2a and 2-2b). Seven of these 12 substations are located on private land, 1 is located on Reclamation land (Rattlesnake), 1 is located on BLM land (Nogales), and 3 are located on ASLD lands (Adams Tap, Pantano, and Tortolita). Substation improvements, which are needed to accommodate the 230-kV transmission line upgrade as part of the Upgrade Section, would generally include new yard expansions, line and/or bus compensation equipment, shunt reactor or shunt capacitors, and installation of new transformers, in addition to construction laydown areas. See figure 2-14 for a representative photograph of a 230-kV substation.

Figure 2-14. Example of a 230-kV substation.

Total new permanent disturbance for the existing substations would be approximately 74 acres for the new yard expansions at each of the 12 existing substations. Additional temporary disturbance of up to 46 acres for each of the existing substations would be used for the transmission line and substation construction laydown yard, with the total disturbance area for substation expansion approximately 120 acres. Although the design of transmission line entrances into an existing substation and/or substation expansion is typically dictated by voltage, existing configuration, and future needs, final design of these proposed Project elements would be sited in previously disturbed areas as much as possible.

Proposed permanent and temporary disturbance at each substation in the Upgrade Section is listed in table 2-6 and analyzed in chapter 4. If a proposed substation expansion area is previously disturbed, that disturbance is quantified in the substation description.

Table 2-6. Project Substation Expansions, Upgrade Section

Substation	Permanent Disturbance (acres)	Additional Temporary Disturbance (acres)	Land Status
Apache	28	10	Private
Adams Tap	4	0	ASLD
Pantano	5	5	ASLD
Vail	5	5	Private
Nogales	5	4	BLM

Table 2-6. Project Substation Expansions, Upgrade Section (Continued)

Substation	Permanent Disturbance (acres)	Additional Temporary Disturbance (acres)	Land Status
Del Bac	5	5	Private
Tucson	3.7	0	Private
DeMoss Petrie	0	0	Private
Rattlesnake	5	5	Reclamation
Marana	5	5	Private
Tortolita	1.4	0	ASLD
Saguaro	7	7	Private

Apache

The Apache Substation is an existing substation owned and operated by SWTC, located southwest of Willcox Playa in Arizona. This substation is the west end of the proposed 345-kV line (New Build Section) and the east end of the proposed upgrade of Western's existing Tucson–Apache 115-kV line to 230 kV (Upgrade Section). Existing access to the site would be used for construction, operation, and maintenance.

The existing Apache 230-kV yard is almost completely built out; a new 28-acre 345-/230-kV yard would be constructed adjacent to the existing substation to handle power on the new 345-kV line and power on the upgraded 230-kV line. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, transformers, and a static volt ampere reactive compensator. One line upgraded from 115 to 230 kV from the Adams Tap Substation, one 230-kV transmission line from Pantano Substation, and one tie line to the existing 230-kV yard would terminate at the new 230-kV yard. Two 345-kV line positions from the Hidalgo Substation would terminate at the new 345-kV yard. Two transformer positions would be installed at each of the 230- and 345-kV yards (four total). The maximum takeoff transmission line structure height would be 80 feet. A new control building would also be required. None of this proposed substation expansion area has been previously disturbed.

The existing yard would have its last available position built out to connect to the new yard. Equipment to be installed within the existing yard would include a circuit breaker and associated equipment, high-voltage switches, and bus supports.

Additional equipment, such as line and/or bus compensation equipment, a shunt reactor, or shunt capacitors, would be located within the footprint of the new yard. There would be approximately 38 acres of disturbance, 10 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 28 acres of which would be the permanent disturbance for the substation expansion.

Adams Tap

The Adams Tap Substation is an existing 115-kV substation owned and operated by Western. The Adams Tap Substation is located on lands managed by the ASLD, between Benson, Arizona, and the Apache Substation. Western's existing Tucson–Apache 115-kV line passes through this substation.

A new 4-acre yard would be built adjacent to the existing switchyard, and would accommodate 230-kV line positions from the Apache and Nogales substations. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and a transformer. A 230-/115-kV transformer would be installed in the new yard. A new control building would also be required. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 4 acres of permanent disturbance. No temporary disturbance is anticipated. Approximately 0.5 acre of this proposed substation expansion area has been previously disturbed; the remainder is undisturbed lands.

Pantano

The existing Pantano Substation is owned and operated by SWTC. However, the Pantano Substation could not easily be expanded to accommodate additional 230-kV line positions from the Apache and Vail substations. As a result, it is anticipated that a new 230-kV substation would be built close to the existing substation. The new substation would consist of two bays for four line positions but would have enough room to expand to four bays or eight line positions ultimately. New 230-kV lines from Apache and Vail substations would be routed into this substation. This substation would also loop in the existing SWTC 230-kV line from Apache to Bicknell. Another potential option involves adding an additional 230-/115-kV transformer position and transformer to feed SWTC's existing 115-kV line to Kartchner Substation. This option would enable the existing substation to be decommissioned. Slightly expanded existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus supports, and transformers.

There would be approximately 10 acres of disturbance, 5 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion, including any new access. Approximately 2 acres of this proposed substation expansion area have been previously disturbed; the remainder is undisturbed lands.

Vail

The existing Vail Substation is owned and operated by TEP, located between the Pantano Substation and suburban Tucson along the south side of I-10. An additional 5 acres for a 230-kV yard would be required to house two additional 345-/230-kV transformer positions. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. The expansion would be built to accommodate 230-kV line positions from the Pantano and Tucson substations. In addition, two 345-/230-kV transformer positions would be installed. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 10 acres of disturbance, 5 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion. Approximately 3.5 acres of this proposed substation expansion area have been previously disturbed; the remainder is undisturbed lands.

Nogales

The Nogales Substation is owned and operated by Western and is located on BLM land south of I-10 on South Wilmot Road. Western's existing Tucson–Apache 115-kV line passes through this substation. A new 5-acre yard would be constructed to accommodate 230-kV line positions from Adams Tap and Del

Bac substations. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. One 230-/138-kV transformer position may be installed. The maximum takeoff transmission line structure height would be 60 feet. Additional equipment such as line and/or bus compensation equipment, a shunt reactor, or shunt capacitor would be located within the footprint of the new yard.

There would be approximately 9 acres of disturbance, 4 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion. Approximately 1.5 acres of this proposed substation expansion area have been previously disturbed; the remainder is undisturbed lands.

Del Bac

The Del Bac Substation is an optional stop for the proposed Project located on land owned in fee by Western, within a larger privately owned parcel; the substation is operated by Western. The existing substation is located on the north side of Valencia Road and west of I-19 in Tucson. Western's existing Tucson–Apache 115-kV line passes through this substation.

Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. An additional 5 acres for a 230-kV yard would be required to accommodate 230-kV line positions from the Nogales and Tucson substations. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 10 acres of disturbance, 5 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion. Less than 1 acre of this proposed substation expansion area has been previously disturbed; the remainder is undisturbed lands.

Tucson

The Tucson Substation is an existing substation owned and operated by Western, located on the north side of Grant Road, east of I-10 in Tucson. Western's existing Tucson–Apache 115-kV line "ends" at, and Western's existing Saguaro–Tucson 115-kV line "begins" at, this substation.

A new 3.7-acre 230-kV yard would be built to accommodate four 230-kV line positions from the Vail, Del Bac, Rattlesnake, and Tortolita substations. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. Three transformer positions would be installed, including one 230-/115-kV transformer position and two 230-/138-kV transformer positions. The low side of the transformers would be tied to existing 115-kV bus at the Tucson Substation and existing 138-kV bus at the DeMoss Petrie Substation. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 3.7 acres of permanent disturbance. No temporary disturbance is anticipated. All of this proposed substation expansion area has been previously disturbed.

DeMoss Petrie

The DeMoss Petrie Substation is an existing substation owned and operated by TEP, located on the north side of Grant Road, east of I-10 in Tucson. The DeMoss Petrie Substation is directly adjacent to the

Tucson Substation. The upgraded 115-kV Saguaro–Tucson Western line would interconnect to the DeMoss Petrie Substation through a new double-circuit 138-kV line from the adjacent Tucson Substation. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the existing yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, and bus work supports. The new 138-kV line would be 800 to 1,100 feet long outside the existing substation fence, depending on the final alignment; this would require two to five monopoles between the DeMoss Petrie and Tucson substations.

The existing 138-kV buses at the DeMoss Petrie Substation would be expanded for two additional 138-kV line positions. Disturbance associated with the 138-kV line is considered in the disturbance estimates for the Upgrade Section of the proposed Project. All of this proposed substation expansion area has been previously disturbed.

Rattlesnake

The existing Rattlesnake Substation is owned and operated by Western and is located northwest of Twin Peaks and North Sandario roads in Tucson. Western's existing Saguaro–Tucson 115-kV line passes through this substation. A new 5-acre 230-kV yard would be constructed to accommodate 230-kV line positions from the Tucson and Marana substations. In addition, one 230-/115-kV transformer position would be installed. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. The low side of the transformer would be tied to the existing facility. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 10 acres of disturbance, 5 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion. Approximately 1 acre of this proposed substation expansion area has been previously disturbed; the remainder is undisturbed lands.

The existing substation is located on Reclamation land but is surrounded by ASLD lands. As a result, depending on the final footprint of the expansion and disturbance, portions of the substation expansion and construction yard could be on ASLD lands.

Marana

The existing Marana Substation is located at Silverbell and North Trico roads and is owned and operated by SWTC. Western's existing Saguaro–Tucson 115-kV line passes through this substation. A new 5-acre 230-kV yard would accommodate 230-kV line positions from the Rattlesnake and Saguaro substations. In addition, one 230-/115-kV transformer position would be installed. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 10 acres of disturbance, 5 acres of which would be used for the transmission line construction and as a substation laydown yard and be reclaimed, and the other 5 acres of which would be the permanent disturbance for the substation expansion. Approximately 2 acres of this proposed substation expansion area have been previously disturbed; the remainder is undisturbed lands.

Tortolita

The existing Tortolita Substation is owned and operated by TEP, located on lands managed by the ASLD. The substation is east of I-10 and south of Red Rock. A new 1.4-acre 230-kV yard would accommodate a 230-kV line position from the Tucson Substation and a 500-/230-kV transformer position. The high side of the transformer would terminate into a new position in the existing 500-kV yard. Existing access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 1.4 acres of permanent disturbance. No temporary disturbance is anticipated. Less than 0.5 acre of this substation expansion area has been previously disturbed; the remainder is undisturbed lands.

Saguaro

The Saguaro Substation is an existing substation owned and operated by APS and located on private land north of the Tortolita Substation. Western's existing Saguaro–Tucson 115-kV line "ends" at this substation. A new 7-acre 230-/115-kV yard would be built on the west side of I-10 across from the existing substation. One line from the Marana Substation would terminate at the new 230-kV yard, and two tie lines to the existing 115-kV yard would terminate at the new 115-kV yard. The termination of Western's existing Electrical District 5 115-kV transmission line would be relocated from the existing 115-kV yard to the new 115-kV yard. Two transformer positions would be installed at each of the 230- and 115-kV yards (four total). Existing and new access to the site would be used for construction, operation, and maintenance. Equipment to be installed within the new yard would include circuit breakers and associated equipment, high-voltage switches, transmission line termination structures, bus work and supports, and transformers. The maximum takeoff transmission line structure height would be 60 feet.

There would be approximately 14 to 23 acres of disturbance. Seven acres would be temporarily disturbed during transmission line construction and used as a substation laydown yard; these areas would be reclaimed. Seven acres would be permanently disturbed during expansion of the substation, and up to 9 acres would be permanently disturbed for access road use. None of this proposed substation expansion area has been previously disturbed.

Access Roads

Access roads would be required during construction for the movement of trucks, cranes, concrete trucks, earthmoving bulldozers, and other light and heavy construction equipment to and along the ROW. Access roads would also serve as the primary means of movement for construction crews and Project materials. During operation, these roads would be needed to access transmission lines, substations, and ancillary facilities for period line inspections and scheduled and emergency maintenance over the life of the Project. As such, access roads must be sufficient to support the weight of construction equipment; upon completion of the proposed Project, access roads would be used by operation and maintenance vehicles.

The proposed Project would be designed, as feasible, to use existing access roads with minimal improvement. The level of construction for access roads would range from unimproved cross-country travel to completely bladed roads (see below for a description of access types A–E). For example, unimproved cross-country travel access (two-track) would be on flat, sparsely vegetated areas, and would be used to maintain the maximum amount of native vegetation and minimize overall disturbance instead of creating new roads, as appropriate. Improvements to existing roads that would be used as access roads would occur in areas where occasional blading would be needed on rough spots and would transition to more blading with other improvements on steep, rocky, or rough country. The intent is to do no more than is necessary to get equipment in and out safely and to prevent erosion. All roads would be within designated ROW, whether inside the main transmission line ROW, or outside in a 30-foot access road ROW.

In areas where improvements are required, access roads would be graded, as needed, to provide a smooth travel surface. Such improvements could include blading, widening of the road, or installing drainage structures, such as culverts. No graveling or paving is planned. Typically, Project access roads would have a travel surface width of 12 to 16 feet but could have a maximum width of 24 feet, depending on site-specific circumstances, such as steep terrain, and where needed to accommodate expanded turning areas for cranes and pole trucks. Access road types that could be used for this Project include existing roads that require no improvements, existing roads that require improvements, and new access roads.

Access roads would be designed to go directly from structure to structure, except in difficult terrain or where sensitive resources need to be avoided. In such cases, the road would follow suitable topography from structure to structure and would be built in areas that generally cause the least amount of overall disturbance, which may be outside the ROW in cases of difficult terrain. Typically, where the line spans a river channel, or large steep-sided wash, access may come from either side to avoid damage to riparian vegetation.

The Access Road Plan for the proposed Project assumes that five primary types of access would be used:

- **Access Type A** – Access from adequate private roads. This type of access would be used when there is no existing road adjacent or parallel to the alignment, but where there is a patchwork of existing roads in the area that would be crossed by the proposed Project ROW, and could be used to access the ROW and get close to the structure locations. Grading between the existing roads and each structure location would only be conducted where necessary and would depend on site conditions. Grading and other improvements may not be necessary, depending on site conditions. Typically, overall disturbance would be limited to a width of 16 feet or less. The purpose of using existing access from private roads would be to minimize overall disturbance.
- **Access Type B** – Parallel to maintained public roads. This type of access would be used when the alignment roughly parallels a nearby public road that is either paved or has gravel surfacing. Short spur roads would be graded from the existing roads to each structure location. Except in rare cases, the existing roads would not be upgraded, but any damage to public roads from construction activities would be repaired. The purpose of access roads parallel to a nearby public road would be to consolidate and minimize overall disturbance.
- **Access Type C** – Parallel to existing utility roads. This type of access would be used when the alignment roughly parallels an existing utility that already has an existing access road. Spur roads would be graded from the existing utility roads to each structure location. Generally, the existing utility roads would be improved. Grading between the existing utility roads and each structure location would only be conducted where necessary and would depend on site conditions. Grading and other improvements may not be necessary, depending on site conditions. Typically, overall disturbance would be limited to a width of 16 feet or less. The purpose of access roads parallel to a utility road would be to consolidate and minimize overall disturbance.
- **Access Type D** – New down-ROW primary access. This type of access would only be used when access types A–C are not feasible. It would consist of a 16-foot-wide road (12-foot travel surface plus 2 feet on either side for berms/ditches). As much as possible, new access would be entirely within the ROW. Typically, new down-ROW access would be used if any parallel roads are more than 700 feet from the alignment. This access type would also normally be used for alignments

that parallel interstate highways and railroads because the owners of those facilities generally place restrictions on the use of their ROWs; these restrictions do not allow for the addition of spur roads or their related ROW crossings and gates in ROW fences.

- **Access Type E –** Spur roads–improved and unimproved access. Spur roads would be used to connect type A, B, and C access roads to the ROW and for temporary access to stringing and splicing sites. Spur roads would be a combination of improved (bladed) and unimproved (two-track) roads, with an average of one new spur road per mile for temporary access and approximately 5 spur roads per mile in areas where type A, B, and C access roads are used for permanent access to structure locations. Where necessary, these spur roads would be improved, and the roads would be bladed and 10 to 12 feet wide. Otherwise, spur roads might not be improved in areas with flat terrain and within grassland, desertscrub, sand scrub, and sand dune vegetation communities. Vegetation on unimproved roads may be crushed by driving, but cropping or blading vegetation would not be conducted. This would avoid removal of root mass and organics in the soil (no surface soil would be removed). The purpose of unimproved spur roads would be to preserve the maximum amount of native vegetation and minimize overall disturbance.

Once design is finalized, all access roads described above would be surveyed, appropriate ROW would be acquired, and ROW would be mapped and incorporated into the Access Road Plan and Management Plan. Construction details are outlined in “Access Road Construction” in section 2.4.3. Table 2-7 includes design features, and table 2-8 includes a summary of proposed Project components, including access roads mileage and disturbance by subroute, segment, and local alternative.

Communication Systems

The proposed Project would include a communications system consisting of a fiber-optic network necessary for control and protection of the transmission system (referred to as supervisory control and data acquisition). For redundancy purposes, a secondary communications path would be provided via a power line carrier or microwave system. The type of communication system would be determined during final design.

FIBER-OPTIC COMMUNICATIONS

The communication system is needed to transfer data for operation of the line and substations. The system would not be made available for commercial use. Primary communications for relaying and control would be provided via one optical ground wire that would be installed on one of the shield wire positions on the transmission line structures.

As the optical data signal is passed through the optical fiber cable, the signal degrades with distance. Consequently, communication regeneration stations are required to amplify the signals if the distance between communication regeneration stations exceeds approximately 50 miles.

Table 2-7. Design Features for Environmental Protection by Resource

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Standard Mitigation				
The boundaries of construction activities would be predetermined and staked or flagged prior to any construction activity. No paint or permanent markings would be applied to rocks or vegetation.	X			
Prior to construction, all construction personnel would be instructed on the protection of cultural and ecological resources.	X			
All vehicle movement would be restricted to designated access, contracted acquired access, or public roads.	X	X	X	X
To limit disturbance, existing access roads would be used to the extent practicable, providing that doing so does not additionally impact resource values. Widening and grading of roads would be kept to the minimum required for access by Project construction equipment.	X	X	X	X
Structures and/or ground wire would be marked with high-visibility devices such as vibration dampers, where required by government agencies such as the FAA.	X	X	X	
Transmission line materials would be designed and tested to minimize audible noise, radio interference, electromagnetic interference (EMI), and television interference due to corona.	X	X	X	
No widening or upgrading of existing roads would be undertaken in the area of construction and operations, where soils and vegetation are sensitive to disturbance, in areas of critical habitat for vegetation or wildlife, in areas of habitat for BLM special status species, or where archaeological sites are present.		X	X	
During operation of the transmission lines, the ROW would be maintained free of non-biodegradable debris. Crush desert vegetation in place to promote seeding and revegetation, and reduce erosion potential.			X	
BLM and Western road construction specifications would be followed where unimproved spur roads cannot be employed.		X	X	
Unimproved spur roads would be used to the extent practicable in areas where no grading would be warranted to access work areas, within the approved ROW. Unimproved spur roads would be used to access a site without specifically blading a road or significantly modifying the landscape. All vehicle movement would be restricted to designated access, even if that is unimproved access. Vegetation would be crushed, not cut. For all access types, soil would be compacted, but not removed.		X	X	X
Structures would be placed to avoid, and/or to allow conductors to span, sensitive features such as riparian areas, waterways, roads, trails, and cultural sites within limits of standard transmission line structure design. This would minimize the amount of sensitive features disturbed and/or reduce visual contrast.	X	X	X	

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Clearing of trees in and adjacent to the ROW would be minimized to the extent practicable to satisfy conductor-clearance requirements (NESC and up to 10 years' timber growth). Trees and other vegetation would be selectively removed to blend the edge of the ROW into adjacent vegetation patterns, as appropriate.		X	X	
Separation between transmission lines and existing utilities, roads, and railroads would be minimized to the extent practicable. Opportunities to share portions of adjacent ROWs would also be explored.	X			
All construction vehicle movement would be restricted to predesignated access, contractor-acquired access, and public roads.		X		
The width of construction and new temporary access roads would be sited to keep to the minimum needed to avoid sensitive areas and to limit ground disturbance.		X		
Surface elevations would be returned to approximate pre-Project conditions, as practicable.		X		X
A WEAP would be prepared. All construction crews and contractors would be required to participate in WEAP training prior to starting work on the Project. The WEAP training would include a review of the special status species; WUS; riparian habitat; cultural, paleontological, and other sensitive resources that could be impacted by the proposed Project; the locations of sensitive biological resources and their legal status and protections; and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained during the construction period.	X	X		
The process by which the BLM, Western, and Southline and its construction contractor would conduct environmental monitoring, compliance, and reporting activities during construction would be described in a project compliance plan that would be prepared by the compliance inspection contractor (CIC) after they have been selected. After issuance of the notice to proceed, a CIC, designated by the BLM and Western, would provide environmental oversight and compliance monitoring during Project construction to ensure compliance with all design features and mitigation measures.	X	X		
Reclamation				
A Reclamation, Vegetation, and Monitoring Plan would be developed and implemented.		X	X	X
Reclamation would be accomplished with native species, unless otherwise approved.		X	X	X
Seeding would occur between November and March to ensure a greater chance of success. This would be tied to replacement of conserved topsoil with its natural seed stock.		X	X	X
Air Quality and Climate Change				
Project activities would be in compliance with all applicable Federal, State, and local laws and regulations concerning prevention and control of air pollution during construction and operation.		X	X	

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
An Erosion, Dust Control, and Air Quality Plan would prepared as part of the final POD. The plan would be developed and implemented to minimize and mitigate potential air quality and climate change impacts.	X	X	X	X
All necessary air quality permits would be obtained prior to construction or operating equipment that would result in regulated atmospheric or fugitive dust emissions.	X			
Dust control measures consistent with all applicable State or local standards, as outlined in the Erosion, Dust Control, and Air Quality Plan, would be implemented; these include the following reasonable precautions: 1) frequent watering (trucked in, no new water sources) or stabilization of excavations, spoils, access roads, storage piles, and other sources of fugitive dust (parking areas, staging areas, other) if construction activity causes visible emissions of fugitive dust beyond the work area; (2) reduction in the amount of disturbed area where possible; (3) planting of vegetative ground cover, as appropriate, in disturbed areas after construction activities have ended, and treatment of actively disturbed areas with BLM approved dust palliatives.		X		
Trackout control devices such as grizzly bars, wheel washers, and gravel pads would be located at all entrances and exits.		X		
Haul-truck cargo beds would be covered with tarps and travel speeds would be limited to no more than 15 miles per hour on unpaved roads.		X		
Combustion emissions from mobile sources would be minimized by proper maintenance and tune-up of equipment.		X	X	
To reduce the potential for greenhouse gas emissions, only properly trained Project personnel would handle sulfur hexafluoride, and a sulfur hexafluoride recovery and recycling program would be implemented.		X	X	X
Cultural Resources				
Cultural resources would continue to be considered during post-EIS phases of work. Specific cultural resource inventory, protection, and mitigation measures to be employed would be outlined in the Project-specific Programmatic Agreement, in accordance with Section 106 of the NHPA. The final POD would include the signed Programmatic Agreement.	X	X	X	X
The area of potential effects will be defined, consisting of the approved alternative corridor and all areas and ancillary features that sustain ground disturbance (access roads, construction yards, etc.) will be subject of 100% pedestrian cultural resources survey in order to identify all cultural resources that may be adversely impacted by the Project. Survey and reporting requirements would follow BLM Handbook 8110 and 8111 requirements for a Class III Intensive Field Survey (BLM 2004).	X			

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
An HPTP would be developed and implemented to avoid, minimize, and mitigate the adverse effects of the Project on known cultural resources. Mitigation measures may range from avoidance and preservation in place to data recovery excavations conducted before the destruction of a site if avoidance is not a feasible option. The HPTP would include a monitoring and discovery plan detailing procedures to be followed in the inadvertent discovery of a potentially significant archaeological site or human remains.	X	X	X	
To the extent practical, all ground-disturbing activities and other Project components would be micro-sited to avoid or minimize impacts on cultural resources listed as or potentially eligible for listing as, unique archaeological sites, historical resources, or historic properties.	X	X		
Before construction, and as described in the WEAP, Southline and its construction contractor would provide cultural resources sensitivity training to all construction personnel so that Project personnel understand the procedures in the monitoring and discovery portion of the HPTP.	X			
Hazardous Materials and Waste				
Several framework plans prepared as part of the final POD would be developed and implemented to minimize and mitigate potential hazardous materials and waste; plans include SWPPP, SPCC, Soil Management, and Hazardous Materials Management. These plans would include requirements by the EPA, OSHA, Arizona Department of Environmental Quality, and the New Mexico and Arizona Departments of Transportation.	X	X	X	X
The SWPPP would include BMPs to address the storage and handling of hazardous materials and sediment runoff during construction activities to minimize the risk of an accidental release. The SWPPP is required by, and enforced by, the EPA in New Mexico, and the Arizona Department of Environmental Quality in Arizona.	X	X	X	
All construction, operation, and maintenance crew members would be properly trained to deal with a spill, and appropriate spill containment material would be on hand at every work site. Careful handling and designation of specific equipment repair and fuel storage areas, as outlined in the SPCC Plan, would reduce the potential for oil and fuel spills. In the event that there is an oil or fuel spill, immediate measures would be taken to control the spill, and the BLM, National Response Center and/or Arizona Department of Environmental Quality or NMED would be notified immediately as defined in the SPCC Plan.	X	X	X	X
The Soil Management Plan would provide guidance for the proper handling, onsite management, and disposal of contaminated soil, if encountered during construction, operation and maintenance activities. Appropriately trained personnel would be onsite during preparation, grading, and related earthwork activities to monitor the soil conditions encountered.	X	X	X	X

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
The Project-specific Hazardous Materials Management Plan and program would outline proper hazardous materials use, storage, and transport requirements and applicable handling procedures. EPA procedures for handling and storage of hazardous materials, OSHA requirements for proper storage and labeling on the job site, and New Mexico and Arizona Department of Transportation requirements for transportation of hazardous materials would be followed.	X	X	X	X
Personnel, contractors, and transporters involved with hazardous materials management would be required to comply with Federal and State regulations established for the transportation, storage, handling, and disposal of hazardous substances, materials, and wastes. “Hazardous material” means any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.		X	X	X
New or expanded substation locations that involve the purchase or long-term leasing of land, purchased transmission line ROWs, and any other property to be acquired would be screened for environmental liabilities. The degree and level of screening would be based on knowledge or information available on the property to determine the probability of contaminants of concern or other environmental impairment. A Phase I Environmental Site Assessment would be conducted if preliminary screening indicates a reasonable risk that such environmental conditions may exist on the property and the property continues to be targeted for acquisition by the Project, consistent with American Society for Testing and Materials Standard E1527-05.	X			
In the event of a spill, workers in the immediate area would cease work, begin spill cleanup operations, and notify appropriate agencies as required by law and specified in the SPCC Plan. Southline and its construction contractor is responsible for cleanup and assumes liability for any and all releases of hazardous substances disposed on public land, in accordance with State, Federal, and local laws and regulations. Southline would immediately notify the BLM authorized officer of any and all releases of hazardous substances on public land.		X	X	X
If backfill material to be used is derived from a site that could possibly have contamination, it would be sampled and determined to be free of regulated contaminants before it is used to fill excavations. The results of any tested soils should be shared with the appropriate surface managing agency. No contaminated soils would be used as fill material for the Project.		X		
All construction and demolition waste, including trash and litter, garbage, and other solid waste, would be removed and transported to an appropriately permitted recycling or disposal facility. Southline and its construction contractor would prepare a construction waste disposal plan for all nonhazardous wastes generated during construction of the Project. The plan would contain a description of all nonhazardous solid and liquid construction wastes, recycling plans, and waste management methods to be used for each type of waste.		X		X
Southline or the applicable contractors would maintain all vehicles in good working order. Equipment would be properly tuned and maintained to avoid leaks of fluids.		X	X	X

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Service and refueling procedures would not be conducted within 500 feet of a seep, wash, or other water body. Routine service of any vehicles or equipment would not be done within the ROW.		X	X	X
Health and Human Safety				
The HASP and Fire Protection Plan prepared as part of the final POD would be developed and implemented to minimize and mitigate potential health and human safety impacts. Southline and its contractors would work with the appropriate surface managing agencies to incorporate any fire restrictions that are put into effect during construction, operation, and decommissioning of the project.	X	X	X	X
The HASP would address potential situations that workers could encounter during construction and maintenance. The purpose and goal of the worker safety and environmental training would be to communicate Project-related environmental and safety concerns and appropriate work practices to all field and construction personnel prior to the start of construction, including spill prevention, emergency response measures, accident prevention, use of protective equipment, medical care of injured employees, safety education, and fire protection. Training would encompass environmental training related to road designations and speed limits, promote "good neighbor" policies, and institute BMPs for construction. The training would emphasize site-specific physical conditions to improve hazard prevention in accordance with OSHA requirements (29 CFR 1910).	X	X	X	
Southline and its construction contractor would locate overhead and underground utilities that may reasonably be expected to be encountered during construction. If a utility service interruption is known to be unavoidable, Southline and its construction contractor would coordinate with the service provider to notify members of the public, the jurisdiction, and the service providers affected by the interruption via letters and newspapers notices published no later than 7 days prior to the first interruption. Copies of the notices would be provided to the BLM and Western following notification.	X	X		
All permanent metallic objects within the Project's transmission line ROWs would be grounded in accordance with industry standards.	X	X	X	
Farmlands and Grazing				
Fences and gates would be repaired or replaced to their original, predisturbed condition (or better), as required by the landowner, BLM authorized officer, or other land managing entity if they are damaged or destroyed by construction activities. New temporary and/or permanent gates would be installed only with the permission of the landowner or the BLM. Temporary gates not required for postconstruction access control would be removed following construction completion and in accordance with the POD.		X		X

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Water facilities (e.g., tanks, developed springs, water lines, wells, etc.) would be repaired or replaced to their predisturbed condition if they are damaged or destroyed by construction, operation, or maintenance activities, as required by the landowner of land management agency. Temporary watering facilities would be provided for wildlife and livestock until permanent repair or replacement is complete.		X	X	X
On agricultural land, ROWs would be aligned, in so far as practicable, to reduce the impact to farm operations and agricultural production. This would typically be done in conjunction with negotiating ROW agreements with landowners.	X	X		
Military Operations				
The transmission line operator would work with Buffalo Soldier Electronic Testing Range (BSETR) to coordinate, and possibly limit, interconnections to the proposed Project to the extent allowed by FERC.	X			
Southline and Western would work with BSETR to identify micro-siting opportunities during Project design.	X			
The transmission line operator would coordinate with BSETR during the design phase of the proposed Project to limit EMI. The proposed Project would be constructed using the best available construction techniques and technology (i.e., use of grounding, selective conductor type and arrangement, and conductor surface gradients), to the extent feasible and reasonably economical, in order to minimize EMI.	X			
The transmission line operator would coordinate with BSETR to allow for an updated measure of the “floor value” of the proposed Project, once the proposed line is energized. Such cooperation could include provision of real-time operating and load information to BSETR to help calibrate the floor value of EMI.	X	X	X	
The transmission line operator would coordinate with BSETR to develop reporting standards, for potential inclusion in the transmission line maintenance and inspection program, to the extent allowable by FERC. While normal inspection maintenance would take care of typical EMI issues, specific incidents such as storm damage or vandalism would need to be responded to outside of the normal maintenance cycle. If not detectable through transmission line monitoring, the operator would need to hear from someone experiencing interference in order to respond.	X	X	X	
The transmission line operator would coordinate planned outages (curtailment of power line operations for BSETR to implement testing) with BSETR to the extent feasible in order to meet necessary contractual commitments, utility mandates, laws and regulations, and power system requirements. The operator is very limited in the timing and duration of potential outages; outages stress the rest of the system, which can cause system failures.	X		X	

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Noise				
Construction would comply with local noise ordinances. There may be a need to work outside the local ordinances to perform work during available line outage windows in order to take advantage of low electrical draw periods during nighttime hours. The construction contractor would comply with variance procedures required by local authorities.		X		
Construction equipment would be maintained in good working order in accordance with manufacturer's recommendations.		X		X
Idling of construction equipment and vehicles would be minimized during construction.		X		
Workers would be provided with appropriate hearing protection, if necessary, as described in the HASP.		X	X	X
Paleontology				
In consultation with appropriate land management agencies, Southline and its contractor would participate in the preparation of a Monitoring Plan, paleontological surveys, personnel education, monitoring ground disturbance for fossils, curation of fossils, and deposition of fossils in a paleontological repository, as necessary in areas of highest likelihood of encountering resources.	X	X		
If significant fossils are encountered during construction, construction activities would be temporarily diverted away from the discovery. The monitor would notify all concerned parties and collect matrix for testing, processing, and documentation, as directed by the authorized officer of the BLM.		X		
Recreation				
Southline and its contractor would coordinate with the BLM to display appropriate "closed" signage at the entrance to new spur roads to structure locations and access roads located on BLM-managed lands. This includes temporary signs during the construction phase of the Project and permanent signs and/or vehicle barriers that would close the spur routes to public travel during the operational phase. Signs would be removed as appropriate upon decommissioning.	X	X	X	X
If temporary short-term closures to recreational areas are necessary for construction activities, Southline and its contractor would coordinate those closures with recreational facility owners. To the extent practicable, Southline and its construction contractor would schedule construction activities to avoid heavy recreational use periods (e.g., holidays or tournaments). Southline and its construction contractor would coordinate with the facility owner to post notice of the planned closure onsite 14 calendar days prior to the closure.	X	X	X	X

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
If the Arizona National Scenic Trail must be temporarily closed during construction, an alternate trail route (detour) would be provided during the closure. If it is necessary for trail users to leave the trail during the temporary closure, trail users would need to obtain permission from the ASLD.	X	X		X
Soils				
As appropriate and feasible, Southline and its construction contractor would implement topsoil segregation and conservation practices at substation sites and as directed by the BLM and Western.		X		
In construction areas (i.e., temporary use areas, structure sites, access roads, etc.) where grading is required, surface restoration would be implemented as required by the landowner or BLM authorized officer. The method of restoration would normally consist of returning disturbed areas back to their normal contour, replacing topsoil, reseeding (where required), installing cross drains for erosion control, placing water bars in the road, and filling ditches. The Reclamation, Vegetation, and Monitoring Plan would include final details on the details of restoration.		X		
Transportation				
Prior to the start of construction, Southline and its construction contractor would prepare a Traffic and Transportation Management Plan for the Project to address the timing and routing of Project trips in an effort to minimize Project impacts on local streets, highways, and railroad operations.	X			
At least 90 days prior to any helicopter use on the Project, Southline and its construction contractor would coordinate with the FAA for review and approval of plans for any helicopter flights that would take place during construction and operation. Southline and its construction contractor would then provide information to the BLM and Western regarding the intended need and use of helicopters during construction and operation of the Project, including the Flight and Safety Plan; the estimated number of days and hours that the helicopter would operate; the type and number of helicopters that would be used; the location, size, and number of staging areas for helicopter takeoffs and landings; and written approval from property owners for use of helicopter staging areas.	X	X	X	
Identify transmission structures with high-visibility markers in areas where they intersect or parallel military training routes.			X	
Provide gates and fencing in areas where off-highway-vehicle use would be restricted due to military operations, or to protect sensitive resources.		X	X	X

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Vegetation				
Preconstruction native plant inventories and surveys for noxious weed species as stipulated by the appropriate land managing agency would be conducted once transmission line centerline, access road, and transmission line structure sites have been located.	X			
Every effort would be made to minimize vegetation removal and permanent loss at construction sites to the extent practicable. Access would not be graded unless necessary for erosion control or other engineering reason. Final structure and spur road locations would be selected to avoid sensitive vegetation to the greatest extent feasible.		X		
In construction areas where grading is not required, vegetation would be left in place wherever possible, and original contours would be maintained to avoid excessive root damage and allow for regrowth. All existing roads would be left in a condition that is equal to or better than their condition before the construction of the transmission lines, as determined by the appropriate land managing agency.		X		
Southline and its construction contractor would develop a Reclamation, Vegetation, and Monitoring Plan that would guide restoration and revegetation activities for all disturbed lands associated with construction of the Project and its eventual termination and decommissioning. The plan would address all land disturbances, regardless of ownership. It would be developed in consultation with appropriate agencies and landowners and would be provided to these entities for review and concurrence. The plan would provide details on topsoil segregation and conservation, vegetation treatment and removal, salvage of appropriate species, and revegetation methods, including use of native seed mixes, application rates, transplants, and criteria to monitor and evaluate revegetation success.	X	X	X	X
Special status plants, including the Pima pineapple cactus, would be avoided. Where avoidance is not possible, special status plants would be conserved by relocating plants and/or reseeding, replacing topsoil with existing topsoil that was removed, and regrading in compliance with local ordinances (Pima County). Measures to conserve special status plants would be implemented through the Reclamation, Vegetation, and Monitoring Plan.	X	X		X
Removal of riparian scrubland vegetation would be avoided where possible. Natural regeneration of native plants would be supported by selectively cutting vegetation with hand tools, mowing, trimming, or using other removal methods that allow root systems to remain intact.		X	X	X
Southline and its construction contractor would provide training to all personnel working on the Project to identify noxious weeds and prevent spread. Training would discuss known invasive and noxious weed species, known locations, identification methods, and treatment protocols. Training materials and a list of Project personnel completing the course would be provided to the BLM and Western.		X		

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
In consultation with local BLM Field Offices and local resource agencies, Southline and its construction contractor would develop and implement a Noxious Weed Management Plan.	X	X	X	X
Invasive and noxious weed populations would be mapped and reported to BLM/Western. BLM and Western will determine in which areas vehicle washing would be required, based on the results of the invasive/noxious weed surveys.	X	X		
As required, equipment would be cleaned before ingress to minimize the potential for the spread of invasive species. These details would be described in the Noxious Weed Management Plan. Buffelgrass would be specifically addressed in the plan, which would outline efforts to eliminate it from within areas disturbed by the proposed Project to ensure that it does not spread to adjoining lands.	X	X	X	X
Visual Resources				
In order to restore disturbed areas to an appearance that would blend back into the overall landscape, seeding and/or planting would be conducted in any area that has been cleared or disturbed during construction. Seed mix would be tailored to an area's soil type, existing vegetation, and native species.		X		X
The Project would incorporate nonspecular conductors into the Project design to decrease reflectivity and visibility of Project features, where specified by the BLM authorized officer.	X	X		
Non-transmission line structures such as operations and maintenance buildings, microwave equipment buildings, regeneration structures, emergency generators, and other associated structures would be treated or painted with non-reflective, flat-toned surface treatment. The color of the structures would be painted in earth tones or in a color designed to reduce color contrasts with the surrounding landscape. A dark, neutral color, such as the BLM Standard Environmental Color, "Carlsbad Canyon," or similar is recommended because the hue tends to blend into desert landscape at varying distances.		X	X	
"Dulled" metal or self-weathering finish structures would be used to reduce visual impacts, if specified by the BLM authorized officer.	X	X		
The alignment of any new access roads (including unimproved spur roads) would stay within the designated access ROW and would follow the designated area's landform contours and avoid steep areas as much as feasible, provided that such alignment does not additionally impact resource values. This would minimize ground disturbance and/or reduce scarring (visual contrast).	X	X		

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Aerial markers or warning lights would be required for conductors or structures, in keeping with FAA, CBP, and DOD regulations for structures over 130 feet. The use of red strobe lighting would reduce potential impacts from artificial night lighting and would reduce impacts from night brightness and viewing of night skies. The minimum number and intensity of lights would be used, given that the tallest structures are under the 200-foot FAA requirement (FAA Advisory Circular 70/7460-1K (FAA 2007)). Exterior lights installed on conductors or other facilities would be aviation warning lights, or FAA L-864 aviation red-colored flashing lights with 20 to 40 flashes per minute standard flashing range.		X	X	
Water Resources				
A Project-specific construction SWPPP would be prepared prior to the start of construction of the transmission line and substations in compliance with CWA Section 402, if required. The SWPPP would use BMPs to address the storage and handling of hazardous materials and sediment runoff during construction activities to minimize the risk of an accidental release. As part of the SWPPP, soil disturbance at structure construction sites and access roads would be the minimum necessary for construction and would be designed to prevent long-term erosion, through activities such as restoration of disturbed soil, revegetation, and/or construction of permanent erosion control structures. A Department of the Army permit application would be prepared prior to the start of construction of the transmission line and substations for the discharge of dredged or fill material in compliance with CWA Section 404, if required. Activities in and around streams and wetlands would be designed to avoid, minimize, and mitigate impacts to WUS.	X	X		
Roads would be built as close as possible to right angles to the streams and washes. Culverts or temporary bridges would be installed where conditions warrant. All construction and operations activities shall be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks.		X		
To the extent practicable, structures would be sited with a minimum distance of 200 feet from streams.	X			
Construction equipment would be kept out of flowing stream channels. Structures would be located to avoid active drainage channels, especially downstream of steep slope areas, to minimize the potential for damage by flash flooding and mud and debris flows.	X	X		X
Flood control devices would be located where required to protect structures or other Project structures from flooding or erosion. Appropriate design of structure foundations would be used to prevent scour or inundation by a 100-year flood to avoid disturbed areas. The locations of transmission structures would be designed to avoid steep, disturbed, or otherwise unstable slopes. If drainages cannot be avoided by structure placement, Southline and its construction contractor would design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon postconstruction restoration.	X	X		

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
Wildlife				
In consultation with the BLM and Western, Southline and its construction contractor would prepare and implement a Biological Monitoring Plan prior to issuance of a notice to proceed and prior to construction that would specify the level of biological monitoring to be provided throughout construction activities in all construction zones with the potential for presence of sensitive biological resources. The number of monitors and monitoring frequency would be specified for each work zone.	X	X		
Preconstruction surveys would be required in areas where Sonoran desert tortoise (now a separate species: Morafka's desert tortoise (*Gopherus morafkai*)), Gila monster, and Tucson shovel-nosed snake are expected to occur. In consultation with the BLM and Western, Southline and its construction contractor would hire qualified biologists to conduct preconstruction surveys in ground disturbance areas within suitable habitat for appropriate special status species.	X			
To reduce impacts on the Sonoran (Morafka's) desert tortoise, known to exist in the western portion of the project area, only authorized biologists with a valid AGFD permit would handle desert tortoises if encountered within the Project area, following the most current desert tortoise handling guidelines published by the AGFD.		X		X
Preconstruction surveys for species listed under the ESA or specified by the appropriate land management agency as sensitive or of concern would be conducted in areas of known occurrences or suitable habitat. Timing of the surveys would be determined by FWS approved species-specific survey protocol.	X			
Monitoring of construction activities would be required in some areas to ensure that effects on these species are avoided during construction. If bald eagle or golden eagle nests are identified during preconstruction surveys, seasonal restrictions on construction within a specified buffer would be implemented where applicable, according to FWS protocols, to comply with the Bald and Golden Eagle Protection Act. Preconstruction nesting-season surveys for migratory birds and surveys for burrowing owls in suitable habitat would be conducted as needed to comply with the Migratory Bird Treaty Act.		X		
Surveys for bat roosts would be conducted within 0.25 mile of the Project ROW in areas that potentially contain caves, karst features, or mines. Occupied bat roosts would be avoided.	X			
Access roads in Tucson shovel-nosed snake habitat would be posted closed to off-road-vehicle use and gated if appropriate to decrease the potential for vehicles striking the subspecies.		X	X	
Where appropriate, protective drift fencing would be placed along access roads and disturbance areas in suitable Tucson shovel-nosed snake habitat during the active season of the snake to limit the potential for vehicle strikes.		X	X	

Table 2-7. Design Features for Environmental Protection by Resource (Continued)

Feature by Resource	Preconstruction	Construction	Operation and Maintenance	Decommissioning
In Tucson shovel-nosed snake habitat, temporarily disturbed areas will be revegetated with native shrubs, grasses, and forbs to reduce impacts on habitat for prey populations of the Tucson shovel-nosed snake.		X		X
Tucson shovel-nosed snake identification and avoidance measures would be included in the worker training program. If during construction activities Tucson shovel-nosed snakes are discovered in or near areas being disturbed, biological monitors would be required to be present onsite during construction activities.	X	X		
To reduce impacts on migratory birds and raptors, especially near the Willcox Playa: (1) Southline and its construction contractor would consult with the appropriate agencies (BLM or FWS) on a case-by-case basis when active nests are found in Project areas, unless directed to do otherwise by these same agencies; (2) active bird nests would not be moved during breeding season, in compliance with the Migratory Bird Treaty Act, unless the Project is expressly permitted to do so by the FWS or BLM, depending on the location of the nest; (3) all active nests and disturbance or harm to active nests would be reported to the FWS or BLM, upon detection; and (4) work would halt if it is determined that active nests would be disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.	X	X		
Clearing, grubbing, blading, and access road improvements occurring within identified sensitive areas would be conducted outside the breeding season for most desert-nesting migratory birds.	X	X		
Construction holes left open overnight would be appropriately fenced or covered to prevent damage to wildlife or livestock.		X		
To reduce impacts on golden eagles and other raptors, Southline and its construction contractor would develop and implement an APP, in coordination with the BLM and Western for approval. The plan would be prepared in accordance with guidance provided by the FWS and in consultation with best practices such as the "Suggested Practices for Avian Protection of Power Lines."	X	X	X	X
Southline and its construction contractor would follow Pima County guidelines for surveys prior to disturbance in priority conservation areas located in Pima County for western burrowing owls.	X	X		
Final structure and spur road locations would be adjusted to avoid sensitive wildlife resources to the greatest extent feasible.	X	X	X	

Table 2-8. Summary of Project Components and Estimated Temporary and Permanent Disturbance by Subroute, Segment, and Local Alternative

		Land Ownership (miles)								Access Road Type (miles)							Subroute Structure Ground Disturbance Estimates (based on POD disturbance estimates)								
																	Temporary Disturbance		Permanent Disturbance		Substation Expansion (acres) POD Appendix G				
Subroute	Total Length (miles)	BLM	Bureau of Indian Affairs	DOD	U.S. Forest Service	Reclamation	State	County	Private	A	B	C	D	E	Total Length Access Roads (miles)	Total New Disturbance Access Roads (acres) (using road type C and D at 16-foot width less any existing disturbance and road type E at 12-foot width)	Acres	Acres/ Mile	Acres	Acres/ Mile	Temp	Perm	Construction Laydown Yard (acres)	Total Temporary Disturbance (acres) (structure, substation, and construction laydown yards)	Total Permanent Disturbance (acres) (access, substation expansion, and structure foundations)
New Build Route Group 1: Afton (New Mexico) to Hidalgo (New Mexico)																									
Subroute 1.1																									
P1	5.1	3.0	0.0	0.0	0.0	0.0	0.2	0.0	1.9	0.0	0.0	0.0	5.1	0.0	5.1	9.9	28.7	5.6	0.5	0.1			20.0	48.7	10.4
P2	102.0	32.8	0.0	0.0	0.0	0.0	37.9	0.0	31.2	4.9	0.0	98.1	0.0	26.3	129.3	121.5	571.0	5.6	10.2	0.1			40.0	611.0	131.7
P3	31.1	25.4	0.0	0.0	0.0	0.0	4.2	0.0	1.4	0.0	0.0	0.0	31.1	0.0	31.1	60.3	174.2	5.6	3.1	0.1			20.0	194.2	63.4
P4a	8.7	4.1	0.0	0.0	0.0	0.0	1.0	0.0	3.6	0.0	0.0	8.8	0.0	1.9	10.7	10.2	48.7	5.6	0.9	0.1			20.0	68.7	11.1
Total	**146.9**	**65.3**	**0.0**	**0.0**	**0.0**	**0.0**	**43.4**	**0.0**	**38.1**	**4.9**	**0.0**	**106.9**	**36.2**	**28.2**	**176.2**	**201.9**	**822.6**		**14.7**		**20**	**35**	**100.0**	**957.6**	**251.6**
Subroute 1.2																									
S1	13.4	10.9	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	4.3	9.1	0.6	14.0	20.6	74.9	5.6	1.3	0.1			20.0	94.9	21.9
S2	11.1	9.8	0.0	0.0	0.0	0.0	1.0	0.0	0.3	0.0	0.0	0.0	11.0	0.0	11.0	21.3	62.0	5.6	1.1	0.1			20.0	82.0	22.4
S3	12.9	12.3	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	12.9	0.0	0.0	4.9	17.8	0.0	72.0	5.6	1.3	0.1			20.0	92.0	1.3
S4	10.6	10.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	10.5	0.0	10.5	20.4	59.5	5.6	1.1	0.1			20.0	79.5	21.4
S5	29.7	12.1	0.0	0.0	0.0	0.0	3.7	0.0	13.9	3.7	13.9	5.3	7.4	4.9	35.2	26.0	166.3	5.6	3.0	0.1			20.0	186.3	28.9
S6	7.4	4.4	0.0	0.0	0.0	0.0	2.4	0.0	0.5	1.0	0.0	0.0	6.4	0.3	7.4	12.4	41.2	5.6	0.7	0.1			20.0	61.2	13.1
S7	41.5	22.2	0.0	0.0	0.0	0.0	10.4	0.0	8.9	0.0	21.0	1.0	19.4	6.4	47.8	47.9	232.6	5.6	4.2	0.1			20.0	252.6	52.1
S8	14.6	0.2	0.0	0.0	0.0	0.0	5.8	0.0	8.5	0.0	0.0	0.0	14.6	0.0	14.6	28.3	81.6	5.6	1.5	0.1			20.0	101.6	29.8
Total	**141.2**	**82.4**	**0.0**	**0.0**	**0.0**	**0.0**	**26.5**	**0.0**	**32.1**	**4.7**	**47.8**	**10.6**	**78.4**	**17.1**	**158.6**	**184.5**	**790.1**		**14.2**		**20**	**35**	**160.0**	**985.1**	**233.6**

Table 2-8. Summary of Project Components and Estimated Temporary and Permanent Disturbance by Subroute, Segment, and Local Alternative (Continued)

Subroute	Total Length (miles)	Land Ownership (miles)								Access Road Type (miles)					Total Length Access Roads (miles)	Total New Disturbance Access Roads (acres) (using road type C and D at 16-foot width less any existing disturbance and road type E at 12-foot width)	Subroute Structure Ground Disturbance Estimates (based on POD disturbance estimates)				Substation Expansion (acres) POD Appendix G		Construction Laydown Yard (acres)	Total Temporary Disturbance (acres) (structure, substation, and construction laydown yards)	Total Permanent Disturbance (acres) (access, substation expansion, and structure foundations)
																	Temporary Disturbance		Permanent Disturbance						
		BLM	Bureau of Indian Affairs	DOD	U.S. Forest Service	Reclamation	State	County	Private	A	B	C	D	E			Acres	Acres/ Mile	Acres	Acres/ Mile	Temp	Perm			
Route Group 1 Local Alternatives																									
Deming 1 (DN1)	42.5	6.9	0.0	0.0	0.0	0.0	29.3	0.0	6.3	0.0	0.0	0.0	42.5	4.3	46.8	88.7	238.0	5.6	4.3	0.1				238.1	92.9
A	17.5	14.7	0.0	0.0	0.0	0.0	1.1	0.0	1.8	0.0	8.1	8.4	1.2	3.8	21.5	16.0	98.0	5.6	1.8	0.1				98.0	17.8
B	12.2	9.9	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	12.0	0.0	0.0	4.1	16.1	6.0	68.3	5.6	1.2	0.1				68.3	7.2
C	9.0	4.0	0.0	0.0	0.0	0.0	1.6	0.0	3.4	0.3	7.7	0.0	1.2	2.0	11.2	5.2	50.3	5.6	0.9	0.1				50.3	6.1
D	22.8	6.8	0.0	0.0	0.0	0.0	2.5	0.0	13.5	0.0	0.0	13.1	9.6	0.6	23.3	25.8	127.6	5.6	2.3	0.1			20.0	147.6	28.1
New Build Route Group 2: Hidalgo (New Mexico) to Apache (Arizona)																									
Subroute 2.1																									
P4b	14.0	0.7	0.0	0.0	0.0	0.0	9.5	0.0	3.8	0.0	0.0	0.0	13.8	0.0	13.8	26.8	78.2	5.6	1.4	0.1				78.3	28.2
P4c	1.9	0.4	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.9	0.0	1.9	3.7	10.4	5.6	0.2	0.1				10.4	3.9
P5a	9.6	6.1	0.0	0.0	0.0	0.0	1.3	0.0	2.2	0.0	0.0	9.6	0.0	1.6	11.2	18.6	53.9	5.6	1.0	0.1				53.9	19.6
P5b	21.1	17.9	0.0	0.0	0.0	0.0	1.0	0.0	2.2	0.0	0.0	21.2	0.0	2.7	23.9	19.3	118.1	5.6	2.1	0.1				118.1	21.5
P6a	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.8	0.7	4.9	5.6	0.1	0.1			20.0	24.9	0.7
P6b	22.5	0.2	0.0	0.0	0.0	0.0	12.6	0.0	9.7	0.0	0.0	20.8	2.3	2.7	25.8	23.5	125.9	5.6	2.2	0.1			20.0	145.9	25.8
P6c	2.8	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	2.8	0.0	0.4	3.2	3.0	15.8	5.6	0.3	0.1			20.0	35.8	3.2
P7	22.3	2.3	0.0	0.2	0.0	0.0	8.5	0.0	11.3	0.0	0.5	22.1	0.0	3.8	26.4	21.6	125.0	5.6	2.2	0.1			20.0	145.0	23.8
P8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.0	2.8	5.6	0.1	0.1			20.0	22.8	0.1
Total	**95.6**	**28.4**	**0.0**	**0.2**	**0.0**	**0.0**	**37.1**	**0.0**	**29.7**	**0.5**	**0.5**	**77.2**	**18.0**	**11.3**	**107.5**	**109.0**	**534.9**		**9.6**		**20**	**53**	**100.0**	**687.9**	**171.5**

Table 2-8. Summary of Project Components and Estimated Temporary and Permanent Disturbance by Subroute, Segment, and Local Alternative (Continued)

		Land Ownership (miles)								Access Road Type (miles)							Subroute Structure Ground Disturbance Estimates (based on POD disturbance estimates)								
																	Temporary Disturbance		Permanent Disturbance		Substation Expansion (acres) POD Appendix G				
Subroute	**Total Length (miles)**	**BLM**	**Bureau of Indian Affairs**	**DOD**	**U.S. Forest Service**	**Reclamation**	**State**	**County**	**Private**	**A**	**B**	**C**	**D**	**E**	**Total Length Access Roads (miles)**	**Total New Disturbance Access Roads (acres) (using road type C and D at 16-foot width less any existing disturbance and road type E at 12-foot width)**	**Acres**	**Acres/ Mile**	**Acres**	**Acres/ Mile**	**Temp**	**Perm**	**Construction Laydown Yard (acres)**	**Total Temporary Disturbance (acres) (structure, substation, and construction laydown yards)**	**Total Permanent Disturbance (acres) (access, substation expansion, and structure foundations)**
Subroute 2.2																									
E	31.8	18.8	0.0	0.0	0.0	0.0	4.2	0.0	8.8	2.5	0.0	0.0	29.2	0.9	32.6	57.9	178.2	5.6	3.2	0.1			20.0	198.2	61.1
F	25.3	3.1	0.0	0.0	0.0	0.0	15.1	0.0	7.1	6.8	0.0	7.5	12.0	2.4	28.7	30.4	141.6	5.6	2.5	0.1			20.0	161.6	32.9
Ga	25.7	0.0	0.0	0.0	0.0	0.0	13.4	0.0	12.4	5.2	0.9	8.6	11.5	1.7	27.9	32.1	144.2	5.6	2.6	0.1			20.0	164.2	34.6
Gb	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.0	0.0	0.8	0.0	1.0	1.6	5.7	5.6	0.1	0.1			20.0	25.7	1.7
Gc	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	1.2	3.8	2.4	0.0	1.2	8.6	6.4	41.6	5.6	0.7	0.1				41.6	7.1
I	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.0	2.3	4.5	13.1	5.6	0.2	0.1				13.1	4.7
J	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	2.3	0.0	0.4	2.7	2.8	12.9	5.6	0.2	0.1				12.9	3.0
Total	**95.8**	**21.9**	**0.0**	**0.0**	**0.0**	**0.0**	**37.3**	**0.0**	**36.7**	**15.9**	**4.7**	**20.8**	**55.8**	**6.6**	**103.8**	**135.6**	**537.3**		**9.5**		**20**	**53**	**80.0**	**670.3**	**198.2**
Route Group 2 Local Alternatives																									
LD1	35.4	19.5	0.0	0.0	0.0	0.0	6.8	0.0	9.1	6.1	0.0	10.8	19.0	4.8	40.7	51.7	198.1	5.6	3.5	0.1			20.0	218.1	55.2
LD2	9.6	3.6	0.0	0.0	0.0	0.0	5.8	0.0	0.2	0.0	0.0	0.0	9.9	0.0	9.9	19.2	54.0	5.6	1.0	0.1				54.0	20.2
LD3a	27.9	11.3	0.0	0.0	0.0	0.0	13.3	0.0	3.4	0.0	8.5	17.3	2.8	4.4	33.0	26.5	156.5	5.6	2.8	0.1			20.0	176.5	29.3
LD3b	1.9	1.2	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	2.0	0.0	0.0	0.3	2.3	0.4	10.8	5.6	0.2	0.1				10.8	0.6
LD4	51.7	37.1	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0	0.0	0.0	51.5	6.1	57.6	108.8	289.3	5.6	5.2	0.1				289.3	113.9
LD4-Option 4	6.5	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	6.5	0.7	7.2	13.6	36.2	5.6	0.6	0.1				36.2	14.3
LD4-Option 5	12.3	0.0	0.0	0.0	0.0	0.0	10.7	0.0	1.6	0.0	0.0	9.9	0.0	1.2	11.1	20.9	68.7	5.6	1.2	0.1				68.7	22.2
WC1	14.8	0.0	0.0	0.0	0.0	0.0	4.4	0.0	10.4	0.0	0.0	2.4	12.5	0.4	15.3	26.9	83.0	5.6	1.5	0.1			20.0	103.0	28.3

Table 2-8. Summary of Project Components and Estimated Temporary and Permanent Disturbance by Subroute, Segment, and Local Alternative (Continued)

		Land Ownership (miles)								Access Road Type (miles)							Subroute Structure Ground Disturbance Estimates (based on POD disturbance estimates)				Substation Expansion (acres) POD Appendix G				
																	Temporary Disturbance		Permanent Disturbance						
Subroute	**Total Length (miles)**	**BLM**	**Bureau of Indian Affairs**	**DOD**	**U.S. Forest Service**	**Reclamation**	**State**	**County**	**Private**	**A**	**B**	**C**	**D**	**E**	**Total Length Access Roads (miles)**	**Total New Disturbance Access Roads (acres) (using road type C and D at 16-foot width less any existing disturbance and road type E at 12-foot width)**	**Acres**	**Acres/ Mile**	**Acres**	**Acres/ Mile**	**Temp**	**Perm**	**Construction Laydown Yard (acres)**	**Total Temporary Disturbance (acres) (structure, substation, and construction laydown yards)**	**Total Permanent Disturbance (acres) (access, substation expansion, and structure foundations)**
Upgrade Route Group 3: Apache (Arizona) to Pantano (Arizona)																									
Subroute 3.1																									
U1a	16.1	0.4	0.0	0.0	0.5	0.0	8.8	0.0	6.4	4.9	0.0	11.9	0.0	3.3	20.1	13.5	81.87	5.1	0.16	0.01				81.9	13.6
U1b	2.9	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	2.7	0.0	0.1	2.8	2.4	14.79	5.1	0.03	0.01			20.0	34.8	2.5
U2	15.8	0.0	0.0	0.0	0.0	0.0	3.3	0.0	12.5	1.5	0.0	21.0	0.0	1.6	24.1	20.1	80.64	5.1	0.16	0.01				80.6	20.3
U3a	35.6	0.2	2.9	0.0	0.0	0.2	20.7	0.0	11.6	0.8	0.0	36.2	0.0	3.9	40.9	32.0	181.39	5.1	0.36	0.01			60.0	241.4	32.4
Total	**70.4**	**0.6**	**2.9**	**0.0**	**0.5**	**0.2**	**35.7**	**0.0**	**30.5**	**7.2**	**0.0**	**71.8**	**0.0**	**8.9**	**87.9**	**68.1**	**358.69**		**0.71**		**0.0**	**4**	**80.0**	**438.7**	**72.7**
Route Group 3 Local Alternative																									
H	19.3	0.0	0.0	0.0	0.0	0.0	15.3	0.0	4.0	0.0	0.0	23.1	1.0	6.5	30.6	28.2	98.44	5.1	0.19	0.01				98.4	28.4
Upgrade Route Group 4: Pantano (Arizona) to Saguaro (Arizona)																									
Subroute 4.1																									
U3b	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.2	0.0	0.1	0.5	0.3	2.33	5.1	0.00	0.01				2.3	0.3
U3c	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.7	0.0	0.0	0.0	01	0.8	0.1	4.9	5.1	0.01	0.01				4.9	0.2
U3d	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.0	3.1	0.0	1.8	0.0	0.8	5.7	2.5	17.52	5.1	0.03	0.01				17.5	2.5
U3e	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.9	0.0	0.0	0.9	0.7	4.52	5.1	0.01	0.01				4.5	0.7

Table 2-8. Summary of Project Components and Estimated Temporary and Permanent Disturbance by Subroute, Segment, and Local Alternative (Continued)

		Land Ownership (miles)								Access Road Type (miles)							Subroute Structure Ground Disturbance Estimates (based on POD disturbance estimates)				Substation Expansion (acres) POD Appendix G				
																	Temporary Disturbance		Permanent Disturbance						
Subroute	**Total Length (miles)**	**BLM**	**Bureau of Indian Affairs**	**DOD**	**U.S. Forest Service**	**Reclamation**	**State**	**County**	**Private**	**A**	**B**	**C**	**D**	**E**	**Total Length Access Roads (miles)**	**Total New Disturbance Access Roads (acres) (using road type C and D at 16-foot width less any existing disturbance and road type E at 12-foot width)**	**Acres**	**Acres/ Mile**	**Acres**	**Acres/ Mile**	**Temp**	**Perm**	**Construction Laydown Yard (acres)**	**Total Temporary Disturbance (acres) (structure, substation, and construction laydown yards)**	**Total Permanent Disturbance (acres) (access, substation expansion, and structure foundations)**
U3f	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.7	0.0	0.0	0.7	0.5	3.48	5.1	0.01	0.01				3.5	0.5
U3g	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.3	0.0	0.1	1.3	0.4	4.56	5.1	0.01	0.01				4.6	0.4
U3h	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.9	0.0	0.0	0.0	0.1	1.0	0.1	5.56	5.1	0.01	0.01				5.6	0.2
U3i	18.2	0.0	0.0	0.0	0.0	0.2	2.7	0.0	15.3	7.4	0.0	12.8	0.0	1.4	21.6	12.9	92.99	5.1	0.18	0.01			40.0	133.0	13.1
U3j	0.9	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	1.6	0.0	0.0	0.0	0.5	2.1	0.7	4.45	5.1	0.01	0.01				4.5	0.7
U3k	16.7	0.0	0.0	0.0	0.0	0.0	10.8	0.0	5.9	3.3	0.0	15.1	0.0	1.8	20.2	15.4	85.15	5.1	0.17	0.01			20.0	105.2	15.6
U3l	1.6	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.4	0.6	0.0	0.4	0.2	0.2	1.4	1.0	7.92	5.1	0.02	0.01				7.9	1.0
U3m	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.4	0.0	0.0	0.0	0.1	0.5	0.1	2.97	5.1	0.01	0.01				3.0	0.2
U4	1.9	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	1.8	0.0	0.5	2.3	1.6	9.81	5.1	0.02	0.01				9.8	1.6
Total	**48.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**17.9**	**0.4**	**29.8**	**19.1**	**0.0**	**34.0**	**0.2**	**5.7**	**59.0**	**36.4**	**246.18**		**0.49**		**42.1**	**34**	**60.0**	**340.2**	**79.0**
Route Group 4 Local Alternatives																									
MA1	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.0	0.0	0.0	0.0	0.2	1.2	0.3	5.58	5.1	0.01	0.01				5.6	0.3
TH1a	1.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.2	0.0	1.5	0.0	0.0	0.2	1.7	0.3	7.2	5.1	0.01	0.01				7.2	0.3
TH1b	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4	0.2	1.7	0.0	0.0	0.4	2.3	0.6	7.99	5.1	0.02	0.01				8.0	0.6
TH1c	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.1	0.5	0.1	1.69	5.1	0.00	0.01				1.7	0.1
TH1-Option	0.5	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.5	0.0	2.42	5.1	0.00	0.01				2.4	0.0
TH3-Option A	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.8	0.0	0.0	0.0	0.6	2.4	0.9	4.24	5.1	0.01	0.01				4.2	0.9
TH3-Option B	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4	0.0	0.4	0.0	0.2	1.0	0.6	4.16	5.1	0.01	0.01				4.2	0.6
TH3-Option C	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	1.1	0.0	0.3	1.4	2.6	9.19	5.1	0.02	0.01				9.2	2.6
TH3a	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	3.0	0.0	1.1	0.0	1.2	5.3	2.7	13.94	5.1	0.03	0.01				13.9	2.7
TH3b	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	2.7	0.6	1.6	0.0	1.3	6.2	3.2	22.97	5.1	0.05	0.01				23.0	3.3

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Approximately two new communication regeneration stations would be required along the New Build Section: one between Apache and Hidalgo substations, and one between the Hidalgo and Midpoint substations. The two new fiber-optic regeneration sites would be located next to or in the ROW. The existing substations along the Upgrade Section of the Project are close enough together that required communication equipment would be located within the substation perimeter (either existing or proposed new yards, as described above).

New communication regeneration sites would typically be 100 x 100 feet, with a fenced-in area of 75 x 75 feet. A 12 x 12 x 9–foot tall building (metal or concrete) would be placed on the site, and access would be available from the transmission line access roads. Entrances above the door of each building would be lit to allow for safe entrance and exit, but the rest of the site would not be lit at night. Power would likely be provided from a local electric distribution line, located in proximity to the regeneration site. The voltage of the distribution supply line is typically 12 kV or lower and carried on wooden poles. For the estimated two new sites, it would be necessary to extend the electric distribution line from a take-off point on the existing distribution line to the new site. The location and routing of the existing distribution lines to the new sites would be determined during the final design process.

An emergency generator system would be needed to prevent a power interruption to the site from impacting the function of the system as a whole during short service outages. The emergency generator, equipped with a liquid propane gas fuel tank, would be installed at the communication regeneration site inside the fenced area. The communication regeneration station would also provide communication support for transmission line patrol and maintenance operations and allow emergency operations independent of commercial common carrier.

MICROWAVE REGENERATION SITES

Microwave regeneration sites would be co-located with fiber-optic sites if possible along the Upgrade Section, and are only anticipated to be needed along the New Build Section of the Project. As above, the existing substations along the Upgrade Section of the Project are close enough together that required communication equipment would be located within the substation perimeter (either existing or proposed new yards, as described above). The two new microwave regeneration sites along the New Build Section, one of which could possibly be located off the ROW, would have their final location determined based on line of sight between substations. These locations would be determined during final engineering.

New microwave communication regeneration sites would typically be 100 x 100 feet, with a fenced-in area of 75 x 75 feet. A typical site consists of a microwave equipment building, which houses telecommunication and network equipment, backup batteries, and chargers. The building would be approximately 12 x 12 x 9 feet tall and, where possible, microwave regeneration sites would be co-located with the fiber-optic regeneration site buildings (i.e., all equipment would be housed in the same building). Buildings would be finished to minimize visual impact, and lighting at night would be limited to an entrance light above the door for security and to allow for safe entrance and exit. The site would also have a microwave antenna installed on a self-standing tower approximately 100 feet tall.

2.4.3 Project Construction Activities

This section provides typical construction specifications relative to the proposed Project, including construction seasons, major construction activities, and the design features of the proposed Project. The following descriptions are preliminary and could potentially be refined during final engineering design. Any changes to the final design would be within the parameters identified within this NEPA analysis; therefore, the analysis would still be valid.

Given the location of the proposed Project, construction would generally occur year-round. Sporadic activities would occur at any given structure site over a period of months as each crew type comes and goes. Some crews could stay only a few hours (e.g., access road crew), and some could stay several days (e.g., tower assembly crew). It is anticipated that the total number of days each site would be visited by a crew would vary from 10 to 20 days; however, for a typical structure, only about 5 of those days would have a crew onsite for more than 4 hours.

Weather conditions are not anticipated to impact Project scheduling, financing, design, and/or material delivery. It is also anticipated that outages associated with interconnecting facilities would not hinder the proposed Project's critical path. There is a potential need to take portions of the existing Western lines out of service to complete construction of the Upgrade Section where it crosses constrained (suburban) areas. Taking line segments out of service would result in a temporary disruption of power flow over that circuit, and detailed planning would be needed to provide an alternate power source for affected parties. The residents nearby would still get power from their utility company. It is the bulk delivery that would be affected. Outages would be planned when load is light and other transmission facilities can assume the load. There could also be some brief outages necessary to cut in the sub-expansions.

Transmission Line Construction

Southline has incorporated design features in the proposed Project description that provide environmental protective measures. These design features aim to reduce and minimize potentially significant environmental impacts associated with the Project's construction, as well as the Project's operation and maintenance. These design features (see table 2-7) address specific environmental policies and regulatory requirements, and would be applied across the whole Project.

Construction of the New Build Section and upgrading of the existing Western line are described in the following sections, according to the sequence of construction activities, as listed below. Table 2-8 (above) presents estimated temporary and permanent disturbance by Project component.

- Temporary work area preparation;
- Access road construction;
- Typical structure work area preparation;
- Structure foundation installation;
- Structure erection;
- Conductor, shield wire, and fiber-optic ground wire stringing; and
- Disposal, cleanup, and reclamation.

TEMPORARY WORK AREA PREPARATION

There are six types of temporary work areas: equipment staging and construction yards, concrete batch plants, temporary use areas at each transmission line structure, tensioning and pulling sites, wire splicing sites, and helicopter fly yards. In some areas, only minimal site preparation would be required, and in general, previously disturbed sites requiring minimal site preparation would be preferred. In the Upgrade Section many of these temporary work areas would be inside the existing ROW, with no additional acreage disturbed. However, some areas may need to be scraped by a bulldozer and overlaid with a temporary layer of rock to provide an all-weather surface. Unless otherwise directed by the agency or landowner, the rock would be removed from the staging area(s) upon completion of construction. The work areas would be used only during the construction phase of the proposed Project and would be returned to their prior condition through reclamation activities (see “Postconstruction: Cleanup and Reclamation” in section 2.4.3) upon completion of construction activities.

Temporary work areas would be cleared of vegetation and/or graded to allow for the safe construction of the structures and to facilitate access for future Project operation and maintenance. Clearing of vegetation at each structure work area, as well as the larger Project ROW, would be performed in compliance with Western Operation and Maintenance clearing practices and construction specifications, NESC ANSI A300, Part 7, “American Operations Integrated Vegetation Management” (BLM’s Integrated Vegetation Management Handbook – H 1740-02, March 25, 2008a), electric utility ROWs, and International Society of Automation BMPs. Vegetation removal and management activities would be based on NERC Reliability Standard FAC-003-1.

EQUIPMENT STAGING AND CONSTRUCTION YARDS

Temporary construction yards and equipment staging areas would be required for storing materials, construction equipment, and vehicles, as meeting areas where work crews would assemble on a daily basis prior to traveling to the various work sites via vans and trucks, and for partial structure assembly and in some cases for concrete batch plants. The construction yards would be approximately 20 acres in size; they would be located approximately every 20 miles, with 10 estimated along the New Build Section and 7 along the Upgrade Section. The construction yards would be fenced with locked gates and security, as needed. Previously disturbed areas have been identified for use as equipment staging and construction yards, and would all be located along existing access roads, as close to the ROW as practicable and adjacent to existing public roads.

In general, minimal site preparation is proposed; however, some areas may require scraping 6 to 8 inches of topsoil and adding a temporary layer of rock to provide an all-weather surface. Construction yards would not be lit at night, but if lighting is deemed necessary for a yard due to theft or other site-specific issues, local lighting and dark sky ordinances will be followed. Rock and fencing would be removed once use of the construction yard is complete. The disturbed area would be reclaimed and revegetated to preconstruction conditions unless otherwise directed by the landowner.

CONCRETE BATCH PLANTS

Some construction yards would be used for concrete batch plant operations. Concrete batch plants would be needed to mix concrete for use in transmission line tower foundations, etc.

It is assumed that concrete is available in the major towns (Deming, Lordsburg, Willcox, Benson, and Tucson) and that concrete for any tower locations within 15 miles of the boundaries of those towns would be serviced by those facilities. Where concrete sources are not available within 15 miles, concrete batch plants would be required.

An estimated seven concrete batch plants would be required along the New Build Section of the Project. These seven plants are likely to be located in Doña Ana County (one plant), Luna County (three plants), Grant County (one plant), and Cochise County (two plants). An estimated four concrete batch plants would be required along the Upgrade Section of the Project. These four plants are likely to be located in Cochise County (one plant) and Pima County (three plants).

Site preparation at each batch plant would include removal of the top 6 to 8 inches of soil; soil would be removed by a bulldozer or motor grader and replaced with temporary gravel. A crane would be used to set the concrete equipment. Unless otherwise requested by the landowner, any topsoil removed would be stored and used to reclaim the site after work is completed.

Water would be needed to make the concrete, and would be obtained from existing sources along the ROW. Water would be trucked in from a variety of existing sources, and no wells would be drilled. No new water sources would be developed for this proposed Project. Approximately 3 million gallons (or 10 acre-feet) of water would be required for foundation construction and be used at the concrete batch plants. The construction contractors would be responsible for obtaining aggregate from private sources. If expansion of existing aggregate borrow pits is needed for the proposed Project, cultural and biological surveys of the expansion areas would be required, if not already completed.

Batch plants are anticipated to be in operation for 3 to 6 months. The hours of operation would vary but would generally be 6 a.m. to 6 p.m., Monday through Saturday. Approximately 70 percent (55,000 to 65,000 cubic yards) of the concrete needed for the proposed Project would be derived from concrete batch plants. Each batch plant location would be reclaimed using any topsoil that was removed and revegetated to preconstruction conditions, unless otherwise requested by the landowner.

For the purpose of analysis, these batch plants would be located within the footprint of the construction yards discussed. As noted above, previously disturbed areas have been identified for use as equipment staging and construction yards, and would all be located along existing access roads.

TEMPORARY USE AREAS AT STRUCTURES

At each structure site, areas would be needed to facilitate the safe operation of equipment such as construction cranes or line trucks. The area required for the location and safe operation of cranes and line trucks would be approximately 100 x 200 feet. All disturbances are assumed to occur within the ROW for these temporary use areas. Rock hauling, hammering, or blasting may be required if solid rock is encountered at structure locations, but would be used only as necessary.

TENSIONING AND PULLING SITES

Tensioning and pulling sites would be required at dead-end and heavy-angle structures and every 2.0 to 3.5 miles along the ROW.

For the New Build Section, the temporary disturbance would be 200 x 500 feet for mid-span conductor and shield-wire set up sites (approximately every 10,000 feet), 100 x 500 feet for fiber-optic cable set-up sites (approximately every 18,000 feet), and 200 x 550 feet at all dead-end structures and heavy-angle structures with greater than 25-degree line angles. For the Upgrade Section, the temporary disturbance area would be 150 x 450 feet for mid-span conductor and shield-wire set-up sites (approximately every 10,000 feet), 100 x 450 feet for fiber-optic cable set-up sites (approximately every 18,000 feet), and 150 x 500 feet at all dead-end structures and heavy-angle structures with greater than 25-degree line angles.

All tensioning and pulling sites would be located on lands within and adjacent to the ROW. Sites outside the ROW on BLM-managed lands would require a separate short-term ROW authorization and would be primarily located at angle points in the transmission line, at a 180-degree angle to the ROW.

When construction occurs in the steep and rough terrain, these sites may require larger, less symmetrical pulling and tensioning areas. Equipment at sites required for pulling and tensioning activities would include tractors and trailers with spooled reels that hold the conductors and shield wire and trucks with the tensioning equipment. To the extent practicable, pulling and tensioning sites would be located within the ROW. Depending on topography, minor grading may be required at some sites to create level pads for equipment.

WIRE SPLICING SITES

Specific work areas are needed for wire splicing activities about halfway between each pair of wire pulling/tensioning sites (approximately every 10,000 feet). The temporary disturbance area would be 200 x 500 feet on the New Build Section and 150 x 450 feet on the Upgrade Section. Generally, wire splicing would occur in the ROW where the project work would be straight and not on an angle. All wire splicing sites would be located on lands either within or adjacent to the ROW. Sites outside the ROW on BLM-managed lands would require a separate short-term ROW authorization.

All fiber-optic cable would be spliced at structure sites within the temporary disturbance area of the structure. It is assumed that standard methods will be used for conductor and shield wire splicing, rather than implosive sleeves. It is anticipated that woven wire grips would be used to join two reels of wire at the tension site. After pulling, the wire would be lowered to the ground at the splicing site, and the woven wire grips would be replaced with full tension splices.

HELICOPTER FLY YARDS

Based on the terrain in the proposed Project area, helicopter operations during construction are expected to be minimal. Should such operations be needed, the helicopter fly yards would be incorporated in the footprint of the appropriate temporary work areas identified above. No additional disturbance is considered for the purpose of analysis.

ACCESS ROAD CONSTRUCTION

Access roads would consist of existing roads with no improvements, existing roads requiring improvement, or new roads. As described previously in “Access Roads” in section 2.4.2, to limit the amount of new road construction for the Project, existing paved and unpaved access roads would be used to the fullest extent possible. Affected landowners and agencies would be consulted and ROW procured before any road improvements or new road construction begins. Relevant road construction criteria of the affected landowners and agencies, including BLM and Western, would be outlined in the final POD. The POD would also document specific plans for the construction, rehabilitation, and/or maintenance of the roads based on site-specific conditions and final engineering.

All existing roads would be left in a condition equal to, or better than, their condition prior to construction activities. Where existing roads could be used for construction and operation purposes, only spur roads to the Project ROW or work areas would be needed. For the purpose of analysis, where needed, all new and improved access roads would typically have a 12-foot-wide travel surface, plus 2 feet on each side for berms/ditches, for an overall road width of 16 feet. Final travel surface widths of any particular new and improved access road would be identified in the final POD. In some circumstances in steeper terrain, the travel surface width could be a maximum of 24 feet for radius of curves, depending on site-specific conditions and as specified in the POD. The disturbance analyzed is likely greater than the footprint needed for the proposed Project.

Where new access roads are required, they may be built as either temporary or permanent access roads. Wherever possible, new access roads would be constructed within the transmission line ROW. Typically, permanent access roads would be obtained on private lands through the acquisition of easements or property. Permanent access roads on BLM, Reclamation, Coronado National Forest, or State lands would be identified in coordination with the respective agency. Temporary access roads would be used when required for construction purposes only or in temporary work areas. Temporary roads serve the needs for Project access during the construction phases but are not anticipated to be necessary for operation and maintenance purposes.

Upon completion of construction activities, temporary access roads would be reclaimed in accordance with the procedures specified in the reclamation plan in the final POD. Where grading would be required, surface restoration would be implemented as required by the landowner or BLM authorized officer. The method of restoration would normally consist of returning disturbed areas back to their normal contour, replacing topsoil, reseeding (where required), etc. The Reclamation, Vegetation, and Monitoring Plan would include final details on restoration.

All operations access routes would be carefully sited, and vehicle use would be confined to designated access. To reduce the severity of the proposed Project disturbance where it is unwarranted to blade a new road or make other improvements, unimproved roads would be used to reduce impacts to vegetation and minimize disturbance to select access points along the proposed ROW. Vegetation would be crushed but not cropped, thereby avoiding removal of vegetative root mass and organics in the soil, as no surface soil would be removed. This type of access may be used in areas with flat terrain and within grassland, desertscrub, sand scrub, and sand dune vegetation communities. Use of unimproved spur roads would be used to preserve the maximum amount of native vegetation and minimize overall disturbance.

Estimates of potential permanent access road requirements for the proposed Project (see table 2-8) were developed using overlays of route alternatives in Google Earth to collect data on the existing adjacent road system and terrain conditions. Existing roads were evaluated to determine the approximate percentage that could be used as either access type A, B, or C and to collect data such as road widths, required spur road lengths, and apparent need for upgrading. If an existing road appeared to be in need of upgrading, then it was automatically categorized as access type C. Access type D was assigned only when one of the other three access types was not feasible. Access type E would include spur roads (improved and unimproved) used for short distances to access specific points of the proposed ROW. To better estimate average lengths of parallel/down-line access roads that would be required for the Project, this Google Earth overlay method was used to assess the terrain along each road segment. Estimated total lengths were then modified, as necessary, relative to the terrain along the corridor length.

The following assumptions were used to estimate permanent access road disturbance:

- All 345-kV segments would use a 200-foot ROW, with 4.5 structures per mile.
- All 230-kV segments would use a 150-foot ROW, with 5.5 structures per mile.
- All existing parallel access would be outside the Project ROW.
- All new down-line access would be within the Project ROW.
- Spur roads would be outside the Project ROW, except for the first 100 feet for 345-kV segments and the first 75 feet for 230-kV segments.
- The total width of spur roads, including berms and ditches if needed, would be 12 feet.

Additional temporary spur roads would be required for stringing and splicing sites with access types A, B, and C. Table 2-8 describes estimated miles of access roads by type (A, B, C, D, or E) and by Project component.

FOUNDATION INSTALLATION

Each structure would require the installation of foundations, which are typically drilled concrete piers; direct embedded foundation systems for tubular steel poles may be used as well. For drilled concrete piers, drilled shafts would be excavated for each structure, which means four excavated holes approximately 4 feet in diameter for each lattice structure and one excavated hole approximately 6 to 8 feet in diameter for each single shaft tubular steel pole. Foundation depths would be dependent on geotechnical conditions at the structure site and the structure type. Typical hole depths for tangent structures range from 18 to 30 feet deep, while angle and dead-end structure foundation depths range from 22 to 50 feet deep. It is anticipated that soil borings would be obtained at each major angle point and at representative locations in between. The holes would be drilled using a truck-mounted excavator equipped with an auger specifically sized for the type of structure being installed. Spoil material would be used to backfill the boring, and any excess would be spread thinly across the surface surrounding the hole.

For tubular steel poles, steel reinforcing cages and anchor bolt cages would be installed after excavation and before concrete placement and structure installation. For lattice structures, steel reinforcing cages and stub angles would be installed after excavation and before concrete placement and structure installation. The foundations would be designed to meet or exceed all applicable design codes.

Water would be required for concrete mixing. Each structure would require approximately 1,500 gallons of water. Water would be needed to make the concrete, and would be obtained from existing sources along the ROW. Water would be trucked in from a variety of existing sources, and no wells would be drilled. No new water sources would be developed for this proposed Project.

The concrete mixing would not occur at each structure site. Rather, mixing would occur at the previously identified concrete batch plants or existing commercial plants and would be delivered to the structure as part of the already prepared concrete mix. Typically, concrete would be delivered directly to the site in concrete trucks with a capacity of up to 10 cubic yards. However, in areas with limited access or environmental constraints, the concrete would be placed in the excavation with either a crane and garbo bucket, or pumped from a distance of several hundred feet. Each structure would have a finished foundation reveal that would extend approximately 2 feet above the ground level. The foundation reveal is used to provide some protection to the steel structure from vehicles and from potential steel corrosion due to corrosive soils and cathodic protection.

Although unlikely for this proposed Project, where solid rock is encountered, blasting, rock hauling, or the use of a rock anchoring or mini-pile system may be required. The rock anchoring or mini-pile system would be used in areas where site access is limited or where adjacent structures could be damaged as a result of blasting or rock-hauling activities. Such anchoring systems may also be used where economically and technically justified. In areas where it is not possible to operate large drilling equipment due to access or environmental constraints, hand digging may be required. Materials used for rock anchoring or mini-pile systems would be stored in the staging areas and not on the ROW. Foundation holes left open or unguarded would be covered to protect the public and wildlife. If practical, temporary safety fencing may be used.

STRUCTURE ASSEMBLY

To erect the structures, which would be either lattice or monopole, materials would be fabricated, staged, and assembled at temporary work areas. From the temporary work areas, material and subassemblies would be delivered to the structure work areas via flatbed truck. Subsequent to full or partial assembly, sections of the structure would be assembled adjacent to the structure location and lifted onto the foundation using a large crane of suitable capacity. The crane would move along the access road and ROW as structures are erected. More than one structure assembly crew and crane could be working concurrently.

CONDUCTOR STRINGING

Conductor, fiber-optic, and non-fiber shield wire would be placed on the structures by a process called stringing. Overhead shield wires would be located at the top of each structure and above the conductors and function to intercept lightning that would otherwise strike the conductor. If a single shield wire is used, it would be a fiber-optic shield wire. If dual shield wires are installed, one would include fiber-optic bundle and one would be a normal steel cable shield wire. Additionally, a grounding system would be installed at the base of each structure that would consist of copper or copper weld ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by buried copper lead.

The first step to conductor and shield wire stringing would be to install insulators and stringing sheaves. Stringing sheaves are large pulleys that are temporarily attached at the end of the insulator strings at each structure to allow conductors to be pulled along the line. Once the stringing sheaves have been installed, the initial stringing operation would commence. This would consist of pulling a sock line or pulling line or high-strength rope through the sheaves. The sock line is attached to the hard line, which follows the sock line as it is pulled through the sheaves. The hard line would then be attached to the conductor or shield wire to pull it through the sheaves into its final location. Pulling a line may be accomplished by attaching it to a specialized vehicle or to a small helicopter that moves along the ROW. Shield wire and conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end.

Additionally, temporary clearance structures called guard structures would be erected over highways, railroads, transmission lines, structures, and other obstacles prior to conductor stringing. The guard structures are typically vertical wood poles with cross arms and are erected at road crossings or crossings with other energized electric and communication lines to prevent contact during stringing activities. Bucket trucks may also be used to provide temporary clearance. Bucket trucks are trucks fitted with a hinged arm ending in an enclosed platform called a “bucket,” which can be raised to let the worker in the bucket service aerial equipment.

All guard structures would be located within the Project ROW. The temporary disturbance associated with installation of guard structures would consist of an approximately 100 x 100–foot work area at the base of each guard structure and two holes approximately 3 feet in diameter. The installation method of the guard structures would be direct embedding with crushed rock and excavated material. All excavated material for the guard structures would be used to backfill these guard structures. As such, no excavated material would require offsite removal. All topsoil would be salvaged, stockpiled, and replaced on removal of the guard structures and initiation of reclamation activities.

UPGRADE OF THE EXISTING WESTERN TRANSMISSION LINE

One of two methods of construction for the Upgrade Section of the Project would be used, depending on ROW constraints: the tear-down and rebuild in place method; or construction of the new facilities adjacent to the existing facilities. In locations where possible, the new 230-kV line would be built 50 feet away from the edge of the existing 100-foot ROW, parallel to the existing line. This would allow the existing line to remain in service until the new line is energized, at which point the existing line would be decommissioned and removed. The existing ROW would then be abandoned, except for a 25-foot-wide strip along the edge, which would become part of the new 150-foot ROW. This is the preferred method of construction, as it would minimize the outage time on the existing line, and the risk of outages for local consumers during the upgrade process. Most of the disturbance in the old ROW would occur within 50 to 75 feet of the existing ROW centerline to remove old structures or old conductors.

In some places, such as through congested suburban areas, it may not be physically possible to construct the upgrade line in this manner. In these cases, a tear down and rebuild in place method would need to be used. The old line would need to be taken out of service and torn out and the new line constructed in the original 100-foot, or somewhat expanded, ROW. This work would likely be subject to seasonal restrictions to minimize the outage impacts on system reliability.

Figures 2-15a and 2-15b are examples of typical ROW configuration for the New Build and Upgrade sections of the Project.

Figure 2-15a. Typical ROW configuration, New Build Section.

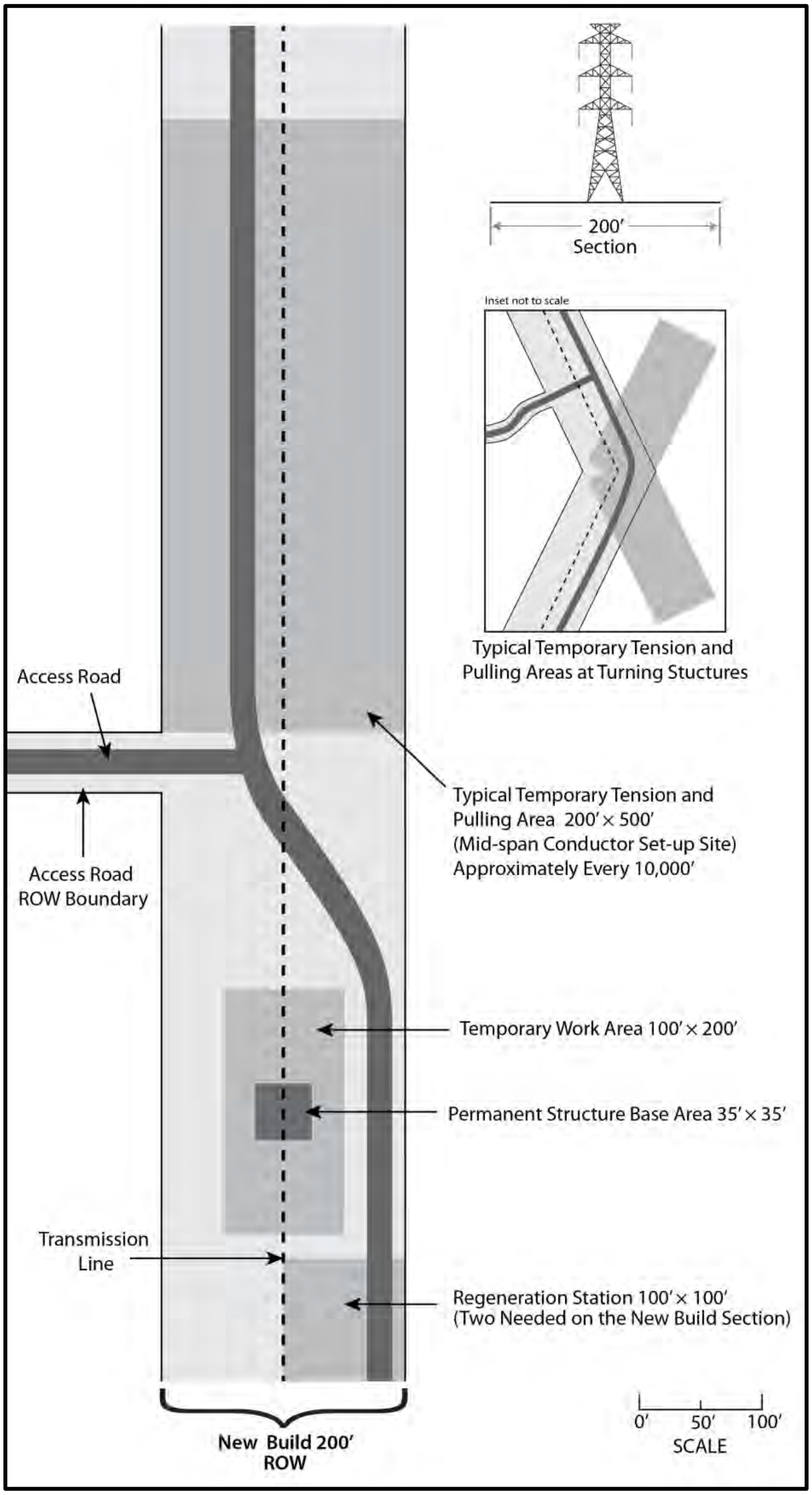
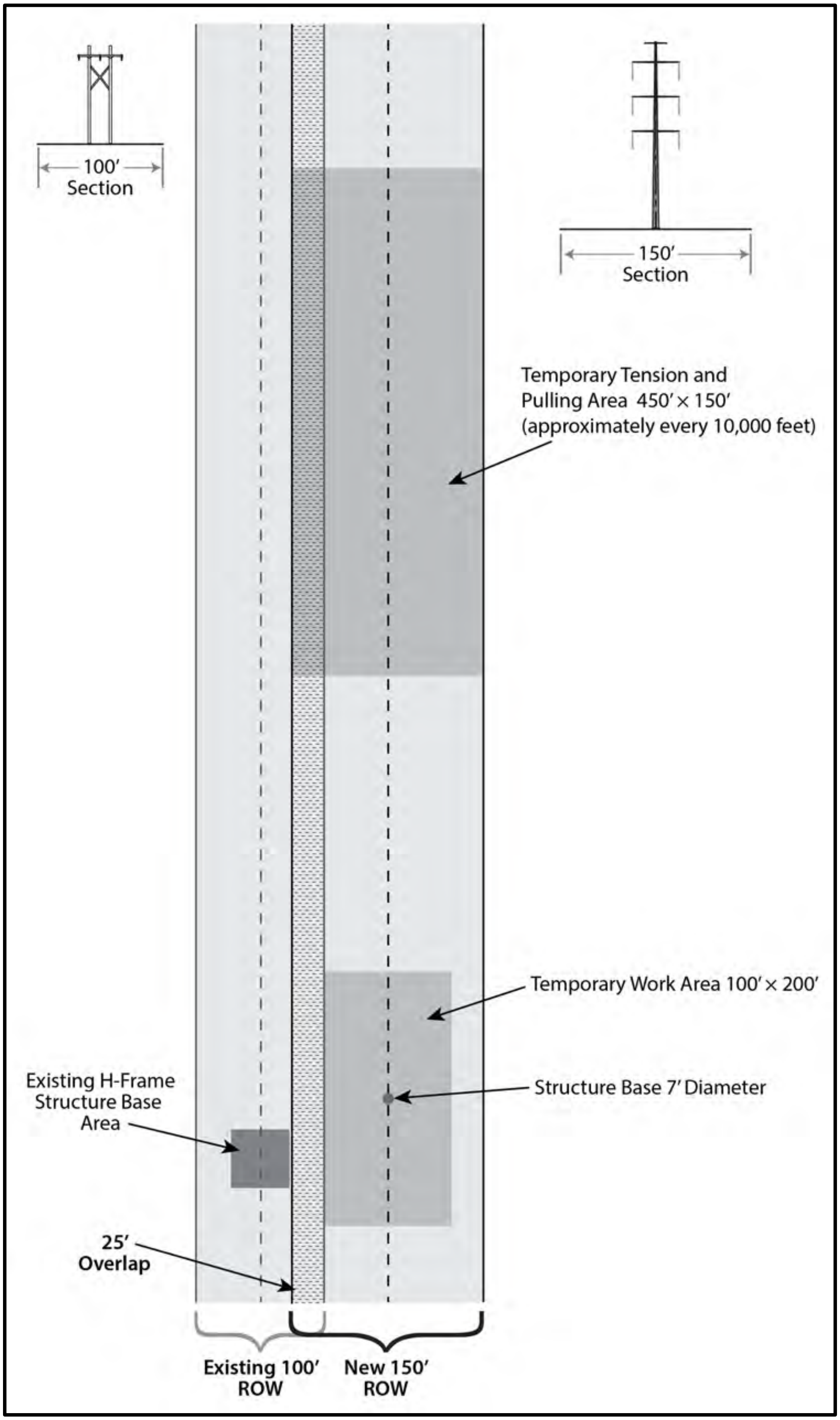


Figure 2-15b. Typical ROW configuration, Upgrade Section.



Substations

As described previously, the proposed Project involves interconnection with and upgrades of 14 existing substations along the Project route in New Mexico and Arizona and the potential construction of a new substation facility proposed for Luna County, New Mexico (referred to as “Midpoint Substation”). See table 2-4 for a summary of substations associated with the Project. The following discussion is an overview of the types of construction activities that could take place at the new and existing substations, depending on the level of work required. Table 2-8 describes estimated temporary and permanent disturbance by Project component.

SOIL BORING

Typically, soil borings would be made at three to four locations in the substation, particularly at the approximate location of large structures and equipment, such as transmission line dead-ends, transformers, microwave tower, and regeneration building sites, to determine the engineering properties of the soil. Borings would be made with truck or truck-mounted equipment. The borings would be approximately 4 inches in diameter, would range from 30 to 60 feet in depth, and would be backfilled with the excavated material upon completion of soil sampling.

CLEARING AND GRADING

Clearing of all vegetation would be required for all new substation areas, as well as for substation expansion areas. Cleared and graded material would be disposed of in accordance with local ordinances. Some topsoil would be stockpiled adjacent to the cleared area and used for dressing the slopes outside fenced areas. Clearing of all vegetation would occur within the entire substation areas, including to a distance of 10 feet outside the substation fence. This is required for personnel safety due to grounding concerns and because of lower clearances to energized conductors within the substation, compared with transmission lines. These lower clearances are allowed by the NESC because the entire substation is fenced.

Stormwater runoff containment ponds would be installed to moderate the discharge of stormwater offsite if determined to be necessary in the course of design. Typically, a 4- to 6-inch layer of aggregate crushed rock obtained from local sources would be applied to the graded surface of the substation area. The substation would be treated with a soil sterilizer.

CONSTRUCTION YARDS

Construction material storage or laydown yards may be required in support of substation construction (see tables 2-5 and 2-6). Construction material storage and laydown yards would be located within the substation property or proposed expansion area to the extent feasible. Previously disturbed areas would be used as available. If an external area is necessary for a construction material storage or laydown yard, sites outside the ROW on BLM-managed lands would require a separate short-term ROW authorization. After construction is completed, all debris and unused materials would be removed and the construction material storage or laydown yards returned to preconstruction conditions as required by the surface managing entity/landowner.

GROUNDING

A grounding system is needed at each substation for detection of faults and for personnel safety. The grounding system generally consists of buried copper conductor arranged in a grid system and driven ground rods measuring 8 to 10 feet long. The ground rods and equipment are connected to the grounding conductor. Ground grid is extended to approximately 4 feet outside the perimeter fence to prevent unsafe reach or touch potential.

FENCING

Security fencing would be installed around the entire perimeter of each new or expanded substation to protect equipment and prevent accidental contact with energized electrical equipment by authorized and unauthorized personnel. The fence would be a 7-foot-tall chain-link fence with steel posts; it would have 1 foot of barbed wire installed on top of the fence, for a total fence height of 8 feet, and would be properly grounded. Locked gates would be installed at appropriate locations for authorized vehicle and personnel access.

FOUNDATION INSTALLATION

Foundations for supporting structures at substations would be of the drilled pier type. Pier foundations are placed in a hole generally made by a truck-mounted auger. Reinforcing steel and anchor bolts are placed into the hole using truck-mounted crane. The portion of the foundation above ground would be formed. The portion below ground uses the undisturbed earth of the augured hole as the form. After the foundation has been poured, the forms would be removed, the excavation backfilled, and the surface of the foundation dressed.

Equipment foundations for circuit breakers and transformers would be slab-on-grade type. These foundations are placed by excavating the foundation area, placing forms and reinforcing steel and anchor bolts, and pouring concrete into the forms. After the foundation has been poured, the forms would be removed and the surface of the foundation dressed.

Where necessary, provision would be made in the design of the foundations to mitigate potential problems due to frost. Reinforcing steel and anchor bolts would be transported to each site by truck, either as a prefabricated cage or as loose pieces, which would then be fabricated into cages on the site. Concrete would be hauled to the site in concrete trucks. Excavated material would be spread at the site or disposed of in accordance with local ordinances and/or per agreement. Structures and equipment would be attached to the foundation by means of threaded anchor bolts embedded in the concrete. Some equipment, such as transformers, may not require anchor bolts and would be secured to the foundation by other means.

OIL CONTAINMENT

Transformers at substations would be filled with an insulating mineral oil. Containment structures would be required to prevent equipment oil from getting into the ground or water bodies in the event of a rupture or leak. These structures take many forms, depending on site requirements, environmental conditions, and regulatory restrictions. The simplest type of oil containment is a pit, of a calculated capacity, located under the oil-filled equipment that has an oil impervious liner. The pit is filled with rock to grade level. In the event of an oil leak or rupture, the oil captured in the containment pit would be pumped into tanks or barrels and transported to a disposal facility. If required, more elaborate oil containment systems would be installed. This may take the form of oil-water separator method, depending on site requirements. An Oil Spill Prevention Preparedness Plan would be developed in conjunction with the operating utility as required.

STRUCTURE AND EQUIPMENT INSTALLATION

Supporting steel structures at substations would be erected on concrete foundations. These would be set with a truck-mounted crane and attached to the foundation anchor bolts by means of a steel base plate. These structures would be used to support the energized conductors and certain types of equipment. This equipment would be lifted onto the structure by means of a truck-mounted crane and bolted to the structures, and electrical connections would then be made. Some equipment, such as transformers and circuit breakers, would be mounted directly to the foundations without supporting structures. These would be set in place by means of a truck-mounted crane. Some of this equipment would require assembly and testing on the pad. Electrical connections to the equipment would then be made.

CONDUCTOR INSTALLATION

Two main types of high-voltage conductors could be used in substations: tubular aluminum for rigid bus sections and/or stranded aluminum conductor for strain bus and connections to equipment. Rigid bus sections would be supported by porcelain insulators installed on steel supports. The bus sections would be welded together and attached to special fittings for connection to equipment. Stranded aluminum conductors would be used as flexible connectors between the rigid bus sections and the station equipment.

CONDUIT AND CONTROL CABLE INSTALLATION

Typically, substation equipment requires low-voltage connections to power relaying and control circuits. These circuits allow metering, protective functions, and control (both remote and local) of the power system. Connections would be made from the control building to the equipment through multi-conductor control cables installed in conduits or in a precast concrete cable trench system.

CONTROL BUILDING CONSTRUCTION

One or more control buildings would be required at each substation to house protective relays, control devices, battery system for primary control power, and remote control and monitoring equipment. The size and construction of the building depend on individual substation requirements. Typically, the control building would be constructed of concrete block, pre-engineered metal sheets, or composite surfaced materials. Once the control building is erected, equipment would be mounted and wired inside. In the case of a pre-engineered building, all internal wirings would be performed at the building manufacturer factory. New control buildings would be required at the Midpoint, Hidalgo, Apache, Adams Tap, Pantano, Vail, Tucson, Marana, Saguaro, and Tortolita substations. Existing control buildings would be used at the Afton, Nogales, Del Bac, DeMoss Petrie, and Rattlesnake substations. Nighttime lighting would be the minimal amount needed for safety and security of new substations and would be downward-shielded to minimize the effects of sky glow and glare on the surrounding areas.

SUBSTATION ACCESS ROADS: MIDPOINT SUBSTATION

New all-weather access to either of the proposed Midpoint Substations (North or South) would be required. Substation roads are constructed using a bulldozer or grader, followed by a roller to compact and smooth the ground. Front-end loaders would be used to move the soil locally or offsite. Either gravel obtained from a local source or asphalt would be applied as a base layer. Gravel, chip seal, or asphalt would be applied to the prepared base layer. Substation access roads would typically be 12 to 16 feet wide. Existing permanent roads for existing substations would likely fulfill the access requirements for proposed Project substation upgrade and expansion activities.

Construction Workforce and Equipment

Construction activities for all substation work are expected to occur over a 24-month period, beginning after all necessary permits and approvals. The estimated number of workers and types of equipment necessary to construct the proposed Project are shown in tables A-1 and A-2 in appendix A. Additional equipment may be required on an as-needed basis to mobilize, maintain, and demobilize the other equipment.

The construction workforce for the substations would vary by substation size and stage of construction, but typically consist of approximately 40 crew members. At the peak of construction, approximately 6 teams of 40 crew members would be active at the same time across multiple substations. Typical equipment used during substation construction and expansion efforts would include large material delivery trucks, bulldozers, scrapers, water trucks, rollers, loaders, excavators, forklifts and man lifts, and cranes.

A typical work schedule for the construction workforce would be 7 a.m. to 5 p.m., Monday through Saturday. The hours may be adjusted throughout the year to account for daylight and temperature fluctuations. Workdays may be extended occasionally to complete a task (e.g., a concrete pour). Construction on Sundays is possible on occasion, especially to make up for days when weather has prohibited work. Night work would only occur rarely but would sometimes be used in the summer, primarily during the foundation construction phase to keep concrete temperatures within acceptable limits during placement.

Postconstruction: Cleanup and Reclamation

The Project ROWs, temporary or permanent, would be kept in an orderly condition and free of trash throughout the construction period. Refuse and trash, including stakes and flagging, would be collected at the temporary use areas in a closeable container until removed from the sites and disposed of in an approved manner. Oils and fuels would not be dumped on the ROW. All construction crews would have proper training and would have spill kits onsite; absorbent materials would be placed under leaking equipment immediately to prevent ground contamination. All construction waste, including trash and litter, garbage or solid waste, petroleum products, and other materials, would be removed to a disposal facility authorized to accept such materials.

Construction would generate nonhazardous solid wastes, including concrete, hardware, packing material such as wood, cardboard, plastic wrap, and scrap metal. However, the volume of these wastes is not expected to be significant. Cleanup activities would occur continuously throughout construction. All waste and scrap material would be removed from the site and recycled, or disposed of in local permitted landfills in accordance with local ordinances.

RECLAMATION PLAN

As discussed in section 2.4.1, generally, Southline would manage vegetation within the proposed Project ROWs and in access and service roads to minimize system reliability issues, to address safety issues, and to facilitate operation and maintenance activities. See also the “Vegetation Management” section below.

In terms of the Reclamation Plan, the BLM is required by law (FLMPA of 1976) to ensure that authorized actions are carried out in a manner that does not result in “permanent impairment of the productivity of the land or the quality of the environment.” In order to promote a consistent and science-based approach to reclamation, this protocol identifies minimum information and operational requirements and performance-based criteria that are expected to satisfy Southline’s responsibilities.

Projects that include activities resulting in surface disturbance are required to implement approved reclamation plans. The result of such activities is intended to provide surface and subsurface stability and a functioning plant community that consists of native plants and reduces the opportunity for invasive species to occur. Following implementation of the final Reclamation Plan, the disturbed area should be compatible with land use objectives developed by the BLM for any given area. The Reclamation Plan would be a dynamic document that explains the extent and timing of reclamation activities, setting up monitoring schedules, success criteria, and reporting requirements. Elements of the plan would include treatment of soil, seed bed preparation, identification of the appropriate seed mix approved by BLM, and treatment of noxious weeds. The following provides a general description of the elements of a reclamation plan. Both an interim and final Reclamation Plan would be developed by Southline for review and approval by the BLM prior to initiating any ground-disturbing activities.

Standards-based reclamation focuses on using the desired end condition as the ultimate determinant of reclamation success. Reclamation procedures are designed to provide soil stabilization while expediting the return of a functional and desirable plant community. These standards are to be location specific and strictly adhered to unless a written exception is granted by the authorized officer. There are numerous other sources of guidance (e.g., BMPs) to aid operators in achieving reclamation success.

Topsoil and Spoil Treatment

Surface disturbances resulting from construction activities associated with Southline would be subject to reclamation standards described in the Reclamation Plan. It is important to note that reclamation success criteria that would be described in the Reclamation Plan are considered standards that, through the authorized officer, are subject to adaptation, depending on site-specific reclamation challenges (i.e., physical or biological constraints beyond the operator’s control).

Southline and/or their construction contractor would minimize ground disturbance where practical; however, there would still be extensive areas of soil disturbance due to the nature of the work and existing topography. The final Reclamation Plan would identify locations where the management of topsoil is warranted, such as areas where topsoil supports native plant species or is important to a private landowner (e.g., agricultural soils). Generally, topsoil is considered the uppermost 6 to 12 inches, but this can vary by soil type, particularly in desert ecosystems.

Right-of-Way Reclamation

Reclamation of temporarily disturbed areas would involve replacing stockpiled subsoil and topsoil (where applicable), restoring preexisting contours, installing permanent erosion control structures (i.e., water bars), and reestablishing vegetation.

Some areas may not have extensive vegetation before proposed Project construction, such as areas of shallow bedrock, shallow topsoil, steep slopes, or dry desert soils. These areas would be identified during preconstruction surveys. Where appropriate, other reclamation activities (e.g., restoring preconstruction contours) would be conducted.

Preconstruction surveys may be required to identify baseline conditions, including the following types of information: existing land use, surface water hydrology, vegetation, presence of listed species, active migratory bird nests, soil features, soil mapping, soil inhibiting factors, photodocumentation, species density, and known weed infestations. These data would inform the development of the Reclamation Plan, which would provide more detailed information on the methods described in the following sections.

Seeding

As part of the reclamation process, Southline would prepare the seedbed to facilitate the restoration of vegetation to preconstruction conditions. General measures are discussed as follows, and habitat-specific seedbed measures would be provided in the final reclamation plan.

Soil amendments are intended to minimize soil erosion and subsequent sedimentation, conserve soil moisture, provide cover, and moderate temperatures to facilitate the germination of seeds.

Unless otherwise directed, following seedbed preparation, only native seed would be used and would be applied using a broadcast spreader, drill, and/or hydroseeder, depending on site conditions and seed mix. Seeding would be done on portions of the proposed Project where ground-disturbing activities are complete and at the appropriate time of year (preferably in the fall or, if fall is not an option, the spring). If there is a lag time between the end of ground-disturbing activities and seeding, BMPs from the SWPPP would be implemented.

The choice of seed mixtures would be dependent on the existing vegetation types, the availability of commercial, weed-free live seed at the time of seeding, and landowner approval. The final Reclamation Plan would identify proposed seed mixes based on specific vegetation communities (e.g., desertscrub, grassland, etc.) and would include the species, cultivar (if applicable), percent seed mix, pure live seeds per acre, and the application rate. Seed mixes would also take into account vegetation management requirements under transmission lines to avoid species that would frequently exceed height requirements. Proposed mixes would not be applied prior to landowner notification. In most cases, the BLM process would be followed on all lands unless specific landowners objected.

Southline would reseed some permanently disturbed areas as well. The Upgrade Section of the proposed Project would use primarily existing roads. Roads created for the proposed Project, primarily associated with the New Build Section, which would be necessary for the long-term operation and maintenance of the transmission line, are considered a permanent impact. Upon terminating and decommissioning of the proposed Project, these permanent disturbances would be reseeded. The intent of this reseeding differs from the long-term objective of establishing plant communities and habitat. Therefore, the final Reclamation Plan would also include one or more seed mixes that would be used as a BMP for permanently disturbed areas.

POSTCONSTRUCTION MONITORING AND REPORTING

Southline would conduct postconstruction surveys for a period of time based on the interim and final Reclamation Plans approved by the BLM following the conclusion of ground-disturbing activities.

Successful revegetation would be determined by monitoring reclaimed areas against existing conditions prior to construction activities. It some areas, preconstruction surveys may be required to identify protected species. Species and relative density would be assessed annually and compared with baseline data collected prior to the start of ground-disturbing activities. Reclamation would be determined successful if the seeded areas have germinated and are demonstrating that they would, over time, achieve a distribution and diversity similar to preconstruction conditions. Specific success criteria would be established for the various vegetation communities within the project area. If after a second growing season problem areas have been identified (e.g., seed germination is lower than expected; prevalence of noxious-weed species), the area would be treated and reseeded. Treatment may include additional seedbed preparation, control of noxious weeds, use of soil amendments, and/or use of another appropriate seed mix. Monitoring reclamation activities and remedial measures on private lands or lands managed by State agencies, counties, or other municipalities would be up to the landowner or land managers and agreements they negotiate with Southline.

Southline would document preconstruction observations, construction reclamation activities, and postconstruction monitoring on federally managed lands in an annual report. Annual reports would be prepared for submittal to Federal entities that administer public lands in the project area. The reports would provide a summary of Project reclamation activities and observations and include recommendations for additional corrective actions if necessary.

The final Reclamation Plan would be prepared prior to the start of construction. As Southline better defines the construction order and schedule, the final Reclamation Plan would be updated to include the schedule for baseline vegetation and weed surveys and identification of any areas for preconstruction noxious-weed treatment, along with a more detailed reclamation schedule and plan.

Operation and Maintenance

Following Project construction, operation and maintenance would commence. The following section provides information relative to the ongoing and long-term activities that would occur along the ROW for the anticipated operation and maintenance requirements for the proposed Project. This includes transmission line and substation inspection and maintenance, ROW and access road repair, vegetation management, and emergency response. Table 2-8 describes estimated temporary and permanent disturbance by Project component.

INSPECTION AND MAINTENANCE

Regular inspection of transmission lines, substations, and support systems is critical for safe, efficient, and economical operation. Early identification of items needing maintenance, repair, or replacement would ensure continued safe operation of the proposed Project. The proposed Project must comply with industry standard codes and practices such as NESC (ANSI C2) (ANSI 2012), which governs the design and operation of high-voltage electric utility systems.

TRANSMISSION LINE MAINTENANCE

Regular ground and aerial inspections would be performed in accordance with applicable Western/Southline requirements. The conductors would be inspected for corrosion, equipment misalignment, loose fittings, physical damage, and other mechanical problems. Climbing inspections would be conducted to coincide with bolt checking and tightening on lattice structures. The need for vegetation management would also be determined during inspection patrols. Annual maintenance activities are typically conducted by using helicopters, ground vehicles (4 x 4 trucks or all-terrain vehicles (ATVs)), or on foot. Visual or infrared inspections of the entire Project would be conducted annually. Typically, 10 percent of all structures would be inspected during annual structure-climbing inspections, so that each structure is inspected every 10 years.

Detailed ground inspections would be conducted as needed and are anticipated to occur every 2 to 3 years. Inspections assess the condition of the line and hardware to determine whether any component needs to be repaired or replaced and whether other conditions exist that may require maintenance or modification. Inspections also assess any authorized encroachments and/or trash dumping in the ROW that could constitute a safety hazard. Aerial inspection would be conducted by helicopter, generally in the spring and fall.

Maintenance would be performed as needed during operations. Routine maintenance activities typically consist of repair or replacement of individual components and as standard practice do not include new ground-disturbing activities. Electrical equipment that may require repair or replacement (usually due to isolated damage such as lightning or gunshot) includes conductors, insulators, shield wires, fiber-optic lines, and related equipment. Typically, equipment repair or replacement would be conducted by a four-person crew with two or three trucks, a boom or line truck, an aerial truck, and an assist truck. Maintenance on transmission lines can often be completed safely using live-line techniques in order to avoid interruption of service to critical transmission line infrastructure.

Routine operation and maintenance activities on the proposed Project would minimize the need for most emergency repairs; however, emergency repairs are often necessary to address natural hazard, fire, or human-caused damage to a line. Emergency maintenance may be needed to repair downed wires during storms and correct unexpected outages. Emergency maintenance activities can involve prompt response by repair crews to repair or replace damaged equipment. When emergency repair work is required, an attempt would be made to notify landowners in advance of repairs. Restoration and reclamation procedures following completion of emergency repair activities would be similar to those used during construction. See “Fire Protection and Emergency Response” later in this section.

SUBSTATION AND REGENERATION STATION MAINTENANCE

Substation and regeneration stations are unmanned. Monitoring and control are performed remotely. Regeneration sites would provide communications support for transmission line patrol and maintenance operations and would allow emergency operations independent of commercial common carrier. Unauthorized entry into facilities is discouraged with the provision of fencing and locked gates. Warning signs would be posted, and entry to the operating facilities would be restricted to authorized personnel. Remotely monitored security systems would be installed. Several forms of security would be planned for each of the locations. Security measures may include fire detection in the control building via the remote monitoring system; alarming for forced entry; and a perimeter security system coupled with remote sensing infrared camera equipment in the fenced area of the station to provide visual observation to the system operator of disturbances at the fence line.

Maintenance activities would include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. It is anticipated that maintenance at each substation would require approximately six trips per year by a two- to four-person crew. Routine operations would require one or two workers in a light utility truck to visit the substations monthly. Typically, a major substation maintenance inspection would take place once per year, requiring up to 15 personnel for 1 to 3 weeks.

Regeneration stations would be visited every 2 to 3 months by 1 individual in a light truck to inspect the facilities. Annual maintenance would be performed by a 2-person crew in a light truck over a 2- to 5-day period.

Minimal lighting for routine needs at the substation would be provided inside the substation fence. Maintenance crews would bring adequate lighting in the event that emergency repair work is required. All lighting would be shielded downwards to minimize contributions to sky glow.

ACCESS ROAD AND STRUCTURE WORK AREA REPAIR

Inspection and maintenance activities would be done using roads for which all appropriate ROWs have been obtained from the landowner.

ROW repairs would include grading or repair of existing maintenance access roads and structure foundation bases, and spot repair of sites subject to flooding or scouring. Activities related to ROW repair are usually conducted outside the rainy season. Required maintenance equipment may include a small bulldozer that would be trailered to the work site and offloaded for use as needed, a backhoe, a 4-wheel-drive pickup truck, a front-end loader, and, on rare occasion, a motor grader. The bulldozer and loader have steel tracks or large tires, whereas the grader, backhoe, and truck typically have rubber tires.

VEGETATION MANAGEMENT

Vegetation management practices along the ROW would be in accordance with NESC ANSI A300 Part 7, "American Operations Integrated Vegetation Management" (BLM's Integrated Vegetation Management Handbook – H 1740-02, March 25, 2008a), Western Operation and Maintenance clearing practices and construction specifications, electric utility ROWs, and International Society of Arboriculture BMPs. The Vegetation Management Plan would be part of the POD as one of the framework plans and would be based on NERC Reliability Standard FAC-003-1.

Vegetation management activities would focus on establishing sustainable native plant communities that are compatible with the electric facilities. Establishment of vegetation would also reduce the potential for noxious weeds to become established in the ROW. Where practicable, vegetation that does not pose a fire hazard or physical impedance would not be cleared.

The goal of vegetation management activities during operation and maintenance is to proactively manage vegetation within the transmission line ROW, to control or minimize impacts of wildfires, and to minimize the likelihood of transmission outages resulting from smoke effects and/or vegetation intrusion on the line.

The proposed Project primarily crosses areas of low-growing shrubs and grasses. Where needed, vegetation would be removed using mechanical and manual equipment, such as weed trimmers, rakes, shovels, mowers, and brush hooks. Shrubs and other obstructions would be regularly removed near structures to facilitate inspection and maintenance of equipment, comply with NERC Reliability Standard FAC-003-1, and ensure system reliability. In limited areas, chain saws may be required for trimming larger trees. The duration of activities and the size of crew and equipment required would depend on the amount and size of the vegetation to be trimmed or removed. For analysis purposes, a crew size of 4 with a working foreman would be assumed to complete 2 miles a day of vegetation maintenance. Although unlikely to be necessary, species-dependent herbicide could be applied subsequent to vegetation clearing to prevent regrowth of that vegetation and/or noxious and invasive weeds. Only herbicides, as approved by agencies with jurisdiction (i.e., BLM, Coronado National Forest, NMSLO, and ASLD), would be used. All pesticide and herbicide applications would be performed in accordance with Federal, State, and local regulations, and in compliance with land management agency and/or landowner requirements. Aerial application of herbicide would not be performed.

Southline would comply with agency requirements regarding management of noxious weeds within the ROW, along access roads, and at temporary use areas (e.g., cleaning equipment to prevent spread of noxious weeds). Chemical treatment within or adjacent to the ROW generally would be limited only to areas with noxious weeds, and only if absolutely necessary and in accordance with the Noxious Weed Management Plan, to be developed. If required, only herbicides or pesticides that are agency-approved would be used, and only upon prior approval of the BLM authorized officer or landowner.

Fire protection jurisdictions would be consulted to ensure implementation and effectiveness of safety requirements and procedural protocols, including Fire Response Plans. The following practices may be implemented to prevent fire during construction and maintenance/repair activities: brush clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, and providing "fire behavior" training to all pertinent personnel.

FIRE PROTECTION AND EMERGENCY RESPONSE

Emergencies are events requiring immediate response to a condition and may include fires, car-to-pole contact, downed poles, transformer outages, vandalism, etc. All applicable fire laws and regulations, including BLM fire safety standards, would be observed during the operation period. If extreme fire conditions occur, the BLM and other land management agency representatives would be contacted and access could be restricted. Maintenance personnel would coordinate with the agency representatives and implement practical measures to report and suppress fires. Measures may include brush clearing, stationing a water truck at the site to keep ground vegetation moist in extreme fire conditions, enforcing red flag warnings, etc.

2.4.4 Right-of-Way Renewal

The proposed Project would have a minimum projected operational life of 50 years or longer. A ROW grant issued for 50 years with the option of renewal would be necessary for the operation, maintenance, and decommissioning of the transmission facilities located on BLM-managed public land. At the end of the ROW grant term (50 years), Southline would have the option to renew the ROW grant past 50 years to continue operation of the line. The terms and conditions included in the original ROW grant could be modified for the renewed ROW grant.

2.4.5 Decommissioning

At the end of its service life, the transmission line would be removed if the facilities are no longer needed. The decommissioning of transmission lines would involve the removal of wire, insulators, hardware, and structures from the ROW. Structures would be removed and foundations removed to below ground surface. Foundations and direct-embedded structures (if used) would be cut off 1 foot below ground. Material would be disposed of in an appropriate manner. Wire and steel could be salvaged and sold; if structures are in good condition, some may be sold to utilities for re-use. The equipment required to safely remove the wires and structures would be nearly the same as that required for installation.

Removal operations would be anticipated to occur at an average rate of approximately 4 miles per week per crew. Each removal crew would consist of about 60 workers for the New Build Section and about 50 workers for the Upgrade Section. All work would occur within the same disturbance limits identified for construction. Following abandonment and removal of the transmission line structures and equipment from the ROW, any areas disturbed during line dismantling would be restored and rehabilitated in accordance with requirements of a Decommissioning Plan.

Similarly, if any of the New Build Section substations are no longer required, the substation structures and equipment would be dismantled and removed from the site. Substations would be similarly decommissioned, with all remaining equipment disposed of in an appropriate manner and foundations cut off 1 foot below ground. The substation structures would be disassembled and either reused at another station, sold for scrap, or recycled. Major equipment, such as breakers, transformers, and reactors, would be removed, refurbished, and stored for use at another facility, depending on the age and condition of the equipment. Foundations would be either abandoned in place or cut off below ground level and buried. Removal operations are anticipated to occur at an average rate of one substation per month per crew. Each crew would consist of about 20 workers for the Upgrade Section and 40 workers for the New Build Section. All work would occur within the same disturbance limits identified for construction.

Southline would reclaim service roads following abandonment in accordance with land management agency or landowner agreements. Access roads would be reclaimed and seeded in accordance with the requirements of the Reclamation Plan. A Restoration Plan would be submitted for approval but is expected to include leveling and seeding of the Project access roads, structure sites, and other areas disturbed during removal operations. Equipment and manpower for restoration operations would be similar to that required at the end of construction. In some cases, reseeding may not be necessary, given the existing amount of soil compaction and vegetation currently in place. Where required by the land management agency or landowner, compacted areas would be ripped and appropriate sediment control measures would be implemented.

2.4.6 Typical Design Features (Proponent Committed Environmental Measures and Best Management Practices)

Activities under the proposed Project and action alternatives (see sections 2.4 and 2.6) would include environmental protection measures that are an integral part of the proposed Project. These measures include BMPs established by the BLM and Western for construction, operation, and maintenance of the proposed Project. These BMPs, typical for a transmission line project of this nature, would be followed to avoid or minimize the potential for adverse environmental effects resulting from Project-related activities.

Project design features are described in table 2-7 for the following:

- Standard mitigation
- Reclamation (site restoration, revegetation)
- Air quality and climate change
- Cultural resources
- Hazardous materials and waste
- Health and human safety
- Farm and rangeland
- Military operations
- Noise
- Paleontology
- Recreation
- Soils
- Transportation
- Biological resources (wildlife, vegetation)
- Visual resources
- Water resources

As discussed previously, the final POD would include Project details such as mitigation and BMPs, which would be requirements of the ROW grant. BLM requires that a grant holder post a surety bond to ensure compliance with the terms, conditions, and stipulations of the grant, if issued, which would include mitigation. The grant authorization, if issued, would be contingent upon Southline's complying with a list of terms, conditions, and stipulations.

2.4.7 Project Design Refinements (Variance Process)

Southline and its construction contractors would conduct all activities associated within the authorized limits of the ROW. Southline would construct, operate, and maintain the facilities, improvements, and structures within the ROW in strict conformity with the final POD approved and made part of the ROW. Any relocation, additional construction, or use that is not in accordance with the approved POD (a "variance") would not be initiated without the prior written approval of the authorized officer using a variance request. A process for requesting and obtaining variances would be included in the final POD, and would include preparation of a Variance Plan. The Variance Plan would detail how requests would be tracked, approved, or not approved, as well as how it would be ensured that the requests have been covered by the analysis in the EIS.

A copy of the complete ROW agreement, including all stipulations and the final approved POD, would be available onsite during construction for all Project components. Minor changes to the approved POD may be necessary to accommodate or mitigate onsite circumstances. When the variance requested is for an action that has been assessed in the EIS for the Project and that occurs within the area inventoried at the Class III level, and the resulting disturbance area is within the existing approved temporary and permanent ROW, the construction inspection contractor (CIC) would have the authority to approve or deny the variance if authority is delegated by the authorized officer. Enabling the CIC to approve minor variances within areas analyzed for disturbance would expedite the Project while protecting resource values.

When the variance requested is outside an area covered within the EIS and addressed in the ROW grant, approval from the authorized officer would be required. In these cases, additional environmental analysis may be required.

Minor changes that occur would not require amending the ROW. The CIC and environmental monitors would review the POD and the area of minor change to identify any additional avoidance concerns. Examples of changes that could be approved by the CIC include the following:

- **Structure locations:** Minor changes include adjustment of structure locations within the approved temporary and permanent ROW to avoid sensitive plant or animal species or sensitive cultural sites.
- **Disturbance areas:** Minor changes include modification of disturbance areas within the authorized ROW and temporary work area boundaries.
- **Power lines:** Minor changes include moving the location of erosion control devices, temporary fences, tensioning locations, temporary work areas, access point to poles/structures, and material storage locations within the authorized ROW and temporary work area boundaries.
- **Access roads:** Minor changes include moving culvert locations to better accommodate natural drainages and meandering roads within authorized ROW to avoid impacts to plants and wildlife, and to use existing previously disturbed roads.

2.5 NO ACTION ALTERNATIVE

In addition to considering the proposed Project, as described in section 2.4, the no action alternative “provides a benchmark, enabling decision makers to compare the magnitude of environmental effects of the action alternatives” (CEQ 1981:question 3) (40 CFR 1502.14). The no action alternative provides the environmental baseline against which the other alternatives are compared.

Under the no action alternative, the BLM would not grant the ROW for construction and operation of the proposed Project. The Project facilities, including transmission lines and substations, would not be built or expanded, and existing land uses and present activities in the analysis area would continue. An amendment to the Mimbres RMP would not be required.

Western would not provide Hoover Act funding and Western would not participate in the proposed Project. It is likely, however, that Southline would pursue the Upgrade Section of the proposed Project under other funding sources. The existing Western 115-kV lines would continue to serve the existing transmission system. However, while the existing Western lines would not be upgraded as part of the proposed Project, upgrades to the existing line are in Western’s capital improvement plan. Western could adopt this EIS and determine whether additional supplemental analyses are needed. An upgrade of the existing lines is planned for in Western’s 10-year capital improvement plan (Western 2012a) because the lines are old, require an inordinate amount of maintenance, and need to be replaced, not only because of age but because of increased power demand. Existing customers are currently getting the power they need, but the system is approaching capacity, with little contingency if a major power system link goes down.

In terms of new energy generation projects along Western's existing lines, any future energy projects would need to submit an interconnection request to Western, in accordance with Western's Open Access and Transmission Tariff requirements and the Federal Power Act. Western would determine how the new generation project would impact the existing system and determine whether upgrades to the existing transmission system would be required to accommodate the new energy source. A NEPA analysis would be conducted in accordance with DOE NEPA implementing guidelines, and would assess the impacts of constructing and operating the energy project, which would be enabled by Western's execution of the interconnection agreement and upgrades to their existing transmission system (the Federal actions).

2.6 ACTION ALTERNATIVES

The alternatives development process began with the initial routing efforts completed by Southline to identify the Project used for the BLM ROW grant application, followed by public and agency scoping. Issues noted during public and agency scoping were used to develop agency alternatives. The agency alternatives do not constitute wholesale route alternatives, but rather are local alternatives that provide additional route options addressing specific identified resource issues. These processes are described below.

2.6.1 Process

Alternatives Developed by Southline

As described in Section 2.2, "Route Selection Process," Southline prepared a routing study to identify viable routes, evaluate potential environmental and land use constraints associated with those routes, and identify the optimal route alternatives for the proposed Project. Through this process, Southline submitted "proponent preferred routes" to BLM for the ROW grant application. The process of preparing the routing study and selecting Southline's preferred routes was needed to develop a Project proposal for review by the agencies and to initiate the NEPA process.

Southline's siting process was iterative, wherein a number of reasonable routes or segments were identified as possible alternatives and then studied using a geographic information system (GIS)-based evaluation process. For the siting process, Southline collected data, identified major on-the-ground features, and coordinated with land management agencies and landowners. Southline also adjusted possible alternative routes in response to input from its stakeholder outreach, and from early outreach with the BLM and Western.

The primary focus of the routing process for the New Build Section was to analyze existing linear facilities to identify and eliminate those initial route segments that did not conform to the overall objectives of the Project. These included route segments that were duplications of other options that had better overall routing potential, as well as other segments that were unusable because of their alignment/direction.

The screening process was augmented by a public engagement program that was designed to identify stakeholders and to work closely with these stakeholders to discuss the Project and obtain their input to the routing study process through direct interaction with the Project team. This approach was used for both the New Build and Upgrade sections of the line. Through this siting process, Southline ultimately selected a set of preferred alternatives ("Proponent Preferred" and "Proponent Alternative") and eliminated a number of routes, some due to public input and others as a result of constraints or because they did not meet the technical needs of the Project.

Southline's routing process is described in detail in the "Southline Transmission Project Routing Report" (Southline 2012a).

Alternatives Developed by the Bureau of Land Management and Western Area Power Administration

The BLM and Western, in coordination with the interdisciplinary (ID) team and cooperators, developed alternatives to the proposed route in order to address issues raised by Federal land management, State and local agencies, and the public. WWEC data were considered (figure 2-16), and Southline provided input on the reasonableness and suitability of the BLM- and Western-developed alternatives.

Because Southline's routing process was so interactive and included extensive stakeholder outreach and early screening with Western and BLM, agency alternatives developed through the NEPA process resulted in only small route variations around local resource conflicts. Through the Federal scoping process, routes identified by Southline were considered, and, in some cases, new local alternatives were added, based on the public and agency comments, ID team, and cooperating agency input. The alternatives development process included the evaluation of the following:

- Environmental concerns expressed during scoping, including the potential for major environmental impacts;
- Consideration of the BLM and DOE NEPA guidelines, including recommendation to evaluate or dismiss; and
- Review of all route alternatives and rationale by cooperating agencies and the ID team.

2.7 TRANSMISSION LINE ROUTE ALTERNATIVES

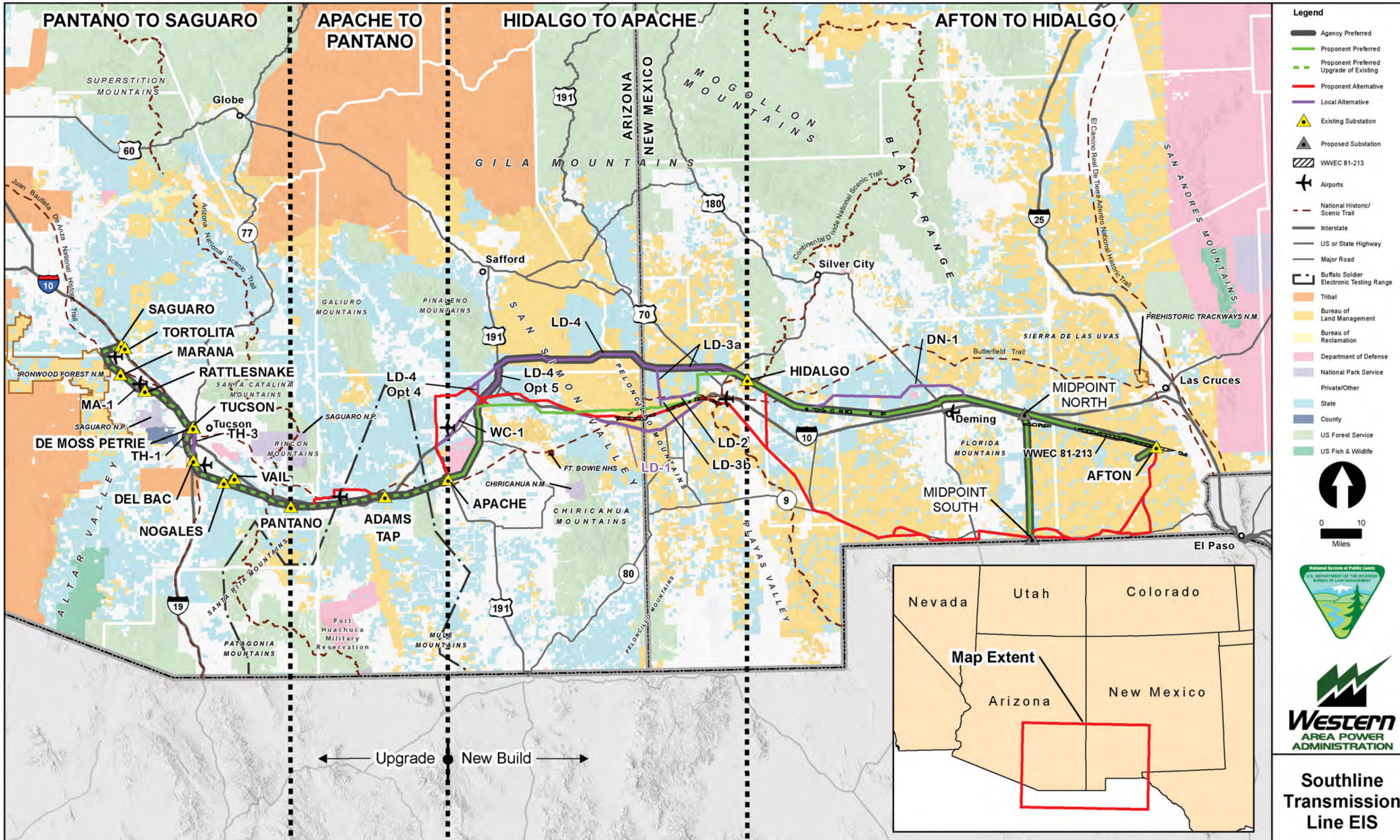
Southline's Proponent Preferred (also the proposed action) and Proponent Alternative routes were divided into four route groups and then into subroutes within each route group. Route groups were established based on geography, common resource issues, and interconnection points (substations), as shown in figure 2-16. These four geographic route groups allow for localized comparisons among subroutes and local alternatives.

Transmission line route alternatives developed by the agencies are "local alternative" segment options that attempt to avoid or minimize negative impacts to specific environmental or socioeconomic conditions. The agency alternatives do not form wholesale new routes, but rather local routes around resource conflicts. The naming convention and labeling style for each local alternative is based on nearby geographic landmarks (e.g., Deming (D); local alternative No. 1 (DN1)).

The four route groups are:

1. Route group 1: Afton Substation to Hidalgo Substation (New Build Section);
2. Route group 2: Hidalgo Substation to Apache Substation (New Build Section);
3. Route group 3: Apache Substation to Pantano Substation (Upgrade Section); and
4. Route group 4: Pantano Substation to Saguaro Substation (Upgrade Section).

Figure 2-16. Overview of transmission line route and substation alternatives considered in detail.



1 **Figure 2-17a.** Overview of route group 1: Afton Substation to Hidalgo Substation subroutes, segments, and local alternatives.

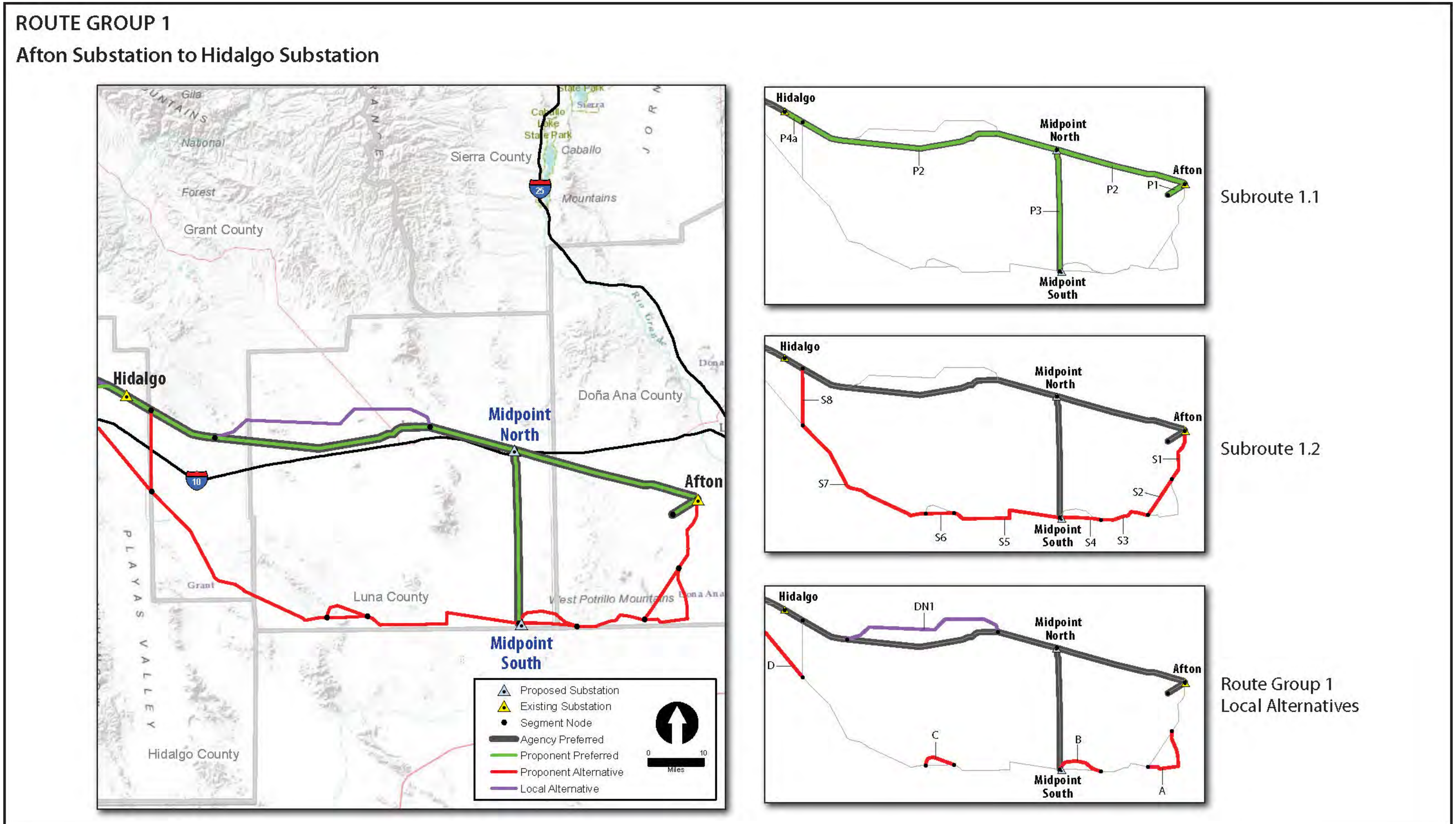


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Figure 2-17b. Overview of route group 2: Hidalgo Substation to Apache Substation subroutes, segments, and local alternatives.

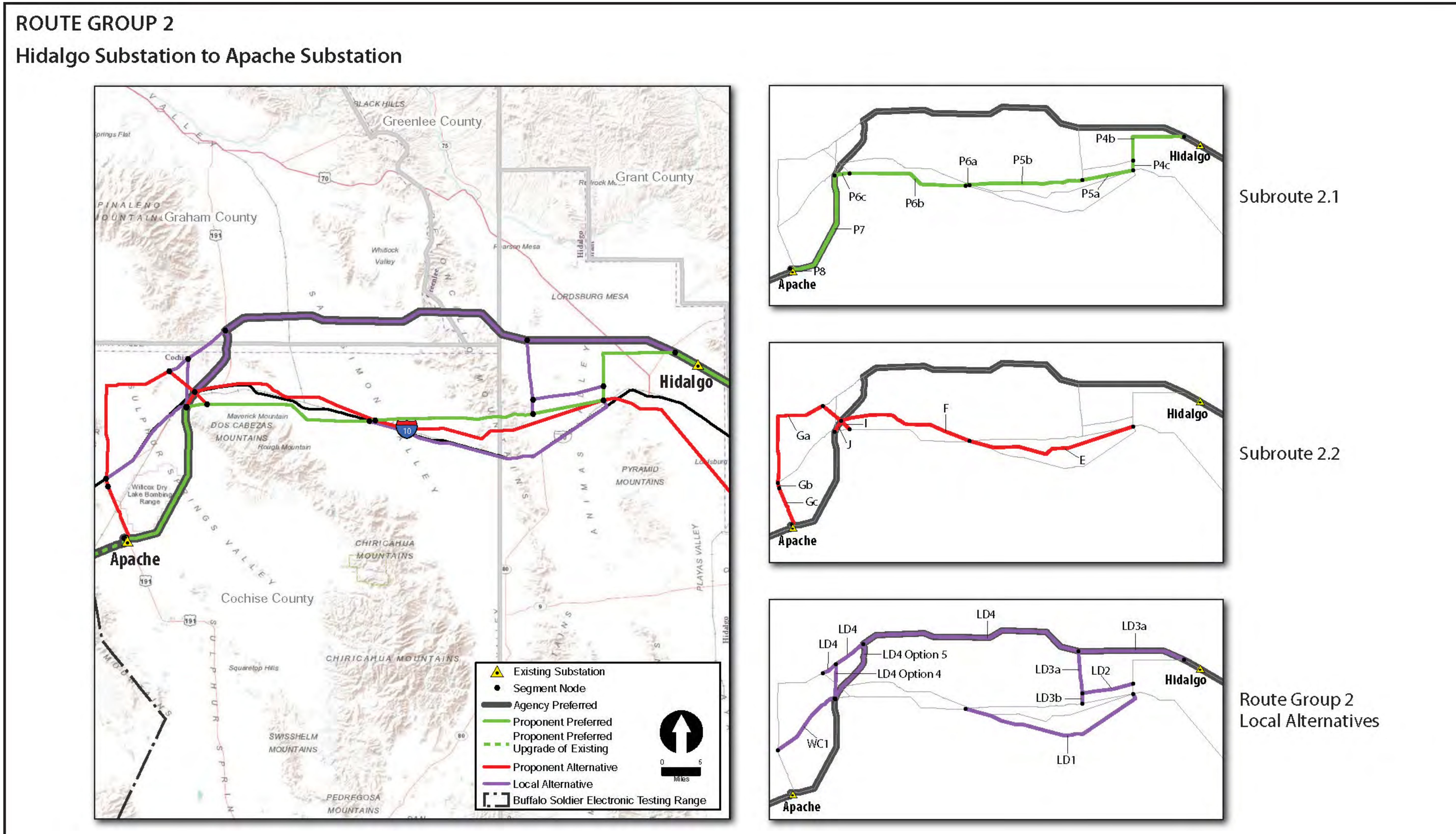


Figure 2-17c. Overview of route group 3: Apache Substation to Pantano Substation subroutes, segments, and local alternatives.

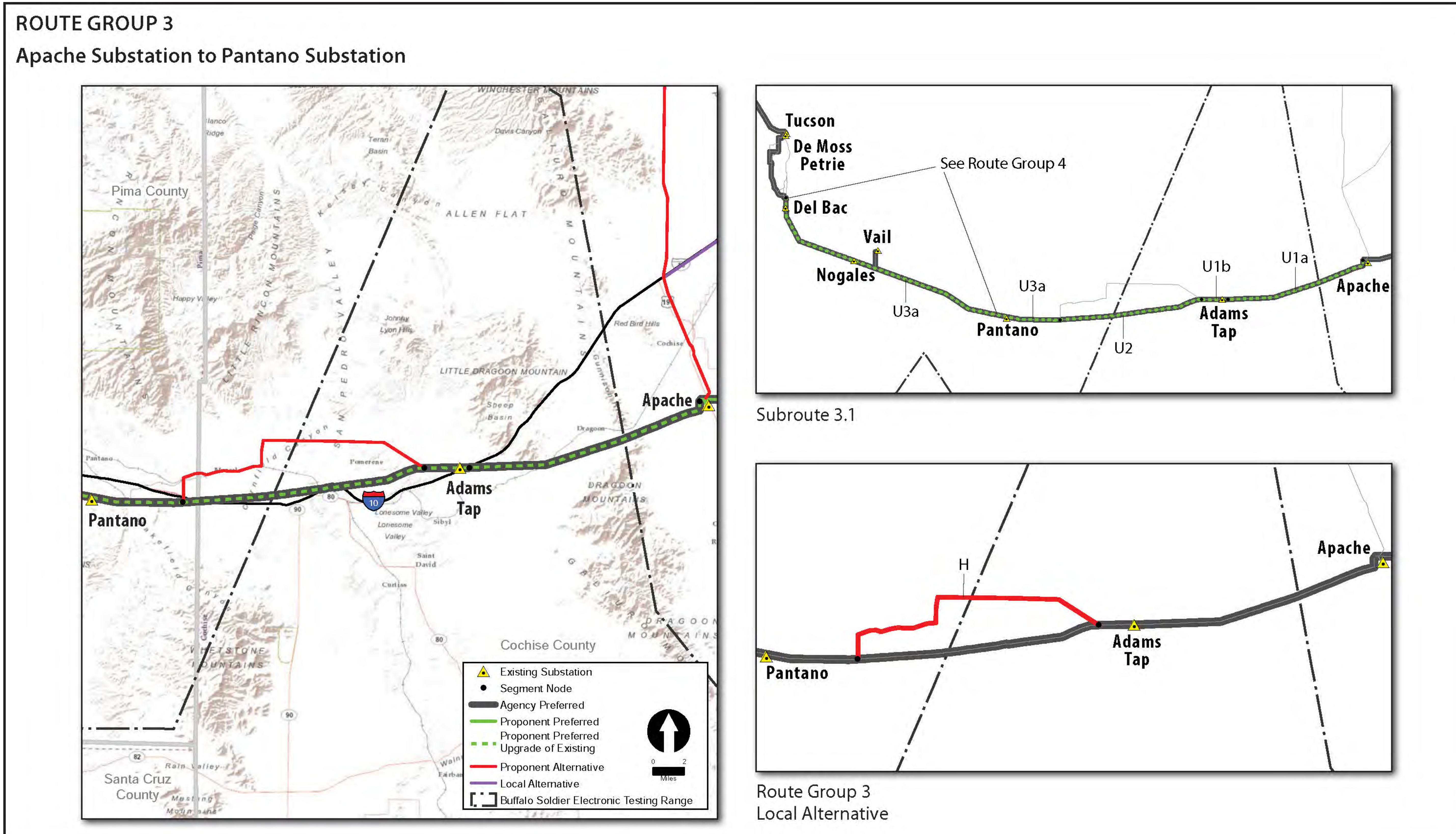
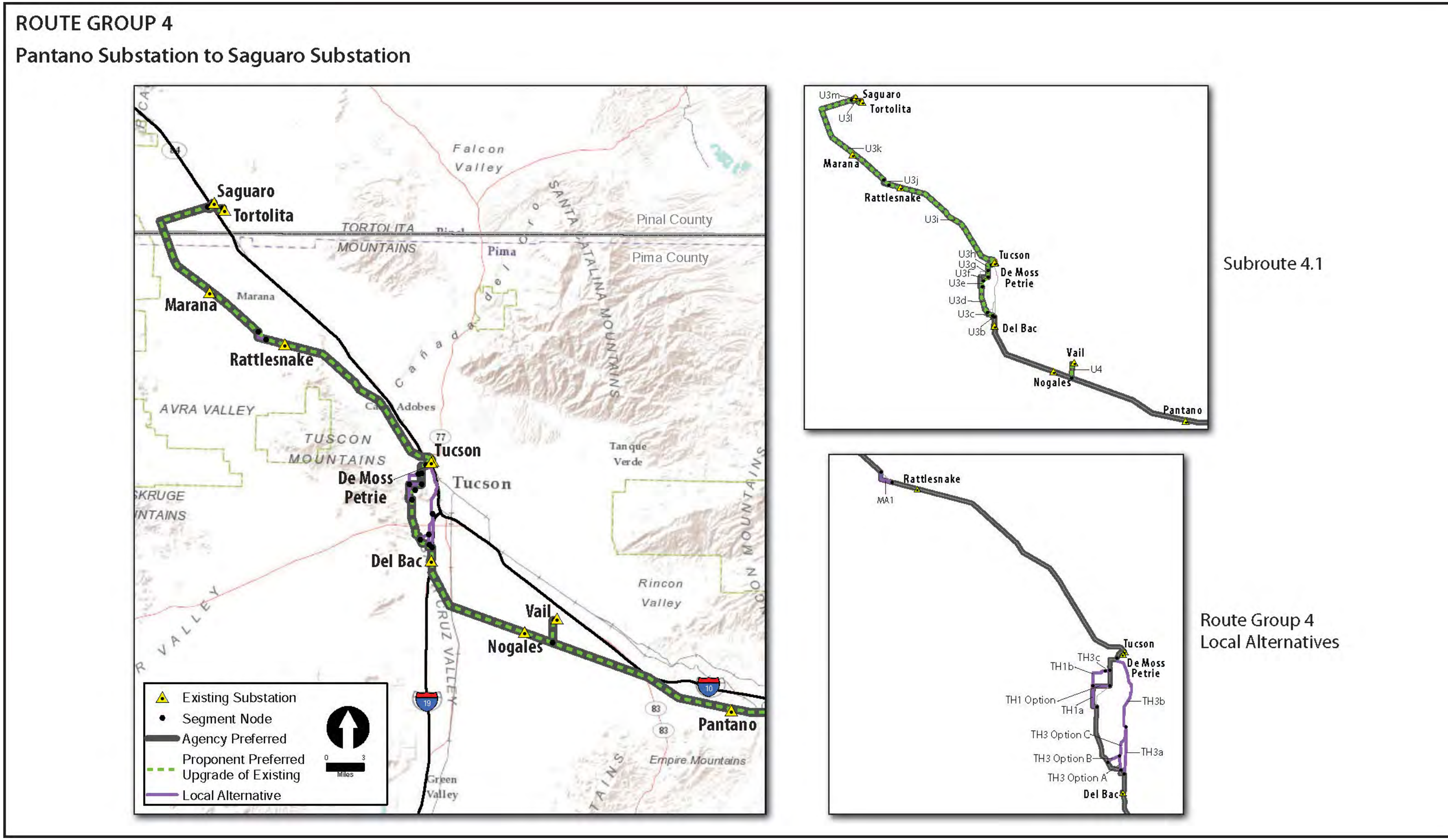


Figure 2-17d. Overview of route group 4: Pantano Substation to Saguaro Substation subroutes, segments, and local alternatives.



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Local alternatives were developed consistent with NEPA (40 CFR 1502.14), which requires Federal agencies to “rigorously explore and objectively evaluate” a range of alternatives to the proposed Federal action. In addition, the route alternative alignments were sited to address issues raised by land management agencies, local government, individuals, and organizations. Agency cooperators and the ID team provided input on the reasonableness and suitability of these BLM- and Western-developed local alternatives.

The following considerations were used to further evaluate alternatives:

1. Did the alternative meet the underlying Project stated objectives for the proposed Project?
2. Is the route alternative consistent with the policy objectives for the management of the area (e.g., in conformance with land use plans)?
3. Is it substantially similar in design or does it have substantially similar effects as an alternative that is already being analyzed?
4. Did the route alternative address and resolve resources conflicts and/or identified issues?
5. Did the route alternative cause fewer adverse environmental effects (fewer detrimental effects, less severe effects, or shorter-term effects) than the proposed route for at least some resources?

Some local alternatives were considered but eliminated from detailed study because they do not meet the criteria for a reasonable alternative (listed above). A discussion of alternatives considered but eliminated can be found in section 2.9.

Route groups, subroutes, and local routes are listed in table 2-9, followed by a description of each alternative subroute and local alternative presented by route group. Route groups are depicted in figures 2-17a through 2-17d.

Table 2-9. Summary of Route Groups, Subroutes, and Local Alternatives

Subroutes	Total Miles	Segments
Route Group 1: Afton Substation to Hidalgo Substation		
Subroute 1.1, Proponent Preferred	146.9	P1, P2, P3, P4a
Subroute 1.2, Proponent Alternative	141.1	S1, S2, S3, S4, S5, S6, S7, S8
Route Group 1 Local Alternatives		
Local Alternatives for Subroute 1.1	–	DN1
Local Alternatives for Subroute 1.2	–	A, B, C, D
Route Group 2: Hidalgo Substation to Apache Substation		
Subroute 2.1, Proponent Preferred	95.5	P4b, P4c, P5a, P5b, P6a, P6b, P6c, P7, P8
Subroute 2.2, Proponent Alternative	95.9	E, F, Ga, Gb, Gc, I, J
Route Group 2 Local Alternatives		
Local Alternatives for Subroutes 2.1 or 2.2	–	LD2, LD3a, LD3b, LD4, LD4-Option 4, LD4-Option 5
Local Alternatives for Subroutes 2.2	–	LD1, WC1
Route Group 3: Apache Substation to Pantano Substation		
Subroute 3.1, Proponent Preferred	70.3	U1a, U1b, U2, U3a
Route Group 3 Local Alternative		
Local Alternatives for Subroute 3.1 (also the Proponent Alternative)	–	H

Table 2-9. Summary of Route Groups, Subroutes, and Local Alternatives (Continued)

Subroutes	Total Miles	Segments
Route Group 4: Pantano Substation to Saguaro Substation		
Subroute 4.1, Proponent Preferred	48.3	U3b, U3c, U3d, U3e, U3f, U3g, U3h, U3i, U3j, U3k, U3l, U3m, U4
Route Group 4 Local Alternative		
Local Alternatives for Subroute 4.1	–	MA1, TH1a, TH1b, TH1c, TH1-Option, TH3-Option A, TH3-Option B, TH3-Option C, TH3a, TH3b

2.7.1 Route Group 1: Afton Substation to Hidalgo Substation

General Description and Issues

The critical public concerns expressed for the proposed Project in this route group include north-south-trending wildlife linkage and migratory bird pathways, potential habitat fragmentation, potential conflict with national scenic and historic trails, and potential conflict with land uses. Specifically, there are known migration pathways for sandhill crane that bisect this area in two general northeast-southwesterly flight paths. In addition, several agency and public comments indicated that the Proponent Alternative (subroute 1.2) traverses largely untouched open space, agricultural areas, and important wildlife habitat.

In addition, this route group crosses near several visually and environmentally important mountain ranges and natural topographic features, such as the Florida Mountains, Potrillo Mountains, Cedar Mountains, Lewis Flats, and Playas Valley, which support important wildlife connections and include the West Potrillo Mountains, Aden Lava Flow, Mount Riley, and Florida Mountains Wilderness Study Areas. Finally, within this route group, the proposed Project and alternative route each cross the Continental Divide National Scenic Trail (CDNST) and the Butterfield Overland Mail and Stage Route/Butterfield Overland Trail National Historic Trail (Butterfield Trail) in three places.

Subroute 1.1, Proponent Preferred

Subroute 1.1 (Proponent Preferred, New Build Section) extends approximately 147 miles between Las Cruces and Lordsburg and generally heads west along I-10 and north around Deming, “ending” just east of Lordsburg at the existing Hidalgo Substation. This route also includes a 31-mile-long, north-south alignment west of the Potrillo Mountains. Subroute 1.1 includes segments P1, P2, P3, and P4a (see figure 2-17a). More than 75 percent of subroute 1.1 is adjacent to, and routed along, linear features such as existing transmission and gas lines.

The primary segments that comprise the east-west alignment of subroute 1.1 are P2 and P4a. The subroute begins at the Afton Substation, which is located southwest of Las Cruces, New Mexico. The subroute follows an existing EPEC 345-kV transmission line northwest of I-10, past the Aden Hills off-highway vehicle (OHV) area. The subroute then heads north around Deming; from the Deming area, the line follows the existing 345-kV line to the Hidalgo Substation. Segment P2 is located within an existing West-Wide Energy Corridor (segment 81-213) (see figure 2-17a).

Segment P1 is a short (5-mile) segment (in and out loop) between the existing Afton Substation and the existing Luna–Diablo 345-kV transmission line. Subroute P3 is a 31-mile-long connector segment (for interconnection to potential future solar generation), running north-south between I-10 and NM 9, located approximately 9 miles west of the West Potrillo Mountains Wilderness Study Area (WSA).

No amendment to the Mimbres RMP would be required for subroute 1.1.

Subroute 1.2, Proponent Alternative

Subroute 1.2 (Proponent Alternative, New Build Section) is a southern alternative for the New Build Section of the Project between the Afton and Hidalgo substations in New Mexico. Subroute 1.2 includes S1, S2, S3, S4, S5, S6, S7, and S8. Approximately 43 percent of subroute 1.2 is adjacent to, and routed along, existing linear features such as roadways (e.g., Columbus Road and NM 9).

Subroute 1.2 extends south and southwest of the existing Afton Substation for approximately 30 miles, crossing the Union Pacific Railroad (UPRR) and NM 9 near the U.S.–Mexico border. The subroute then extends generally west along Columbus Road for another 30 miles across the Doña Ana County–Luna County line to near Columbus, New Mexico. The subroute drops south of the town of Columbus approximately 1 mile north of the international border before paralleling NM 9. The subroute then heads due west, running south of NM 9 before rejoining NM 9 and heading north-northwest for approximately 15 miles to the Luna and Grant county lines. From the county line, the subroute extends west along NM 9 to the intersection of NM 9 and NM 146. From there, the subroute extends northwest for approximately 23 miles to just east of the border of Luna and Grant counties, New Mexico. The final segment (S8) of subroute 1.2 extends north-south toward segment P4a of subroute 1.1. Subroute 1.2 does not itself connect with the Hidalgo Substation. Segment S8 parallels an existing Tri-State Generation and Transmission (TSGT) 230-kV line.

Segments S5, S6 and S7 would cross VRM Class II lands. An amendment to the Mimbres RMP would be required. Where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified.

Local Alternatives

Local alternatives within route group 1 include DN1, A, B, C, and D. Local alternative DN1 is a routing option for subroute 1.1, and local alternatives A, B, C, and D are routing options for subroute 1.2.

Local alternatives C and D would cross VRM Class II lands. An amendment to the Mimbres RMP would be required. Where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified.

DN1

DN1 is an approximately 43-mile local alternative developed by the BLM and Western. DN1 provides a co-location option with the proposed SunZia Southwest Transmission Line Project (SunZia project). DN1 would include a combined ROW with the SunZia project along the SunZia and BLM preferred segments B60, B90, and B120a of the SunZia project. The shared use of 48 miles of ROW for DN1 would result in a minimum common corridor width of 800 feet (400 feet of ROW for the two 500-kV SunZia project lines, in addition to 150 feet of ROW for Southline, separated by a minimum of 250 feet). If the SunZia project is not constructed, DN1 would be located within a 200-foot corridor like the rest of the New Build Section of the Project. DN1 does not otherwise parallel or follow existing transmission lines, pipelines, or roadways. DN1 is approximately 41 miles long, crossing NM 26 (Hatch Highway), the EPEC 345-kV line, U.S. Route (U.S.) 180, a Public Service Company of New Mexico 230-kV line, and an El Paso Natural Gas Company pipeline.

Local Alternative A

Local alternative A is approximately 18 miles long and would largely follow existing unpaved county roads. Where Alternative A intersects NM 9, the alignment turns due west and parallels NM 9, ending approximately 2.5 miles southwest of the East Potrillo Mountains. Local alternative A is an option to provide an alternate location for segments of subroute 1.2 to avoid local environmental conflicts.

Local Alternative B

Local alternative B is approximately 12 miles long and parallels NM 9 for the entire 12 miles, beginning approximately 4 miles east of the Luna and Doña Ana county line. Like local alternative A, local alternative B is an option to provide an alternate location for segments of subroute 1.2 to avoid local environmental conflicts.

Local Alternative C

Local alternative C is approximately 9 miles long and would parallel NM 9 for the entire 9 miles. Like local alternative A, local alternative C is an option to provide an alternate location for segments of subroute 1.2 to avoid local environmental conflicts.

Local Alternative D

Local alternative D is approximately 23 miles long, beginning just east of the Hidalgo and Grant county line in New Mexico. Proceeding northwest, alternative D follows an abandoned railroad bed and crosses the CDNST approximately 2 miles south of Lordsburg. South of Lordsburg, local alternative D turns to the west before proceeding northwest and ending approximately 1 mile north of I-10. The eastern end of local alternative D is located within West-Wide Energy Corridor segment 81-213. Like local alternative A, local alternative D is an option to provide an alternate location for segments of subroute 1.2 to avoid local environmental conflicts.

2.7.2 Route Group 2: Hidalgo Substation to Apache Substation

General Description and Issues

The Lordsburg and Willcox playas were identified as important waterfowl destinations (for both wildlife and ecotourism/birders). The Lordsburg Playa is the only known location in New Mexico for the Lynch tadpole shrimp and the Bowman’s fairy shrimp and is a designated recreation management area (RMA). In the area of the Willcox Playa there are migratory birds, including sandhill crane, particularly in the Sulphur Springs Valley, along with burrowing owl habitat. In addition, portions of the Willcox Playa have been used both by the military (portions are currently under a military withdrawal) and by the public for recreational and community events. Therefore, route alternatives that avoid both playas were included in this route group.

In addition, this route group includes several visually and environmentally important mountain ranges such as the Peloncillo Mountains (west of Lordsburg); Pinaleño Mountains (west of Lordsburg and north of Willcox); and Dos Cabezas and Chiricahua mountains (east and south of Willcox), which support wildlife connections and habitat of bighorn sheep and mule deer, as well as other sensitive species.

Subroute 2.1, Proponent Preferred

Subroute 2.1 (Proponent Preferred, New Build Section) extends from roughly the Hidalgo Substation located north of Lordsburg to the Afton Substation through southwestern New Mexico and southeastern Arizona. Subroute 2.1 includes segments P4b, P4c, P5a, P5b, P6a, P6b, P6c, P7, and P8. Almost 82 percent of subroute 2.1 is adjacent to, and routed along, existing linear features, most of which are existing transmission and gas lines.

Beginning about north of Lordsburg, subroute 2.1 departs the existing 345-kV transmission line and extends roughly 14 miles west and south around Lordsburg (segment P4b). The subroute then heads west for approximately 30 miles (segments P5a and P5b) across the New Mexico–Arizona state line to an intersection with I-10 west of San Simon, Arizona (near milepost (MP) 383 on I-10). Once the subroute crosses I-10, it extends another 25 miles due west (segments P6b and P6c), where it intersects an existing SWTC 230-kv line. From this area northeast of Willcox, the subroute extends south and then southwest around the east side of the Willcox Playa; this segment is P7, which measures approximately 22 miles (see figure 2-17b).

No amendment to the Mimbres RMP would be required for subroute 2.1.

Subroute 2.2, Proponent Alternative

Like subroute 2.1, subroute 2.2 (Proponent Alternative, New Build Section) would connect the Hidalgo and Apache substations. Subroute 2.2 includes segments E, F, Ga, Gb, Gc, I, and J. Subroute 2.1 would require use of segments P4a, P4b, and P4c (from subroute 2.1) to connect to the Hidalgo Substation. More than 27 percent of subroute 2.2 is adjacent to, and routed along, linear features such as existing transmission lines.

Subroute 2.2 starts south of the Lordsburg Playa and extends 32 miles (segment E) across the New Mexico–Arizona state line to an area north of San Simon, Arizona. From the San Simon area, the subroute would extend west-northwest, roughly paralleling two existing 230-kV transmission lines for 25 miles (segment F) to an area north of the Dos Cabezas Mountains.

Segments Ga, Gb, and Gc head northwest, west, and then south to provide a western route around the Willcox Playa. Portions of segments Ga and Gc parallel TEP 345-kV and APS 69-kV lines (see figure 2-17b).

No amendment to the Mimbres or Safford RMPs would be required for subroute 2.2 or any of the local alternatives described below, except LD3a and LD2.

Local Alternatives

Local alternatives within route group 2 include LD1, LD2, LD3a, LD3b, LD4, LD4-Option 4, LD4-Option 5, and WC1 (see figure 2-17b).

LD1

LD1 is approximately 35 miles long, beginning at the existing El Paso Natural Gas pipeline, approximately 1 mile north of I-10, east of the Lordsburg Playa. LD1 proceeds to the southwest across the Peloncillo Mountains and into Arizona, following I-10 and two existing El Paso Natural Gas pipelines. LD1 continues to follow I-10, turning to the northwest upon entering Arizona, to the town of San Simon.

LD1 ends on the south side of I-10, approximately 7 miles northwest of the town of San Simon at MP 373. LD1 was developed to avoid crossing through the Lordsburg Playa.

LD2

LD2 is approximately 10 miles long, beginning approximately 6 miles northwest of Lordsburg. LD2 does not follow existing transmission lines or pipelines. LD2 proceeds to the southwest, between the smaller northern playa and the larger, southern playa that form Lordsburg Playa. LD2 ends approximately 4 miles east of the Arizona border, 7 miles north of I-10. Like LD1, LD2 was developed to avoid impacts to the Lordsburg Playa by crossing between the north and south playas.

Local alternative LD2 would cross VRM Class II lands. An amendment to the Mimbres RMP would be required. Where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified. Additionally, where the proposed 200-foot Project ROW would parallel the Butterfield Trail along local alternative LD2, the ROW avoidance area stipulation in the Mimbres RMP would be modified.

LD3A AND LD3B

LD3a and LD3b were developed to avoid the Lordsburg Playa by being routed around the north side of the playa. LD3a and LD3b head generally west and then south down to segment P5b from the Proponent Preferred (subroute 2.1). Segments LD3a and LD3b measure 28 and 2 miles, respectively.

A portion of local alternative LD3a would cross VRM Class II lands. An amendment to the Mimbres RMP would be required. Where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified.

LD4

Like DN1, LD4 is a local alternative developed by the BLM and Western that provides a co-location option with the proposed SunZia project. LD4 is approximately 52 miles long, beginning 3 miles east of the Peloncillo Mountains and Arizona border. LD4 does not follow existing transmission lines or pipelines as it traverses the Peloncillo Mountains and the San Simon Valley in Graham County, Arizona. Approximately 3 miles east of U.S. 191, LD4 intersects an existing TEP 345-kV line and turns to the southwest, following this transmission line across the southern foothills of the Pinaleño Mountains, ending where it intersects segment Ga of the Proponent Alternative. LD4 would include the shared use of 50 miles of ROW with the proposed SunZia project, measuring 800 to 1,400 feet or more in width.

LD4-Option 4

LD4-Option 4 is approximately 7 miles long, beginning in the southern foothills of the Pinaleño Mountains in Graham County, Arizona. Proceeding due south across I-10, LD4-Option 4 intersects and follows the existing SWTC 230-kV line and ends 1 mile south of I-10 at the northwest corner of the Dos Cabezas Mountains, 6 miles northeast of Willcox.

LD4-Option 5

LD4-Option 5 follows an existing SWTC 230-kV line and is approximately 12 miles long. This local alternative runs roughly southwest between LD4 and P6c.

WC1

WC1 is a local alternative developed by the BLM and Western that measures approximately 15 miles long. WC1 would roughly parallel I-10 (but would not be located within the ROW).

2.7.3 Route Group 3: Apache Substation to Pantano Substation

General Description and Issues

The Apache to Pantano route group extends west from the Apache Substation beyond the town of Benson just across the Pima County line (see figure 2-17c) to the Pantano Substation. Issues within this route group largely include conflicts with potential land development (e.g., residential development) to the north of Benson, as well as the existing aviation facility (Benson Municipal Airport), the proposed extension of State Route (SR) 90 north through Benson, and the San Pedro River. Sensitive environmental issues within the Apache to Pantano route group include wildlife linkages between the Rincon Mountains and the Santa Rita and Whetstone mountains. Additionally, potential electromagnetic interference (EMI) issues have been identified at the Fort Huachuca Buffalo Soldier Electronic Testing Range (BSETR), which includes the town of Benson and surrounding areas north and south of I-10.

Subroute 3.1, Proponent Preferred

Subroute 3.1 (Proponent Preferred, Upgrade Section) extends from Apache Substation to the Pantano Substation, connecting to the Adams Tap Substation east of Benson. Subroute 3.1 includes segments U1a, U1b, U2, and U3a. One-hundred percent of subroute 3.1 is the existing Western 115-kV line.

Beginning at the existing Apache Substation near the community of Cochise, Arizona, the proposed route includes the upgrade of the existing Western 115-kV line as it exits the Apache Substation and heads due west, approximately 1 mile south of the community of Dragoon. This stretch of the proposed route crosses approximately 0.5 mile of the Coronado National Forest. The proposed route crosses the existing UPRR at Dragoon Wash, where it turns to the northeast until it connects to the existing Adams Tap Substation. It crosses I-10 at MP 314, approximately 20 miles west of the Apache Substation. From the Adams Tap Substation, located north of I-10 and west of Z R Ranch Road (exit 312 on I-10), the proposed route continues west, extending another 20 miles to north of the town of Benson and north of I-10 until the line crosses south of I-10 at MP 296 near the Pima and Cochise county line. This stretch of the Proponent Preferred alternative includes segments U1a, U1b, and U2 (see figure 2-17c).

No amendment to the Safford, Las Cienegas, or Phoenix RMPs would be required for subroute 3.1.

Local Alternatives

There is one local alternative within route group 3. Local alternative H was developed by Southline as a local option around the north side of the town of Benson (see figure 2-17c).

ALTERNATIVE H

Alternative H is approximately 19 miles long and begins at Sheep Wash, approximately 1 mile north of I-10. From Sheep Wash, Alternative H travels in a northeastern direction along the existing Western 115-kV line, then turns due west across the San Pedro River valley. Alternative H turns due south for 2 miles, approximately 2 miles northwest of the Benson Municipal Airport. Alternative H turns due west, paralleling the UPRR for 5 miles before turning due south and crossing I-10, approximately 2 miles west of the town of Mescal. Alternative H ends approximately 1 mile east of the Pima and Cochise county line. Local alternative H is an option to provide an alternate location for segments of subroute 3.1 to avoid housing and development in the Benson area. One-hundred percent of local alternative H is adjacent to, and routed along, an existing transmission or railroad lines.

2.7.4 Route Group 4: Pantano Substation to Saguaro Substation

General Description and Issues

The Pantano to Saguaro route group extends through the greater Tucson metropolitan area and includes several sensitive environmental, socioeconomic, and land use areas. Important environmental issues in this area include potential conflicts with the historic Tumamoc Hill area in Tucson, riparian habitat along the Santa Cruz River, potential visual conflict within close proximity to established residential areas in Tucson and surrounding communities, and potential conflict with scenic trails such as the Arizona National Scenic Trail (Arizona Trail) and Juan Bautista de Anza National Historic Trail (Anza Trail), as well as with the Pinal and Marana aviation facilities.

Subroute 4.1, Proponent Preferred

Subroute 4.1 (Proponent Preferred, Upgrade Section) extends from the Pantano Substation to the Saguaro Substation, connecting to the Nogales, Vail, Del Bac, DeMoss Petrie, Tucson, Rattlesnake, Marana, Tortolita, and Saguaro substations. Subroute 4.1 includes segments U3b, U3c, U3d, U3e, U3f, U3g, U3h, U3i, U3j, U3k, U3l, U3m, and U4. One-hundred percent of subroute 4.1 is the existing Western 115-kV line.

From the Pima and Cochise county line, the existing Western line exits the Pantano Substation and proceeds northwest to the Nogales Substation for a distance of approximately 30 miles. This portion of the route is located south of Vail and south of I-10. In this area, the proposed route includes a 2-mile-long, north-south connection to the existing Vail Substation (segment U4); the existing Vail Substation is located southwest of I-10 near MP 273, west of Rita Road.

From the Nogales Substation, located south of MP 272 on I-10 on Wilmot Road, the proposed route extends approximately 8 miles, where it crosses the Nogales Highway. It then heads north-northwest for approximately 4 miles around the Tucson International Airport, where it crosses to the west side of I-10 near downtown Tucson before connecting to the existing Del Bac Substation on the north side of Valencia Road and west of I-19. From the Del Bac Substation, the proposed route (segments U3b–h) heads northwest and north across Tumamoc Hill for approximately 10 miles. It then heads back across I-10 to the east side, connecting to the Tucson Substation north of Grant Road and east of Flowing Wells Road. From the Tucson Substation, the route extends west 0.5 mile, crossing I-10 and then running north-northwest through the Silverbell Golf Course. It roughly parallels the Silverbell Road alignment for approximately 18 miles until it connects with the existing Rattlesnake Substation (segment U3i). From the Rattlesnake Substation at Twin Peaks and Sandario roads, the route extends approximately 9 miles northwest to connect with the existing Marana Substation near Trico and Marana roads (segments U3j and U3k). From the Marana Substation, the route extends an estimated 9 miles north-northwest around the west side of the Pinal Airpark. From there, the route turns sharply east-northeast, extending approximately 5 miles to connect to the existing Saguaro Substation on the west side of I-10 just north of MP 229 (segments U3l and U3m) (see figure 2-17d).

No amendment to the Tucson or Phoenix RMPs would be required for subroute 3.1 or any of the local alternatives described below.

Local Alternatives

All of the local alternatives within route group 4 were developed by BLM and Western. These local alternatives include TH1a, TH1b, TH1c, TH1-Option, TH3-Option A, TH3-Option B, TH3-Option C, TH3a, TH3b, and MA1.

The nine local alternatives beginning with "TH" are various options for replacing the portion of the existing Western line that crosses over Tumamoc Hill in Tucson (see figure 2-17d).

TH1A

TH1a is approximately 1 mile long; it is located along the western boundary of Tumamoc Hill, beginning at the corner of West Starr Pass Boulevard and South La Cholla Boulevard. TH1a turns to the north, paralleling South Greasewood Road and ending at West Anklam Road, where it connects to TH1B.

TH1B

Th1b is approximately 2 miles long, beginning at the intersection of West Anklam Road and North Greasewood Road, just west of Pima Community College–West Campus. Proceeding north, TH1b parallels North Greasewood Road, turning east at West Speedway Boulevard. TH1b crosses to the north side of West Speedway Boulevard and ends northwest of the intersection of West Speedway Boulevard and North Silverbell Road, where it connects to TH1C.

TH1C

TH1c is less than 0.5 mile long and begins northwest of the intersection of West Speedway Boulevard and North Silverbell Road. It proceeds east across North Silverbell Road and ends just west of the El Rio Golf Course's western boundary, where it connects back to the Proponent Preferred segment U3h.

TH1-OPTION

TH1-Option is approximately 1.0 mile long and begins at the northwest corner of Tumamoc Hill, at the intersection of West Anklam Road and South Greasewood Road. It proceeds east along St. Mary's Road and connects back to the Proponent Preferred segment U3g.

TH3-OPTION A

TH3-Option A is approximately 1 mile long, beginning along the east banks of the Santa Cruz River, 0.5 mile north of West Drexel Road. Proceeding north, TH3-Option A follows the existing Western 115-kV line across West Irvington Road, ending in the Santa Cruz River 0.25 mile north of West Irvington Road, where it connects to TH3-Option C.

TH3-OPTION B

TH3-Option B is approximately 1 mile long, beginning just northeast of the intersection of West Irvington Road and South Mission Road, 3 miles south of Tumamoc Hill. TH3-Option B proceeds northeast along an existing drainage channel, ending at the Santa Cruz River, where it connects to TH3-Option C.

TH3-OPTION C

TH3-Option C is approximately 2 miles long, beginning in the Santa Cruz River 0.2 mile north of West Irvington Road. Proceeding north, TH3-Option C follows the Santa Cruz River's west bank. It crosses West Ajo Way and ends approximately 0.6 mile southwest of the intersection of I-10 and I-19 in the Santa Cruz River bed, where it connects to TH3B.

TH3A

TH3a is approximately 3 miles long, beginning just north of West Drexel Road and the I-19 intersection. TH3a proceeds north and parallels the west side of I-19 along the existing Western 115-kV line, ending 0.6 mile southwest of the intersection of I-10 and I-19 in the Santa Cruz River bed, where it connects to TH3B.

TH3B

TH3b is approximately 5 miles long, beginning in the Santa Cruz River bed. It proceeds north and follows the Santa Cruz River as it continues north along the I-10 corridor. TH3b ends 0.25 mile southwest of the West Grant Road and I-10 interchange in the Santa Cruz River bed, where it connects back to Proponent Preferred segment U3i.

MA1

MA1 was developed to avoid future expansion of the Marana Regional Airport and provides an angular connection (L-shaped) west of the existing Western line. MA1 is approximately 1 mile long and is located southwest of the Marana Regional Airport. MA1 traverses agricultural fields before turning north on North Sanders Road, ending just south of West Avra Valley Road.

2.8 SUBSTATION ALTERNATIVES

There are two substation alternatives proposed by Southline; they are options for the location of the proposed Midpoint Substation located within route group 1. The proposed Midpoint Substation would interconnect segment P3, either at the north or south end of segment P3, to the Project and would be built when needed to connect future generation along segment P3.

2.8.1 Midpoint North

The proposed Midpoint North Substation would be located at the north end of P3, north of I-10 in Luna County, New Mexico.

2.8.2 Midpoint South

The proposed Midpoint South Substation would be located at the south end of P3, south of NM 9 in Luna County, New Mexico.

2.9 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

This section describes the route alternatives to the proposed Project that were considered but are proposed for elimination from detailed analysis. As a requirement of CEQ regulations, an EIS must "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated" (40 CFR 1502.14(a)). The BLM NEPA Handbook (H-1790-1, Section 6.6.3, 2008b) states that an alternative can be dismissed from detailed analysis if:

- it is ineffective (it would not respond to the stated objectives);
- it is technically or economically infeasible;
- it is inconsistent with the basic policy objectives for the management of the area (such as not being in conformance with the land use plan);
- its implementation is remote or speculative;
- it is substantially similar in design to an alternative that is proposed for detailed analysis; and/or
- it would have substantially similar effects as an alternative that is proposed for detailed analysis.

Southline's routing process (Southline 2012a) included an extensive screening of route options throughout the routing study area that were ultimately dropped from consideration. Although those routes are not described in this section as they were part of Southline's pre-NEPA screening process, it is worth noting that those alternatives were considered and eliminated due to environmental and technical constraints, pre-NEPA stakeholder outreach, and early discussions with BLM and Western, detailed in the project routing report (Southline 2012a). BLM and Western were aware of, and involved in, Southline's pre-NEPA routing efforts and are knowledgeable as to why other routes were eliminated. After further review of constraints and other routing possibilities, the agencies did not identify any viable major new routes that had not been previously reviewed by Southline; they did, however, identify local alternatives around particular resource issues.

As described above, input from the public and various agencies resulted in the addition, modification, or elimination of alternative transmission line routes. Following is a summary of the local alternatives considered but eliminated from detailed study in this EIS.

2.9.1 Transmission Line Route Alternatives

The following discussion provides a summary and rationale of six local alternatives for the Project (figure 2-18) that were considered but eliminated from detailed analysis based on the criteria from the BLM NEPA Handbook listed above. No alternatives in route group 1 were eliminated from detailed analysis.

Alternatives Eliminated in Route Group 2

One local alternative was eliminated in route group 2: DC1. This local alternative, and the rationale for its elimination from detailed analysis, is provided below.

LOCAL ALTERNATIVE DC1

Dos Cabezas 1 (DC1) was initially developed in response to comments from the public expressing concerns about avian and wildlife conflicts near Willcox Playa. DC1 would have replaced a total of 67 miles of subroute 2.1 in Cochise County, Arizona, and shifted the line southwest to a saddle in the Dos Cabezas Mountains through somewhat mountainous terrain, avoiding the Willcox Playa.

Environmentally, DC1 posed a conflict with areas identified as important habitat conservation areas by the AGFD in the "State Wildlife Action Plan" (AGFD 2012a). These areas include the Galiuro-Pinaleño-Dos Cabezas Linkage (Arizona Missing Linkages), species and habitat conservation area, high-value riparian area, unfragmented habitat, a habitat block, and proximity (adjacent) to a linkage zone. Sensitive species identified in this area are golden eagle (*Aquila chrysaetos*), Bear Canyon talussnail (*Sonorella danielsi*), Plains black-headed snake (*Tantilla nigriceps*), and great short-horned lizard (*Phrynosoma hernandesi*).

Additionally, DC1 conflicts with current BLM and Coronado National Forest FireScape planning efforts in the Dos Cabezas Mountains—specifically the FireScape project (FireScape 2013). FireScape is a framework for expanding safe, ecologically sound, large-scale fire management across multiple land ownerships in the mountains of southeastern Arizona. In particular, the Chiricahua-Dragoons-Dos Cabezas Analysis Area is proposed by the Coronado National Forest to coordinate its fire and fuels reduction activities with those of the NPS (Chiricahua National Monument and Fort Bowie National Historic Site), BLM, and other land managers in the region. The FireScape planning efforts include proposals to conduct prescribed burns and allow natural fires to burn for multiple resource benefits in the region. Construction of a transmission line through the FireScape area would jeopardize the ability of the Coronado National Forest and BLM to use fire to maintain habitat in the Chiricahua-Dragoons-Dos Cabezas Analysis Area.

The benefits of DC1 to those avian and wildlife resources associated with the Wilcox Playa did not offset or outweigh the potential wildlife conflicts in the Dos Cabezas Mountains. For the concerns mentioned above, this alternative was eliminated because it would have presented planning conflicts but offered no environmental advantage over the action alternatives in route group 2.

Alternatives Eliminated in Route Group 3

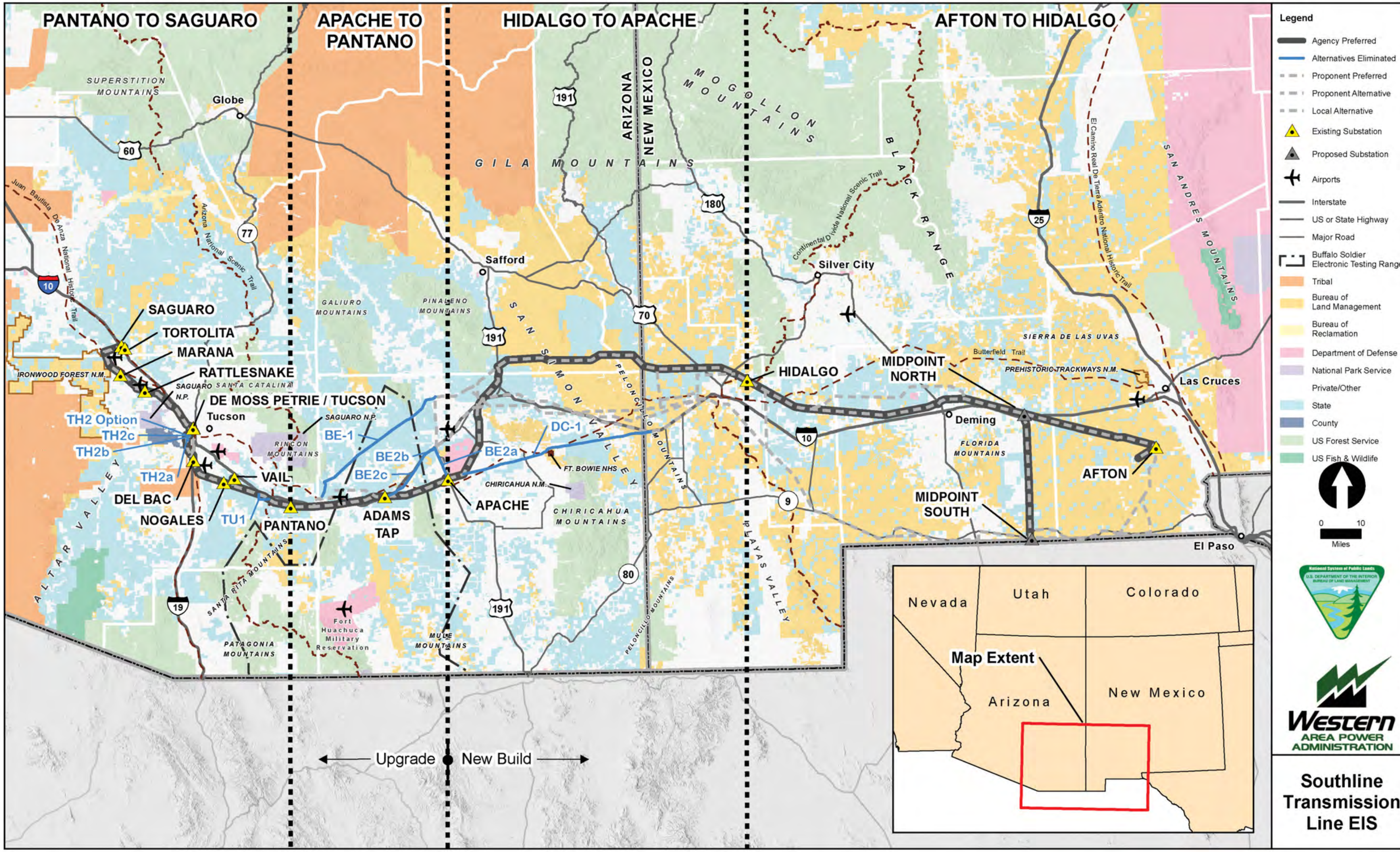
Two local alternatives were eliminated in route group 3: BE1 and BE2. These two local alternatives, and the rationale for their elimination from detailed analysis, are provided below.

LOCAL ALTERNATIVE BE1

Benson 1 (BE1) was developed in response to comments from the public expressing concerns about potential private land and residential, as well as aviation facility (airport), conflicts near the town of Benson, Arizona, and initial concerns from DOD, as well as Cochise County and the City of Sierra Vista regarding interference in BSETR. Like DN1 and LD4, BE1 would have provided an opportunity to collocate a portion of the proposed SunZia project, if developed, with the Southline Project. BE1 would have gone to the north of Benson and avoided proposed future development, an aviation facility, and the proposed extension of SR 90. BE1 would have been constructed in addition to upgrading 35 miles of Western's existing 115-kV transmission line.

Of the 44-mile route, BE1 would have included the shared use of 26.5 miles of ROW with the proposed SunZia BLM preferred alternative, along with two TEP Springerville–Vail 345-kV lines. These three transmission projects would form one corridor through the BSETR. The total minimum ROW width along this 26.5-mile stretch would have been 1,400 feet. The remaining 17.5 miles of the 44-mile route would not share the corridor with the proposed SunZia preferred alternative but would still parallel the two TEP Springerville–Vail 345-kV lines. The total minimum ROW width along this 17.5-mile stretch would be 750 feet.

Figure 2-18. Overview of alternatives considered but eliminated from detailed analysis.



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BE1, like other action alternatives in route group 3, would cross through the BSETR. Although initially developed to potentially address concerns regarding EMI at the BSETR, later discussions with the military concluded that the combination of the proposed SunZia project, Southline Project, new TEP line, and the existing two TEP 345-kV lines would result in more EMI than upgrading the existing Western line. Although BE1 would move the line toward the north end of the testing range, the combined impact of placing the five lines together in a common corridor has not been studied but would risk the creation of more EMI within the testing range. Additionally, the military indicated that they use the far northern part of the range for many testing efforts.

The DOD preferred the BE1 alignment during early alternatives discussions with cooperating agencies because it is the farthest north within the BSETR and away from testing sites near Willcox Playa (DOD 2013b). However, the BE1 option still would require a connection to Apache Substation and upgrade of the section of existing Western line across the BSETR west of Apache Substation. As such, BE1 would actually result in both a new transmission line and an upgraded transmission line crossing the BSETR, a worse scenario for the DOD. The upgrade of the existing Western transmission line would change the electronic signature of that line, and a new potential source of interference would be created by the additional line or lines in the BE1 location. Southline's proposed route would entail only upgrading Western's line in the same location. The location of potential interference would not change, and is already accounted for by the military. The level of interference could actually decrease, compared with the existing line, as the new line would be of modern design to reduce EMI, the new line would be tighter with no electrical arcing, and the conductors would be cleaner with fewer nicks and less of the wear-and-tear damage that increases EMI. The Electronic Proving Ground (EPG) has provided recommended mitigation, incorporated into this DEIS, and indicated that they do not have issues with the current Western 115-kV line being upgraded in its existing path (Roxberry 2013).

BE1 could also lead to more total disturbed area, greater vegetation impacts, and a higher risk of cultural resources impacts due primarily to the additional miles of transmission line and the need for two crossings of the San Pedro River, compared with the upgrade of a single existing crossing. The five lines (TEP, SunZia, and Southline) would cross the San Pedro River together between the Little Rincon Mountains and Johnny Lyon Hills through the Middle San Pedro River valley in a common 1,400-foot-wide ROW. Several resource conflicts are noted in the SunZia FEIS (BLM 2013a) regarding potential impacts to the Middle San Pedro River valley, including impacts to conservation lands along the San Pedro River, riparian birds, and multiple threatened and endangered species in this area.

BE1 also poses potential conflicts with areas identified as critical by the AGFD in the "State Wildlife Action Plan" (2012a). AGFD also expressed concerns about impacts crossing the south end of the Winchester Mountains and crossing the San Pedro River in this location. These critical areas include wildlife links between the Rincon, Santa Rita, and Whetstone mountains; these linkages are designated to maintain connectivity for more than 20 sensitive species of wildlife with habitat and migration patterns between the mountains.

For the potential technical and environmental considerations mentioned above, this alternative was eliminated because it would have presented military operations concerns but offered no environmental advantage over the action alternatives in route group 3.

LOCAL ALTERNATIVE BE2

Similar to BE1, BE2 was developed in response to comments from the public expressing concerns about being too close to future development in and around Benson, existing aviation facilities, and wildlife linkages. BE2 would have been constructed in addition to upgrading 20-miles of Western's existing 115-kV transmission line.

BE2 would have included the construction of two transmission line segments to meet technical requirements for transmission connection. One double-circuit 345-kV line would be needed between I-10 and Apache Substation to interconnect with the New Build Section of the proposed Project, and a second 230-kV line would be needed to interconnect the Upgrade Section of the proposed Project with the Apache Substation. In total, BE2 would be 26 miles long and would have replaced 20 miles of subroute 3.1 between the Apache and Adams Tap substations. BE2 would have required additional crossovers, complicating the approach to the substation. This alternative route would have gone north of the Apache Substation along U.S. 191 to I-10 before heading southwest along the I-10 corridor from the Willcox Playa to Adams Tap Substation.

Like BE1, BE2 would cross through the BSETR, and if BE2 were selected, Western would not abandon or remove its existing lines. Therefore, current EMI along the Western line would continue and potentially increase when Western later elects to upgrade the existing line on its own as part of its capital improvement program (as discussed in the no action alternative).

For the potential technical considerations mentioned above, this alternative was eliminated because it would have offered no environmental advantage over the action alternatives in route group 3, in particular because of BSETR and EMI conflicts and because the existing Western lines would not be removed.

Alternatives Eliminated in Route Group 4

Two local alternatives were eliminated in route group 3: TU1 and TH2. These two local alternatives, and the rationale for their elimination from detailed analysis, are provided below.

LOCAL ALTERNATIVE TU1

TU1 was developed in response to comments from the public expressing concerns about residential development (established and future) and recreational facility conflicts near Vail, Arizona, in the Tucson metropolitan area. TU1 would have been constructed instead of upgrading 3 miles of Western’s existing 115-kV transmission line, shifting the line farther south of I-10.

TU1 would have included the construction of a new 4-mile-long “L-shaped” transmission line along East Andrada Road and North Calle Rinconado, following an existing SWTC 69-kV line. TU1 would move potential residential impacts from the area to the north where the Western transmission line exists to the existing 69-kV line to the south. This route would still cross through low-density residential development, with a residential development just to the southwest. Any benefits to the developer would more than be offset by the electrical issues of crossing the smaller lines and avoiding the small substation at the point of the “L.” The existing lines and substation would complicate the use of the re-route because of the need for additional line crossovers and would severely compromise future lines from entering or exiting this substation or any future expansion of it.

This route does not resolve, minimize, or reduce resource conflicts, and it substantially complicates the power system in the area. It is not substantially different in terms of effects of the proposed Project. For this reason, this alternative was eliminated because it would have offered no environmental advantage over the action alternatives in route group 4.

LOCAL ALTERNATIVE TH2

Several subalternatives to upgrading the existing line across Tumamoc Hill were developed out of public concern over impacts to this sensitive area. TH2 is one of three options developed at an outreach stakeholder workshop held in Tucson, Arizona, in summer 2012. TH2 would have been constructed instead of upgrading 2 miles of Western’s existing 115-kV transmission line.

TH2 option is a 2-mile alternative that relocates 2 miles of the existing Western line and follows an existing Kinder-Morgan buried pipeline through Tumamoc Hill. This route continues north at Anklam Road along North La Cholla Boulevard before heading northeast along a disturbed ROW to connect back to the TH1 alternative.

TH2 in particular was developed to parallel, or follow, the existing Kinder-Morgan gas line that runs north-south across the west side of Tumamoc Hill. However, TH2 runs across an area within Tumamoc Hill that is topographically higher in elevation. Thus, it would be in a more prominent location and be more visible than the existing line. In a subsequent stakeholder outreach meetings, stakeholders unanimously agreed that the primary goal for alternatives around Tumamoc Hill would include relocating the transmission line off of Tumamoc Hill and consolidating transmission lines into a single utility corridor. Additionally, high-voltage transmission lines and pipelines typically do not overlap or share ROWs because of the safety standards, cathodic issues, and maintenance clearance requirements for their respective utilities.

This route does not resolve, minimize, or reduce resource conflicts and is not substantially different in terms of effects of the other local alternatives or the proposed Project across Tumamoc Hill. For this reason, this alternative was eliminated because it would have offered no environmental advantage over the action alternatives for Tumamoc Hill in route group 4.

Technical/Design Alternative

Section 503 of the FLPMA directs the BLM to minimize the proliferation of ROWs across public lands and to consider minimizing the environmental footprint of projects on public lands. As such, BLM management directed that a new technological/design alternative be considered for a portion of the Southline Project wherein Southline would acquire capacity on the proposed SunZia project rather than constructing a new adjacent ROW, as proposed in alternatives DN1 and LD4.

The SunZia project is a proposed new transmission line project currently in the NEPA process, with a ROD anticipated in the near future. The project consists of a proposal to construct an approximately 500-mile-long transmission line between a new substation in Lincoln County, New Mexico, and the Pinal Central Substation in Arizona, with up to four new substations between the two terminals. The SunZia FEIS (BLM 2013a) presents several different design alternatives; one would be the construction of two 500-kV AC lines; another would be one AC line and one 500-kV direct current (DC) line.

Both the SunZia project and the Southline Project are proposed to stretch between New Mexico and Arizona and in several areas are geographically very close. In New Mexico, the two projects would geographically close east of Deming, where the proposed SunZia project would turn west and continue to the Hidalgo Substation. West of the Hidalgo Substation, several of the SunZia project alternatives are in relatively close proximity to the proposed Southline Project route until they reach the San Pedro Valley in eastern Arizona, at which point the two proposed projects diverge, as the proposed SunZia project would head north and the Southline Project would continue west to the Tucson area.

For this technological/design alternative, new transmission line would still be constructed for the proposed SunZia project, but an additional two substations would be necessary where the Southline Project would enter and exit the SunZia project lines. Under this alternative, the Southline Project would begin at Afton Substation and extend along the Proponent Preferred route to a location north of Deming, New Mexico. At this point, the Southline Project would need to enter a substation before joining the SunZia project; this would be a new substation not currently proposed by either SunZia or Southline that would be shared with SunZia. Southline would then use SunZia’s facilities for approximately 140 to 160 miles along alternatives DN1 and LD4, where it would enter another proposed new substation that would also be shared with SunZia and is not currently proposed by either SunZia or Southline. From this point, the two proposed projects would then diverge and follow separate routes to their respective proposed termini.

Screening of this alternative involved examining the feasibility in detail on multiple levels: technically, commercially, economically, legally, and environmentally. Details of the feasibility screening are summarized below:

- **Technically.** The design for this alternative would need to be studied further for both the SunZia and Southline projects before it could be determined whether it is technically feasible. On the face of it, the proposal does not look reasonable or feasible. If Southline were to acquire 1,000 MW of capacity in the middle of SunZia's proposed line, this could create an operational "bottleneck" in the middle of SunZia's line and leave stranded capacity on either end. Also, because both SunZia and Southline would be merchant transmission projects, neither project could provide the ancillary service capability that would be needed for the line to operate.
- **Commercially**. This alternative would mandate that Southline relinquish sections of its proposed Project and instead become a customer of the yet-to-be-constructed SunZia project. SunZia involves multiple capacity holders, and as such, each owner and project participant would have specific rights to SunZia's capacity. Consequently, Southline would have to negotiate with each entity separately, on a piecemeal basis, in order to obtain 1,000 MW of capacity that would enter and exit in the middle of the proposed SunZia project. There is no guarantee that Southline could acquire this sort of capacity on the proposed SunZia project line at rates and terms that would be commercially viable, and no guarantee that the proposed SunZia project would be constructed to begin with.
- **Economically**. Because SunZia would have multiple capacity holders, as stated above, the rates and terms of negotiated capacity would likely be different with each holder and subject to periodic change. Southline would not necessarily be able to acquire the needed capacity at rates necessary to make the Project economically viable. This alternative would also force Southline to underwrite additional risk by taking on SunZia's risk, both of being constructed and of having viable transmission rates. Further, this alternative would require a substantial modification to both the Southline and SunZia projects in order to combine the two proposed projects onto one line. There would be added costs from additional substations, and from back-tracking Western's line to the Apache Substation, depending on the exit point. This would require detailed design and technical studies, as well as restarting the WECC approval process for both proposed projects; this would cost a considerable amount of additional time and money for both projects.
- **Legally.** The FERC regulates the allocation of interstate electric transmission line capacity and has imposed specific restrictions on the allocation of SunZia capacity rights in order to ensure open and non-discriminatory access to that capacity for all interested parties (FERC Docket No. EL-11-24-000) (FERC 2011). Therefore, it is unknown whether 1,000 MW of capacity would be available on the SunZia project, since FERC has authorized a portion of their capacity to be reserved for 'anchor' tenants, with the balance to be allocated through the formal 'open season' process. Additionally, the proposed SunZia project currently has an accepted WECC path rating of 3,000 MW for two 500-kV AC lines in the east-to-west direction; to date, no other plan of service study has been peer reviewed, as required by WECC (2011). The WECC plan of service, upon which SunZia's path rating is based, indicates connections directly to SunZia's Midpoint Substation and then to Luna Substation. The SunZia FEIS (BLM 2013a), however, does not show a connection to Luna Substation, without which their accepted WECC path rating is not supported. Southline could not acquire non-rated transmission capacity. In addition, the proposed SunZia WECC plan of service (WECC 2011) is for transmission in an east-to-west direction. Thus, obtaining capacity on the SunZia project would cause Southline to lose its bidirectional

rating and would not satisfy one of Southline's stated objectives, which is to provide bidirectional capacity.

- **Environmentally**. This alternative would require two new 500-/230-kV substations, which were not planned by either project, as well as a new 230-kV line segment back to the existing Western alignment. One of the new substations and the new 230-kV line segment would be located in the environmentally sensitive area of San Pedro Valley and adjacent to the BSETR, thus creating additional environmental impacts to both biological and military resources.

This route alternative is ineffective. It does not resolve, minimize, or reduce resource conflicts, and it could contribute to additional environmental disturbance, compared with other alternatives that would achieve the same purpose. It is also technically problematic and is economically infeasible. Further, it does not meet the applicant's stated objectives, and it likely would prevent Western from participating as a TIP project; funding and ownership would become too complicated and problematic. For these reasons, this technical/design alternative for Southline to acquire capacity on the proposed SunZia project line has not been carried forward for detailed analysis.

2.10 COMPARISON OF ALTERNATIVES

This section of the document provides a summary of the impacts of each subroute, by segment, as well as the local alternatives. This summary is based on the analysis in chapter 4. The BLM and Western Preferred Alternative description follows the route group summaries.

- Route group 1: Afton Substation to Hidalgo Substation
- Route group 2: Hidalgo Substation to Apache Substation
- Route group 3: Apache Substation to Pantano Substation
- Route group 4: Pantano Substation to Saguaro Substation

Tables 2-11 through 2-14 later in this chapter include a comparison of land ownership and estimated temporary and permanent ground disturbance, as well as comparison of resource impacts associated with each of the subroutes and local alternatives.

2.10.1 Route Group 1: Afton Substation to Hidalgo Substation

Route group 1 includes subroutes 1.1 and 1.2 (Proponent Preferred and Proponent Alternative, New Build Section) extending between the Afton and Hidalgo substations in New Mexico. Segments within each route group cross BLM, NMSLO, and private lands. Subroute 1.1 is 146.9 miles long, of which 44 percent is BLM land, 26 percent is NMSLO land, and the rest is private. Subroute 1.2 is 141.1 miles long; 58 percent of subroute 1.2 is BLM land, 19 percent is NMSLO, and the rest is private.

Subroute 1.1 follows an existing EPEC 345-kV transmission line near I-10 west of the Afton Substation, past the Aden Hills OHV area. The subroute then heads north around Deming; from the Deming area, the line follows the existing 345-kV line to the Hidalgo Substation. A portion of subroute 1.1 is located within an existing West-Wide Energy Corridor (segment 81-213). Subroute 1.1 crosses aplomado falcon (*Falco femoralis septentrionalis*) suitable habitat and a CDNST corridor designated as avoidance areas in the Mimbres RMP. In terms of cultural resources, subroute 1.1 could have potential direct and indirect impacts to the Butterfield Overland Stage Route (Butterfield Trail), the Mormon Battalion Trail, and the Janos Copper Road. Subroute 1.1 also has the potential to directly impact two known NRHP-eligible resources and 26 forecast NRHP-eligible resources. Subroute 1.1 has the potential to impact more than 1,000 acres of wildlife habitat, of which 337 acres could impact northern aplomado falcon habitat and 335 acres of Sprague's pipit (*Anthus spragueii*) habitat. This subroute could impact 5 WUS and 512 acres of floodplains. Subroute 1.1 does not cross any VRM Class II lands.

Subroute 1.2 extends south and southwest of the existing Afton Substation for approximately 30 miles, then extends generally west along the international border before heading northwest near the Luna and Grant county line. From the county line, the subroute extends west along NM 9 to the intersection of NM 9 and NM 146. From there, the subroute extends northwest for approximately 23 miles to just east of the border of Luna and Grant counties, New Mexico. Subroute 1.2 does not itself connect with the Hidalgo Substation. The western end of subroute 1.2 parallels an existing TSGT 230-kV line. This subroute crosses bighorn sheep (*Ovis canadensis nelsoni*) habitat designated as an avoidance area in the Mimbres RMP. Like subroute 1.1, subroute 1.2 could have potential direct and indirect impacts to the Butterfield Trail, the Mormon Battalion Trail, the Janos Copper Road, and the abandoned El Paso and Southwestern railroad. Subroute 1.2 would parallel the abandoned railroad in places, Subroute 1.2 has the potential to directly impact 6 known NRHP-eligible resources and 45 forecast NRHP-eligible resources. Subroute 1.2 has the potential to impact more than 1,200 acres of wildlife habitat, of which 312 acres could impact northern aplomado falcon habitat and 325 acres of Sprague's pipit habitat. This subroute could impact 2 WUS and 302 acres of floodplains. Subroute 1.2 crosses 468.5 acres of VRM Class II lands managed by the Mimbres RMP.

2.10.2 Route Group 2: Hidalgo Substation to Apache Substation

Route group 2 includes subroutes 2.1 and 2.2 (Proponent Preferred and Proponent Alternative, New Build Section) extending between the Hidalgo Substation in New Mexico and the Apache Substation in Arizona. Segments within each route group cross BLM, NMSLO, and private lands. Subroute 2.1 is 95.5 miles long, of which 28 percent is BLM land, 31 percent is NMSLO, and the rest is private. Subroute 2.2 is 95.9 miles long; 23 percent of subroute 2.2 is BLM land, 39 percent is ASLD and NMSLO, and the rest is private.

Subroute 2.1 departs an existing 345-kV transmission line north of Lordsburg and extends roughly 14 miles west and south around Lordsburg. The subroute then heads west for approximately 30 miles across the New Mexico–Arizona state line to an intersection with I-10 west of San Simon, Arizona. Once the subroute crosses I-10, it extends another 25 miles due west, where it intersects an existing SWTC 230-kV line. From this area northeast of Willcox, the subroute extends south and then southwest around the east side of the Willcox Playa. Subroute 2.1 crosses bighorn sheep suitable habitat and a CDNST corridor designated as avoidance areas in the Mimbres RMP. In terms of cultural resources, subroute 2.1 could have potential direct and indirect impacts to the Butterfield Trail, and also has the potential to directly impact 4 known NRHP-eligible resources and 19 forecast NRHP-eligible resources. Subroute 2.1 has the potential to impact more than 575 acres of wildlife habitat, of which 263 acres could impact northern aplomado falcon habitat, 277 acres could impact Sprague's pipit habitat, and 324 acres could impact lesser long-nosed bat habitat (*Leptonycteris curasoae yerbabuenae*) and Mexican long-nosed bat (*Leptonycteris nivalis*) habitat. This subroute could impact 3 WUS, 2 wetlands, and 182 acres of floodplains. Subroute 2.1 crosses no VRM Class II lands managed by the Mimbres and Safford District RMPs.

Subroute 2.2 starts south of the Lordsburg Playa and extends 32 miles across the New Mexico–Arizona state line to an area north of San Simon, Arizona. From the San Simon area, the subroute would extend west-northwest, roughly paralleling two existing 230-kV transmission lines for 25 miles to an area north of the Dos Cabezas Mountains. Subroute 2.2 crosses bighorn sheep suitable habitat and a CDNST corridor designated as avoidance areas in the Mimbres RMP. In terms of cultural resources, subroute 2.1 could have potential direct and indirect impacts to the Butterfield Trail and the Zuñiga Route, and also has the potential to directly impact 3 known NRHP-eligible resources and 16 forecast NRHP-eligible resources. Subroute 2.2 has the potential to impact more than 522 acres of wildlife habitat, of which 210 acres could impact northern aplomado falcon habitat, 243 acres could impact Sprague's pipit habitat, and 324 acres could impact lesser long-nosed bat habitat and Mexican long-nosed bat habitat. Subroute 2.2 could also impact 780 acres of lesser long-nosed bat habitat. This subroute could impact 3 WUS and 265 acres of floodplains. Subroute 2.2 crosses no VRM Class II lands managed by the Mimbres RMP.

2.10.3 Route Group 3: Apache Substation to Pantano Substation

Route group 3 includes one subroute: subroute 3.1, which comprises the existing Western transmission line, extending from Apache Substation to the Pantano Substation, connecting to the Adams Tap Substation east of Benson. Subroute 3.1 is 70.3 miles long, of which 1 percent is BLM land, 4 percent is tribal (Tohono O'odham), 1 percent is DOD, 1 percent is Coronado National Forest, 51 percent is ASLD, and 43 percent is private.

Subroute 3.1 crosses the Butterfield Trail, the Mormon Battalion Trail, and the projected Zuñiga Route, and could have direct and indirect impacts to these trails and routes. The subroute could have direct impacts to three NRHP-listed historic properties (the Valencia Site, AZ BB:13:315(ASM), and the Empirita Ranch), two NRHP-eligible resources, and eight forecast NRHP-eligible resources. Subroute 3.1 has the potential to impact more than 376 acres of wildlife habitat, including disturbance to 50 acres of Sprague's pipit habitat, impacts to northern Mexican gartersnake (*Thamnophis eques megalops*) proposed critical habitat at Cienega Creek and San Pedro River, disturbance to 323 acres of lesser long-nosed bat habitat, and disturbance to 251 acres of Sonoran desert tortoise (*Gopherus morafkai*) habitat. Subroute 3.1 could impact 7 WUS, 2 wetlands, and 36 acres of floodplains. Subroute 3.1 does not cross any VRM Class I or II lands.

2.10.4 Route Group 4: Pantano Substation to Saguaro Substation

Route group 4 includes one subroute: subroute 4.1, which comprises the existing Western transmission line, extending from the Pantano Substation to the Saguaro Substation, connecting to the Nogales, Vail, Del Bac, DeMoss Petrie, Tucson, Rattlesnake, Marana, Tortolita, and Saguaro substations in Arizona. Subroute 4.1 is a total of 48.3 miles long, of which less than 1 percent is Reclamation land, 37 percent is ASLD land, 1 percent is county-owned, and 61 percent is private.

Subroute 4.1 crosses the Tumamoc Hill Archaeological District and Desert Laboratory National Historic Landmark (NHL), the Anza National Historic Trail, the Butterfield Trail, and the Mormon Battalion Trail. Subroute 4.1 could also have direct impacts to the Los Robles Archaeological District (NRHP-listed), 16 eligible resources, and 66 forecast NRHP-eligible resources. Subroute 4.1 has the potential to impact more than 622 acres of wildlife habitat, including disturbance to 263 acres of lesser long-nosed bat habitat, and disturbance to 183 acres of Sonoran desert tortoise habitat. Subroute 4.1 could impact 6 WUS, 4 wetlands, and 275 acres of floodplains. Subroute 4.1 does not cross any VRM Class I or II lands.

2.10.5 Selection of the Agency Preferred Alternative

New Build Section

The BLM and Western (Agency) Preferred Alternative for the New Build Section consists of a combination of the Proponent Preferred, Proponent Alternative, and agency local alternative segments within route groups 1 and 2. The Agency Preferred Alternative for the New Build Section would include Proponent Preferred segments P1, P2, P3, P4a, and P7 in combination with local alternatives LD3a, LD4, LD4-Option 5 for a total of 244 miles. Approximately 78 percent of the Agency Preferred Alternative would be parallel to existing or proposed linear infrastructure.

This route was selected by the BLM and Western as the Agency Preferred Alternative because it would:

- Maximize use of existing and proposed linear ROWs by paralleling existing and proposed infrastructure and transmission lines;
- Eliminate the need for plan amendments through conformance with existing Land Use Plans;
- Minimize impacts to military operations at and near the Willcox Playa; and
- Minimize impacts to sensitive resources.

The Agency Preferred Alternative would start at the existing Afton Substation south of Las Cruces and include segments P1 and a portion of P2 between the Afton and proposed Midpoint North substation; these proposed Project segments parallel an existing EPEC 345-kv transmission line. From the proposed Midpoint North Substation, the Agency Preferred Alternative extends west along and parallel to an existing Public Service Company of New Mexico 345-kV line and includes proposed Project segments P3 and a portion of segment P4a to the Hidalgo Substation. Segment P1 is a short (5-mile) segment (in and out loop) between the existing Afton Substation and the existing Luna–Diablo 345-kV transmission line. Subroute P3 is a 31-mile-long connector segment (for interconnection to potential future solar generation), running north-south between I-10 and NM 9, located approximately 9 miles west of the West Potrillo Mountains WSA.

The Agency Preferred Alternative extends west along segment P4a from the existing Hidalgo Substation, connecting to local alternative LD3a and LD4 north of Lordsburg Playa. LD3a parallels a portion of the existing Public Service Company of New Mexico 345-kV line. LD3a connects to LD4, which parallels the Agency Preferred Alternative for the SunZia project (portions of SunZia segments B121, B160a, B160d, and B170), as described in the SunZia FEIS (BLM 2013a). The Agency Preferred Alternative from LD4 would connect south to local alternative LD4-Option 5 to segment P7 around Willcox Playa. Segment P7 parallels an existing SWTC 230-kV transmission line around the southeast side of the playa, connecting to the existing Apache Substation.

Upgrade Section

The Agency Preferred Alternative for the Upgrade Section consists of a combination of the Proponent Preferred and local alternatives at Tumamoc Hill and near the Marana Airport, within route groups 3 and 4. The Agency Preferred Alternative for the Upgrade Section would include Proponent Preferred segments U1a, U1b, U2, U3a, U3b, U3c, U3d, U3f, U3g, U3h, U3i, U3k, U3l, U3m, and U4, in combination with local alternatives TH1a and TH1-Option around Tumamoc Hill, and MA1 near the Marana Airport. The Agency Preferred Alternative for the Upgrade Section would be 120.3 miles, of which 116.8 miles would be the upgrade of Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines.

This route was selected by the BLM and Western as the Agency Preferred Alternative because it would:

- Maximize use of the existing ROW and facilities currently used for Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines;
- Minimize impacts to sensitive resources at Tumamoc Hill; and
- Minimize impacts to military training operations at the Marana Airport.

The Agency Preferred Alternative would start at the existing Apache Substation south of Willcox, Arizona, and extend through Benson, upgrading the existing Western 115-kV line. The Agency Preferred Alternative between Apache and Del Bac substations includes proposed Project segments U1a, U1b, U2, U3a and U4. From the Del Bac Substation, the Agency Preferred Alternative includes upgrading the existing Western 115-kV line north along segments U3b, U3c, and U3d. From the south side of Tumamoc Hill at Starr Pass Boulevard, the Agency Preferred Alternative would then connect segment U3d to local alternative TH1a west along Starr Pass Boulevard and then north along Greasewood Road. Local alternative TH1a would then connect to TH1-Option east along St. Mary's Road, connecting back up to the existing Western line and ROW at segment U3g. The Agency Preferred Alternative would then include the upgrade of the existing Western line north to the Saguaro Substation (segments U3h, U3i, U3k, U3l, U3m, and U4), except for reroute using local alternative MA1 near the Marana Airport.

2.10.6 Environmentally Preferred Alternative

The Environmentally Preferred Alternative is the alternative that will promote the national environmental policy as expressed in Section 101(B) of the National Environmental Policy Act. This means that the Environmentally Preferred Alternative is the "alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ 1981:question 6a). To determine the Environmentally Preferred Alternative, BLM and Western considered the results of the environmental analyses presented in chapter 4. Each alternative was evaluated in terms of a range of potential adverse environmental impacts by route.

While BLM and Western are required to identify an Environmentally Preferred Alternative in their ROD, they are not required to select the Environmentally Preferred Alternative as the Agency Preferred Alternative for analysis or in their decision. For the Environmentally Preferred Alternative, action alternatives were evaluated according to the nature and magnitude of their environmental consequences.

Of the alternatives and routes considered in detail, there are some segments that have fewer environmental impacts on the whole than others, and it is the combination of those collective segments that forms the Environmentally Preferred Alternative. The Environmentally Preferred Alternative for the New Build Section consists of the Proponent Preferred segments P1, P2, P3, P4a, P5b, P6a, P6b, P6c, Gb, and Gc in combination with local alternatives LD3a, LD3b, and WC1 around the Lordsburg and Willcox playas. The Environmentally Preferred Alternative for the Upgrade Section would be upgrade in Western's existing Saguaro–Tucson and Tucson–Apache 115-kV transmission line ROW, with no local alternatives. Rebuilding a transmission line in place on an existing ROW with its associated existing access roads, etc., in a location where it has been for over 60 years would obviously result in the least environmental impact, since the baseline already includes any existing impacts. However, responsible transmission line planning also looks for opportunities to reduce existing impacts, or address changing attitudes about the values and weights of impacts. Tumamoc Hill is an excellent example of this sort of planning, where concerned parties are willing to incur new impacts to other resources in exchange for reducing existing impacts on a resource considered more important. Situations such as this are one reason an Agency Preferred Alternative can vary from an Environmentally Preferred Alternative.

The main differences between the Environmentally Preferred Alternative and the Agency Preferred Alternative (see section 2.10.5), are the areas around Lordsburg and Willcox playas. The Environmentally Preferred Alternative would follow the Proponent Preferred segments (P1, P2, P3, P4a) to the Lordsburg Playa area, connect with LD3a and LD3b north and west of the playa. From the west side of Lordsburg Playa, the route would then connect with the Proponent Preferred segments again (segments P5b, P6a, P6b, P6c) between the existing Afton Substation, routing north around Willcox Playa via local alternative WC1, and then connect to the Apache Substation along the west side of the playa via segments Gb and GC of the Proponent Alternative (see figure 2-16). This alternative would minimize impacts at Lordsburg Playa through local alternatives LD3a and LD3b; because it would follow existing infrastructure rather than proposed transmission projects along LD4. Routing north (WC1) and west of Willcox Playa (Gb and Gc), it would avoid avian impacts and issues along the southeast side of Willcox Playa (at Proponent Preferred segment P7) and follow the I-10 corridor (WC1).

2.10.7 Action Alternatives Requiring BLM Plan Amendments

As discussed in chapter 1 and in section 2.3 of chapter 2, management direction on public land and resources is provided in land use plans or RMPs for each BLM Field or District Office. The BLM must review relevant land use plans and RMPs to determine whether a proposed project is in conformance with the management decisions and objectives of those plans. If the proposed project is not in conformance, the BLM can either choose to deny the project, adjust the project to conform to the RMP, or amend the plan to address nonconformance.

Subroutes, segments, and local alternatives have been evaluated by the respective BLM Field Offices for conformance with each of the four BLM RMPs that cover the project area (see section 2.3). There are two potential conformance issues with the Mimbres RMP: (1) where portions of alternative route segments would cross VRM Class II areas, and (2) where portions of the alternative route segments would cross ROW avoidance areas designated the Butterfield Trail near Lordsburg Playa. The following section (2.10.8) describes in detail which Project segments have potential conformance issues with the Mimbres RMP and whether or not these conformance issues would require a plan amendment.

A screening of the four relevant RMPs indicates there are seven Project segments or local alternatives where construction, operation, and maintenance of the Project would not conform to the RMP because the Project would not comply with VRM objectives or a stipulation for a ROW avoidance area. These seven Project segments or local alternatives would cross lands covered by the Mimbres RMP.

The following segments and local alternatives would intersect with VRM Class II lands and would therefore not be in conformance with the Mimbres RMP:

1. Route group 1
    a. Local alternatives C and D
    b. Subroute 1.2, segments S5, S6, and S7
2. Route group 2
    a. Local Alternatives LD2, and LD3a

The following local alternative would intersect a ROW avoidance area and conflict with the stipulations of that ROW avoidance area. The Mimbres RMP stipulates that a proposed project in a ROW avoidance area must not parallel the Butterfield Trail. The proposed Project segment listed below would roughly parallel the Butterfield Trail and therefore would not be in conformance with the Mimbres RMP:

1. Route group 2
    b. Local alternative LD2

2.10.8 Proposed Plan Amendments

A plan amendment for the Mimbres RMP would be required for the portion of the alternative route segment (local alternative LD2 near the Lordsburg Playa) that parallels an avoidance area designated for the Butterfield Trail. A plan amendment would also be required for the Mimbres RMP that would change the VRM Class II to VRM Class III or IV for seven project segments within the New Build Section that intersect VRM Class II lands. Four plan amendment alternatives have been identified for the Mimbres RMP. These options include: (1) the no action, (2) modifying VRM Class II to Class III, (3) modifying VRM Class II to Class IV, and (4) allowing a ROW to parallel the Butterfield Trail in a ROW avoidance area. No plan amendment would be required for the Agency Preferred Alternative.

Table 2-10 provides a summary of the existing VRM Class II areas and the acreage of potential change (either to VRM Class III or IV) within the Mimbres RMP. No other plan amendments would be required for subroutes, segments, or local alternatives crossing the Safford RMP, Las Cienegas RMP, or Phoenix RMP lands.

Impacts associated with the plan amendment alternatives are described in chapter 4. The Agency Preferred Alternative would not intersect any VRM Class II lands or ROW avoidance area noted above; therefore, no Agency Preferred plan amendment alternative is proposed. The Environmentally Preferred Alternative described above (see section 2.10.7) would intersect VRM Class II (segment LD3a) and would require a plan amendment.

No Action

If no action is taken, then the ROW for the proposed Project would not be granted and no amendment to the Mimbres RMP would be necessary.

Modify VRM Class II to Class III

Under this plan amendment option, where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified to VRM Class III.

Modify VRM Class II to Class IV

Under this plan amendment option, where the proposed 200-foot Project ROW crosses VRM Class II lands, the VRM class would be modified and reclassified to VRM Class IV.

Modify ROW Avoidance Area Stipulation

Under this plan amendment option, where the proposed 200-foot Project ROW would parallel the Butterfield Trail along local alternative LD2, the ROW avoidance area would be modified. The special stipulations for ROWs in the Mimbres RMP would be modified from “Facilities will not be located parallel to the Continental Divide National Scenic Trail or Butterfield Trail” to “Facilities will not be located parallel to the Continental Divide National Scenic Trail or Butterfield Trail, except for a 9.1-mile-long by 200-foot-wide linear transmission ROW at the Lordsburg Playa.”

Tables 2-11 through 2-14 include a comparison of land ownership and estimated temporary and permanent ground disturbance, as well as comparison of resource impacts associated with each of the subroutes and local alternatives.

Table 2-10. Mimbres RMP Plan Conformance and Proposed Amendment Summaries for VRM Class II

Segments/Local Alternatives	Proposed Project Intersection with Existing VRM Class II (miles)	Acres of Proposed Project That Would Result in VRM Class II Modification
S5	1.2	29.8
S6	4.4	107.7
S7	13.7	331.0
C	3.7	87.5
D	1.8	43.1
LD2	3.1	74.0
LD3a	0.5	12.1

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation

Route Group 1			Subroute 1.1 - Proponent Preferred	Subroute 1.2 - Proponent Alternative	Local Alternative Segments					Agency Preferred Alternative
					DN1	A	B	C	D	
Subroute Length (miles)			146.9	141.1	42.5	17.5	12.2	9.0	22.8	146.9
Land Ownership (miles crossed)	BLM		65.3	82.5	6.9	14.7	9.9	4.0	6.8	65.3
	Bureau of Indian Affairs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coronado National Forest		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Reclamation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	State		38.2	26.4	29.3	1.1	2.2	1.6	2.5	38.2
	County		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Private		43.4	32.2	6.3	1.8	0.0	3.4	13.5	43.4
Ground Disturbance	Temporary	Acres	942.6	970.1	238.0	98.0	68.3	50.3	147.6	942.6
		Acres/Mile	6.4	6.9	5.6	5.6	5.6	5.6	6.5	6.4
	Permanent	Acres	251.6	233.6	92.9	17.8	7.2	6.1	28.1	251.6
		Acres/Mile	1.7	1.6	2.2	1.0	0.6	0.7	1.2	1.7
BLM RMP Conformance	VRM	Acres crossing VRM Class II Lands	None	468.5	None	None	None	87.5	43.1	None
	ROW avoidance areas under the Mimbres RMP		Crosses CDNST corridor designated as an avoidance area.	Crosses bighorn sheep habitat designated as an avoidance area.	No impact	No impact	No impact	No impact	Crosses CDNST corridor designated as an avoidance area.	Crosses CDNST corridor designated as an avoidance area.
	Plan Conformance		No conflict	BLM plan non-conformance crossing VRM Class II lands.	No conflict	No conflict	No conflict	BLM plan non-conformance crossing VRM Class II lands.	BLM plan non-conformance crossing VRM Class II lands.	No conflict
Air Quality			Fugitive dust and equipment emissions would occur under all subroutes and alternatives; emissions would be relative to the length of the subroute and alternative(s) chosen. Does not traverse any nonattainment or maintenance areas. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Noise and Vibration			Approximately 56 noise sensitive receptors (NSRs) are located along this subroute, primarily in Deming, New Mexico. The nearest NSR is approximately 100 feet from the ROW. **Impact Intensity: Major but Temporary**	Approximately 55 NSRs are located along this subroute, primarily in Columbus and Hatch, New Mexico. The nearest NSR is approximately 50 feet from the ROW. **Impact Intensity: Major but Temporary**	This alternative avoids the town of Deming, New Mexico, avoiding those NSRs (approximately 40). Two additional NSRs would be impacted, the nearest at a distance of approximately 100 feet from the ROW. **Impact Intensity: Major but Temporary**	Does not avoid or pick up any NSRs from the subroute being substituted for. **Impact Intensity: Major but Temporary**	Same as segment A	Same as segment A	This alternative would pick up about 12 more NSRs than the subroute it is substituting for, as it passes closer to Lordsburg, New Mexico, than the subroute. **Impact Intensity: Major but Temporary**	Same as subroute 1.1

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

			Local Alternative Segments					
Route Group 1	**Subroute 1.1 - Proponent Preferred**	**Subroute 1.2 - Proponent Alternative**	**DN1**	**A**	**B**	**C**	**D**	**Agency Preferred Alternative**
Geology and Mineral Resources	Geology: No impacts Mineral Resources: No more than 0.14% of any active mining district is crossed. No active mines are crossed. Minor, short-term future impacts possible due to temporary preclusion of access to mineral resources if transmission line structures need to be moved to accommodate surface mining. No unavoidable adverse impacts, no long-term loss of productivity, and no irretrievable or irreversible commitment of resources. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Soil Resources	Wind erosive soils in all segments and alternatives in route group 1. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Cultural Resources	Potential for direct/visual impacts to the Butterfield Trail, the Mormon Battalion Trail, and the Janos Copper Road. Potential direct impact to 2 known NRHP-eligible resources and 26 forecast and 582 estimated NRHP-eligible resources. **Impact Intensity: Major**	Potential for direct/visual impacts to the Butterfield Trail, the Mormon Battalion Trail, and the Janos Copper Road. Potential direct impact to 6 known NRHP-eligible resources and 45 forecast and 534 estimated NRHP-eligible resources. **Impact Intensity: Major**	Potential for direct/visual impacts to the Mormon Battalion Trail and the Janos Copper Road. Potential direct impact to 114 estimated NRHP-eligible resources. **Impact Intensity: Major**	Potential direct impact to 1 known NRHP-eligible resource and 3 forecast and 71 estimated NRHP-eligible resources. **Impact Intensity: Minor**	Potential direct impact to 2 known NRHP-eligible resources and 9 forecast and 73 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential for direct/visual impacts to the Janos Copper Road. Potential direct impact to 1 known NRHP-eligible resource and 3 forecast and 59 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential direct/visual impact to 1 listed resource, the Town of Shakespeare, and direct impacts to 9 forecast and 94 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Same as subroute 4.1. **Impact Intensity: Major**
Groundwater, Surface Water, and Wetlands	5 WUS 0 wetlands 512 acres of floodplains Mimbres River special consideration **Impact Intensity: No impact**	2 WUS 0 wetlands 302 acres of floodplains **Impact Intensity: No impact**	3 WUS 0 wetlands 96 acres of floodplains Mimbres River special consideration **Impact Intensity: No impact**	0 WUS 1 wetland 0 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 0 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 27 acres of floodplains **Impact Intensity: No impact**	2 WUS 0 wetlands 9 acres of floodplains **Impact Intensity: No impact**	5 WUS 0 wetlands 512 acres of floodplains Mimbres River special consideration **Impact Intensity: No Impact**

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

Route Group 1		Subroute 1.1 - Proponent Preferred	Subroute 1.2 - Proponent Alternative	Local Alternative Segments					Agency Preferred Alternative
				DN1	**A**	**B**	**C**	**D**	
Biological Resources (Vegetation)		Crosses through region of existing disturbance. No ESA-listed species have the potential to occur along the subroute. Four sensitive plant species—Sneed's pin-cushion cactus (*Escobaria sneedii*), dune prickly pear (*Opuntia polyacantha* var. *arenaria*), Gregg night-blooming cereus (*Peniocereus greggii* var. *greggii*), and Parish's alkali grass (*Puccinellia parishii*)—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, Gregg night-blooming cereus, Parish's alkali grass, and Chihuahua scurfpea (*Pediomelum pentaphyllum*)—have potential to occur. Tamarisk (*Tamarix* spp.) was observed in sections S1–S8. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, and Gregg night-blooming cereus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, and Gregg night-blooming cereus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, and Gregg night-blooming cereus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, Gregg night-blooming cereus, and Parish's alkali grass—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—Sneed's pin-cushion cactus, dune prickly pear, and Gregg night-blooming cereus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur along the subroute. Sensitive species—dune prickly pear and Sneed's pin-cushion cactus—have potential to occur. **Impact Intensity: Minor**
Biological Resources (Wildlife)	General Wildlife	Disturbance to wildlife habitat on 1,036 acres.	Disturbance to wildlife habitat on 1,276 acres.	Disturbance to wildlife habitat on 237 acres.	Disturbance to wildlife habitat on 342 acres.	Disturbance to wildlife habitat on 239 acres.	Disturbance to wildlife habitat on 177acres.	Disturbance to wildlife habitat on 453 acres.	Disturbance to wildlife habitat on 1,036 acres.
	Federally Listed Species	Disturbance to 337 acres of northern aplomado falcon and 375 acres of Sprague's pipit habitat.	Disturbance to 312 acres of northern aplomado falcon and 325 acres of Sprague's pipit habitat.	Disturbance to 176 acres of northern aplomado falcon and Sprague's pipit habitat t.	Disturbance to 3 acres of northern aplomado falcon and Sprague's pipit habitat.	Disturbance to 3 acres of northern aplomado falcon and Sprague's pipit habitat.	Disturbance to 26 acres of northern aplomado falcon and Sprague's pipit habitat.	Disturbance to 176 acres of northern aplomado falcon and Sprague's pipit habitat.	Disturbance to 337 acres of northern aplomado falcon and 375 acres of Sprague's pipit habitat.
	BLM Sensitive Species	Disturbance to habitat for 15 BLM Sensitive Species.	Disturbance to habitat for 15 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 15 BLM Sensitive Species.
	New Mexico Wildlife Conservation Act Species	Disturbance to habitat for 11 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 11 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 7 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 4 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 5 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 6 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 7 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 11 New Mexico Wildlife Conservation Act Species.
	New Mexico Species of Greatest Conservation Need	Disturbance to habitat for 17 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 17 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 2 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 7 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 4 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 3 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 5 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 17 New Mexico Species of Greatest Conservation Need.
	Migratory Birds	Disturbance to migratory bird habitat on 990 acres. Not near any high ridges or low passes.	Disturbance to migratory bird habitat on 1,169 acres. Near several high ridges and low passes, which increases likelihood for collisions with transmission lines. Disturbance to a sandhill crane (*Grus canadensis*) migratory flyway and wintering habitat.	Disturbance to migratory bird habitat on 237 acres.	Disturbance to migratory bird habitat on 96 acres.	Disturbance to migratory bird habitat on 70 acres.	Disturbance to migratory bird habitat on 47 acres. Crosses a low pass between the Cedar Mountains and the Carrizalillo Hills.	Disturbance to migratory bird habitat on 127 acres. Near a low pass in the Pyramid Mountains.	Disturbance to migratory bird habitat on 990 acres. Not near any high ridges or low passes.
	Wildlife Special Designation Areas	Disturbance to northern aplomado falcon designated habitat (47 acres) and the Big Burro Mountains to Cedar Mountains Potential Cougar Corridor (73 acres).	Disturbance to northern aplomado falcon (33 acres) and desert bighorn designated habitat (5 acres). Avoids the Big Burro Mountains to Cedar Mountains Potential Cougar Corridor.	Disturbance to northern aplomado falcon designated habitat (32 acres) and the Big Burro Mountains to Cedar Mountains Potential Cougar Corridor (32 acres).	None present; no impacts.	None present; no impacts.	None present; no impacts.	None present; no impacts.	Disturbance to northern aplomado falcon designated habitat (47 acres) and the Big Burro Mountains to Cedar Mountains Potential Cougar Corridor (73 acres).

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

			Local Alternative Segments					
Route Group 1	**Subroute 1.1 - Proponent Preferred**	**Subroute 1.2 - Proponent Alternative**	**DN1**	**A**	**B**	**C**	**D**	**Agency Preferred Alternative**
All Wildlife	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**
Paleontological Resources	Potential to disturb high sensitivity geological units that may contain important fossils. **Impact Intensity: Moderate**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	No key issues for paleontological resources. **Impact Intensity: No Impact**	Same as segment C	Same as subroute 1.1 **Impact Intensity: Major**
Visual Resources	Crosses mostly Class C scenery (96%). High sensitivity viewers along I-10 and NM 549 and where segment p4a crosses the CDNST. Low impacts are anticipated because the new transmission lines would follow existing transmission lines. **Impact Intensity: Minor**	Crosses mostly Class C scenery (85.8%). Higher sensitivity viewers are located at the Pancho Villa State Park, CDNST, and in dispersed rural residences. There would be moderate impacts where new transmission structures are introduced into largely undeveloped areas. 19.4 miles of segments S5, S6, and S7 cross VRM Class II lands and would require a plan amendment. **Impact Intensity: Moderate**	Avoids high sensitivity viewers along I-10. **Impact Intensity: Minor**	Local segments follow existing roads. Segment D crosses perpendicular to the CDNST. There would be moderate impacts where new transmission structures are introduced. 3.7 miles of segment C and 1.8 miles of segment D cross VRM Class II lands, 13.9 miles less than subroute 1.2. Segment B is located along the West Potrillo Mountains WSA boundary and there would be greater visibility from the WSA of segment B over subroute 1.2. **Impact Intensity: Moderate**	Same as segment A	Same as segment A	Same as segment A	Crosses mostly Class C scenery (96%). High sensitivity viewers along I-10 and NM 549 and where segment p4a crosses the CDNST. Low impacts are anticipated because the new transmission lines would follow existing transmission lines. **Impact Intensity: Minor**

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

			Local Alternative Segments					
Route Group 1	**Subroute 1.1 - Proponent Preferred**	**Subroute 1.2 - Proponent Alternative**	**DN1**	**A**	**B**	**C**	**D**	**Agency Preferred Alternative**
Land Use, Including Farm and Range Resources and Military Operations	- Occurs within existing transmission ROW. - Crosses lands identified for disposal. - Crosses military training route (MTR) VR-263. - Would result in a 28% impact to farmlands of statewide importance. - No significant impacts to rangelands are expected to occur. - Runs parallel to existing linear features for approximately 111 miles (75%) of the ROW. **Impact Intensity: Minor**	- Occurs along existing transportation ROW and along old railroad bed. - Crosses bighorn sheep habitat designated as an avoidance area. - Crosses grassland restoration areas designated as an avoidance area. - Crosses MTR VR-263. - Would result in a 21% impact to farmlands of statewide importance. - No significant impacts to rangelands are expected to occur. - Runs parallel to existing linear features for approximately 62 miles (44%) of the ROW. **Impact Intensity: Minor**	- Does not occur within existing ROWs. - Crosses lands identified for disposal. - Would result in a 12% impact to farmlands of statewide importance. - No significant impacts to rangelands are expected to occur. - Would parallel proposed SunZia transmission line for entire length of local alternative. **Impact Intensity: Moderate**	- No impact to land use. - No significant impacts to farmlands or rangelands. **Impact Intensity: No impact**	- No impact to land use. - No significant impacts to farmlands or rangelands. **Impact Intensity: No impact**	- No impact to land use. - No significant impacts to farmlands or rangelands. **Impact Intensity: Minor**	- Crosses CDNST corridor designated as an avoidance area. - Would result in a significant (72%) impact to farmlands of statewide importance and prime farmlands if they are irrigated. - No significant impacts to rangelands are expected to occur. **Impact Intensity: Minor**	- Occurs within existing transmission ROW. - Crosses lands identified for disposal. - Crosses MTR VR-263. - 1,026 acres of Farmland of Statewide Importance would be temporarily impacted during construction. - No significant impacts to rangelands are expected to occur. - Runs parallel to existing linear features for approximately 111 miles (75%) of the ROW. **Impact Intensity: Minor**
Special Designations	Crosses CDNST once. Crosses Butterfield Trail once. **Impact Intensity: Minor**	Crosses Butterfield Trail once. **Impact Intensity: Minor**	No impacts. **Impact Intensity: No impacts**	No impacts. **Impact Intensity: No impacts**	Adjacent to Mount Riley/West Potrillo Mountains WSA. **Impact Intensity: Minor**	No impacts. **Impact Intensity: No impacts**	Crosses CDNST once. Crosses Butterfield Trail once. **Impact Intensity: Minor**	Crosses CDNST once. Crosses Butterfield Trail once. **Impact Intensity: Minor**
Wilderness Characteristics	Crosses 5 Wilderness Inventory Units (WIUs) for a total of 28 miles. Would reduce one WIU to less than 5,000 acres **Impact Intensity: Major**	Crosses 11 WIUs for a total of 46 miles. **Impact Intensity: Minor**	Crosses 1 WIU for a total of 2.1 miles. **Impact Intensity: Minor**	Crosses 4 WIUs for a total of 8 miles. **Impact Intensity: Minor**	Crosses 1 WIU for a total of 8 miles. **Impact Intensity: Minor**	Crosses 1 WIU for a total of 0.1 mile. **Impact Intensity: Minor**	Crosses 1 WIU for a total of 2.3 miles. **Impact Intensity: Minor**	Crosses 5 WIUs for a total of 28 miles. Would reduce 1 WIU to less than 5,000 acres. **Impact Intensity: Moderate**
Recreation	Adjacent to the Aden Hills OHV Special Recreation Management Area (SRMA). **Impact Intensity: Minor**	Crosses bighorn sheep habitat in Game Management Unit 25. **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. **Impact Intensity: Minor**	No impacts. **Impact Intensity: No impact**	No impacts. **Impact Intensity: No impact**	No impacts. **Impact Intensity: No impact**	Negligible impacts. **Impact Intensity: Minor**	Adjacent to the Aden Hills OHV SRMA. **Impact Intensity: Minor**

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

			Local Alternative Segments					
Route Group 1	**Subroute 1.1 - Proponent Preferred**	**Subroute 1.2 - Proponent Alternative**	**DN1**	**A**	**B**	**C**	**D**	**Agency Preferred Alternative**
Socioeconomics and Environmental Justice	Project would directly and indirectly support an estimated 235 local jobs, along with 246 non-local workers, in the New Build Section during 2-year construction period. Corresponding increases in labor income, output, and tax revenues. Construction could create short-term shortages of temporary housing, and short-term increases in the demand for local services, in the more remote western portion of the New Build Section. Ongoing operations could benefit local communities through increased property tax revenues and improved electrical capacity to serve future growth. Given the prevalence of low-income and minority populations throughout the area, disproportionate impacts on low-income and minority populations are likely inevitable under any feasible transmission route. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Public Health and Safety	Increased potential for occupational safety hazards to occur. Increased potential for fire hazards to occur. Increased potential for public exposure to electromagnetic fields. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Hazardous Materials and Hazardous and Solid Waste	No impacts. **Impact Intensity: No Impact**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1
Transportation	Temporary short-term increase in traffic during construction. **Impact Intensity: Minor**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1

Table 2-11. Comparison Summary for Subroute 1: Afton Substation to Hidalgo Substation (Continued)

Route Group 1	Subroute 1.1 - Proponent Preferred	Subroute 1.2 - Proponent Alternative	Local Alternative Segments					Agency Preferred Alternative
			DN1	A	B	C	D	
Intentional Acts of Destruction	Increase in potential targets for acts of sabotage or terrorism. Decrease in the potential for acts of sabotage or terrorism to cause service disruption and/or potential reduction in duration of service disruption. **Impact Intensity: No Impact**	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1	Same as subroute 1.1

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation

					Local Alternative Segments								
Route Group 2			**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Subroute Length (miles)			95.5	95.9	35.4	9.6	27.9	1.9	51.7	6.5	12.3	14.8	97.1
Land Ownership (miles crossed)	BLM		28.4	21.9	19.5	3.6	11.3	1.2	37.1	0.0	0.0	0.0	48.6
	BIA		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOD		0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	FS		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Reclamation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	State		37.2	37.2	6.8	5.8	13.3	0.7	14.6	6.5	10.7	4.4	32.0
	County		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Private		29.7	36.8	9.1	0.2	3.4	0.0	0.0	0.0	1.6	10.4	16.2
Ground Disturbance	Temporary	Acres	654.9	637.3	218.1	54.0	176.5	10.8	289.3	36.2	68.7	103.0	683.9
		Acres/Mile	6.9	6.6	6.2	5.6	6.3	5.7	5.6	5.6	5.6	7.0	7.0
	Permanent	Acres	171.5	198.2	55.2	20.2	29.3	0.6	113.9	14.3	22.2	28.3	187.5
		Acres/Mile	1.8	2.1	1.6	2.1	1.1	0.3	2.2	2.2	1.8	1.9	1.9
BLM RMP Conformance	VRM	Acres crossing Class II Lands	None	None	None	74.0	12.1	None	None	None	None	None	None
	ROW avoidance areas under the Mimbres RMP		Crosses CDNST corridor designated as an avoidance area. Crosses bighorn sheep habitat designated as an avoidance area.	Crosses CDNST corridor designated as an avoidance area. Crosses bighorn sheep habitat designated as an avoidance area.	Crosses bighorn sheep habitat designated as an avoidance area.	Crosses and parallels Butterfield Trail corridor designated as an avoidance area.	Crosses Butterfield Trail corridor designated as an avoidance area.	No impact	No impact	No impact	No impact	No impact	Crosses CDNST corridor designated as an avoidance area. Crosses bighorn sheep habitat designated as an avoidance area.
	Plan Conformance		No conflict	No conflict	No conflict	BLM plan non-conformance for paralleling the Butterfield Trail in a ROW avoidance area.	No conflict	BLM plan non-conformance crossing VRM Class II lands.	No conflict	No conflict	No conflict	No conflict	No conflict

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

			Local Alternative Segments								
Route Group 2	**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Air Quality	Fugitive dust and equipment emissions would occur under all subroutes and alternatives; emissions would be relative to the length of the subroute and alternative(s) chosen. Does not traverse any nonattainment or maintenance areas. Potential conflict with prevailing winds and dust storms on the Lordsburg and Willcox playas causing flashover on the transmission line. **Impact Intensity: Minor**	Same as subroute 2.1. Less potential conflict with prevailing winds and dust storms on the Lordsburg and Willcox Playas causing flashover on the transmission line.	Same as subroute 2.1.	Same as subroute 2.1. Potential conflict with prevailing winds and dust storms on the Lordsburg Playa causing flashover on the transmission line.	Same as subroute 2.1. Less potential conflict with prevailing winds and dust storms on the Lordsburg Playa causing flashover on the transmission line.	Same as subroute 2.1. Less potential conflict with prevailing winds and dust storms on the playa causing flashover on the transmission line.	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1. Less potential conflict with prevailing winds and dust storms on the Willcox Playa causing flashover on the transmission line.	Same as subroute 2.1
Noise and Vibration	Approximately 5 noise sensitive receptors (NSRs) are located along this subroute. The nearest NSR is located within 50 feet from the ROW. No NSRs are present near the Lordsburg Playa, and 2 NSRs are present near Willcox Playa. **Impact Intensity: Major but Temporary**	Greater than 100 NSRs are located along this subroute. The nearest NSR is located within 50 feet from the ROW. No NSRs are present near the Lordsburg Playa, and 36 NSRs are present near Willcox Playa. **Impact Intensity: Major but Temporary**	This alternative follows I-10 more closely than the subroute it is substituting for. This alternative would pick up a greater number of NSRs than the subroute; however, the existing baseline noise conditions are higher from traffic from the interstate. Approximately 85 NSRs are present near Lordsburg Playa. **Impact Intensity: Major but Temporary**	Does not avoid or pick up any NSRs from the subroute being substituted for. No NSRs near Lordsburg Playa. **Impact Intensity: Major but Temporary**	Same as segment LD2. One NSR near Lordsburg Playa.	Same as segment LD2. No NSRs near Lordsburg Playa.	This alternative would avoid the NSRs clustered along I-10. This alternative picks up approximately 8 additional NSRs while avoiding approximately the same number. **Impact Intensity: Major but Temporary**	Does not avoid or pick up any NSRs from the subroute being substituted for. **Impact Intensity: Major but Temporary**	Same as segment LD4-Option 4.	This alternative passes through Willcox, Arizona, and thus picks up more than 100 additional NSRs than the subroute. Approximately 102 NSRs near Willcox Playa. **Impact Intensity: Major but Temporary**	Approximately 10 NSRs are located along this subroute. The nearest NSR is located within 50 feet from the ROW. **Impact Intensity: Major but Temporary**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

			Local Alternative Segments								
Route Group 2	**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Geology and Mineral Resources	Geology: No impacts. Mineral Resources: All mining districts crossed are inactive. Minor short-term future impacts are possible due to temporary preclusion of access to mineral resources if transmission line structures need to be moved to accommodate surface mining. No unavoidable adverse impacts, no long-term loss of productivity, and no irretrievable or irreversible commitment of resources. No mining districts would be crossed in the Lordsburg and Willcox playa areas. **Impact Intensity: Minor**	Same as subroute 2.1. 74 acres of mining districts would be crossed in the Lordsburg Playa area. No mining districts would be crossed near Willcox Playa.	Same as subroute 2.1. 13 acres of mining districts would be crossed near Lordsburg Playa.	Same as subroute 2.1. 124 acres of mining districts would be crossed near Lordsburg Playa.	Same as subroute 2.1. No mining districts would be crossed near Lordsburg Playa.	Same as subroute 2.1. No mining districts would be crossed near Lordsburg Playa.	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1. No mining districts would be crossed near Willcox Playa.	Same as subroute 2.1. 245 acres of mining districts would be crossed, including 121 acres of the active Bowie Mining District.
Soil Resources	Wind erosive soils are in all segments and alternatives in route group 2. Has moderately (~97 acres) and highly erodible soils (~10 acres) near Lordsburg Playa. Has moderately (~270 acres) and highly erodible soils (~41 acres) near Willcox Playa. **Impact Intensity: Minor**	Same as subroute 2.1. Has moderately (~337 acres) and highly erodible soils (~12 acres) near Lordsburg Playa. Has moderately erodible soils (~396 acres) near Willcox Playa.	Same as subroute 2.1. Has moderately (~325 acres) and highly erodible soils (~8 acres) near Lordsburg Playa.	Same as subroute 2.1. Has moderately (~117 acres) and highly erodible soils (~33 acres) near Lordsburg Playa.	Same as subroute 2.1. Has moderately (~276 acres) and highly erodible soils (~191 acres) near Lordsburg Playa.	Same as subroute 2.1. Has moderately erodible soils (~2 acres) near Lordsburg Playa.	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1. Has moderately erodible soils (~220 acres) near Willcox Playa.	Same as subroute 2.1

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

			Local Alternative Segments								
Route Group 2	**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Cultural Resources	Potential for direct/visual impacts to the Butterfield Trail. Potential direct impact to 4 known NRHP-eligible resources and 19 forecast and 69 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential for direct/visual impacts to the Butterfield Trail and the Zuñiga Route. Potential direct impact to 3 known NRHP-eligible resources and 16 forecast and 34 estimated NRHP-eligible resources. **Impact Intensity: Major**	Potential for direct/visual impacts to the Butterfield Trail. Potential direct impact to one known NRHP-eligible resource and 7 forecast and 41 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential for direct/visual impacts to the Butterfield Trail. Potential direct impact to 24 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential for direct/visual impacts to the Butterfield Trail. Potential direct impact to 63 estimated NRHP-eligible resources. **Impact Intensity: Moderate**	Potential direct impacts to 5 estimated NRHP-eligible resources. **Impact Intensity: Minor**	Potential for direct/visual impacts to the Zuñiga Route. Potential direct impact to 12 estimated NRHP-eligible resources. **Impact Intensity: Minor**	No key issues for cultural resources. **Impact Intensity: No impact**	No key issues for cultural resources. **Impact Intensity: No impact**	Potential direct impact to 89 resources with unknown number of NRHP-eligible resources. **Impact Intensity: Moderate**	Potential for direct impacts to 3 NRHP-eligible sites and 1 forecast NRHP-eligible site. Potential for direct/visual impacts to the Butterfield Trail. **Impact Intensity: Moderate**
Groundwater, Surface Water, and Wetlands	3 waters of U.S. 2 wetlands 182 acres floodplain Lordsburg Playas special considerations **Impact Intensity: Minor**	3 waters of U.S. 0 wetlands 265 acres of floodplains Lordsburg and Willcox Playas special considerations **Impact Intensity: No impact**	3 WUS 0 wetlands 90 acres of floodplains **Impact Intensity: Minor to Moderate**	0 WUS 0 wetlands 0 acres of floodplains . **Impact Intensity: No impact**	0 WUS 0 wetlands 0 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 0 acres of floodplains **Impact Intensity: No impact**	4 WUS 0 wetlands 117 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 0 acres of floodplains **Impact Intensity: No impact**	1 WUS 0 wetlands 12 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 142 acres of floodplains Willcox Playa special considerations **Impact Intensity: No impact**	5 WUS 2 wetlands 245 acres of floodplains **Impact Intensity: Minor to Moderate**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2		Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments: LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	Agency Preferred Alternative
Biological Resources (Vegetation)		Crosses the southeastern portion of the Wilcox Playa, but impacts are expected to be temporary and minimal. No ESA-listed species have the potential to occur. Sensitive species— Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus (*Epithelantha micromeris*), devilthorn hedgehog cactus (*Echinocereus pseudopectinatus*), playa spider plant (*Cleome multicaulis*), San Carlos wild-buckwheat (*Eriogonum capillare*), slender needle corycactus (*Coryphantha scheeri* var. *valida*), varied fishhook cactus (*Mammillaria viridiflora*), and Wilcox pincushion cactus (*Mamillaria wrightii* var. *wilcoxii*)—have potential to occur. Tamarisk is known to occur in segment P5. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus (*Echinomastus erectocentrus* var. *erectocentrus*), and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. Tamarisk could be present on route segment LD1. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. Hoary cress (*Cardaria* spp.) could be present on route segment LD3a. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—Sneed's pin-cushion cactus, Gregg night-blooming cereus, Parish's alkali grass, button cactus, devilthorn hedgehog cactus, playa spider plant, San Carlos wild-buckwheat, slender needle corycactus, varied fishhook cactus, needle-spined pineapple cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	No ESA-listed species have the potential to occur. Sensitive species—slender needle corycactus, devilthorn hedgehog cactus, Wilcox pincushion cactus, San Carlos wild - buckwheat, varied fishhook cactus, playa spider plant—have potential to occur. **Impact Intensity: Minor**
Biological Resources (Wildlife)	General Wildlife	Disturbance to wildlife habitat on 575 acres.	Disturbance to wildlife habitat on 522 acres.	Disturbance to wildlife habitat on 197 acres.	Disturbance to wildlife habitat on 54 acres.	Disturbance to wildlife habitat on 156 acres.	Disturbance to wildlife habitat on 11 acres.	Disturbance to wildlife habitat on 238 acres.	Disturbance to wildlife habitat on 36 acres.	Disturbance to wildlife habitat on 68 acres.	Disturbance to wildlife habitat on 83 acres.	Disturbance to wildlife habitat on 846 acres.

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

				Local Alternative Segments								
Route Group 2		**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
	Federally Listed Species	Disturbance to 263 acres of northern aplomado falcon and 277 acres of Sprague's pipit habitat. Disturbance to 349 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher (*Empidonax traillii extimus*) and Chiricahua leopard frog (*Lithobates chiricahuensis*). Indirect impacts only.	Disturbance to 210 acres of northern aplomado falcon and 243 acres of Sprague's pipit habitat. Disturbance to 324 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 65 acres of northern aplomado falcon and 81 acres of Sprague's pipit habitat. Disturbance to 126 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 40 acres of northern aplomado falcon and Sprague's pipit habitat. Disturbance to 53 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 95 acres of northern aplomado falcon and Sprague's pipit habitat. Disturbance to 134 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 11 acres of northern aplomado falcon and Sprague's pipit habitat. Disturbance to 11 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 449 acres of northern aplomado falcon and 54 acres of Sprague's pipit habitat. Disturbance to 220 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 23 acres of Sprague's pipit and northern aplomado falcon habitat. Disturbance to 32 acres of lesser long-nosed and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 35 acres of Sprague's pipit habitat. Disturbance to 55 acres of lesser long-nosed bat, Mexican long-nosed bat and northern aplomado falcon habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 58 acres of northern aplomado falcon and Sprague's pipit habitat. Disturbance to 63 acres of lesser long-nosed and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.	Disturbance to 647 acres of northern aplomado falcon and 287 acres of Sprague's pipit habitat. Disturbance to 523 acres of lesser long-nosed bat habitat and Mexican long-nosed bat habitat. No habitat disturbed for southwestern willow flycatcher and Chiricahua leopard frog. Indirect impacts only.
	BLM Sensitive Species	Disturbance to habitat for 16 BLM Sensitive Species. No habitat disturbance for Colorado River toad (*Anaxyrus alvarius*) and lowland leopard frog (*Lithobates yavapaiensis*). Indirect impacts only.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species.	Disturbance to habitat for 18 BLM Sensitive Species
	New Mexico Wildlife Conservation Act Species	Disturbance to habitat for 12 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 16 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.	This local alternative does not occur in New Mexico.	This local alternative does not occur in New Mexico.	This local alternative does not occur in New Mexico.	Disturbance to habitat for 10 New Mexico Wildlife Conservation Act Species.
	Arizona Wildlife Species of Concern	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 7 Arizona Wildlife Species of Concern.	This local alternative does not occur in Arizona.	This local alternative does not occur in Arizona.	This local alternative does not occur in Arizona.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.	Disturbance to habitat for 8 Arizona Wildlife Species of Concern.
	New Mexico Species of Greatest Conservation Need	Disturbance to habitat for 17 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 17 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 10 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 5 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 5 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 5 New Mexico Species of Greatest Conservation Need.	Disturbance to habitat for 10 New Mexico Species of Greatest Conservation Need.	This local alternative does not occur in New Mexico.	This local alternative does not occur in New Mexico.	This local alternative does not occur in New Mexico.	Disturbance to habitat for 10 New Mexico Species of Greatest Conservation Need.
	Arizona Species of Greatest Conservation Need	Disturbance to habitat for 10 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 10 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 7 Arizona Species of Greatest Conservation Need.	This local alternative does not occur in Arizona.	This local alternative does not occur in Arizona.	This local alternative does not occur in Arizona.	Disturbance to habitat for 6 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 10 Arizona Species of Greatest Conservation Need

1 **Table 2-12.** Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2	Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments								Agency Preferred Alternative
			LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	
Migratory Birds	Disturbance to migratory bird habitat on 575 acres. Significant risk of collision for many species of waterfowl, waders, and shorebirds documented at Willcox Playa. Additional collision hazard, October–March, sandhill cranes have a daily migration between playa and agricultural fields to the southeast. This is a major collision hazard. The risk would be mitigated with use of line marking devices. Near low passes in Peloncillo Mountains and Dos Cabezas Range.	Disturbance to migratory bird habitat on 522 acres. Significant risk of collision for many species of waterfowl, waders, and shorebirds documented at Willcox Playa. The risk would be mitigated with use of line marking devices. Crosses Powers Canyon, a low pass in the Peloncillo Mountains.	Disturbance to migratory bird habitat on 197 acres. Significant risk of collision for many species of waterfowl, waders, and shorebirds documented at Willcox Playa. The risk would be mitigated with use of line marking devices. Crosses low pass in the Peloncillo Mountains.	Disturbance to migratory bird habitat on 54 acres. Crosses Powers Canyon, a low pass in the Peloncillo Mountains.	Disturbance to migratory bird habitat on 156 acres.	Disturbance to migratory bird habitat on 11 acres.	Disturbance to migratory bird habitat on 338 acres.	Disturbance to migratory bird habitat on 36 acres.	Disturbance to migratory bird habitat on 68 acres.	Disturbance to migratory bird habitat on 83 acres.	Disturbance to migratory bird habitat on 846 acres. Significant risk of collision for many species of waterfowl, waders, and shorebirds documented at Willcox Playa. Additional collision hazard, October–March, sandhill cranes have a daily migration between playa and agricultural fields to the southeast. This is a major collision hazard. The risk would be mitigated with use of line marking devices.
Wildlife Special Designation Areas	Disturbance to desert bighorn designated habitat (17 acres). Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (226 acres). Segment P7 is adjacent to the Willcox Playa Wildlife Area and would cross the Willcox Playa/Lake Cochise Important Bird Area (~200 acres).	Disturbance to desert bighorn designated habitat (16 acres). Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (362 acres).	Disturbance to northern aplomado falcon (24 acres) and desert bighorn designated habitat (10 acres). Disturbance to the Peloncillo Bighorn Avoidance Area (9 acres). Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and Pinaleño-Dos Cabezas-San Simon Valley linkages (106 acres).	This local alternative does not cross any wildlife special designation areas.	This local alternative does not cross any wildlife special designation areas.	Disturbance to desert bighorn designated habitat (1 acre).	Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (121 acres).	This local alternative does not cross any wildlife special designation areas.	Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (68 acres).	Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (82 acres). Would cross the Willcox Playa/Lake Cochise Important Bird Area (~2 acres).	Disturbance to the Willcox Playa-Winchester-Pinaleño-Dos Cabezas and the Pinaleño-Dos Cabezas-San Simon Valley linkages (189 acres). Segment P7 is adjacent to the Willcox Playa Wildlife Area and would cross the Willcox Playa/Lake Cochise Important Bird Area (~200 acres).
All Wildlife	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**

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Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

			Local Alternative Segments								
Route Group 2	**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Paleontological Resources	Potential to disturb high sensitivity geological units in segment P5b only. **Impact Intensity: Minor**	Potential to disturb high sensitivity geological units considered to have "high potential" in segment E only on approximately 16 acres near Lordsburg Playa. **Impact Intensity: Minor**	No key issues for paleontological resources. **Impact Intensity: No impact**	No key issues for paleontological resources. **Impact Intensity: No impact**	Potential to disturb high sensitivity geological units considered to have "high potential" on approximately 40 acres near Lordsburg Playa. **Impact Intensity: Minor**	No key issues for paleontological resources. **Impact Intensity: No impact**	Same as segment L3b	Same as segment L3b	Same as segment L3b	Same as segment L3b	Same as LD3a. No key impacts for P7, LD4, and LD4-Option 5. **Impact Intensity: Minor**
Visual Resources	Crosses primarily Class B and C scenery. There are moderately sensitive viewers from the Peloncillo Mountains, Dos Cabezas Wilderness, Fort Bowie, and the Willcox Playa. There would be moderate impacts to viewers where there are unobstructed views of new structures. Crosses VRM Classes III and IV near Lordsburg Playa and VRM Class IV near Willcox Playa. **Impact Intensity: Moderate**	Crosses primarily Class B and C scenery. Because dispersed recreation viewers would have views of the segments where they are adjacent to existing transmission facilities, impacts to viewers from the Willcox Playa are expected to be low. Crosses VRM Classes III and IV near Lordsburg Playa. **Impact Intensity: Minor**	Local alternative segments cross Class B and C scenery. There are high sensitivity views of the local alternative segments from I-10. Where local alternative segments follow existing transmission lines, there would be low to moderate impacts to scenic quality. **Impact Intensity: Moderate to Major**	Same as segment LD1. Crosses VRM Class II on 3.1 miles near Lordsburg Playa.	Same as segment LD1. Crosses VRM Classes II, III, and IV near Lordsburg Playa.	Same as segment LD1. Crosses VRM Class IV near Lordsburg Playa.	Same as segment LD1.	Same as segment LD1.	Same as segment LD1.	Same as segment LD1.	Crosses primarily Class B and C scenery. There are low to moderate impacts to unobstructed views of new structures within Class B lands near the Willcox Playa. The portion of LD3a crossing VRM Class II is not included in the Agency Preferred Alternative. **Impact Intensity: Low to Moderate**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

			Local Alternative Segments								
Route Group 2	**Subroute 2.1 - Proponent Preferred**	**Subroute 2.2 - Proponent Alternative**	**LD1**	**LD2**	**LD3a**	**LD3b**	**LD4**	**LD4-Option 4**	**LD4-Option 5**	**WC1**	**Agency Preferred Alternative**
Land Use, Including Farm and Range Resources and Military Operations	- Occurs within existing ROWs. - Crosses CDNST corridor designated as an avoidance area. - Crosses bighorn sheep habitat designated as an avoidance area. - Crosses military training routes (MTRs) VR-259 and VR-260. - No significant impacts to farmlands or rangelands. - Parallels existing SWTC 230 kV. - Crosses MTRs VR-260 and VR-267. - Would be farthest away from the BSETR. - Runs parallel to existing linear features for approximately 78 miles (82%) of the ROW. - Near Willcox Playa, 100% of segment P7 parallels existing linear features. **Impact Intensity: Minor**	- Occurs within existing ROWs. - Crosses CDNST corridor designated as an avoidance area. - Crosses bighorn sheep habitat designated as an avoidance area. - No significant impacts to farmlands or rangelands. - Crosses MTR VR-267. - Runs parallel to existing linear features for approximately 26 miles (28%) of the ROW. - Near Willcox Playa, 51% of segment Ga parallels existing linear features. - Subroute closer to military testing areas. **Impact Intensity: Minor**	- Does not occur within existing ROWs or along existing corridors. - Crosses bighorn sheep habitat designated as an avoidance area. - Would result in a 29% impact to farmlands of statewide and unique importance. - No significant impacts to rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - Crosses Butterfield Trail corridor designated as an avoidance area. Would result in a significant (67%) impact to farmlands of statewide importance. - No significant impacts to rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - Crosses Butterfield Trail corridor designated as an avoidance area. - Crosses MTR VR-1233. - Would result in a 22% impact to farmlands of statewide importance. - No significant impacts to rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - Crosses MTR VR-1233. - Would result in a 21.7% impact to farmlands of statewide importance. - No significant impacts to rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - Occurs within the Morenci Military Operations Area. - No significant impacts to statewide or unique farmlands, or rangelands. - Would parallel proposed SunZia transmission line for entire length of local alternative. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - No significant impacts to statewide or unique farmlands, or rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors - No significant impacts to statewide or unique farmlands, or rangelands. **Impact Intensity: Moderate**	- Does not occur within existing ROWs or along existing corridors. - No significant impacts to statewide or unique farmlands, or rangelands. Would roughly parallel I-10. **Impact Intensity: Moderate**	- Occurs within existing ROWs as well as outside existing ROWs or existing corridors. - Crosses MTRs VR-260, VR-263, and VR-1233. - No significant impacts to farmlands or rangelands. - Would be farthest away from the BSETR. - Parallels existing linear features for approximately 78 miles (82%) of the ROW. - Near Willcox Playa, 100% of segment P7 parallels existing linear features. **Impact Intensity: Moderate** **Farm and Range** - 152 acres of farmland of statewide importance, 160 acres of prime farmland (irrigated), and 51 acres of prime farmland (other) would be temporarily impacted during construction. - No significant impacts to rangelands are expected to occur. **Impact Intensity: Minor**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2	Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments: LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	Agency Preferred Alternative
Special Designations	- Crosses CDNST once. - Crosses Butterfield Trail four times. - Segment P7 is adjacent to the Willcox Playa Wildlife Area. - Segment P7 would cross the Willcox Playa/Lake Cochise Important Bird Area (~200 acres). **Impact Intensity: Minor**	- Crosses CDNST once. - Crosses Butterfield Trail once near Lordsburg Playa. - Adjacent to the Willcox Playa National Natural Landmark (NNL) Area of Critical Environmental Concern (ACEC). - Adjacent to the Willcox Playa NNL ACEC. **Impact Intensity: Minor**	Crosses Butterfield Trail once near Lordsburg Playa. **Impact Intensity: Minor**	Crosses Butterfield Trail once near Lordsburg Playa. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Crosses Butterfield Trail once near Lordsburg Playa. **Impact Intensity: Minor**	No impact. **Intensity: No impact**	Same as segment LD4	Same as segment LD4	Same as segment LD4. Would cross the Willcox Playa/Lake Cochise Important Bird Area (~2 acres).	Segment P7 is adjacent to the Willcox Playa Wildlife Area and would cross the Willcox Playa/Lake Cochise Important Bird Area. **Impact Intensity: Minor**
Wilderness Characteristics	Crosses 3 Wilderness Inventory Units (WIUs) for a total of 10 miles. Crosses 4.3 miles of 2 WIUs near Lordsburg Playa. **Impact Intensity: Minor**	Crosses 3 WIUs for a total of 12 miles Crosses 7.4 miles of 2 WIUs near Lordsburg Playa. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Crosses 1 WIU for a total of 4 miles near Lordsburg Playa. **Impact Intensity: Minor**	Crosses 1 WIU for a total of 0.1 mile near Lordsburg Playa. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Same as LD3b	Same as LD3b	Same as LD3b	Same as LD3b	No impact. **Impact Intensity: No impact**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2	Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments								Agency Preferred Alternative
			LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	
Recreation	Adjacent to Willcox Playa/Lake Cochise Important Bird Area, Willcox Wildlife Area, and Willcox Playa NNL ACEC; however, would follow existing ROWs. Would cross Game Management Unit (GMU) 27 near Lordsburg Playa and GMUs 30A and 30B near Willcox Playa. **Impact Intensity: Minor**	Same as subroute 2.1. Would cross GMUs 27 and 28 near Lordsburg Playa.	Same as subroute 2.1	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. Would cross GMU 27 near Lordsburg Playa. **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. Would cross GMU 27 near Lordsburg Playa. **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. Would cross GMU 27 near Lordsburg Playa. **Impact Intensity: Minor**	Crosses State recreation area in the Peloncillo Mountains. Adjacent to Hot Wells Dunes Special Recreation Management Area (SRMA). **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. **Impact Intensity: Minor**	Crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. Would cross GMU 30 near Willcox Playa. **Impact Intensity: Minor**	LD3a crosses lands available for dispersed recreation that are not along existing ROWs or transportation corridors. Crosses GMU 27 near Lordsburg Playa. Adjacent to Willcox Playa/Lake Cochise Important Bird Area, Willcox Wildlife Area, and Willcox Playa NNL ACEC; however, would follow existing ROWs in these areas. Crosses State recreation area in the Peloncillo Mountains. Adjacent to Hot Wells Dunes SRMA. **Impact Intensity: Minor**

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2	Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments								Agency Preferred Alternative
			LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	
Socioeconomics and Environmental Justice	Project would directly and indirectly support an estimated 235 local jobs, along with 246 non-local workers, in the New Build Section during 2-year construction period. Corresponding increases in labor income, output, and tax revenues. Construction could create short-term shortages of temporary housing, and short-term increases in the demand for local services, in the more remote western portion of the New Build Section. Ongoing operations could benefit local communities through increased property tax revenues and improved electrical capacity to serve future growth. Multiple low-income and minority populations in the study area may be disproportionately negatively affected by localized construction and operation impacts. Given the prevalence of low-income and minority populations throughout the area, disproportionate impacts on low-income and minority populations are likely inevitable under any feasible transmission route. **Impact Intensity: Minor**	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1

Table 2-12. Comparison Summary for Subroute 2: Hidalgo Substation to Apache Substation (Continued)

Route Group 2	Subroute 2.1 - Proponent Preferred	Subroute 2.2 - Proponent Alternative	Local Alternative Segments								Agency Preferred Alternative
			LD1	LD2	LD3a	LD3b	LD4	LD4-Option 4	LD4-Option 5	WC1	
Public Health and Safety	Increased potential for occupational safety hazards to occur. Increased potential for fire hazards to occur. Increased potential for public exposure to electromagnetic fields. **Impact Intensity: Minor**	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1
Hazardous Materials and Hazardous and Solid Waste	No impacts. **Impact Intensity: No impact**	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1
Transportation	Temporary short-term increase in traffic on primary roadways during construction. Approximately 44 miles of access road type C near Lordsburg Playa and 0.5 mile of access road type B plus 22 miles of type C near Willcox Playa. **Impact Intensity: Minor**	Same as subroute 2.1. Approximately 44 miles of access road type C near Lordsburg Playa and 0.5 mile of access road type B plus 22 miles of type C near Willcox Playa.	Same as subroute 2.1. Approximately 11 miles of access road type C and 19 miles of type D near Lordsburg Playa.	Same as subroute 2.1. Approximately 10 miles of access road type D near Lordsburg Playa.	Same as subroute 2.1. Approximately 9 miles of access road type B, 17 miles of type C, and 3 miles of type D near Lordsburg Playa.	Same as subroute 2.1. Approximately 2 miles of access road type B near Lordsburg Playa.	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1. Approximately 2 miles of access road type C, and 13 miles of type D near Willcox Playa.	Same as subroute 2.1.
Intentional Acts of Destruction	Increase in potential targets for acts of sabotage or terrorism. Decrease in the potential for acts of sabotage or terrorism to cause service disruption and/or potential reduction in duration of service disruption. **Impact Intensity: No impact**	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1	Same as subroute 2.1

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation

Route Group 3			Subroute 3.1 - Proponent Preferred (Upgrade)	Local Alternative Segments: H	Agency Preferred Alternative
Subroute Length (miles)			70.3	19.3	70.3
Land Ownership (miles crossed)	BLM		0.6	0.0	0.6
	Bureau of Indian Affairs		2.9	0.0	2.9
	DOD		0.0	0.0	0.0
	Coronado National Forest		0.5	0.0	0.5
	Reclamation		0.2	0.0	0.2
	State		35.7	15.3	35.7
	County		0.0	0.0	0.0
	Private		30.5	4.0	30.5
Ground Disturbance	Temporary	Acres	438.7	98.4	438.7
		Acres/Mile	6.2	5.1	6.2
	Permanent	Acres	72.7	28.4	72.7
		Acres/Mile	1.0	1.5	1.0
BLM RMP Conformance	VRM	Acres crossing Class II Lands	None	None	None
	ROW Avoidance Areas		No impact	No impact	No impact
	Plan Conformance		No conflict	No conflict	No conflict
Air Quality			Fugitive dust and equipment emissions would occur under all subroutes and alternatives; emissions would be relative to the length of the subroute and alternative(s) chosen. Does not traverse any nonattainment or maintenance areas. **Impact Intensity: Minor**	Same as subroute 3.1	Same as subroute 3.1

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

Route Group 3	Subroute 3.1 - Proponent Preferred (Upgrade)	Local Alternative Segments H	Agency Preferred Alternative
Noise and Vibration	More than 100 noise sensitive receptors (NSRs) exist along this subroute around the cities of Benson and Tucson, Arizona. The nearest NSRs in both cities are within 50 feet of the ROW. Few NSRs exist along this subroute outside the cities. **Impact Intensity: Major but Temporary**	This alternative avoids the city of Benson, Arizona, and so has considerably fewer NSRs than the subroute it is substituting for. Approximately 20 NSRs are added from this alternative, however. The nearest NSR to this alternative would be approximately 400 feet. **Impact Intensity: Major but Temporary**	Same as subroute 3.1
Geology and Mineral Resources	Geology: No impacts. Mineral Resources: No impacts. **Impact Intensity: No impact**	Same as subroute 3.1	Same as subroute 3.1
Soil Resources	Wind erosive soils in both segments and alternatives in route group 3. **Impact Intensity: Minor**	same as subroute 3.1	same as subroute 3.1
Cultural Resources	Potential direct/visual impact to the Butterfield Trail, the Mormon Battalion Trail, and the Zuñiga Route, as well as 3 listed historic properties: AZ BB:13:315(ASM); the Valencia Site; and the Empirita Ranch. Potential direct disturbance to 2 NRHP-eligible resources and 8 forecast NRHP-eligible resources. However, route is an existing transmission line meaning reduced ground disturbance. **Impact Intensity: Minor**	Potential direct/visual impact to the Trail, the Mormon Battalion Trail, and the Zuñiga Route. Potential direct disturbance to 2 NRHP-eligible resources and 6 forecast NRHP-eligible resources. **Impact Intensity: Moderate**	Same as subroute 3.1. **Impact Intensity: Minor**

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

Route Group 3		Subroute 3.1 - Proponent Preferred (Upgrade)	Local Alternative Segments H	Agency Preferred Alternative
Groundwater, Surface Water, and Wetlands		7 WUS 2 wetlands 36 acres of floodplains San Pedro River and Cienega Creek special considerations **Impact Intensity: No impact**	2 WUS 1 wetland 48 acres of floodplains San Pedro River special considerations **Impact Intensity: No impact**	7 WUS 2 wetlands 36 acres of floodplains San Pedro River and Cienega Creek special considerations **Impact Intensity: No Impact**
Biological Resources (Vegetation)		The Huachuca water umbel (*Lilaeopsis schaggneriana* var. *recurva*), listed as endangered under the ESA, has some potential to be present on segment U2. Sensitive species—broadleaf ground cherry (*Physalis latiphysa*), button cactus, devilthorn hedgehog cactus, magenta-flowered hedgehog cactus (*Echinocereus fasciculatus*), giant sedge (*Carex ultra* var. *spissa*), littleleaf false tamarind (*Lysiloma watsonii*), needle-spined pineapple cactus, San Carlos wild-buckwheat, San Pedro River wild-buckwheat (*Eriogonum terrenatum*), varied fishhook cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	The Huachuca water umbel, listed as endangered under the ESA, has some potential to be present. Sensitive species—giant sedge, littleleaf false tamarind, needle-spined pineapple cactus, San Carlos wild-buckwheat, San Pedro River wild buckwheat, varied fishhook cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**	The Huachuca water umbel, listed as endangered under the ESA, has some potential to be present on segment U2. Sensitive species—broadleaf ground cherry, button cactus, devilthorn hedgehog cactus, magenta-flowered hedgehog cactus, giant sedge, littleleaf false tamarind, needle-spined pineapple cactus, San Carlos wild-buckwheat, San Pedro River wild buckwheat, varied fishhook cactus, and Wilcox pincushion cactus—have potential to occur. **Impact Intensity: Minor**
Biological Resources (Wildlife)	General Wildlife	Disturbance to wildlife habitat on 376 acres.	Disturbance to wildlife habitat on 98 acres.	Disturbance to wildlife habitat on 376 acres.

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

Route Group 3		Subroute 3.1 - Proponent Preferred (Upgrade)	Local Alternative Segments: H	Agency Preferred Alternative
	Federally Listed Species	Disturbance to 50 acres of Sprague's pipit habitat. Would cross northern Mexican gartersnake proposed critical habitat at Cienega Creek and San Pedro River. Siting of transmission line structure to avoid disturbance to critical habitat would minimize impacts. Disturbance to 323 acres of lesser long-nosed bat habitat. Disturbance to 251 acres of Sonoran desert tortoise habitat. No habitat disturbed for southwestern willow flycatcher and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Indirect impacts only.	Disturbance to 18 acres of Sprague's pipit habitat. Would cross northern Mexican gartersnake proposed critical habitat at the San Pedro River. Siting of transmission line structure to avoid disturbance to critical habitat would minimize impacts. Disturbance to 77acres of Sonoran desert tortoise habitat. Disturbance to 95 acres of lesser long-nosed bat habitat.	Disturbance to 50 acres of Sprague's pipit habitat. Would cross northern Mexican gartersnake proposed critical habitat at Cienega Creek and San Pedro River. Siting of transmission line structure to avoid disturbance to critical habitat would minimize impacts. Disturbance to 323 acres of lesser long-nosed bat habitat. Disturbance to 251 acres of Sonoran desert tortoise habitat. No habitat disturbed for southwestern willow flycatcher and western yellow-billed cuckoo. Indirect impacts only.
	BLM Sensitive Species	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 14 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.
	Coronado National Forest Sensitive Species	Disturbance to habitat for 11 Coronado National Forest Sensitive Species.	This local alternative does not intersect the Coronado National Forest.	Disturbance to habitat for 11 Coronado National Forest Sensitive Species.
	Coronado National Forest Management Indicator Species	Disturbance to habitat for 3 Coronado National Forest Management Indicator Species.	This local alternative does not intersect the Coronado National Forest.	Disturbance to habitat for 3 Coronado National Forest Management Indicator Species.
	Arizona Wildlife Species of Concern	Disturbance to habitat for 14 Arizona Wildlife Species of Concern.	Disturbance to habitat for 14 Arizona Wildlife Species of Concern.	Disturbance to habitat for 14 Arizona Wildlife Species of Concern.
	Arizona Species of Greatest Conservation Need	Disturbance to habitat for 5 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 5 Arizona Species of Greatest Conservation Need.

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

Route Group 3			Local Alternative Segments	
		Subroute 3.1 - Proponent Preferred (Upgrade)	**H**	**Agency Preferred Alternative**
	Migratory Birds	Disturbance to migratory bird habitat on 376 acres.	Disturbance to migratory bird habitat on 98 acres.	Disturbance to migratory bird habitat on 376 acres.
	Wildlife Special Designation Areas	Disturbance to Pima County Biological Core Management Areas (88 acres), Important Riparian Areas (4 acres), and Multiple Use Management Areas (12 acres). Disturbance to Pima County Priority Conservation Areas for rufous-winged sparrow (*Aimophila carpalis*) (38.4 acres) and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) (97.8 acres). Disturbance to Las Cienegas National Conservation Area (26 acres) and Bar V Ranch (42 acres). Disturbance to the Galiuro-Winchester-Dragoon PLZ and the Rincons-Whetstone-Santa Rita linkages (100 acres).	Disturbance to Pima County Biological Core Management Areas (13 acres) and Important Riparian Areas (0.4 acre). Disturbance to the Galiuro-Winchester-Dragoon PLZ and the Rincons-Whetstone-Santa Rita linkages (24 acres).	Disturbance to Pima County Biological Core Management Areas (88 acres), Important Riparian Areas (4 acres), and Multiple Use Management Areas (12 acres). Disturbance to Pima County Priority Conservation Areas for rufous-winged sparrow (38.4 acres) and Pima pineapple cactus (97.8 acres). Disturbance to Las Cienegas National Conservation Area (26 acres) and Bar V Ranch (42 acres). Disturbance to the Galiuro-Winchester-Dragoon PLZ and the Rincons-Whetstone-Santa Rita linkages (100 acres).
	All Wildlife	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**
Paleontological Resources		Potential to disturb moderately sensitive geological units in segment U2 only. **Impact Intensity: Minor**	No key issues for paleontological resources. **Impact Intensity: No Impact**	Same as subroute 3.1 **Impact Intensity: Minor**

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

		Local Alternative Segments	
Route Group 3	**Subroute 3.1 - Proponent Preferred (Upgrade)**	**H**	**Agency Preferred Alternative**
Visual Resources	Crosses primarily Class B scenery (93%). There are high sensitivity viewers from the Willcox Playa. There would be low to moderate impacts where there is some existing construction access and with the replacement of existing transmission line. There are no BLM lands along subroute 3.1. **Impact Intensity: Moderate**	Crosses primarily Class B scenery. Avoids the communities of Pomerene and Mescal and the city of Benson. Requires construction of a new transmission line parallel to an existing H-frame transmission line. Impacts to viewers would be low because the replacement structures would be similar to existing landscape. There are no BLM lands for segment H. **Impact Intensity: Minor**	Crosses primarily Class B scenery (93%). There are high sensitivity viewers from the Willcox Playa. There would be low to moderate impacts where there is some existing construction access and with the replacement of existing transmission line. There are no BLM lands along this portion of the Agency Preferred Alternative. **Impact Intensity: Moderate**
Land Use, Including Farm and Range Resources and Military Operations	Occurs within existing utility corridors. Occurs within the BSETR. No significant impacts to statewide or unique farmlands, or rangelands. Runs parallel to existing linear features for approximately 70 miles (100%) of the ROW. **Impact Intensity: Minor**	Occurs within existing utility corridors. Occurs within the BSETR. No significant impacts to statewide or unique farmlands, or rangelands. Runs parallel to existing linear features for approximately 19 miles (100%) of the ROW. **Impact Intensity: Minor**	Occurs within existing utility corridors. Occurs within the BSETR but would be located along the I-10 corridor, which is not actively used for military operations. 58 acres of prime farmland (irrigated) and 94 acres of prime farmland (other) would be temporarily impacted during construction. No significant impacts to rangelands are expected to occur. **Impact Intensity: Minor**
Special Designations	Crosses Butterfield Trail three times. **Impact Intensity: Minor**	Crosses Butterfield Trail twice. **Impact Intensity: Minor**	Crosses Butterfield Trail three times. **Impact Intensity: Minor**
Wilderness Characteristics	No impact **Impact Intensity: No impact**	No impact **Impact Intensity: No impact**	No impact **Impact Intensity: No impact**
Recreation	Crosses Butterfield Trail three times. **Impact Intensity: Minor**	Crosses Butterfield Trail twice. **Impact Intensity: Minor**	Crosses Butterfield Trail three times. **Impact Intensity: Minor**

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

		Local Alternative Segments	
Route Group 3	**Subroute 3.1 - Proponent Preferred (Upgrade)**	**H**	**Agency Preferred Alternative**
Socioeconomics and Environmental Justice	Project would directly and indirectly support an estimated 138 local jobs, along with 132 non-local workers, in the Upgrade Section during 2-year construction period. Corresponding increases in labor income, output, and tax revenues. Construction could create short-term shortages of temporary housing, and short-term increases in the demand for local services, in the more remote eastern portion of the Upgrade Section. Ongoing operations could benefit local communities through increased property tax revenues and improved electrical capacity to serve future growth. Multiple low-income and minority populations in the study area may be disproportionately negatively affected by localized construction and operation impacts. Given the prevalence of low-income and minority populations throughout the area, disproportionate impacts on low-income and minority populations are likely inevitable under any feasible transmission route. **Impact Intensity: Minor**	Same as subroute 3.1	Same as subroute 3.1

Table 2-13. Comparison Summary for Subroute 3: Apache Substation to Pantano Substation (Continued)

Route Group 3	Subroute 3.1 - Proponent Preferred (Upgrade)	Local Alternative Segments: H	Agency Preferred Alternative
Public Health and Safety	Increased potential for occupational safety hazards to occur. Increased potential for fire hazards to occur. Increased potential for public exposure to electromagnetic fields. **Impact Intensity: Minor**	Increased potential for occupational safety hazards to occur. Increased potential for fire hazards to occur. Increased potential for public exposure to electromagnetic fields. **Impact Intensity: Minor**	Same as subroute 3.1
Hazardous Materials and Hazardous and Solid Waste	No impacts. **Impact Intensity: No impact**	Same as subroute 3.1	Same as subroute 3.1
Transportation	Temporary short-term increase in traffic on primary roadways during construction. **Impact Intensity: Minor**	Temporary short-term increase in traffic on primary roadways during construction. **Impact Intensity: Minor**	Same as subroute 3.1
Intentional Acts of Destruction	Increase in potential targets for acts of sabotage or terrorism. Decrease in the potential for acts of sabotage or terrorism to cause service disruption and/or potential reduction in duration of service disruption. **Impact Intensity: No impact**	Increase in potential targets for acts of sabotage or terrorism. Decrease in the potential for acts of sabotage or terrorism to cause service disruption and/or potential reduction in duration of service disruption. **Impact Intensity: No impact**	Same as subroute 3.1

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation

Route Group 4			Subroute 4.1 - Proponent Preferred (Upgrade)	Local Alternative Segments										Agency Preferred Alternative
				MA1	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	
Subroute Length (miles)			48.3	1.1	1.4	1.6	0.3	1.0	0.8	0.8	1.8	2.7	4.5	49.3
Land Ownership (miles crossed)	BLM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bureau of Indian Affairs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Coronado National Forest		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Reclamation		0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	State		18.0	1.1	0.2	0.2	0.0	0.7	0.0	0.0	0.0	0.0	0.0	18.9
	County		0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	Private		29.6	0.0	1.2	1.4	0.3	0.3	0.8	0.8	1.8	2.7	4.5	29.8
Ground Disturbance	Temporary	Acres	340.2	5.6	7.2	8.0	1.7	5.0	4.2	4.2	9.2	13.9	23.0	405.6
		Acres/Mile	7.0	5.1	5.1	5.0	5.7	5.0	5.3	5.3	5.1	5.1	5.1	8.2
	Permanent	Acres	79.0	0.3	0.3	0.6	0.1	0.2	0.9	0.6	2.6	02.7	3.3	78
		Acres/Mile	1.6	0.3	0.2	0.4	0.3	0.2	1.1	0.8	1.4	1.0	0.7	1.6
BLM RMP Conformance	VRM	Acres crossing Class II Lands	None	None	None	None	None	None	None	None	None	None	None	None
	ROW Avoidance Areas		No impact											No impact
	Plan Conformance		No conflict											No conflict
Air Quality			Fugitive dust and equipment emissions would occur under all subroutes and alternatives; emissions would be relative to the length of the subroute and alternative(s) chosen. The subroute and all the alternatives would traverse the Tucson carbon monoxide maintenance area and the Rillito particulate matter 10 non-attainment area. **Impact Intensity: Minor**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

Route Group 4	Subroute 4.1 - Proponent Preferred (Upgrade)	Local Alternative Segments										Agency Preferred Alternative
		MA1	TH1a	TH1b	TH1c	TH1-Option	TH3-Option A	TH3-Option B	TH3-Option C	TH3a	TH3b	
Noise and Vibration	More than 100 noise sensitive receptors (NSRs) exist along this subroute, particularly around Tucson. The nearest NSRs are within 50 feet of the ROW. The local alternatives still occur within the city of Tucson; therefore, they have little net impact on the quantity or proximity of NSRs to the ROW. **Impact Intensity: Major but Temporary**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Geology and Mineral Resources	Geology: No impact. Mineral Resources: No impact. **Impact Intensity: No impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Soil Resources	No key issues with soil resources in route group 4. **Impact Intensity: No Impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

		Local Alternative Segments										
Route Group 4	**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Cultural Resources	Potential direct/visual impact to Tumamoc Hill Archaeological District and Desert Laboratory NHL, the Anza Trail, the Butterfield Trail, and the Mormon Battalion Trail. Potential direct impacts to the Los Robles Archaeological District (NRHP-listed), 16 NRHP-eligible resources, and 66 forecast NRHP-eligible resources. However, route is an existing transmission line, meaning reduced ground disturbance. **Impact Intensity: Moderate**	No key issues for cultural resources. **Impact Intensity: No impact**	Potential direct/visual impact to Tumamoc Hill Archaeological District and Desert Laboratory NHL. Potential direct impact to 2 forecast NRHP-eligible resources. **Impact Intensity: Moderate**	Potential direct/visual impact to Tumamoc Hill Archaeological District and Desert Laboratory NHL **Impact Intensity: Moderate**	Potential direct/visual impact to the Mormon Battalion Trail. Potential direct impact to 1 eligible resource. **Impact Intensity: Minor**	Potential direct/visual impact to Tumamoc Hill Archaeological District and Desert Laboratory NHL. **Impact Intensity: Moderate**	Potential direct impact to 1 NRHP-eligible resource and 3 forecast NRHP-eligible resources. **Impact Intensity: Minor**	Potential visual impact to the Anza Trail. **Impact Intensity: Minor**	Potential direct/visual impact to the Zuñiga Route. Potential direct impact to 1 NRHP-eligible resource and 17 forecast NRHP-eligible resources. **Impact Intensity: Moderate**	Potential direct/visual impact to the Zuñiga Route. Potential direct impact to 1 NRHP-eligible resource and 7 forecast NRHP-eligible resources. **Impact Intensity: Minor**	Potential direct/visual impact to the Anza Trail. Potential direct/visual impacts to the Butterfield Trail. Potential direct impact to 3 eligible resources and 16 forecast eligible resources. **Impact Intensity: Moderate**	Potential direct/visual impact to Tumamoc Hill Archaeological District and Desert Laboratory NHL, the Anza Trail, and the Butterfield Trail. Potential direct impacts to the Los Robles Archaeological District (NRHP-listed), 15 NRHP-eligible resources, and 58 forecast NRHP-eligible resources. However, route is an existing transmission line, meaning reduced ground disturbance. **Impact Intensity: Moderate**
Groundwater, Surface Water, and Wetlands	6 WUS 4 wetlands 275 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 19 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 3 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 0 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands <1 acres of floodplains **Impact Intensity: No impact**	0 WUS 0 wetlands 2 acres of floodplains **Impact Intensity: No Impact**	1 WUS 1 wetland 3 acres of floodplains **Impact Intensity: No impact**	1 WUS 0 wetlands 14 acres of floodplains **Impact Intensity: No impact**	2 WUS 1 wetland 11 acres of floodplains **Impact Intensity: No impact**	1 WUS 1 wetland 4 acres of floodplains **Impact Intensity: No impact**	1 WUS 2 wetlands 47 acres of floodplains **Impact Intensity: Minor to Moderate**	5 WUS 4 wetlands 275 acres of floodplains **Impact Intensity: No impact**

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

Route Group 4	Subroute 4.1 - Proponent Preferred (Upgrade)	Local Alternative Segments										Agency Preferred Alternative
		MA1	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	
Biological Resources (Vegetation)	The Pima pineapple cactus, listed as endangered under the ESA, has potential to be present on the southern parts of segments U3 and U4. The Huachuca water umbel, listed as endangered under the ESA, has some potential to be present in segment U3. Sensitive species—desert barrel cactus (*Ferocactus cylindraceus*), Engelmann prickly pear (*Opuntia engelmannii* var. *flavispina*), giant sedge, littleleaf false tamarind (*Lysiloma watsonii*), magenta-flowered hedgehog cactus, needle-spined pineapple cactus, night-blooming cereus, Pima Indian mallow (*Abutilon parishii*), San Carlos wild-buckwheat, San Pedro River wild-buckwheat, staghorn cholla (*Cylindropuntia versicolor*), Thornber's fishhook cactus (*Mammillaria thornberi*), Tumamoc globeberry (*Tumamoca macdougalii*), varied fishhook cactus, and hybrid Kelvin cholla (*Opuntia kelvinensis*)—have potential to occur. Buffelgrass (*Opuntia kelvinensis*) is known to be present in segment U3, and likely to occur in segment U4. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. Field bindweed (*Convolvulus arvensis*) and hydrilla (*Hydrilla verticillata*) could be present in TH3a. **Impact Intensity: Minor**	No ESA-listed species occur in this segment. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in this segment. **Impact Intensity: Minor**	The Pima pineapple cactus, listed as endangered under the ESA, has potential to be present on the southern parts of segments U3 and U4. The Huachuca water umbel, listed as endangered under the ESA, has some potential to be present in segment U3. Sensitive species—magenta-flowered hedgehog cactus, night-blooming cereus, Pima Indian mallow, staghorn cholla, Tumamoc globeberry, and hybrid Kelvin cholla—have potential to occur. Buffelgrass is known to occur in segment U3 and likely to occur in segment U4. **Impact Intensity: Minor**

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

			Local Alternative Segments										
Route Group 4		**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Biological Resources (Wildlife)	General Wildlife	Disturbance to wildlife habitat on 622 acres.	Disturbance to wildlife habitat on 5 acres.	Disturbance to wildlife habitat on 7 acres.	Disturbance to wildlife habitat on 8 acres.	Disturbance to wildlife habitat on 1 acre.	Disturbance to wildlife habitat on 4 acres.	Disturbance to wildlife habitat on 4 acres.	Disturbance to wildlife habitat on 4 acres.	Disturbance to wildlife habitat on 8 acres.	Disturbance to wildlife habitat on 14 acres.	Disturbance to wildlife habitat on 23 acres.	Disturbance to wildlife habitat on 238 acres.
	Federally Listed Species	Disturbance to 263acres of lesser long-nosed bat habitat. Disturbance to 183 acres of Sonoran desert tortoise habitat. No habitat disturbed for southwestern willow flycatcher and western yellow-billed cuckoo. Indirect impacts only.	This local alternative occurs in an agricultural area. No impacts on Federally Listed Species.	Disturbance to 7 acres of lesser long-nosed bat habitat and Sonoran desert tortoise habitat.	Disturbance to 8 acres of lesser long-nosed bat habitat and 5 acres of Sonoran desert tortoise habitat.	This local alternative occurs in a developed area. Disturbance to 1.1 acres of lesser long-nosed bat habitat.	Disturbance to 4 acres of lesser long-nosed bat habitat and Sonoran desert tortoise habitat.	Disturbance to 4 acres of lesser long-nosed bat habitat and Sonoran desert tortoise habitat.	Disturbance to 4 acres of lesser long-nosed bat habitat and Sonoran desert tortoise habitat.	Disturbance to 8 acres of lesser long-nosed bat habitat and Sonoran desert tortoise habitat.	Disturbance to 14 acres of lesser long-nosed bat habitat and 8 acres of Sonoran desert tortoise habitat.	Disturbance to 23 acres of lesser long-nosed bat habitat and 2 acres of Sonoran desert tortoise habitat.	Disturbance to 216 acres of lesser long-nosed bat habitat. Disturbance to 144 acres of Sonoran desert tortoise habitat. Disturbance to 8 acres of Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) habitat. No habitat disturbed for southwestern willow flycatcher and western yellow-billed cuckoo. Indirect impacts only.
	BLM Sensitive Species	Disturbance to habitat for 23 BLM Sensitive Species.	This local alternative occurs in an agricultural area. No impacts on BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	This local alternative occurs in a developed area. No impacts on BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 20 BLM Sensitive Species.	Disturbance to habitat for 23 BLM Sensitive Species.
	Arizona Wildlife Species of Concern	Disturbance to habitat for 25 Arizona Wildlife Species of Concern.	Disturbance to habitat for 1 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	This local alternative occurs in a developed area. No impacts on Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 20 Arizona Wildlife Species of Concern.	Disturbance to habitat for 25 Arizona Wildlife Species of Concern.
	Arizona Species of Greatest Conservation Need	Disturbance to habitat for 17 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	This local alternative occurs in a developed area. No impacts on Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 3 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 2 Arizona Species of Greatest Conservation Need.	Disturbance to habitat for 17 Arizona Species of Greatest Conservation Need.
	Pima County Species	Disturbance to habitat for 15 Pima County Species.	Disturbance to habitat for 1 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	This local alternative occurs in a developed area. No impacts on Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 2 Pima County Species.	Disturbance to habitat for 15 Pima County Species.

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

Route Group 4		Subroute 4.1 - Proponent Preferred (Upgrade)	Local Alternative Segments										Agency Preferred Alternative
			MA1	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	
	Migratory Birds	Disturbance to migratory bird habitat on 622 acres. Near an unnamed ridge near Ajo Way and Rattlesnake Pass in the Tucson Mountains.	Disturbance to migratory bird habitat on 5 acres.	Disturbance to migratory bird habitat on 7 acres.	Disturbance to migratory bird habitat on 8 acres.	Disturbance to migratory bird habitat on 1 acre.	Disturbance to migratory bird habitat on 4 acres.	Disturbance to migratory bird habitat on 4 acres.	Disturbance to migratory bird habitat on 4 acres.	Disturbance to migratory bird habitat on 8 acres.	Disturbance to migratory bird habitat on 13 acres.	Disturbance to migratory bird habitat on 23 acres.	Disturbance to migratory bird habitat on 238 acres. Near an unnamed ridge near Ajo Way and Rattlesnake Pass in the Tucson Mountains.
	Wildlife Special Designation Areas	Disturbance to Pima County Biological Core Management Areas (5 acres), Important Riparian Areas (27 acres), and Agricultural Inholdings (17 acres). Disturbance to Pima County Priority Conservation Areas for western burrowing owl (*Athene cunicularia hypugaea*) (216.5 acres), cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*) (93.9 acres), rufous-winged sparrow (38.4 acres), and Pima pineapple cactus (25.9 acres). Disturbance to Tumamoc Hill on 4 acres and Tucson Mountain Park on 2 acres.	No Wildlife Special Designation Areas would be crossed by this local alternative.	Disturbance to Pima County Multiple Use Management Areas on 7 acres. Disturbance to Tumamoc Hill on 6 acres.	Disturbance to Pima County Multiple Use Management Areas on 0.2 acre.	No Wildlife Special Designation Areas would be crossed by this local alternative.	No Wildlife Special Designation Areas would be crossed by this local alternative.	Disturbance to Pima County Important Riparian Areas (2 acres) and Multiple Use Management Areas (1 acre). Disturbance to the Santa Cruz River Park on 0.1 acre. Disturbance to Pima County western burrowing owl priority conservation areas on 4.2 acres.	Disturbance to less than 1 acre of Pima County Important Riparian Areas, Multiple Use Management Areas, and the Santa Cruz River Park. Disturbance to Pima County western burrowing owl priority conservation areas on 4.1 acres.	Disturbance to Pima County Important Riparian Areas (2 acres) and Multiple Use Management Areas (4 acres). Disturbance to the Santa Cruz River Park on 3 acres. Disturbance to Pima County western burrowing owl priority conservation areas on 8.2 acres.	Disturbance to Pima County Important Riparian Areas (2 acres) and Multiple Use Management Areas (less than 1 acre). Disturbance to Pima County western burrowing owl priority conservation areas on 13.9 acres.	Disturbance to the Santa Cruz River Park on 10 acres. Disturbance to Pima County western burrowing owl priority conservation areas on 22.8 acres.	Disturbance to Pima County Biological Core Management Areas (5 acres), Important Riparian Areas (27 acres), and Agricultural Inholdings (17 acres). Disturbance to Pima County Priority Conservation Areas for western burrowing owl (216.5 acres), cactus ferruginous pygmy owl (93.9 acres), rufous-winged sparrow (38.4 acres), and Pima pineapple cactus (25.9 acres). Disturbance to Tucson Mountain Park on 2 acres.
	All Wildlife	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**	**Impact Intensity: Minor**
Paleontological Resources		No key issues for paleontological resources. **Impact Intensity: No impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

		Local Alternative Segments										
Route Group 4	**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Visual Resources	Crosses primarily Class C scenery. There are sensitive viewers located at Sentinel Peak, along the Anza Trail, the Butterfield Trail, the Arizona Trail, at Saguaro National Park, and within pockets of urban recreational places, linear biking, and pedestrian trails. There would low to moderate impacts; the replacement structures and line would similar in form to the existing line, but would be taller. Although the structures would be taller, the increased height would barely be distinguishable viewed against the backdrop of the valley floor, surrounding development, and surrounding hills. **Impact Intensity: Moderate**	Crosses Class C landscape and has a sensitivity level of low to moderate, given the proximity to existing development and existing transmission line. Visual impact would be low. **Impact Intensity: Minor**	Visual impact is considered moderate to high in this area because of the increased scenic quality and visual sensitivity associated with Tumamoc Hill. **Impact Intensity: Moderate to Major**	Same as segment TH1a	Same as segment TH1a	Visual impact is considered moderate to high in this area because of the increased scenic quality and visual sensitivity associated with Tumamoc Hill. **Impact Intensity: Moderate to Major**	Crosses Class C scenery with low sensitivity because of its proximity to human-made development as well as being located within a corridor with existing lattice transmission line structure transmission lines. **Impact Intensity: Minor**	Same as segment TH3-Option A	Same as segment TH3-Option A	Crosses Class C scenery with low sensitivity given the location parallel to a major transportation corridor. **Impact Intensity: Minor**	Same as segment TH3a	TH1-TH1a: Visual impact is considered moderate to high in this area because of the increased scenic quality and visual sensitivity associated with Tumamoc Hill. Alternative is located outside BLM-administered land. **Impact Intensity: Moderate to Major** MA1: Crosses Class C landscape and has a sensitivity level of low to moderate, given the proximity to existing development and existing transmission line. Visual impact would be low. **Impact Intensity: Minor**

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

		Local Alternative Segments										
Route Group 4	**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Land Use, Including Farm and Range Resources and Military Operations	- Follows existing ROW. - Crosses Sonoita Valley Acquisition Planning District of Las Cienegas National Conservation Area. - No significant impacts to statewide or unique farmlands, or rangelands. - Runs parallel to existing linear features for approximately 48 miles (100%) of the ROW. **Impact Intensity: Minor**	No impacts to land use or military. No significant impacts to statewide or unique farmlands, or rangelands. **Impact Intensity: No impact**	Same as segment MA1	Same as segment MA1	Same as segment MA1	Same as segment MA1	Same as segment MA1	Same as segment MA1	Same as segment MA1	Same as segment MA1	- No impacts to land use or military. - Would result in a 30% impact to farmlands of unique importance. - No significant impacts to rangelands. **Impact Intensity: Minor**	- Follows existing ROW. Crosses Sonoita Valley Acquisition Planning District of Las Cienegas National Conservation Area. - No significant impacts to statewide or unique farmlands, or rangelands. - Parallels existing linear features for approximately 48 miles (100%) of the ROW. - 25 acres of farmland of unique importance, 275 acres of prime farmland (irrigated), and 147 acres of prime farmland (other) would be temporarily impacted during construction. - No significant impacts to rangelands are expected to occur. **Impact Intensity: Minor**

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

		Local Alternative Segments										
Route Group 4	**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Special Designations	Crosses Arizona Trail. Crosses Anza Trail six times. Crosses Butterfield Trail two times. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Crosses Anza Trail. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Same as segment TH1b	Same as segment TH1b	Crosses Anza Trail two times. **Impact Intensity: Minor**	Crosses Anza Trail. **Impact Intensity: Minor**	No impact. **Impact Intensity: No impact**	Same as segment Th3-Option C	Crosses Anza Trail. Crosses Butterfield Trail. **Impact Intensity: Minor**	Crosses Arizona Trail. Crosses Anza Trail six times. Crosses Butterfield Trail two times. **Impact Intensity: Minor**
Wilderness Characteristics	No impact **Impact Intensity: No impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Recreation	- Crosses Bar V Ranch. - Crosses Arizona Trail. - Crosses Anza Trail six times. - Crosses Butterfield Trail two times. - Crosses Tucson Mountain Park. Crosses Tumamoc Hill. - Crosses Joaquin Murrieta Park. Crosses Christopher Columbus Park. **Impact Intensity: Minor**	Negligible impacts. **Impact Intensity: No impact**	Crosses Anza Trail. **Impact Intensity: Minor**	Negligible impacts. **Impact Intensity: No impact**	Negligible impacts. **Impact Intensity: No impact**	Negligible impacts. **Impact Intensity: No impact**	Crosses Anza Trail. **Impact Intensity: Minor**	Crosses Santa Cruz River Park. Crosses Anza Trail. **Impact Intensity: Minor**	Negligible impacts. **Impact Intensity: No impact**	Crosses Santa Cruz River Park. **Impact Intensity: Minor**	Crosses Santa Cruz River Park. Crosses Anza Trail. Crosses Butterfield Trail. **Impact Intensity: Minor**	- Crosses Bar V Ranch. - Crosses Arizona Trail. Crosses Anza Trail six times. - Crosses Butterfield Trail two times. - Crosses Tucson Mountain Park. - Crosses Tumamoc Hill. - Crosses Joaquin Murrieta Park. - Crosses Christopher Columbus Park. **Impact Intensity: Minor**

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

Route Group 4	Subroute 4.1 - Proponent Preferred (Upgrade)	Local Alternative Segments: MA1	TH1a	TH1b	TH1c	TH1-Option	TH3-Option A	TH3-Option B	TH3-Option C	TH3a	TH3b	Agency Preferred Alternative
Socioeconomics and Environmental Justice	Project would directly and indirectly support an estimated 138 local jobs, along with 132 non-local workers, in the Upgrade Section during 2-year construction period. Corresponding increases in labor income, output, and tax revenues. Construction could create short-term shortages of temporary housing, and short-term increases in the demand for local services, in the more remote eastern portion of the Upgrade Section. Ongoing operations could benefit local communities through increased property tax revenues and improved electrical capacity to serve future growth. Multiple low-income and minority populations in the study area may be disproportionately negatively affected by localized construction and operation impacts. Given the prevalence of low-income and minority populations throughout the area, disproportionate impacts on low-income and minority populations are likely inevitable under any feasible transmission route. **Impact Intensity: Minor**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1

Table 2-14. Comparison Summary for Subroute 4: Pantano Substation to Saguaro Substation (Continued)

		Local Alternative Segments										
Route Group 4	**Subroute 4.1 - Proponent Preferred (Upgrade)**	**MA1**	**TH1a**	**TH1b**	**TH1c**	**TH1-Option**	**TH3-Option A**	**TH3-Option B**	**TH3-Option C**	**TH3a**	**TH3b**	**Agency Preferred Alternative**
Public Health and Safety	Increased potential for occupational safety hazards to occur. Increased potential for fire hazards to occur. Increased potential for public exposure to electromagnetic fields. **Impact Intensity: Minor**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Hazardous Materials and Hazardous and Solid Waste	No impact. **Impact Intensity: No Impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Transportation	Temporary short-term increase in traffic on primary roadways during construction. **Impact Intensity: Minor**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1
Intentional Acts of Destruction	Increase in potential targets for acts of sabotage or terrorism. Decrease in the potential for acts of sabotage or terrorism to cause service disruption and/or potential reduction in duration of service disruption. **Impact Intensity: No impact**	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1	Same as subroute 4.1

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Chapter 3

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing environment, including the physical environment, natural environment, and human-made resources and uses that would be affected by the action alternatives.

3.1.1 General Setting of the Project

The proposed Project is located on private and public lands in Arizona and New Mexico. Land managing agencies include BLM, Coronado National Forest (Dragoon Mountains near the town of Dragoon), Reclamation, Bureau of Indian Affairs (BIA) (the San Xavier District of the Tohono O'odham Nation in Arizona), NMSLO, and ASLD. In New Mexico, the Project or action alternatives would be located within Doña Ana, Grant, Hidalgo, and Luna counties; in Arizona, the Project or action alternatives would be located in Cochise, Pima, Pinal, Graham, and Greenlee counties.

The four counties in New Mexico are located in the southwest corner of the state. This region can be characterized as a rural, relatively unfragmented landscape. Historically, this part of southwestern New Mexico has had natural resource–dependent, extractive use–based economies with activities like ranching, farming, and mining. In southeastern Arizona, this region includes pockets of extractive uses such as mining and agriculture; it also includes unfragmented rural landscapes and recreation and urban activity centers (i.e., Tucson).

The New Build Section of the Project would be located within the Mexican Highland Subprovince of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is characterized by numerous elongated, subparallel mountain ranges and intervening broad alluvial basins that formed during Late Cenozoic extension. The Upgrade Section of the Project would be located in the eastern edge of the Sonoran Desert Subprovince of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is a region dominated by basins filled with sediments separated by uplifted mountain blocks. Major basins include the Avra Valley, Tucson Basin, San Pedro Valley, and Willcox Playa (Trapp and Reynolds 1995). The San Pedro River drains the San Pedro Basin. Mountain ranges include the Tucson Mountains, west of Tucson; the Tortolita Mountains, northwest of Tucson; the Santa Catalina Mountains, northeast of Tucson; and the Rincon Mountains, east of Tucson.

The proposed Project would cross six biotic communities of the Southwest (Brown and Lowe 1980), including Semidesert Grassland, Chihuahuan Desertscrub, Playa, Arizona Upland Subdivision of Sonoran Desertscrub, Lower Colorado River Subdivision of Sonoran Desertscrub, and Madrean Evergreen Woodland.

3.1.2 Resource Values and Uses Brought Forward

Based on internal (agency and cooperator) and external (public) scoping, a number of issues and concerns were identified for analysis in this DEIS (see section 1.13 and table 1-6 in chapter 1). The following resource values and uses are described (Chapter 3, "Affected Environment"), in order to analyze and respond to the issues and concerns (Chapter 4, "Environmental Consequences"):

- Air quality, section 3.2 and 4.2

- Noise and vibration, section 3.3 and 4.3
- Geology and mineral resources, section 3.4 and 4.4
- Soil resources, section 3.5 and 4.5
- Paleontological resources, section 3.6 and 4.6
- Water resources, section 3.7 and 4.7
- Biological resources, section 3.8 and 4.8
- Cultural resources, section 3.9 and 4.9
- Visual resources, section 3.10 and 4.10
- Land use, including farm and range resources and military operations, section 3.11 and 4.11
- Special designations, section 3.12 and 4.12
- Wilderness characteristics, section 3.13 and 4.13
- Recreation, section 3.14 and 4.14
- Socioeconomics and environmental justice, section 3.15 and 4.15
- Public health and safety (including electromagnetic interference), section 3.16 and 4.16
- Hazardous materials and hazardous and solid waste, section 3.17 and 4.17
- Transportation, section 3.18 and 4.18
- Intentional acts of destruction, section 3.19 and 4.19

3.1.3 Analysis Area

The analysis area varies for the New Build and Upgrade sections of the Project and by resource value or use in the following resource sections.

For the New Build Section and action alternatives, the geographic analysis area for all resources except those listed below is a minimum of 1 mile on either side of a representative centerline(s), or a 2-mile-wide corridor analysis area. For the Upgrade Section of the Project and alternatives, the geographic area of analysis for all resources except those listed below is 500 feet (200 feet off the existing 100-foot corridor).

New Build Section analysis area exceptions:

1. Air quality: based on regional airshed (approximately 31 miles off centerline).
2. Visual resources: 5 miles off centerline; 10-mile corridor.
3. Transportation: 5 miles off centerline; 10-mile corridor (needs to include all new access roads).
4. Socioeconomics: county level only; no “corridor.”

Upgrade Section analysis area exceptions:

1. Air quality: based on regional airshed (approximately 31 miles off centerline).
2. Visual resources: 5 miles off centerline; 10-mile corridor.
3. Cultural resources: 1 mile off centerline; 2-mile corridor.
4. Transportation: 5 miles off centerline; 10-mile corridor (needs to include all new access roads).
5. Socioeconomics: county level only; no “corridor.”

In the following sections of chapter 3, current conditions are characterized within these broader analysis areas. The analysis areas were determined to allowing routing flexibility for final design, and to allow adequate geographic coverage for where direct and indirect impacts could occur.

In the context of the analysis area discussed here in chapter 3, chapter 4 will discuss the environmental consequences of the direct impacts of the proposed project within a 150- to 200-foot-wide representative ROW. A representative ROW was identified for the Project's New Build and Upgrade sections, where the majority of ground disturbance resulting from the proposed Project is expected to occur. The representative ROW for the proposed New Build Section of the Project is 200 feet wide; this includes the proposed Project and all subroutes, segments, and local alternatives. The representative ROW for the Upgrade Section of the project is 150 feet wide; this includes the proposed Project and all subroutes, segments, and local alternatives.

This DEIS has been developed based on available information deemed adequate to characterize expected impacts to the extent that the intensity, context, magnitude, and duration are understood for each affected resource. Any ROW relocation, additional construction, or use that is not analyzed in this EIS, in accordance with the approved POD, or addressed in the ROW grant, would not be initiated without the prior written approval of the appropriate authorized officer (see Section 2.4.7, "Project Design Refinements (Variance Process)").

3.2 AIR QUALITY

The primary factors that influence regional ambient air are the locations of air pollution sources, the quantity and chemical characteristics of the pollutants emitted by those sources, the topography of the region, and the local meteorological conditions. The information provided in the following subsections is taken from a report titled "Southline Transmission Project Resource Report 01: Air Quality and Climate Change" (CH2M Hill 2013a). The contents of that report are used herein without specific reference.

3.2.1 Analysis Area

The air quality analysis area for both the New Build and Upgrade sections and the alternative routes and segments is a 50-km radius (approximately 31 miles) along the centerline. The 50-km radius was used in order to be consistent with minimum air quality analyses required by prevention of significant deterioration (PSD) guidelines, if applicable, and the Arizona Department of Environmental Quality (ADEQ) and NMED modeling guidelines. While the proposed Project and alternatives are not a PSD source, two of the purposes of the PSD program are to prevent violations of the National Ambient Air Quality Standards (NAAQS) and the environment and to protect the air quality and visibility in special designated areas. Figure 3.2-1 shows the air quality analysis area for the proposed Project.

3.2.2 Laws, Ordinances, Regulations, and Standards

The following section provides a summary of Federal, State, and local laws, regulations, and standards that govern activities that could affect air quality resources across the air quality analysis area.

Federal

CLEAN AIR ACT AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Since 1963, the Clean Air Act (CAA) and subsequent amendments in 1970, 1977, and 1990 have provided the authority and framework for EPA regulation of air emission sources. Regulations have been promulgated pursuant to the CAA to serve as requirements for the monitoring, control, and documentation of activities that will affect ambient concentrations of pollutants that may endanger public health or welfare.

Title I of the CAA requires the EPA to establish NAAQS for pollutants considered harmful to public health and the environment. The EPA established NAAQS for six common principal pollutants (“criteria” pollutants) found all over the United States (EPA 2013a). Those criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), lead (Pb), and particulate matter (PM), including PM equal to or less than 10 microns in diameter (PM_{10}) and 2.5 microns in diameter ($PM_{2.5}$).

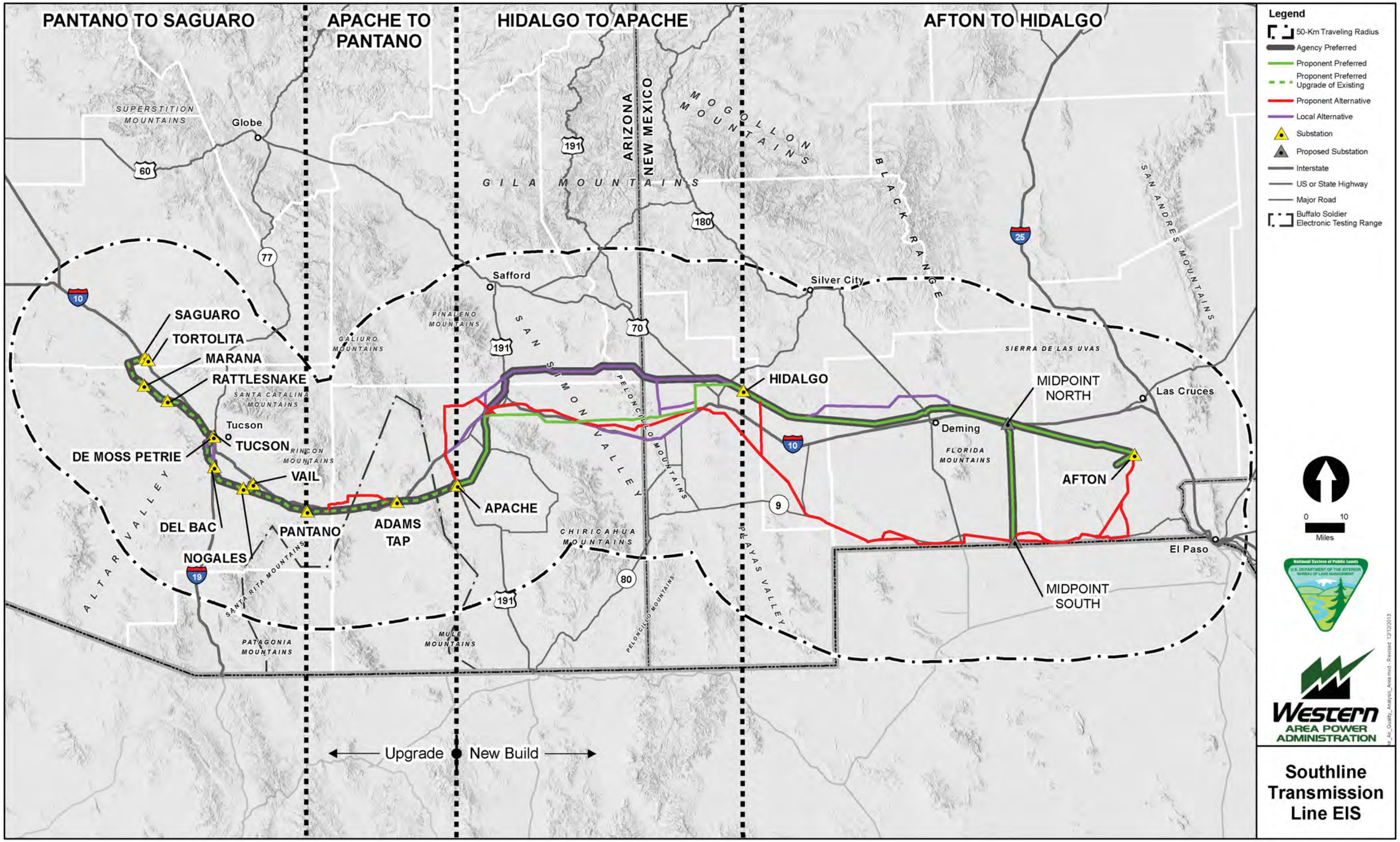
The CAA identifies two types of NAAQS: primary and secondary. Primary standards provide public health protection, including protecting the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. These standards are defined in terms of threshold concentration measured as an average for specified periods of time. Pollutants with acute health effects were given short-term standards, and pollutants with chronic health effects were given long-term standards. The NAAQS are presented in table 3.2-1.

Table 3.2-1. National Ambient Air Quality Standards

	Primary Standards		Secondary Standards	
Pollutant	**Averaging Time**	**Level**	**Averaging Time**	**Level**
CO	1 hour [a] 8 hour [a]	35 ppm 9 ppm	– –	– –
Pb	3 months (rolling) [b]	0.15 μg/m^3	3 months (rolling) [b]	Same as primary
NO_2	Annual [c] 1 hour [d]	0.053 ppm 0.100 ppm	Annual [c]	Same as primary
O_3	8 hour [e]	0.075 ppm	8 hour [e]	Same as primary
PM_{10}	24 hour [f]	150 μg/m^3	24 hour [f]	Same as primary
$PM_{2.5}$	24 hour [g] Annual [h]	35 μg/m^3 12 μg/m^3	24 hour [g] Annual [h]	Same as primary 15 μg/m^3
SO_2	1 hour [i]	0.075 ppm	3 hour [j]	0.5 ppm

Source: EPA (2013a).
Notes:
μg/m^3 = micrograms per cubic meter.
ppm = parts per million.
[a] Not to be exceeded more than once per year.
[b] Not to be exceeded.
[c] Annual mean.
[d] The 3-year average of the 98th percentile of the daily maximum 1-hour average must not exceed this standard.
[e] The 3-year average of the 4th-highest daily maximum 8-hour average O_3 concentration measured at each monitor within an area over each year must not exceed this standard.
[f] Not to be exceeded more than once per year on average over 3 years.
[g] The 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed this standard.
[h] The 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed this standard.
[i] The 3-year average of the annual 99th percentile of the 1-hour daily maximum must not exceed this standard.
[j] Not to be exceeded more than once per year.

Figure 3.2-1. Air quality analysis area.



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The EPA assigns classifications to geographic areas based on monitored ambient air quality conditions. Areas that meet both the primary and secondary standards of a pollutant subject to NAAQS are classified as being in attainment for that pollutant. Areas that do not meet the NAAQS for a pollutant are designated as being in nonattainment for that pollutant. Areas that cannot be classified based on available information for a pollutant are designated as being unclassified. An area's attainment status is designated separately for each criteria pollutant; one area may have all three classifications. Previously designated nonattainment areas for one of the NAAQS that have since met the NAAQS standards are referred to as attainment areas with a maintenance plan. To ensure that the air quality in those areas continues to meet the standards, a maintenance plan is developed and implemented.

Various air pollutants did not meet the specific criteria for development of a NAAQS and are labeled hazardous air pollutants (HAPs). HAPs are known or suspected to cause cancer or other serious health effects such as reproductive health or birth defects, or adverse environmental impacts. Section 112 of the CAA lists 187 HAPs to be regulated by National Emission Standards for Hazardous Air Pollutants (NESHAPs). NESHAPs regulate emissions from specific emission units and source types. The proposed Project and alternatives would not have stationary sources of HAPs and therefore would not be subject to NESHAPs.

PREVENTION OF SIGNIFICANT DETERIORATION AND CLASS I AND II AREAS

New projects within attainment or unclassified areas must demonstrate conformance with limits defined under the PSD program. Two of the purposes of the PSD program are to prevent violations of the NAAQS and the environment and to protect the air quality and visibility in special designated areas.

While the proposed Project and alternatives are not a PSD source, the PSD requirements provide maximum allowable increases in pollutant concentrations for areas that are already in compliance with the NAAQS. These limited increases are designated increments, and as a new PSD source is permitted, the amount of available increment in an airshed is reduced. Certain sensitive areas, defined as Class I areas under the CAA, have a smaller allowable incremental increase in new emissions than Class II and III areas. Areas such as international parks, national parks greater than 6,000 acres, national memorial parks larger than 5,000 acres, and national wilderness areas larger than 5,000 acres are granted Class I status and the highest level of air quality protections under section 162(a) of the CAA. Class II areas are allowed more moderate pollution increases. Class III areas are areas that do not have any air quality standards, and the air quality may be degraded to levels in line with the NAAQS. To date, no Class III areas have been designated; therefore, all areas not established as Class I areas are designated as Class II areas. The maximum allowable PSD increments over baseline, significant impact levels (SILs), and monitoring de minimis concentrations are presented in appendix B.

In 1999, the EPA announced an effort to improve air quality and visibility in 156 national parks and wilderness areas designated as Class I, known as the Regional Haze Rule (EPA 1999). Regional haze reduces long-range visibility over a wide region. Section 169A of the CAA sets forth a national goal for visibility. States are required by the rule to demonstrate reasonable progress towards the "prevention of any future, and the remedying of any existing, impairment in Class I areas which impairment results from manmade air pollution."

New Mexico and Arizona have Class I and II areas that could be affected by the proposed Project. There are 9 Class I areas in New Mexico and 12 in Arizona. Because emissions from activities related to the proposed Project and alternatives would be temporary and localized to the immediate vicinity of the proposed Project and alternatives, only those Class I areas that would be located closest to such activities are of concern. The Class I area in New Mexico that would be closest is the Gila Wilderness in northern Grant County, located approximately 40 miles from the proposed Project route, and outside the analysis area. There are four Class I areas within the analysis area in Arizona. The closest Class I areas in Cochise County are the Chiricahua National Monument and the Chiricahua Wilderness Area, which are 15 and 20 miles south, respectively, of the New Build Section proposed route and 20 miles east of the Upgrade Section proposed route. The Saguaro Wilderness Area in Pima County is 5 miles north of the Upgrade Section. Saguaro National Park–West is the closest Class I area to the proposed Project and alternatives and is located approximately 1 mile west of the Upgrade Section, northwest of Tucson. Figure 3.2-2 shows the Class I and special designation areas closest to the proposed Project and alternatives.

State and Local Regulations

Under the provisions of the CAA, any state can have requirements that are more stringent than those of the national program. In addition to the NAAQS established by the EPA, both New Mexico and Arizona have additional ambient air quality standards (AAQS) that apply. This section discusses State and local regulations and possible required permits that may be applicable to the proposed Project.

NEW MEXICO

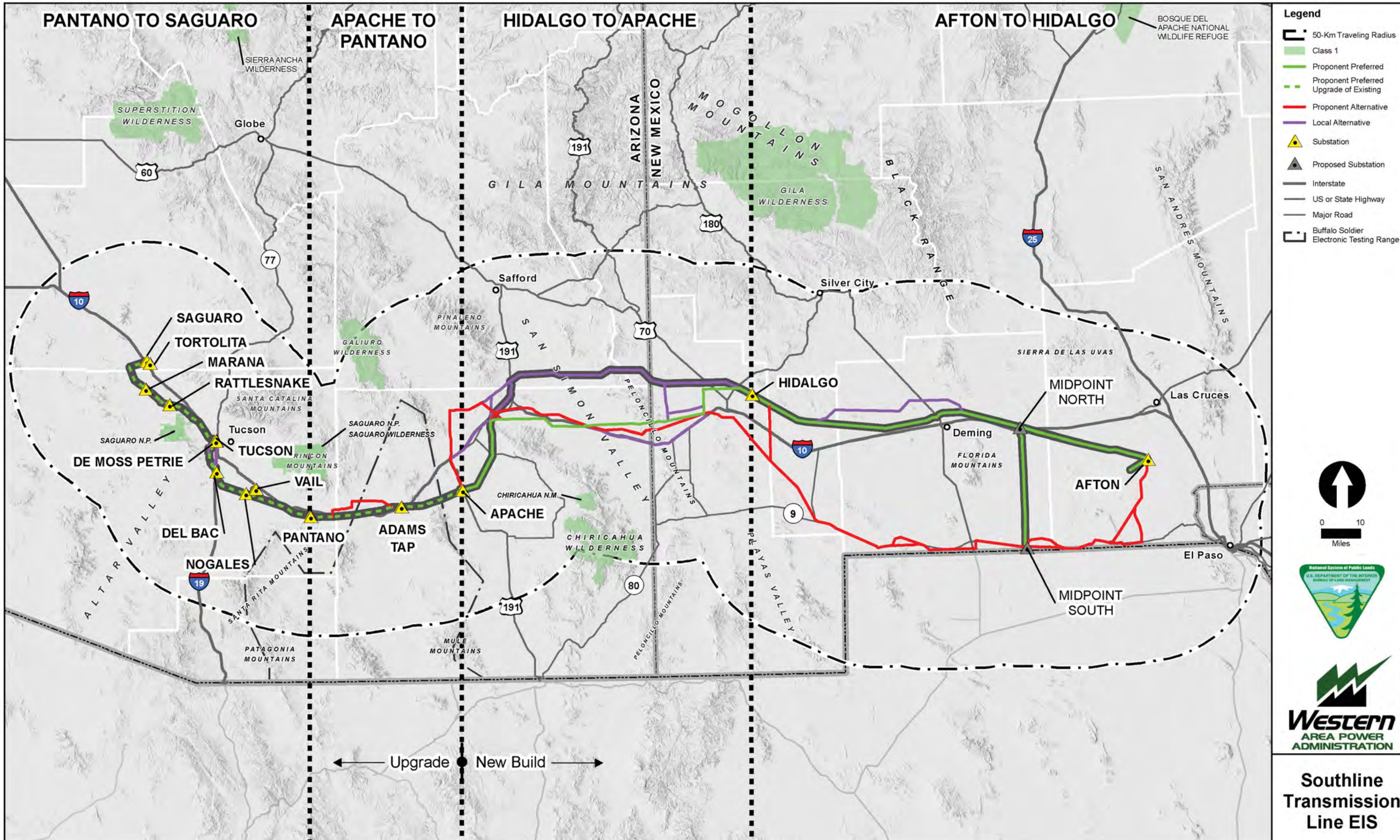
The New Mexico Air Quality Control Act is codified in NMSA, Chapter 74, Article 2. Rules pertaining to air quality are found in Title 20, Chapter 2, of the NMAC, administered by the NMED Air Quality Bureau in all areas of the state except Bernalillo County and tribal lands. The State of New Mexico has additional AAQS in addition to the NAAQS established by the EPA. The New Mexico Ambient Air Quality Standards (NMAAQS) are shown in table 3.2-2.

Table 3.2-2. New Mexico Ambient Air Quality Standards

Pollutant	Averaging Time	Level
CO	1 hour 8 hour	13.1 ppm 8.7 ppm
NO_2	1 hour Annual	0.10 ppm 0.05 ppm
Total Suspended Particulates	24 hour 7 day 30 day Annual [a]	150 µg/m^3 110 µg/m^3 90 µg/m^3 60 µg/m^3
SO_2	24 hour Annual	0.10 ppm 0.02 ppm
Hydrogen sulfide (H_2S)	1 hour [b]	0.010 ppm
Total reduced sulfur	½ hour	0.003 ppm

Notes: µg/m^3 = micrograms per cubic meter.
ppm = parts per million.
[a] Annual geometric mean.
[b] Not to be exceeded more than once per year.

1 **Figure 3.2-2.** Air Quality Class I and special designation areas.



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At the New Mexico State level, temporary sources, such as concrete batch plants, can obtain an NOI for a CGP from the State if the facility meets certain regulatory thresholds. Emission rates above 10 tons per year (tpy) of any regulated air pollutant (with the exception of lead), require submittal of an NOI to the State for the facility; emission rates greater than 25 tpy of criteria pollutants require a permit to construct. A CGP for concrete batch plants is available from the State if the facility meets certain siting, sizing, and regulatory requirements (e.g., facility is not subject to any NESHAP or Maximum Achievable Control Technology standards; facility has production rates equal to or less than 2,400 cubic yards per day) (20.2.72 New Mexico Administrative Code (NMAC)).

Doña Ana County and Luna County have additional ordinances that apply to the proposed Project and alternatives. Grant and Hidalgo counties have no additional county-specific air quality regulations that apply to the proposed Project and alternatives. County-specific regulations for Doña Ana County and Luna County are discussed below.

ARIZONA

In Arizona, air quality statutes are codified in Arizona Revised Statutes (ARS), Title 49, Chapter 3. Air quality regulations in Arizona are codified in the Arizona Administrative Code (AAC), Title 18, Chapter 2. The State of Arizona has AAQS in addition to the NAAQS established by the EPA. Two Arizona counties (Pima and Pinal) associated with the proposed Project and alternatives have their own air pollution control programs and operate pursuant to agreements with the ADEQ. Those counties do not have additional AAQS, and the standards are the same as the Arizona Ambient Air Quality Standards (AAAQS), which are presented in table 3.2-3.

Table 3.2-3. Arizona Ambient Air Quality Standards

	Primary Standards		Secondary Standards	
Pollutant	**Averaging Time**	**Level**	**Averaging Time**	**Level**
NO_2	Annual [a]	0.053	Annual	Same as primary
CO	1-hour [b] 8-hour [c]	35 9	– [d] –	– –
SO_2	24-hour [e] Annual [f]	0.14 0.03	3-hour [g]	0.5 ppm
PM_{10}	24-hour [h] Annual [f]	150 µg/m³ 50 µg/m³	24-hour [h] Annual [f]	Same as primary same as primary
$PM_{2.5}$	24-hour [h] Annual [f]	65 µg/m³ 15 µg/m³	24-hour [h] Annual [f]	Same as primary Same as primary
O_3	8-hour [i]	0.08 ppm	8-hour [i]	Same as primary
Pb	3-month (rolling) [j]	1.5	3-month (rolling) [j]	Same as primary

Notes:
µg/m³ = micrograms per cubic meter.
ppm = parts per million.
[a] Annual arithmetic mean rounded to three decimal places, with fractional parts equal to or greater than 0.0005 ppm rounded up.
[b] Maximum 1-hour concentration not to be exceeded more than once per year.
[c] Maximum 8-hour concentration not to be exceeded more than once per year.
[d] There are no secondary standards for CO.
[e] Maximum 24-hour concentration not to be exceeded more than once per year.
[f] Annual arithmetic mean.
[g] Maximum 3-hour concentration not to be exceeded more than once per year.
[h] 24-hour average concentration.
[i] The 8-hour averaged AAQS for O_3 is met when the average of the annual fourth-highest daily maximum 8-hour O_3 concentration is less than or equal to the standard.
[j] Maximum arithmetic mean averaged over a calendar quarter.

For concrete batch plants, regulations at the State of Arizona level provide an application to permit the source under a concrete batch plant general permit in lieu of an individual permit. For attainment areas, concrete batch plants producing less than 1,280 cubic yards on generator power or 1,310 cubic yards on commercial electric power may be permitted under the general permit. For nonattainment areas, concrete batch plants producing less than 930 cubic yards on generator power or 960 cubic yards on commercial electric power can apply for a general permit.

Cochise, Pima, and Pinal counties have additional county-specific ordinances and/or air quality regulations that apply to the proposed Project and alternatives. Greenlee and Graham counties have no additional county-specific air quality regulations that apply to the proposed Project and alternatives. County-specific regulations for Cochise, Pima, and Pinal counties are discussed below.

COUNTY

Table 3.2-4 presents air quality–related laws, ordinances, regulations, and standards that have been adopted at the county level.

Table 3.2-4. Applicable County Plans, Laws, Ordinances, Regulations, and Standards Related to Air Quality

Jurisdictional	Laws, Ordinances, Regulations, and Standards	Project Consistency with Laws, Ordinances, Regulations, and Standards
Counties		
Doña Ana County, New Mexico		
Ordinance 194-2000 on Erosion Control Regulations (Doña Ana County 2000)	Requires an erosion control plan approved by the county planning director to minimize the creation or aggravation of erosive forces. Further information regarding the requirements of an erosion control plan is provided in appendix B.	Expected
Luna County, New Mexico		
Ordinance 75 on Buildings (Luna County 2010)	Requires a plan approved by the officer to prevent soil, sand, dust, building materials, construction waste, and other materials from being blown by the wind from the land.	Expected
Cochise County, Arizona		
Ordinance 00-030 on Land Clearing (Cochise County 2000)	Any activity that includes the clearing of more than 1 acre of land is required to have a clearing permit from the county. Further information regarding the requirements of a clearing permit is provided in appendix B.	Expected
Pima County, Arizona		
Pima County Air Quality Control District Code of Regulations, Title 17, Air Quality Control (Pima County 2013)	Pima County air quality standards are the same as the AAAQS established by the ADEQ. Specific permitting and emission limitations regulations apply for Class I areas and nonattainment areas. The county has dust control regulations associated with the permitting program. Further information on county dust control regulations are discussed in appendix B.	Yes

Table 3.2-4. Applicable County Plans, Laws, Ordinances, Regulations, and Standards Related to Air Quality (Continued)

Jurisdictional	Laws, Ordinances, Regulations, and Standards	Project Consistency with Laws, Ordinances, Regulations, and Standards
Counties, cont'd.		
Pinal County, Arizona		
Pinal County Air Quality Control District Code of Regulations (Pinal County 2010b)	The Pinal County air quality standards are similar to the AAAQS established by the ADEQ. The county also has dust control regulation associated with the permitting program. The requirements of the dust control regulation in relation to the proposed Project are discussed further in appendix B.	Yes

3.2.3 Issues to Be Analyzed

Conformity

States and local authorities have the responsibility for bringing their regions into compliance with the NAAQS or the more stringent AAQS that they may adopt. State Implementation Plans (SIPs) are EPA-approved plans that set forth the pollution control requirements applicable to the various sources addressed by each SIP. Section 176(c) of the CAA prohibits Federal agencies from taking actions in nonattainment and maintenance areas unless the emissions from the actions conform to the SIP or Tribal Implementation Plan for the area. Federal actions must be evaluated for conformity to the local SIP if the project: (1) is located within an EPA-designated nonattainment or maintenance area, (2) would result in emissions above major source threshold quantities of criteria pollutants, (3) is not a listed exempt action, and (4) has not been accounted for in an EPA-approved SIP.

All Federal actions require a general conformity analysis unless otherwise exempt. Actions covered by the separate transportation conformity, actions with clearly de minimis emissions, actions listed as exempt in the rule, or actions covered by a presumed-to-conform approved list are exempt from a general conformity analysis. In an area with a SIP, conformity can be demonstrated as follows: (1) by showing that emission increases are included in the SIP, (2) by demonstrating that the State agrees to include increases in the SIP, (3) by offsetting the action's emissions in the same or nearby area; (4) through mitigation to reduce the emission increase, or (5) through an air quality modeling demonstration in some circumstances. Some emissions are excluded from conformity determination, such as those already subject to new source review, those covered by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or compliance with other environmental laws, actions that are not reasonably foreseeable, and those for which the agency has no continuing program responsibility.

Attainment/Nonattainment Areas

The New Build Section of the proposed Project and alternatives would cross four counties in New Mexico and between one to three counties in Arizona, depending on the subroute and alternatives chosen. None of the New Build Section segments would cross a nonattainment, maintenance, or Class I area.

The Upgrade Section of the proposed Project and alternatives would cross three counties in Arizona. Part of the section would pass through the Rillito area (a nonattainment area for PM_{10}) and the Tucson area (a maintenance area for CO). Figure 3.2-3 shows the nonattainment and maintenance areas applicable to the proposed Project and alternatives.

DOÑA ANA COUNTY, NEW MEXICO

Presently, a nonattainment area for PM_{10} is next to the city of Anthony, New Mexico. However, the New Build Section of the proposed Project and alternatives close to Afton, New Mexico, would be located a few miles west of the nonattainment zone of the city of Anthony.

In 1995, the EPA declared a 42-square-mile region in the southeast corner of Doña Ana County (including Sunland Park and adjacent areas) as a marginal nonattainment area for the 1-hour O_3 standard (EPA 1995). The 1-hour O_3 standard was revoked by the EPA in 2004 with the adoption of a new 8-hour O_3 standard; Sunland Park was redesignated to maintenance for this new standard (NMED 2004). In March 2008, the Federal Government lowered the NAAQS for O_3 from 0.08 parts per million (ppm) to 0.075 ppm (EPA 2008). Because of the lowering of the Federal standard, the State has recommended that Sunland Park (including the communities of Santa Teresa and La Union) be designated as being in nonattainment for the revised 8-hour O_3 standard (EPA 2008). The New Build Section would be located a few miles north of this area.

LUNA COUNTY, NEW MEXICO

Luna County is presently an attainment area for all pollutants.

GRANT COUNTY, NEW MEXICO

In Grant County, there is presently one SO_2 attainment area with a maintenance plan. In September 2003, the EPA approved a redesignation request and maintenance plan for the Grant County SO_2 nonattainment area (EPA 2003). The proposed Project and alternatives would not pass through this area. The proposed route between Deming and Lordsburg would be 30 miles south of the maintenance area. The portion of the alternative route in Grant County would be even farther away from the maintenance area.

HIDALGO COUNTY, NEW MEXICO

Hidalgo County is presently an attainment area for all pollutants.

COCHISE COUNTY, ARIZONA

The Douglas area, in southern Cochise County, has both a moderate PM_{10} nonattainment area and a former SO_2 nonattainment area that was redesignated as being in attainment/maintenance in 2006 (EPA 2012b). The proposed route and local alternative segments E, F, and G would be located at least 40 miles north of the Douglas area. The Upgrade Section proposed route and local alternative segment H would be at least 50 miles north of the Douglas area.

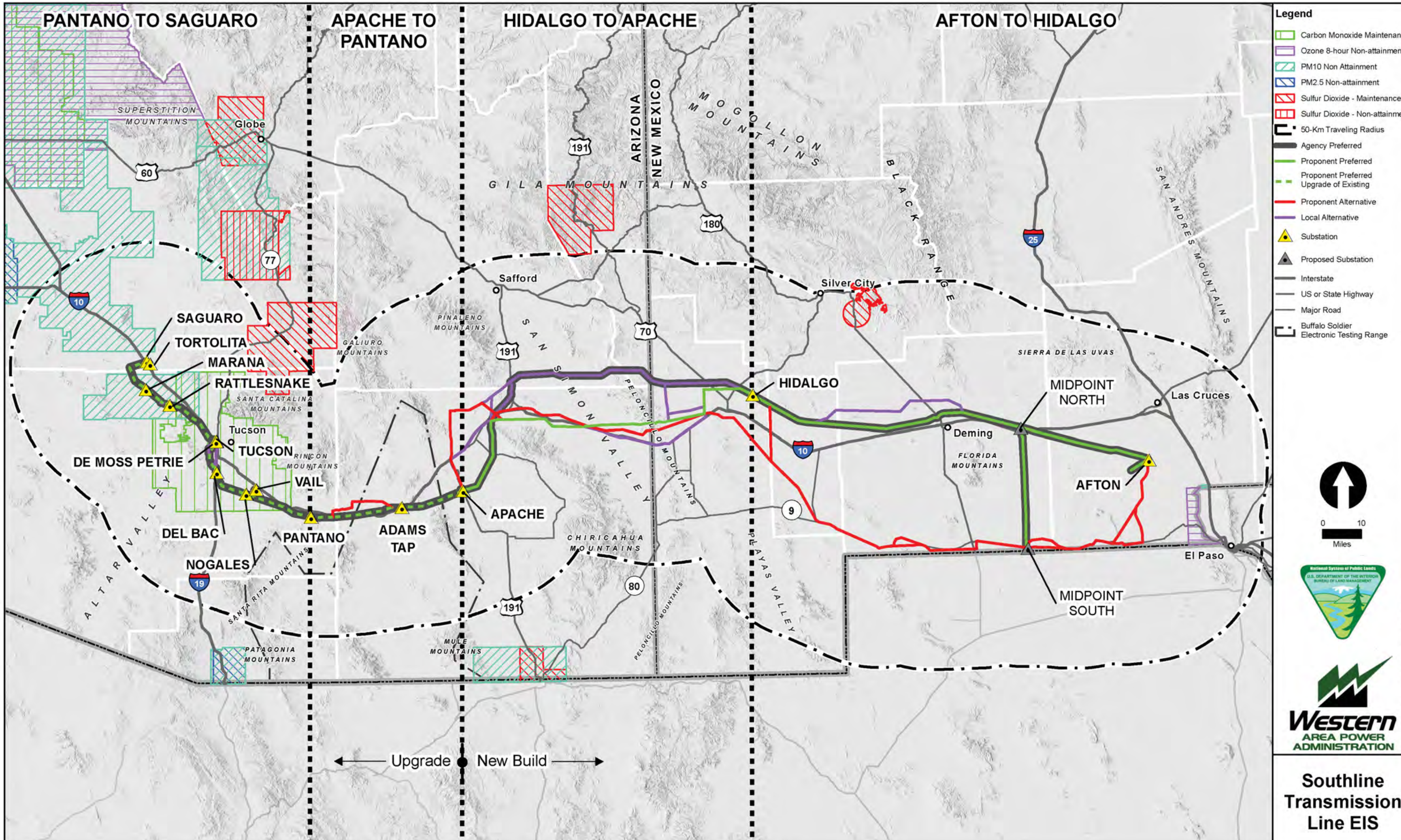
GRAHAM COUNTY, ARIZONA

Graham County is presently an attainment area for all pollutants.

GREENLEE COUNTY, ARIZONA

Greenlee County is presently an attainment area for all pollutants.

Figure 3.2-3. Nonattainment and maintenance areas.



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PIMA COUNTY, ARIZONA

The Ajo area in eastern Pima County has both an SO_2 attainment area with a maintenance plan and a PM_{10} nonattainment area. The proposed route would be more than 60 miles east of this area. The Summerhaven area is an SO_2 attainment area with a maintenance plan. The proposed route would be approximately 20 miles west of this area.

The Tucson area was redesignated from nonattainment to attainment/maintenance for CO in 2000 (EPA 2000). The original nonattainment designation was primarily because of vehicular emissions, which have decreased over time as Federal tailpipe emissions standards have been strengthened. A portion of the Upgrade Section (route group 4 and alternatives) proposed route would cross the Tucson CO attainment/maintenance area.

The Rillito area is designated as being in nonattainment for PM_{10}. In 2006, the EPA determined that the Rillito nonattainment area had met the PM_{10} standard and qualified for redesignation to attainment (ADEQ 2008). In 2008, a maintenance plan and request for redesignation was submitted to the EPA (ADEQ 2008). The EPA has not yet acted on this request. A portion of the Upgrade Section (route group 4 and alternatives) proposed route would cross the Rillito nonattainment area, as shown in figure 3.2-3.

PINAL COUNTY, ARIZONA

Presently, one 8-hour O_3 nonattainment area surrounds the Phoenix urban area, an SO_2 attainment area with a maintenance plan surrounds San Manuel, an SO_2 nonattainment area surrounds Hayden, a $PM_{2.5}$ nonattainment area surrounds Maricopa and Stanfield, and three PM_{10} nonattainment areas surround Hayden, Miami, and the Phoenix urban area (Maricopa Association of Governments (MAG) 2009). The proposed Project and alternatives would not pass through any of these areas, and the proposed routes would be at least 20 miles from them.

3.2.4 Analysis Area Conditions

This section describes existing climate, meteorology, and existing background air quality in and near the analysis area in New Mexico and Arizona. Existing regional air sources and cumulative effects are discussed, as well as global climate change.

Climate and Meteorology

NEW MEXICO

Mean annual temperatures range from 64 degrees Fahrenheit (°F) in the extreme southeast to 40 °F or lower in high mountains and valleys of the north; elevation is a greater factor in determining the temperature of any specific locality than its latitude. This is shown by only a 3 °F difference in mean temperature between stations at similar elevations, one in the extreme northeast and the other in the extreme Southwest. However, at two stations only 15 miles apart, but differing in elevation by 4,700 feet, the mean annual temperatures are 61 °F and 45 °F—a difference of 16 °F, or a little more than a 3 °F decrease in temperature for each 1,000-foot increase in elevation. Climate and meteorology for the state of New Mexico are discussed further in appendix B.

ARIZONA

Cold air masses from Canada sometimes penetrate into the state, bringing temperatures well below zero in the high plateau and mountainous regions of central and northern Arizona. The lowest readings can dip to

−35 °F. High temperatures are common throughout the summer months at the lower elevations. Temperatures higher than 125 °F have been observed in the desert area. Great extremes occur between day and night temperatures throughout Arizona. The daily range between minimum and maximum temperatures sometimes runs as much as 50 °F to 60 °F during the drier portions of the year. During winter months, daytime temperatures may average 70 °F, with night temperatures often falling to freezing of slightly below in the lower desert valleys. In the summer, the pine-clad forests in the central part of the State may have afternoon temperatures of 80 °F, while night temperatures drop to 35 °F or 40 °F. Climate and meteorology for the state of Arizona are discussed further in appendix B.

Background Air Quality

Numerous state monitoring stations were identified within or near the approximately 50-km (31-mile) vicinity of the air quality analysis area. The nearest monitors to the proposed Project and alternatives reporting ambient concentrations in both New Mexico and Arizona did not exceed the NAAQS, even in areas that were designated as being in non-attainment or maintenance for certain criteria pollutants. Background air quality monitoring and data from the nearest monitoring stations to the proposed Project and alternatives are presented and discussed further in appendix B.

Regional Air Emission Sources

While existing conditions can be described by the ambient air quality monitoring values and attainment statuses of the region, there may be regional sources of air emissions near the proposed Project that are located too far or downwind of monitoring stations. Therefore, major point sources of air-pollutant emissions located within the air quality analysis area with emissions greater than PSD thresholds are identified in table 3.2-5. A major source is categorized as a source that has the potential to emit more than 250 tpy for a PSD source, or 100 tpy for a categorical source of a criteria pollutant, or more than 10 tpy of any single HAP, or 25 tpy of any combination of HAPs. PSD sources are normally considered to have the potential for significant impacts, and more restrictive permitting requirements are generally imposed.

Table 3.2-5. Prevention of Significant Deterioration Sources Located within the Air Quality Analysis Area

Facility Name	Facility Type	State	County
EPEC Rio Grande Generating Station	Electric utility	NM	Doña Ana
Public Service Company of New Mexico (PNM) Afton Generating Station	Electric utility	NM	Doña Ana
PNM Luna Energy Facility	Electric utility	NM	Luna
Freeport-McMoRan Chino Mines	Mining	NM	Grant
Freeport-McMoRan Tyrone Mine	Mining	NM	Grant
Tri-State Pyramid Generating Station	Electric utility	NM	Hidalgo
PNM Lordsburg Generating Station	Electric utility	NM	Hidalgo
El Paso Natural Gas San Simon Compressor Station	Pipeline compression	AZ	Cochise
SouthWestern Power Group Bowie Power Station	Electric utility	AZ	Cochise
El Paso Natural Gas Bowie Compressor Station	Pipeline compression	AZ	Cochise
Arizona Electric Power Cooperative Apache Station	Electric utility	AZ	Cochise
Unisource Energy H Wilson Sundt Generating Station	Electric utility	AZ	Pima
TEP De Moss Petrie Generating Station	Electric utility	AZ	Pima
TEP North Loop Generating Station	Electric utility	AZ	Pima
CalPortland Rillito Cement Plant	Cement plant	AZ	Pima

Table 3.2-5. Prevention of Significant Deterioration Sources Located within the Air Quality Analysis Area (Continued)

Facility Name	Facility Type	State	County
APS Saguaro Power Plant	Electric utility	AZ	Pinal
TransCanada Coolidge Generating Station	Electric utility	AZ	Pinal
APS Sundance Power Plant	Electric utility	AZ	Pinal
Salt River Project Desert Basin	Electric utility	AZ	Pinal

Reasonably foreseeable and future projects are described in more detail in Chapter 4, Section 4.20, "Cumulative Impacts."

Global Climate Change

Climate change is a global problem that results from global greenhouse gas (GHG) emissions. Climate change may be affected by numerous factors, including solar radiation, ocean circulation, and human activities such as burning fossil fuels or altering the Earth's surface through deforestation or urbanization (EPA 2012a). There are more sources and actions emitting GHGs (in terms of both absolute numbers and types) than are typically encountered when evaluating the emissions of other pollutants. These emissions are often categorized as either anthropogenic (human-caused) or nonanthropogenic (naturally occurring). From a quantitative perspective, there is no single dominating anthropogenic source and fewer sources that would even be close to dominating total GHG emissions. Global climate change is much more the result of numerous and varied sources, each of which might seem to make a relatively small addition to global atmospheric GHG concentrations. Currently, there are no sites within the air quality analysis area that are collecting ambient GHG data. Ambient background data that exist are parametrically derived from fossil fuel combustion and other industrial sources.

Projected climate change impacts include air temperature increases; sea level rise; changes in the timing, location, and quantity of precipitation; and increased frequency of extreme weather events such as heat waves, droughts, and floods. These changes will vary regionally and affect renewable resources, aquatic and terrestrial ecosystems, and agriculture. Although uncertainties will remain regarding the timing and magnitude of climate change impacts, the scientific evidence predicts that continued increases in GHG emissions will lead to increased climate change. According to the Intergovernmental Panel on Climate Change (IPCC), increased atmospheric levels of carbon dioxide (CO_2) are correlated with rising temperatures. Climate models indicate that temperatures will likely increase by 1.1 to 6.4 degrees Celsius (°C) (2.0 to 11.5 °F) by 2100 (IPCC 2007).

The BLM recognizes the importance of climate change and the potential effects it may have on the environment. Activities within the air quality analysis area that may generate emissions of climate changing pollutants (i.e., CO_2, methane (CH_4), and N_2O (nitrous oxide)) include, as examples, urban development, agricultural, large wildfires, and recreational activities using combustion engines. Other activities may sequester CO, such as managing vegetation and forests, which may function as carbon sinks (BLM 2009a).

Preliminary GHG emissions inventories have been prepared for each state in a cooperative effort between the Center for Climate Strategies (CCS) and the environmental departments for each state. According to the inventory for New Mexico, the GHG emissions for reporting year 2000 were 83 million metric tons of carbon dioxide equivalents (CO_2e). The reference case GHG emissions for year 2020 were estimated at 80.8 million metric tons of CO_2e (CCS 2006). According to the inventory for Arizona, the GHG emissions for reporting year 2000 were 89 million metric tons of CO_2e.

The reference case GHG emissions for year 2020 were estimated at 153.5 million metric tons of CO_2e (CCS 2005).

3.3 NOISE AND VIBRATION

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 08: Noise” (CH2M Hill 2013). The contents of that report are used herein without specific reference.

3.3.1 Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although prolonged exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual. Additional information, including sound levels of representative noises and sounds, can be found in appendix C.

Noise could also disrupt wildlife life-cycle activities of foraging, resting, migrating, and other patterns of behavior. While wildlife already existing in proximity to human development may already be habituated to noise from land use and human disturbance, changes to these baseline activities may still result in wildlife disruption. Additionally, sensitivity to noise varies from species to species, making it difficult to identify how a noise source would affect all flora and fauna in an area.

3.3.2 Vibration

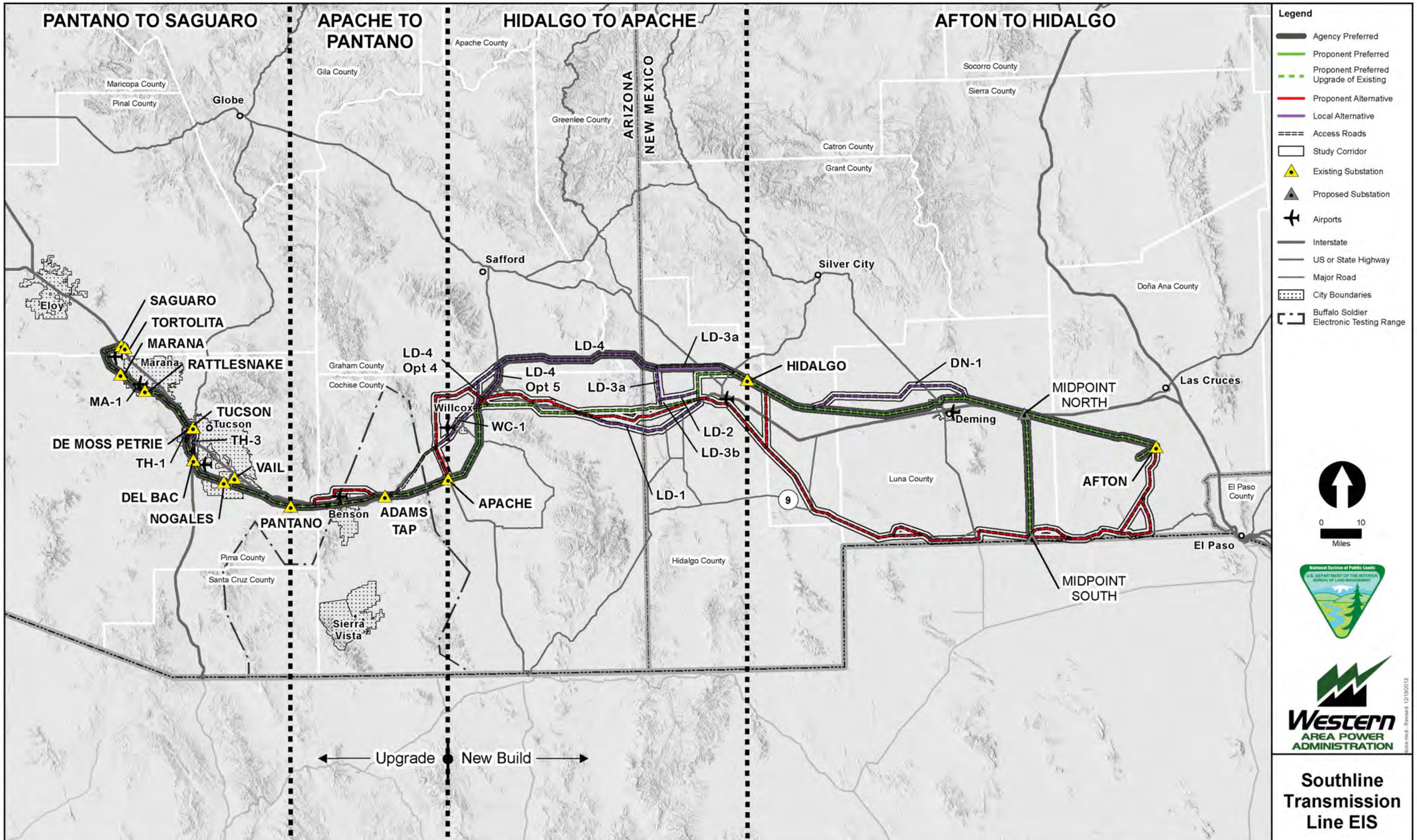
Ground-borne vibration may be induced by traffic and construction activities, such as pile driving and earthmoving. The effects of ground-borne vibration may include perceptible movement of building floors, interference with vibration-sensitive instruments, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The rumbling sounds heard is the noise radiated from the motion of the room surfaces. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance would be well below the damage threshold for normal buildings. Ground-borne vibration is almost never annoying to people who are outdoors; without the effects associated with the shaking of a building, the rumble noise of vibrations are not perceptible.

Unlike noise, human response to vibration is not dependent on existing vibration levels. Humans respond to a new source of vibration based on the frequency of such events.

3.3.3 Analysis Area

The analysis area for noise and vibration for both the New Build Section and the Upgrade Section of the proposed project is 1 mile on either side of the centerline and any substation or access roads outside that corridor. The analysis area for the evaluation of proposed Project noise impacts is depicted in figure 3.3-1.

Figure 3.3-1. Noise analysis area for the Project.



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3.3.4 Laws, Ordinances, Regulations, and Standards

Federal

There are no Federal regulations that limit overall environmental noise levels. However, there are Federal guidance documents that address environmental noise and regulations for specific sources (for example, aircraft or federally funded highways). While there are no Federal regulations or guidance that specifically addresses the types of activities that would occur from the proposed Project, these guidance documents can be used as a proxy to determine what impacts the proposed Project would have. Table 3.3-1 presents a summary of Federal agency guidelines and regulations for exterior noise.

Table 3.3-1. Summary of Federal Guidelines/Regulations for Exterior Noise (dBA)

Agency	L_{eq}	L_{dn}
U.S. Department of Transportation—Federal Rail Administration (FRA) and Federal Transit Administration (FTA) [1, 2]	Sliding scale [3]	Sliding scale [3]
EPA [4]	[49]	55
U.S. Department of Housing and Urban Development [5]	[59]	65

Notes:
dBA = A-weighted decibels.
Brackets [59] indicate a calculated equivalent standard.
[1] FRA (1998).
[2] FTA (2006).
[3] Refer to appendix C.
[4] EPA (1974).
[5] 24 CFR 51 Subpart B.

A review of existing Federal, State, county, and local noise laws, regulations, ordinances, and guidelines was conducted for the proposed Project and alternatives. The proposed Project and alternatives cross two states, nine counties, and several municipalities and unincorporated territory. If noise laws, regulations, ordinances, or guidelines are identified that limit noise or hours of operation for the proposed project as part of the development of special use permitting processes, the proposed Project would address these requirements at that time. The following discussion identifies Federal, State, and local laws, regulations, ordinances, and guidelines that are pertinent to the proposed Project and alternatives. The Noise Control Act and the U.S. Department of Housing and Urban Development (HUD) guidelines are the Federal regulatory criteria against which Project noise is compared in chapter 4. Additional Federal laws, regulations, ordinances, and guidelines with tangential Project applicability are discussed in appendix C.

U.S. ENVIRONMENTAL PROTECTION AGENCY, NOISE CONTROL ACT OF 1972

The Federal Noise Control Act of 1972 and subsequent amendments (42 U.S.C. 4901 et seq.) established a requirement that all Federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare. The EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating Federal research and activities related to noise control, and establishing Federal noise emission standards for selected products distributed in interstate commerce (construction equipment; transportation equipment; motors and engines; and electrical or electronic equipment). States and political subdivisions of States retain the right to establish and enforce controls on environmental noise through the licensing, regulation, or restriction of the use, operation, or movement of products or combinations of products. The Federal Noise Control Act also directed all Federal agencies to comply with Federal, State, interstate, and local noise control and abatement requirements to the same extent that any person is subject to such requirements.

In order to establish Federal noise emission control requirements and to ensure assistance and guidance to States and localities, the EPA has published guidelines that address the issue of community noise and contains goals for noise levels affecting residential land use of day-night level (L_{dn}) of less than 55 A-weighted decibels (dBA) for exterior levels and L_{dn} of less than 45 dBA for interior levels (EPA 1974). Table 3.3-2 presents the noise levels identified as requisite to protect public health and welfare with an adequate margin of safety.

Table 3.3-2. Noise Levels Identified to Protect Public Health and Welfare with an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{eq(24)} \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Source: EPA (1974).
Note: $L_{eq(24)}$ = The continuous sound pressure level integrated over a 24-hour time period.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Chapter 2 of the HUD Noise Guidebook lists a goal that outdoor residential areas follow the EPA guideline of 55 dBA L_{dn} (24 CFR 51.101(a)(8)). However, for the purposes of meeting this regulation, sites with an L_{dn} of 65 dBA and below are acceptable and allowed.

State and Local Regulations

There are no State-level standards for noise in Arizona or New Mexico. However, the New Mexico Public Regulation Commission has jurisdiction on proposed transmission lines in New Mexico and the ACC has jurisdiction on proposed aboveground transmission lines designed for 115 kV or greater locating in Arizona. Utilities are required to make an application to the applicable commission when locating within their jurisdiction. In New Mexico, the New Mexico Public Regulation Commission may consider “noise emission levels and interference with communication signals” in determining if the proposed location of the transmission line will unduly impair important environmental values (NMSA 62-9-3(M)(3)). The ACC’s “Rules of Practice and Procedure” (R14-3-219 in Title 14, Chapter 3, AAC) describes the form of the application to submit. In addition, exhibits to the application must be submitted. Exhibit I mentions a requirement to “describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.”

The Arizona Division of Safety and Health, a division of the Industrial Commission of Arizona, administers and enforce the requirements of the Arizona Occupational Safety and Health Act of 1972, which provides safety and health protection for employees in Arizona. With respect to noise exposure to workers, the Arizona Occupational Safety and Health Act regulations are identical to the Federal Occupational Safety and Health Act regulations and are considered to be equivalent.

The New Mexico Occupational Health and Safety Bureau (NMOHSB) is a State regulatory agency that is part of the NMED. It has the responsibility of enforcing OSHA regulations within New Mexico. New Mexico has adopted the Federal OSHA regulations and has promulgated some state-specific regulations. There are no state-specific regulations concerning noise.

Pinal County has an excessive noise ordinance that addresses construction of buildings and other projects in relation to noise between different land use districts (Pinal County Ordinance No. 050306-ENO (Pinal County 2006), as amended by 031611-ENO-01). Table 3.3-3 presents the limiting sound levels for land use districts in Pinal County.

Table 3.3-3. Pinal County Limiting Sound Levels for Land Use Districts

Residential		Commercial or Business		Industrial		Rural	
7 a.m. to 8 p.m.	60 dBA	7 a.m. to 10 p.m.	65 dBA	7 a.m. to 10 p.m.	70 dBA	7 a.m. to 9 p.m.	65 dBA
8 p.m. to 7 a.m.	55 dBA	10 p.m. to 7 a.m.	60 dBA	10 p.m. to 7 a.m.	65 dBA	9 p.m. to 7 a.m.	60 dBA

Source: Pinal County (2006).

In addition to the limiting of sound levels by land use district, Pinal County's excessive noise ordinance includes construction start and stop times that are identical to Pima County's limited construction start and stop times, as presented in table 3.3-3.

The City of Sierra Vista in Cochise County, Arizona, has noise regulations between land use districts for both day and night. The maximum noise levels are listed in table 3.3-4.

Table 3.3-4. City of Sierra Vista Limiting Sound Levels for Noise Between Land Use Districts

	Residential to Any Other District	Commercial to Residential	Commercial to Industrial	Commercial to Commercial	Industrial to Residential	Industrial to Industrial	Industrial to Commercial
Day	55 dBA	55 dBA	70 dBA	60 dBA	55 dBA	70 dBA	60 dBA
Night	50 dBA	50 dBA	65 dBA	55 dBA	50 dBA	65 dBA	55 dBA

Source: City of Sierra Vista (2009).

With the exceptions of Pinal County and the City of Sierra Vista, no other county, city, or local laws, regulations, ordinances, or guidelines were identified with specific sound level restrictions limiting the decibel (dB) levels of noise. Additional county, city, and local laws, regulations, ordinances, and guidelines with tangential project applicability are discussed in appendix C.

3.3.5 Issues to Be Analyzed

Potential effects of the proposed Project and alternatives include changes in the ambient noise levels at sensitive noise receptor sites, including residences and the adjacent national monument, wilderness, and recreation areas.

Noise would be generated during construction and operational activities of the proposed Project and alternatives. These noises need to be analyzed to determine the effect they would have on baseline conditions. During construction, equipment would generate noise. During operation, substations would produce transformer noise. Corona noise, which results from changes in electric charges, is a source of intermittent noise. Maintenance activities during operation associated with substations and transmission lines are another source of noise to be analyzed. Vibration impacts from construction activities are an issue to be analyzed. Pile-driving and earthmoving activities generate both noise and vibrations.

A significant impact from noise would result if any of the following were to occur from construction or operation of the proposed Project and alternatives:

- Exceedance of local, State, or Federal noise regulations or guidelines. If there are no local guidelines, then State guidelines will be followed. If there are no State guidelines, then Federal guidelines will be used;
- Increased noise levels impose restrictions on land currently planned for residential development; or
- Increased noise levels directly or indirectly affect any places of traditional use that are NRHP listed or eligible, or identified as important to tribes.

Potential noise-related environmental impacts and their intensity are evaluated in chapter 4, section 4.3.

3.3.6 Analysis Area Conditions

Existing noise conditions are evaluated based on land use. Unlike noise, human response to vibration is not dependent on existing vibration levels (Federal Transit Administration (FTA) 2006). Humans respond to a new source of vibration based on the frequency of such events.

Local conditions such as traffic, topography, and winds characteristic of the region can alter background noise conditions. In general, the L_{dn} sound levels at outdoor quiet urban nighttime noise levels range from 40 to 50 dBA (EPA 1974). However, given that most of the proposed Project and alternatives pass through largely undeveloped, sparsely populated areas, the majority of the analysis area would be expected to have background noise L_{dn} of about 35 dBA or less. In addition to natural background, noise sources could include agricultural activities, oil and gas development, coal mining, trains, low-density traffic on rural roads, high-density traffic on city streets and freeways (i.e., near I-10), recreational activities, and aircraft overflights. Additional information on anticipated background noise levels based on land use, vehicle travel on roadways, and current baseline noise conditions at proposed substation and substation upgrades is presented in appendix C.

Existing noise levels were estimated from land use type and available reference documents. Expected baseline noise levels by segment of the proposed Project and alternatives are listed below in table 3.3-5.

Table 3.3-5. Baseline Noise Levels Expected

Section	Route/Segment	Description of Analysis area	Expected Baseline Noise Levels
Route group 1	All	The majority of the analysis area for the New Build Section from the Afton Substation to east of Lordsburg is considered rural with limited development. The area is predominantly desert open space.	Desert open space: Day: 8–45 dBA Night: 20–40 dBA
	Subroute 1.1, Segments P1–P3	Predominantly surrounded by desert open space. Follows and crosses several highways. These highways are largely within the rural open space area and represent a source of existing noise.	Traffic noise at 250 feet: Day/Night: 44–64 dBA

1 **Table 3.3-5.** Baseline Noise Levels Expected (Continued)

Section	Route/Segment	Description of Analysis area	Expected Baseline Noise Levels
		Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
		Bypasses Lordsburg, New Mexico, to the west and several small and medium-sized towns.	Lordsburg: Day: 33–66 dBA Night: 43–61 dBA
		Bypasses Deming, New Mexico, to the north.	Deming: Day: 40–67 dBA Night: 33–55 dBA
	Subroute 1.2 and Local Alternatives A–D	Predominantly surrounded by desert open space. Follows and crosses several highways or various sizes. These highways are largely within the rural open space area.	Traffic noise at 250 feet: Day/Night: 44–64 dBA
		Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
		Several small towns, including Lordsburg and Columbus to the south.	Lordsburg and Columbus: Day: 33–66 dBA Night: 43–61 dBA
Route group 2	All	The majority of the analysis area for the New Build Section from Lordsburg to Apache Substation is considered rural with limited development. The area is predominantly desert open space.	Desert open space: Day: 8–45 dBA Night: 20–40 dBA
	Subroute 2.1, Segments P4–P7	Predominantly surrounded by desert open space. Follows several highways or various sizes. These highways are largely within the rural open space area and represent a source of existing noise.	Traffic noise at 250 feet: Day/Night: 44–64 dBA
		Small pockets of agricultural areas exist.	Agricultural Areas: Day: 30–52 dBA Night: 30–40 dBA
		Bypasses several small and medium-sized towns, including the town of Bowie to the north.	Bowie and other small and medium-sized towns: Day: 33–66 dBA Night: 43–61 dBA
	Subroute 2.2, Segments E, F, G, I, and J	Predominantly surrounded by desert open space. Follows and crosses several highways or various sizes. These highways are largely within the rural open space area and represent a source of existing noise.	Traffic noise at 250 feet: Day/Night: 44–64 dBA
		Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
		Bypasses several small and medium-sized towns, including the town of Bowie to the north.	Bowie, Cochise, San Simon, and other small and medium-sized towns: Day: 33–66 dBA Night: 43–61 dBA
		Passes west of the city of Willcox, which is larger than Bowie and other small to medium-sized towns.	City of Willcox Day: 40–67 dBA Night: 33–55 dBA
	Local Alternatives LD3a, LD3b, LD2, and LD1	Predominantly surrounded by desert open space.	Vary from less than 20 to more than 40 dBA
	Local Alternatives WC-1a and WC1b	WC-1a and WC1b predominantly parallel I-10 and pass just north of the city of Willcox.	Day: 40–67 dBA Night: 33–55 dBA

2

Table 3.3-5. Baseline Noise Levels Expected (Continued)

Section	Route/Segment	Description of Analysis area	Expected Baseline Noise Levels
Route group 3	Subroute 3.1: Segments U1a, U1b, U2, and U3a	Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
		Bypasses several small towns, including Sonoita Ranch, Cortaro, and Vail.	Sonoita Ranch, Cortaro, Vail, and other small and medium-sized towns: Day: 33–66 dBA Night: 43–61 dBA
		Passes through the city of Tucson. The city of Tucson has a major airport (Tucson International Airport).	City of Tucson near major airport: Day: 48–92 dBA Night: 45–88 dBA
		Passes through the city of Tucson. The city of Tucson has a major airport (Tucson International Airport).	City of Tucson 6 miles from major airport: Day: 44–69 dBA Night: 40–66 dBA
		Passes through the city of Tucson, paralleling I-19 and I-10.	City of Tucson at city outskirts / Near transportation corridors: Day: 40–67 dBA Night: 33–55 dBA
	Local Alternative H	Besides being predominantly surrounded by desert open space, the representative ROW follows and crosses I-10. Traffic will result in additional noise.	Traffic noise at 250 feet: Day/Night: 44–64 dBA
		Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
		Bypasses one small town of Mescal, northwest of Benson.	Mescal: Day: 33-66 dBA Night: 43–61 dBA
Route group 4	Subroute 4.1: U3b, U3c, U3d, U3e, U3f, U3g, U3h, U3i, U3j, U3k, U3l, U3m, and U4	Passes through the city of Tucson. The city of Tucson has a major airport (Tucson International Airport).	City of Tucson near major airport: Day: 48–92 dBA Night: 45–88 dBA
		Passes through the city of Tucson. The city of Tucson has a major airport (Tucson International Airport).	City of Tucson 6 miles from major airport: Day: 44–69 dBA Night: 40–66 dBA
		Passes through the city of Tucson, paralleling I-19 and I-10.	City of Tucson at city outskirts / Near transportation corridors: Day: 40–67 dBA Night: 33–55 dBA
		Small pockets of agricultural areas exist.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA
	Local Alternatives TH1a, TH1b, TH1c, TH1-Option	TH1a, TH1b, TH1c, and TH1-Option travel through the outskirts of the city of Tucson.	City of Tucson at city outskirts: Day: 40-67 dBA Night: 33–55 dBA
	Local Alternatives TH3-Option A, TH3-Option B, TH3-Option C, TH3a, TH3b	TH3-OptionA, TH3-OptionB, TH3-OptionC, TH3a, and TH3b more closely parallel I-19 and I-10 than the proposed routes they would replace.	Traffic noise at between 50 to 2,500 feet: Day/Night: 34-71 dBA
	Local Alternative MA1	MA-1 travels through rural agricultural land adjacent to an airstrip. Baseline noise levels do not include aircraft activity.	Agricultural areas: Day: 30–52 dBA Night: 30–40 dBA

3.3.7 Noise-Sensitive Receptors

The New Build Section of the proposed Project and alternatives passes by approximately five population centers with scattered residential areas and unique noise-sensitive receptors (i.e., Deming, Lordsburg, Columbus, and Hachita in New Mexico and Willcox in Arizona). This section consists predominantly of open space and has very few noise-sensitive receptors. No wilderness areas or other public recreation spaces that require low noise limits are within the area of analysis for the New Build Section.

The Upgrade Section passes by the population centers around Benson and Tucson, Arizona, including incorporated and unincorporated cities and towns (e.g., the cities of Sierra Vista, South Tucson, and Marana, and the unincorporated territory of Vail, around Tucson). Moving from east to west along the proposed transmission line corridor, this section initially consists predominantly of open spaces with few noise-sensitive receptors with increasingly dense concentrations of residences and other noise-sensitive receptors as one moves into the Tucson area.

In chapter 4, noise-sensitive receptors are identified and proposed Project impacts to these noise-sensitive receptors are analyzed.

3.4 GEOLOGY AND MINERAL RESOURCES

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 4: Geology and Minerals” (CH2M Hill 2013c). The contents of that report are used herein without specific reference.

3.4.1 Analysis Area

The analysis area for the proposed Project is different for the New Build and Upgrade sections. Because the Upgrade Section already includes existing transmission lines, this portion of the analysis area does not need to be as geographically extensive as for the New Build Section.

New Build Section

The analysis area for the New Build Section is a 2-mile-wide corridor along each of the alternatives and any substations or access roads outside that corridor. This area is sufficient to identify resources that could be directly impacted by ground disturbance and where construction materials, equipment, and workers may be present.

Upgrade Section

The analysis area for the Upgrade Section is 500-foot corridor (200 feet on either side of the existing 100-foot corridor).

3.4.2 Laws, Ordinances, Regulations, and Standards

Permitted activities that may affect or be affected by geological resources and geological hazards are governed primarily by local jurisdictions. The conservation elements and seismic safety elements of city and county general plans often contain policies for protection of geological features and avoidance of hazards, but generally do not specifically address transmission line construction projects. Local grading ordinances may establish detailed procedures for excavation, blasting, or construction. The following section provides a summary of international, Federal, State, and local laws, regulations, and standards that govern permitted activities that may affect or be affected by geology and minerals in the analysis area. There are no Federal laws, ordinances, regulations, or standards for geological hazards and resources.

Federal Laws, Ordinances, Regulations, and Standards

On the Federal level, NEPA and the FLPMA serve as the primary legislation requiring assessment and mitigation of potential impacts to geological resources on federally administered land. NEPA (42 U.S.C. 4321–4347) directs Federal agencies, including the BLM, to assess impacts, adverse and otherwise, to the environment.

The FLPMA incorporated the Mining Law of 1872, which governs prospecting and mining for economic minerals on Federal public lands, with several provisions to aid in managing resources on public land (PL 94-579). The FLPMA dictates how BLM regulates mineral resources extraction on BLM land. The BLM requires an excavation permit for excavations and grading on land under its jurisdiction.

Additional Federal legislation related to the proposed Project include laws and acts that changed the development of deposits such as coal, petroleum, and natural gas from claim staking to leasing (Mineral Leasing Act of 1920), and provided for multiple uses of the surface of the same tracts of the public lands (Multiple Mineral Development Act of 1954, Multiple Surface Use Mining Act of 1955, PL 167 of 1955, and Classification and Multiple Use Act of 1964). Additionally, 43 CFR governs mining operations for coal mining (Part 3400), non-coal mining (Part 3500), and stone/sand/gravel (Part 3600). Title 3 CFR Part 3715 relates to the use or occupancy of unpatented mining claims, and Parts 3802 and 3809 relate to hardrock mining and prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws.

State Laws, Ordinances, Regulations, and Standards

In New Mexico, the Minerals Group of the NMSLO is responsible for leases on State land for commodities such as sand and gravel, limestone, coal, and geothermal resources. NMSA Title 19, Chapter 2, includes applicable laws for governing minerals, mines, and leases on New Mexico State land.

In Arizona, the ASLD is responsible for mining activities and mineral resources on State land. ARS 12, 27, and 37 are the applicable State laws for governing minerals, mines, leases, and geothermal resources on Arizona State land.

3.4.3 Issues to Be Analyzed

Potential environmental changes are described in terms of the temporal scale, spatial extent, and significance to facilitate the comparison of alternatives. The extent to which the proposed Project could result in such effects is addressed in chapter 4, where potential effects with regard to geology and minerals are evaluated.

Potential effects could include changes (positive or negative) to the ability to access areas of recognized unique geological importance (e.g., caves, rock outcroppings, mineral collection areas of recreational or scientific importance) and the ability to access, explore, or extract locatable, leasable, and/or saleable minerals or existing mineral leases (including oil, gas, coal, geothermal, etc.). Other effects could include the effects of existing geological hazards (seismicity/geologic faults, land subsidence/fissures, volcanism, debris flows, landslides) on the proposed Project; and the potential for new or increased geological hazards from Project activities such as blasting foundations.

A significant impact to geology and mineral resources would occur if:

- areas of geological importance are lost or made inaccessible for future use;
- important State-identified rock outcroppings are adversely affected;
- known mineral resources of economic value are lost or made inaccessible;
- Project activity (construction, operation, or maintenance) would locate the ROW over a mining claim located on or before July 23, 1955 or otherwise affect a valid existing mineral right;
- the proposed Project would occur in an area of known geological hazard;
- structures fail or create hazards due to slope instability, the effects of earthquakes, or land subsidence; or
- the proposed Project creates geological hazards, particularly increases in the probability or magnitude of mass wasting events.

While many of the potential impacts are difficult to quantify, “units of change” for the items above include the locations and number of claims, leases, oil/gas wells, geological features, or locatable, leasable, and/or saleable mineral areas within the analysis area, as well as a binary determination of whether or not they are likely to be lost or occluded.

3.4.4 Analysis Area Conditions

This section details the current conditions of the analysis area as they relate to existing geology and known mineral resources of economic value. The New Build Section is described first, followed by the Upgrade Section. Resources are described by route group, working from east to west.

New Build Section – Geological Resources

REGIONAL GEOLOGICAL SETTING

The New Build Section is located within the Mexican Highland Subprovince of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is characterized by numerous elongated, subparallel mountain ranges and intervening broad alluvial basins that formed during the Late Cenozoic extension. The Mexican Highland Subprovince extends from north-central New Mexico to southeastern Arizona.

Basins of the Mexican Highland include the Mesilla, Mimbres, and Animas basins. These basins contain thick sequences of Pliocene-Pleistocene alluvial, eolian, and lacustrine deposits, and several have old playas. The Animas Basin, near Lordsburg, is a remnant of the Pleistocene Lake Animas. It is bounded by the Peloncillo Mountains to the west and the Animas and Pyramid mountains to the east. The Mimbres Basin is bounded by the Black Range to the north, the Goodsight Mountains and West Potrillo Mountains to the east, and the Cedar Mountain Range to the west. The Mesilla Basin is bounded by the Robledo and the Doña Ana mountains to the north, the East and West Potrillo mountains and the Aden Hills to the west, and the Santa Fe River to the east. The intervening mountain ranges consist of a wide variety of rock units of Proterozoic through Cenozoic age, and include the East and West Potrillo mountains, Florida Mountains, Tres Hermanas Mountains, Hatchet Mountains, Peloncillo Mountains, and Burro Mountains.

Geological units underlying the New Build Section analysis area are listed below in table 3.4-1.

Table 3.4-1. Geological Units Mapped in the New Build Section Analysis Area

Map Unit	Name	Description
Route Group 1 – Afton Substation to Hidalgo Substation		
Kbm	Mancos Formation and Beartooth Quartzite	Shale, sandstone, and medium-grained mixed clastic
Kl	Lower Cretaceous, undivided	Clastic, mixed clastic/carbonate rocks
Pys	Yeso, Glorieta, and San Andres formations, undivided	Sandstone, carbonate, and fine-grained mixed clastic; evaporite
Qa	Alluvium	Upper and middle Quaternary alluvium
Qb	Basalt and andesite flows and vent deposits	Andesite and basalt
Qbo	Basalt or basaltic andesite	Basalt; mafic and intermediate volcanic rock
Qp	Piedmont alluvial deposits	Piedmont alluvial deposits: upper and middle Quaternary
QTg	Gila Group	Conglomerate, sandstone, and basalt Summary Mimbres Formation
QTp	Older piedmont alluvial deposits and shallow basin fill	Alluvium and unconsolidated deposits
QTs	Upper Santa Fe Group	Basal conglomerate and interbedded sand and clay beds; cobbles and boulders are mainly andesite on north and east sides of Cristo Rey and mainly felsite on south side. Basal conglomerate forms most of unit in map area.
Qy	Holocene surficial deposits	Unconsolidated deposits associated with modern fluvial systems.
Ti	Intrusive rocks	Tertiary intrusive rocks; undifferentiated
Tla	Andesite and basaltic andesite flows and associated volcaniclastic units	Lower Tertiary (Lower Oligocene and Eocene) andesite and basaltic andesite flows, and associated volcaniclastic units
Tli	Quartz monzonites, intermediate intrusives, and other intermediate felsic dikes and plugs	Quartz monzonites (Eocene) in the Silver City and Los Pinos Range, intermediate intrusives of the Cooke's Range (Oligocene), and other intermediate to felsic dikes and plugs of Oligocene and Eocene age
Tlrf	Silicic flows, domes, and associated pyroclastic rocks	Lower Oligocene silicic (or felsic) flows, domes, and associated pyroclastic rocks and intrusions; includes Mimbres Peak Formation
Tlrp	Silicic pyroclastic rocks	Pyroclastic, tuff, felsic volcanic rock; volcanic rock (aphanitic); mixed clastic/volcanic
Tnb	Basalt and andesite flows, Neogene	Basalt and andesite flows; Neogene. Includes flows interbedded with Santa Fe and Gila Groups.
Tnv	Volcanic rocks, Neogene	Neogene volcanic rocks; primarily in Jemez Mountains
Tos	Sedimentary and volcaniclastic sedimentary rocks	Mostly Oligocene and upper Eocene sedimentary and volcaniclastic sedimentary rocks with local andesitic to intermediate volcanic
Tpb	Basalt and andesite flows, Pliocene	Basalt and andesite flows, Pliocene
Tual	Andesites and basaltic andesites	Upper Oligocene andesites and basaltic andesites
Turf	Silicic flows and masses and associated pyroclastic rocks	Upper Oligocene silicic (or felsic) flows and masses and associated pyroclastic rocks
Tus	Upper Tertiary sedimentary units	Upper Tertiary sedimentary units. Clastic, mixed clastic/volcanic, and volcanic rock (aphanitic); unconsolidated deposit.

Table 3.4-1. Geological Units Mapped in the New Build Section Analysis Area (Continued)

Map Unit	Name	Description
Tv	Middle Miocene to Oligocene volcanic rocks	Lava, tuff, fine-grained intrusive rock, and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt, andesite, dacite, and rhyolite.
Yp	Plutonic rocks, middle Proterozoic	Middle Proterozoic plutonic rocks
Route Group 2 – Hidalgo Substation to Apache Substation		
Q	Quaternary surficial deposits, undivided	Unconsolidated to strongly consolidated alluvial and eolian deposits
Qa	Alluvium	Upper and middle Quaternary alluvium
Qe	Eolian deposits	Eolian deposits
Qo	Early Pleistocene to latest Pliocene surficial deposits	Coarse relict alluvial fan deposits that form rounded ridges or flat, isolated surfaces that are moderately to deeply incised by streams
Qp	Piedmont alluvial deposits	Piedmont alluvial deposits: upper and middle Quaternary
Qpl	Lacustrine and playa-lake deposits	Lacustrine and playa-lake deposits; includes associated alluvial and eolian deposits of major lake basins
QTg	Gila Group	Conglomerate, sandstone, and basalt Summary Mimbres Formation
Qy	Holocene surficial deposits	Unconsolidated deposits associated with modern fluvial systems.
TKav	Andesitic volcanic	Andesitic volcanic
TKi	Intrusive rocks, Paleogene and Upper Cretaceous	Paleogene and Upper Cretaceous intrusive rocks; includes Hanover, Fierro, Tyrone, and Lordsburg granodiorite-quartz monzonite porphyries
Tla	Andesite and basaltic andesite flows and associated volcaniclastic units	Lower Tertiary, (Lower Oligocene and Eocene) andesite and basaltic andesite flows, and associated volcaniclastic units
Tli	Quartz monzonites, intermediate intrusives, and other intermediate felsic dikes and plugs	Quartz monzonites (Eocene) in the Silver City and Los Pinos Range, intermediate intrusives of the Cooke's Range (Oligocene), and other intermediate to felsic dikes and plugs of Oligocene and Eocene age
Tlrf	Silicic flows, domes, and associated pyroclastic rocks	Lower Oligocene silicic (or felsic) flows, domes, and associated pyroclastic rocks and intrusions; includes Mimbres Peak Formation
Tlrp	Silicic pyroclastic rocks	Lower Oligocene silicic pyroclastic rocks (ash-flow tuffs)
Tsy	Pliocene to middle Miocene deposits	Moderately to strongly consolidated conglomerate and sandstone deposited in basins during and after late Tertiary faulting. Includes lesser amounts of mudstone, siltstone, limestone, and gypsum.
Tual	Andesites and basaltic andesites	Upper Oligocene andesites and basaltic andesites
Turp	Rhyolitic pyroclastic rocks	Upper Oligocene rhyolitic pyroclastic rocks (ash-flow tuffs)
Tv	Middle Miocene to Oligocene volcanic rocks	Lava, tuff, fine-grained intrusive rock, and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt, andesite, dacite, and rhyolite.
Xm	Early Proterozoic metamorphic rocks	Undivided metasedimentary, metavolcanic, and gneissic rocks
Yg	Middle Proterozoic granitic rocks	Mostly porphyritic biotite granite with large microcline phenocrysts, with local fine-grained border phases and aplite
Yp	Plutonic rocks, middle Proterozoic	Middle Proterozoic plutonic rocks

Source: U.S. Geological Survey (2013).

POTENTIAL GEOLOGICAL HAZARDS

Potential geological hazards within the New Build Section of the proposed Project and alternatives are described in the following sections. Potential hazards are evaluated further in chapter 4 with regard to their potential impacts on the proposed Project. As described below, identified geological factors that were determined not to be potential hazards include earthquakes, volcanoes, mapped areas of geological importance, and important State-identified rock outcroppings. Mapped areas of geological importance and important State-identified rock outcroppings are not "hazards," but are rather geological features that could potentially be impacted. Each potential hazard, along with its relationship to the proposed Project, is described in further detail below.

Land Subsidence and Earth Fissures

Ground subsidence and earth fissures are typically caused by groundwater depletions. Earth fissures are open surface and subsurface tension cracks in unconsolidated and semiconsolidated sediment. Some also exhibit vertical displacement. Most earth fissures are thought to result from the groundwater withdrawals, where the declining water table causes the aquifer sediments to compact, which leads to ground subsidence. In areas of differential subsidence, fissures form where extensional horizontal stress is the greatest. Basin-fill sediments also may be subject to fissures where evaporites such as anhydrite, gypsum, and halite (salt) are present.

Although no areas of land subsidence are known to be present in route group 1 – Afton Substation to Hidalgo Substation, large areas of land subsidence are mapped in the Willcox, Arizona, area and in the areas around San Simon, Arizona (Arizona Department of Water Resources (ADWR) 2013). The 2-mile-wide analysis area of the New Build Section crosses through approximately 32,000 acres of the Bowie San Simon subsidence feature, approximately 12,900 acres of the Fort Grant subsidence feature, and approximately 38,900 acres of the Kansas Settlement subsidence feature.

No earth fissures are documented in the analysis area for route group 1. Areas of earth fissures have been documented in Cochise County, Arizona, near Apache, and east of the town of Bowie in New Mexico, and the analysis area crosses a number of known fissures (Arizona Geological Survey (AZGS) 2013). Route group 1 crosses approximately 227 fissures.

Geological Faults

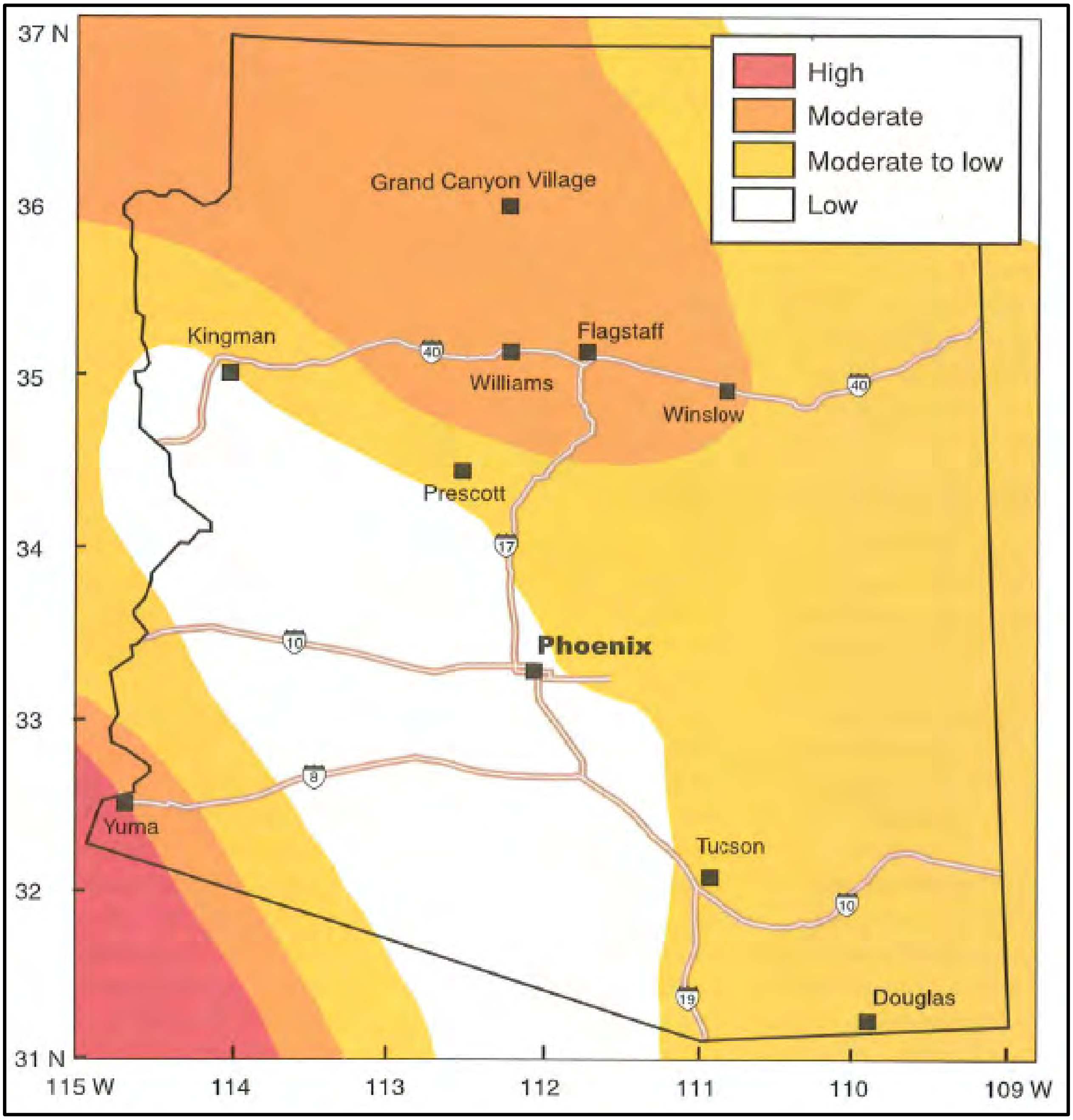
Ground surface displacement along an active surface fault can damage structures and highways when located near the fault zone or straddling the fault trace. The amount of lateral and vertical movement during a single earthquake can range from several inches to tens of feet. Another aspect of fault displacement comes not from the violent movement associated with earthquakes but from the barely perceptible movement along a fault called "fault creep." Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroads, streets, pipelines, curbs, and other such linear features.

The U.S. Geological Survey (USGS) quaternary fault and fold database (USGS 2012a) was used to determine the presence of active faults within the analysis area. Although no "active faults" (surface rupture within the past 11,000 years) have been mapped in the analysis area, the analysis area for route group 1 overlies 38 faults, and route group 2 – Hidalgo Substation to Apache Substation crosses a total of 9 faults.

Earthquakes

The seismic hazard assessment is based on the potential for regional and local seismic activity as described in the existing scientific literature, and on anticipated subsurface soil and groundwater conditions within the boundary of the proposed Project. The seismic hazard analysis included a review of literature and databases that describe historical seismicity in the Project vicinity (figure 3.4-1).

Figure 3.4-1. Seismicity in the analysis area.



Overall, the seismic hazard is relatively low throughout the entire New Build Section. Most of New Mexico's historical seismicity has been concentrated in the Rio Grande Valley between Socorro and Albuquerque. Very few earthquakes and little historical seismicity have occurred in the vicinity of the New Build Section in the Arizona portion of the proposed Project. The largest earthquake in the vicinity of route group 2 was a magnitude 7.4 earthquake that occurred in Sonora, Mexico, in 1887. No damaging historical earthquakes have been recorded in the New Build Section analysis area (USGS 2012b). Based on the USGS seismic hazard analysis mapping (USGS 2012c), the probabilistic ground motion in the vicinity of the proposed New Build Section is between 0.03 and 0.04 g, where g is the acceleration due to gravity equaling 32 feet per second squared, for a 10 percent probability of exceedance in 50 years (500-year return period), which is generally considered the maximum credible (design) earthquake.

Landslides

Geological hazard impacts that the proposed Project could potentially create or for which it could increase the potential to occur include mass wasting and increased instability resulting from steep cuts and fills and blasting. Surface access roads would be required to reach each transmission line tower, substation, and regeneration site. Existing road improvements could include blading, widening of the road, or installing of drainage structures, such as culverts.

Areas where the proposed Project could potentially lead to increased erosion and mass wasting are primarily steeper areas that would require cut slopes and embankment fills for access roads and foundation construction. Where bedrock is very shallow and durable in mountainous areas, blasting may be required to achieve road grades, construct cut slopes, and excavate foundations. Figures 3.4-2 and 3.4-3 show the locations where the analysis area crosses steeper slopes (greater than 25 percent) that could potentially require excavations, cut slopes, fill slopes, and blasting.

Overall, steeper slopes along route group 1 are located where the alignment crosses the Potrillo and Florida Mountains and through the Camel Mountains, Tres Hermanas Mountains, Cedar Mountains, and isolated hills southeast of Lordsburg. In general, the proposed route avoids areas of steep slopes. The total land area with slopes greater than 25 percent within this route group is approximately 1,600 acres.

Route group 2 would cross through the Pyramid Mountains and Peloncillo Mountains. There are numerous steep slopes in this portion of the New Build Section. These areas are primarily where the proposed route would cross the Peloncillo Mountains. The total land area with slopes greater than 25 percent within this route group is approximately 8,800 acres.

Volcanoes

The USGS has established a volcano hazards program that provides advice on the status of volcanic activity through the United States (USGS 2012d). No potentially active volcanoes have been identified or are being monitored in the Project vicinity. The closest potentially active volcano monitored by the USGS is Mammoth Mountain, in east-central California. Therefore, potential hazards to the proposed Project and alternatives from volcanic eruptions appear to be nonexistent.

Figure 3.4-2. Geological map sheet, Afton to Hidalgo Substation and Hidalgo to Apache Substation.

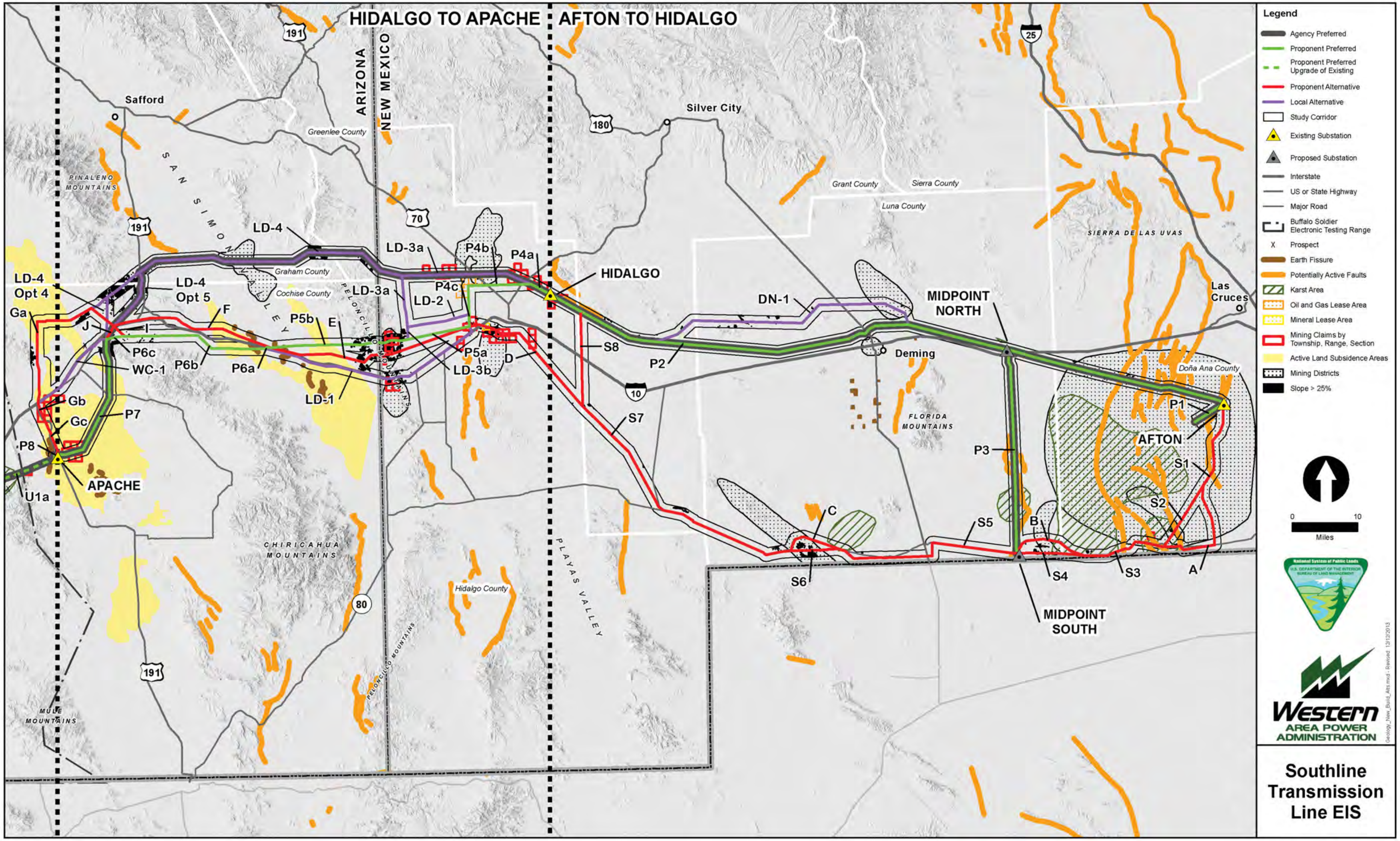
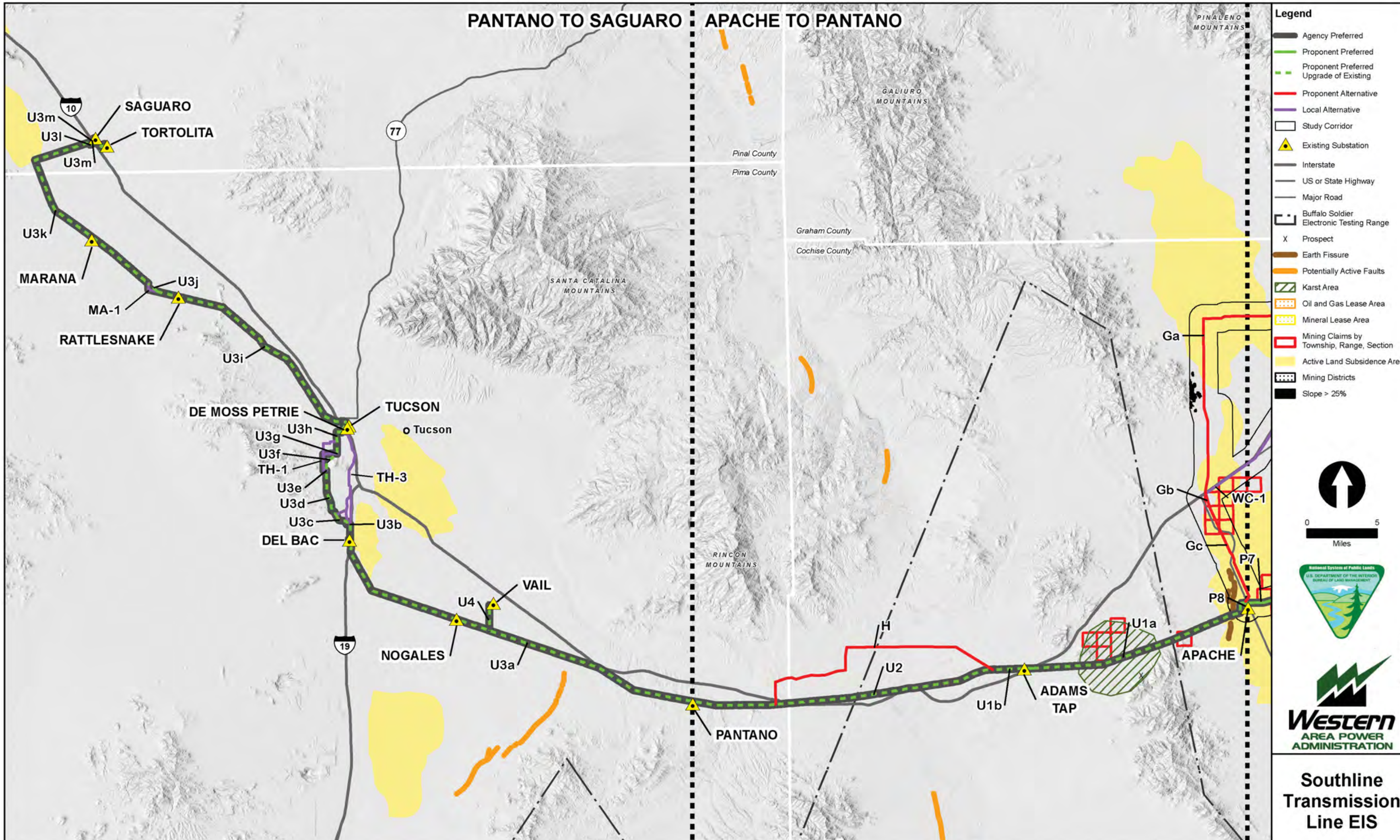


Figure 3.4-3. Geological map sheet, Apache to Pantano Substation and Pantano to Saguaro Substation.



AREAS PRONE TO HIDDEN GEOLOGICAL HAZARDS

When new projects are constructed, they may be unwittingly routed over geologically stable areas that could be made unstable or unsafe by construction activities such as blasting or extreme weight loads. Areas with the potential for geological hazards to be created by construction activities include “karst and cave” areas that may have the potential to contain fissures, tubes, and caves.

“Karst” typically involves dissolution of carbonate rock that results in caves and voids that could collapse. For the purposes of this report, karst also refers to the large areas of volcanic rock in the analysis area that could contain fissures, tubes, and caves in the lava. The karst is thus likely to be primarily related to lava tubes and caves that could influence the placement and construction of the alignment. Construction of the proposed Project or alternatives in karst areas could potentially expose area lava tubes and caves, which could collapse, damage equipment, or cause injuries. Rarely, the ground overlying karst areas can collapse suddenly and damage aboveground structures.

Route group 1 crosses approximately 738 acres mapped as karst; route group 2 does not cross any. Figure 3.4-2 shows the distribution of karst areas in the New Build Section.

MAPPED AREAS OF GEOLOGICAL IMPORTANCE AND IMPORTANT STATE-IDENTIFIED ROCK OUTCROPPINGS

No unique geological features were identified within the analysis area of the New Build Section. No areas of unique geological interest, caves, rock outcroppings, or mineral collection areas of recreational or scientific importance were identified within the New Build Section analysis area.

New Build Section – Mineral Resources

MAPPED AREAS OF MINERAL RESOURCES OF ECONOMIC VALUE

Common-variety minerals include aggregates, sand and gravel, volcanic cinders, basalt, and building stone. In the analysis area for the New Build Section, common-variety mineral resources include primarily sand and gravel pits likely used for crushed rock and fill materials. Figures 3.4-2 and 3.4-3 show the locations of these resources and, where data are available, the type of resource.

Southern New Mexico and southeastern Arizona have long and productive mining histories. Hardrock mineral resources in the area that have been historically mined or with the potential for extraction include beryllium, bismuth, vanadium, copper, germanium, gold, iron, lead-zinc, manganese, molybdenum, niobium, silver, thorium, tin, and tungsten. Active and inactive mines in the Project corridor are producing or have produced manganese, gold, silver, copper, lead, vanadium, and zeolites. Figures 3.4-2 and 3.4-3 show the locations of these resources and, where data are available, the type of resource. Some of these are producers, some are past producers, and some are prospects.

Route group 2 would cross the Lordsburg Mining District south of Lordsburg, New Mexico, and therefore is likely to cross over mineral resources, including lead, copper, silver, gold, and zinc. There are 23 metal occurrences in the vicinity of the analysis area. However, most of these are classified as “past producers,” and none is within the representative ROW.

Southwestern New Mexico and southeastern Arizona produce or could potentially produce numerous non-metallic mineral resources, including calcite, gypsum, perlite, volcanic rock, agate, fire clay, barite, fluorite, garnet, gemstones, limestone/marble, pumice, kyanite, silica, and talc.

EXISTING MINING DISTRICTS / MINING CLAIMS (ESPECIALLY PRE-1955 CLAIMS)

Route group 1 crosses over the Fluorite Ridge, Deming, Aden, Carrizalillo Hills, Potrillo Mountains, and Camel Mountain–Eagle Nest mining districts. Route group 2 – Hidalgo Substation to Apache Substation of the proposed New Build Section would cross the Lordsburg Mining District south of Lordsburg, New Mexico, which is known to produce lead, copper, silver, gold, and zinc; and the Bowie Mining District in Arizona, currently producing industrial zeolite minerals. These are used mostly as molecular sieves, for such purposes as removing ammonia from natural gas. Other mining districts in this route group include the Lordsburg Mesa, Kimball, and McGhee Peak districts.

Prior to 1955, claimants had certain surface rights associated with their mining claim. PL 84-167 required BLM to publish each Township in each state where the United States wished to acquire complete surface management rights. Most Townships were published between 1955 and 1968. The Master Title Plat for a particular Township (and the Historical Index) will show whether the Township was published, give the date of publication, and list the claims (by claim name) that responded or were adjudicated surface rights under this act. To maintain surface rights under this determination, the chain of title cannot be broken. There are very few of these claims in Arizona (BLM 2012b).

Using the online BLM tool (BLM's Land and Mineral Legacy Rehost 2000 System – LR2000 (BLM 2012b)), mining claim locations can be narrowed down to 1–square mile sections of land. The mining claims are inventoried by the section (1 square mile) in which they are located. Using this online tool (BLM 2012b), a search for mining claims within the analysis area that were staked on or before July 23, 1955 did not yield any results. Therefore, no known pre-1955 mining claims are present within the analysis area of the proposed New Build Section.

EXISTING OIL/GAS WELLS

The possibilities of commercial oil and natural gas occurring in southwestern New Mexico are good, as indicated by the thick section of Paleozoic and Cretaceous sedimentary rock, by the oil and gas "shows" in completed test wells, and by favorable geological structures. However, the development of these potentially commercially exploitable oil and gas resources would be difficult due to the presence of igneous intrusions and adverse geological structures (Wengerd 1970).

One oil and gas lease is located within the analysis area, northwest of Lordsburg in route group 2. The status of this lease is unknown. No wells in the New Build Section are currently producing oil or gas (personal communication, S. Rauzi, AZGS, 2012).

According to the BLM, there are no active coal leases in the Las Cruces or Pecos Districts in New Mexico. Most coal production in New Mexico occurs in the northwestern part of the State, well outside the analysis area (personal communication, M. Smith, BLM, 2012). There are no coal leases or known coal resources on BLM lands under the jurisdiction of the Tucson Field Office (personal communication, D. Moore, BLM, 2012).

GEOTHERMAL RESOURCE POTENTIAL AREAS

Because of natural hot springs and wells with elevated water temperatures in the San Simon Valley, the area is classified in Arizona as being prospectively valuable for geothermal resources from near the State line to a few miles west of Bowie, New Mexico (Witcher 1979). But as with oil and gas, there has never been any commercial production in or near the analysis area.

Witcher (1979) showed about 15 water wells with elevated temperatures in the analysis area from San Simon to Bowie, with discharge temperatures between 35 °C and 49 °C. However, the waters are much hotter about 30 miles to the north, where the Gillard Hot Springs along the Gila River has the hottest surface water in Arizona at about 82 °C, and an area near Clifton, Arizona, a few miles east of there has hot water at about 70 °C. This is the area on which research and commercial interest has focused through the years, resulting in the establishment in 1974 of the Gillard Hot Springs and Clifton Hot Springs Known Geothermal Resource Areas (KGRAs). A KGRA is defined by the USGS as an area that has the necessary geothermal potential to justify spending money for development and is based on the level of interest for competitive leasing by the private sector.

These temperatures are only considered to be moderate by geothermal standards, and each of the KGRAs is apparently of limited extent, each being a deep-water convection system controlled by local faulting, with the water coming to the surface along these faults (Richter et al. 1982; Witcher et al. 1982). The moderate temperatures and limited geographic area likely preclude the potential for generating electricity, leaving only direct-use applications, like heating greenhouses (Richter et al. 1982; Witcher et al. 1982). Interest in this resource has waned through the years. The leases that established the KGRAs expired with insufficient further interest in leasing to justify the continued existence of the KGRAs, which were therefore revoked by the BLM in the early 1980s. Richter et al. (1982) rates the potential for geothermal development in this area as “low to very low.” Today, there is just one company showing an interest, Gradient Resources, which maintains a lease on the Clifton site. As mentioned, no geothermal leases have ever been established on or near the subject land. No commercially viable geothermal resources are located on the Arizona portion of the analysis area. A number of small-scale geothermal systems are in use throughout New Mexico for greenhouses or aquaculture (Idaho National Engineering Laboratory 2003), but none were identified within the analysis area.

Upgrade Section – Geological Resources

REGIONAL GEOLOGICAL SETTING

The Upgrade Section is located in the eastern edge of the Sonoran Desert Subprovince of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is a region dominated by basins filled with sediments separated by uplifted mountain blocks. Major basins include the Avra Valley, Tucson Basin, San Pedro Valley, and Sulphur Springs Valley (Trapp and Reynolds 1995). The San Pedro River drains the San Pedro Basin. Mountain ranges include the Tucson Mountains, west of Tucson; the Tortolita Mountains, northwest of Tucson; the Santa Catalina Mountains, northeast of Tucson; and the Rincon Mountains, east of Tucson.

Large-scale detachment faulting and regional subsidence occurred in the mid-Tertiary period (ca. 32 million to 20 million years ago (mya)), and sediments began to accumulate in ancestral basins. Basin and Range faulting occurred from 13 mya to 5 mya, where the basins were down-dropped and mountains were left as upthrown fault blocks. Some of these basins are deep, with up to 8,000 feet of sediment infill.

Bedrock units that form the mountains include Proterozoic-age granitic and metamorphic rocks, as well as shallow-water carbonates and clastic sedimentary rocks that were deposited during the Paleozoic era on an extensive erosion surface across the older rocks. More recent geological activity included plutonism (intrusion of large igneous rocks) and volcanism. There was a major pulse of volcanism in the late Oligocene and Miocene time.

The sediments in the basins have been modified by repeated cycles of dissection and deposition during the Quaternary. The sediments tend to be coarser grained near the source areas in the mountains and finer grained in the basin centers. The basin-fill sediments, therefore, include stratified gravel sand, silt, clay, mudstone, and evaporites (i.e., gypsum).

The Precambrian geological units crossed by the Upgrade Section include the unnamed intrusive and metasedimentary rocks (Richard et al. 2000; USGS 2013a). The Cambrian geological units crossed by the Upgrade Section include the Abrigo Formation and Bolsa Quartzite. These rocks represent a shallow marine depositional environment (Richard et al. 2000; USGS 2013a).

The Cretaceous geological units crossed by the Upgrade Section include the Bisbee Group, Amole Arkose, Recreation Red Beds, and unnamed intrusive and rhyolitic to andesitic volcanic rocks. These rocks record the transition from marine to terrestrial depositional environments (Richard et al. 2000; USGS 2013a).

The Tertiary (Paleocene, Eocene, Oligocene, Miocene, and Pliocene epochs) geological units crossed by the Upgrade Section include the Gila Group and unnamed intrusive and rhyolitic to basaltic volcanic rocks. These deposits represent terrestrial depositional environments associated with mountain building and basin infilling, as well as widespread volcanism associated with a tectonic shift from compression to extension during the late Oligocene to early Miocene (Richard et al. 2000; USGS 2013a).

Quaternary (Pleistocene and Holocene epochs) geological units crossed by the Upgrade Section consist of unnamed older and younger surficial sediments consisting of lacustrine, floodplain, alluvial fan, eolian, and piedmont alluvial deposits (Richard et al. 2000; USGS 2013a).

In route group 3 – Apache Substation to Pantano Substation, the Proponent Alternative runs through a flat area filled with mixed sediments and sedimentary rocks. Closer to Pantano is an outcrop formed by Cretaceous-age andesitic lava flows and tuffs.

Because the Upgrade Section primarily overlies mixed alluvial basin-fill materials and because the existing ROW was presumably designed to avoid major hazards, potential geological hazards and effects on geological resources are limited in the Upgrade Section.

Table 3.4-2 provides a summary of geological units along the proposed Upgrade Section. Figure 3.4-3 shows the distribution of the geological units in the Upgrade Section.

Table 3.4-2. Geological Units Mapped in the Upgrade Section Analysis Area

Map Unit	Name	Description
Route Group 3 – Apache Substation to Pantano Substation		
Mo	Mississippian, Devonian, and Cambrian sedimentary rocks	Brown to dark gray sandstone grades upward into green and gray shale, overlain by light to medium gray or tan limestone and dolostone
Pz	Paleozoic sedimentary rocks	Undivided Paleozoic limestone, dolostone, quartzite, shale, and related sedimentary rocks
Q	Quaternary surficial deposits, undivided	Unconsolidated to strongly consolidated alluvial and eolian deposits
Qo	Early Pleistocene to latest Pliocene surficial deposits	Coarse relict alluvial fan deposits that form rounded ridges or flat, isolated surfaces that are moderately to deeply incised by streams
Qr	Holocene river alluvium	Unconsolidated to weakly consolidated sand and gravel in river channels and sand, silt, and clay on floodplains
Qy	Holocene surficial deposits	Unconsolidated deposits associated with modern fluvial systems

Table 3.4-2. Geological Units Mapped in the Upgrade Section Analysis Area (Continued)

Map Unit	Name	Description
Tsy	Pliocene to middle Miocene deposits	Moderately to strongly consolidated conglomerate and sandstone deposited in basins during and after late Tertiary faulting. Includes lesser amounts of mudstone, siltstone, limestone, and gypsum.
Tv	Middle Miocene to Oligocene volcanic rocks	Lava, tuff, fine-grained intrusive rock, and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt, andesite, dacite, and rhyolite.
Xg	Early Proterozoic granitic rocks	Wide variety of granitic rocks, including granite, granodiorite, tonalite, quartz diorite, diorite, and gabbro
Yg	Middle Proterozoic granitic rocks	Mostly porphyritic biotite granite with large microcline phenocrysts, with local fine-grained border phases and aplite
Ys	Middle Proterozoic sedimentary rocks	Red-brown shale and sandstone, buff to orange quartzite, limestone, basalt, black shale, and sparse conglomerate
Route Group 4 – Pantano Substation to Saguaro Substation		
KJs	Cretaceous to Late Jurassic sedimentary rocks with minor volcanic rocks	Sandstone and conglomerate, rarely forms prominent outcrops; massive conglomerate is typical near base of unit and locally in upper part.
Kv	Early Tertiary to Late Cretaceous volcanic rocks	Rhyolite to andesite and closely associated sedimentary and near-surface intrusive rocks.
Q	Quaternary surficial deposits, undivided	Unconsolidated to strongly consolidated alluvial and eolian deposits.
Qo	Early Pleistocene to latest Pliocene surficial deposits	Coarse relict alluvial fan deposits that form rounded ridges or flat, isolated surfaces that are moderately to deeply incised by streams
Qr	Holocene river alluvium	Unconsolidated to weakly consolidated sand and gravel in river channels and sand, silt, and clay on floodplains
Tsm	Middle Miocene to Oligocene sedimentary rocks	Conglomerate, sandstone, mudstone, limestone, and rock-avalanche breccia (sheet-like deposits of crushed rock) deposited and tilted during widespread normal faulting and basin development
Tsy	Pliocene to middle Miocene deposits	Moderately to strongly consolidated conglomerate and sandstone deposited in basins during and after late Tertiary faulting. Includes lesser amounts of mudstone, siltstone, limestone, and gypsum.
Tv	Middle Miocene to Oligocene volcanic rocks	Lava, tuff, fine-grained intrusive rock, and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt, andesite, dacite, and rhyolite.
Xm	Early Proterozoic metamorphic rocks	Undivided metasedimentary, metavolcanic, and gneissic rocks
Yg	Middle Proterozoic granitic rocks	Mostly porphyritic biotite granite with large microcline phenocrysts, with local fine-grained border phases and aplite

Source: USGS (2013a).

POTENTIAL GEOLOGICAL HAZARDS

Potential geological hazards within the Upgrade Section of the proposed Project and alternatives are described in the following sections. Potential hazards are evaluated further in chapter 4 with regard to their potential impacts on the proposed Project. Identified geological factors that were determined not to be potential hazards include earth fissures, geological faults, earthquakes, volcanoes, mapped areas of geological importance, and important State-identified rock outcroppings. Each potential hazard, along with its relationship to the proposed Project, is described in further detail below.

Land Subsidence and Earth Fissures

The causes of land subsidence and earth fissures and their related geological hazards were described above under the New Build Section description.

Route group 3 crosses through 73.5 acres of subsidence areas: the Fort Grant (37.2 acres) and Kansas Settlement (36.3 acres) subsidence features. In the corridor of the Pantano to Saguaro route group, large areas of groundwater-level declines have been documented along the alignment in the Avra Valley and Tucson area (Schuman and Guinaldi 1986). The water table has been lowered by as much as 150 feet in the Avra Valley and up to several hundred feet in the Tucson Basin (Pearthree et al. 2000). Continuing subsidence has been documented as water levels decline in the Tucson area. Measurements in the Tucson Basin suggest that the rate of subsidence has increased markedly since 1980. Two large areas of land subsidence are documented in the Tucson area; the ROW passes through one, located south of I-10 and east of I-19. Route group 4 crosses through 16.1 acres of land identified as the Tucson subsidence area.

Areas of large groundwater-level declines could potentially be subject to further land subsidence and formation of earth fissures in these areas. However, active groundwater management areas in the Tucson Basin have been formed, with the goal of reducing groundwater withdrawals and their associated impacts.

The Upgrade Section is not located within an AZGS earth fissure study area, and AZGS mapping does not depict any earth fissures in the Upgrade Section of the analysis area (AZGS 2013).

Geological Faults

Geological hazards associated with possible surface fault ruptures are the same as those described above for the New Build Section.

The Project would be constructed within the Basin and Range Physiographic Province, which formed by normal faulting (i.e., primarily vertical displacement) over a period of millions of years. Although most of the faulting has ceased, several Quaternary-age faults (with activity within the past 1.6 million years) have been recognized and mapped in the vicinity of the proposed Project and alternatives.

The USGS quaternary fault and fold database (USGS 2012a) was used to determine the presence of active faults within the analysis area. No “active faults” (surface rupture within the past 11,000 years) have been mapped in the Upgrade Section. The Upgrade Section does not cross any Quaternary-age faults.

Earthquakes

Geological hazards associated with earthquakes for the Upgrade Section are the same as those described above for the New Build Section. More than 20 earthquakes with magnitudes greater than 5 have occurred in or near Arizona since 1850. The largest earthquake in the vicinity of the proposed Upgrade Section is a magnitude 7.4 quake that occurred in Mexico in 1887, approximately 40 miles southeast of Douglas, Arizona. This earthquake caused property damage throughout southeastern Arizona. However, no earthquakes have been recorded within the project analysis area.

Based on USGS (2012b) seismic hazard analysis mapping, the probabilistic ground motion in the vicinity of the proposed Upgrade Section is between 0.03 and 0.04 g, for a 10 percent probability of exceedance in 50 years (500-year return period), which is generally considered the maximum credible (design) earthquake. Figure 3.4-1 shows that the analysis area in southeastern Arizona is rated as a “moderate to low” to “low” earthquake hazard (Dubois and Smith 1980).

Landslides

Geological hazards associated with landslides for the Upgrade Section are the same as those described above for the New Build Section. Figure 3.4-3 shows areas along the proposed Upgrade Section where slopes are steeper than 25 percent that could potentially require excavations, cut slopes, fill slopes, and blasting.

Because the Upgrade Section runs primarily through broad alluvial valleys, few areas along the proposed route are steeper than 25 percent. These areas are primarily near the Dragoon Mountains, terrace surfaces around Benson, and through the Twin Peaks area west of Tucson. The Apache to Pantano section crosses approximately 201 acres of land with slopes greater than 25 percent. Route group 4 crosses approximately 24 acres of land with slopes greater than 25 percent.

Volcanoes

According to the USGS volcano hazards program, no active volcanoes are listed in the Project vicinity (USGS 2012c). The closest potentially active volcano monitored by the USGS is Mammoth Mountain, in east-central California. No volcanic hazards are anticipated in the Upgrade Section.

AREAS PRONE TO HIDDEN GEOLOGICAL HAZARDS

When new projects are constructed, they may be unwittingly routed over geologically stable areas that could be made unstable or unsafe by construction activities such as blasting or extreme weight loads. Areas with the potential for geological hazards to be created by construction activities include “karst and cave” areas that may have the potential to contain fissures, tubes and caves. As previously described, karst typically involves dissolution of carbonate rock that results in caves and voids that could collapse. For the purposes of this report, karst also refers to the large areas of volcanic rock in the analysis area that could contain fissures, tubes, and caves in the lava.

Route group 3 crosses approximately 110 acres mapped as karst; route group 4 does not cross any karst areas.

Figure 3.4-3 shows the distribution of karst areas in the Upgrade Section.

MAPPED AREAS OF GEOLOGICAL IMPORTANCE AND IMPORTANT STATE-IDENTIFIED ROCK OUTCROPPINGS

No unique geological features were identified within the analysis area of the Upgrade Section. No areas of unique geological interest, caves, rock outcroppings, or mineral collection areas of recreational or scientific importance were identified within the Upgrade Section analysis area.

Upgrade Section – Mineral Resources

Because the Upgrade Section runs primarily through broad alluvial basins, there are very few mineral resources within the 500-foot-wide analysis area corridor of the Upgrade Section.

MAPPED AREAS OF MINERAL RESOURCES OF ECONOMIC VALUE

Common-variety minerals include aggregates, sand and gravel, volcanic cinders, basalt, and building stone. No other common-variety mineral resources are identified within the Upgrade Section.

Southern Arizona has a long and productive mining history. Metal resources in the area that have been historically mined or with potential for extraction include beryllium, bismuth, copper, germanium, gold, iron, lead-zinc, manganese, molybdenum, niobium, silver, thorium, tin, and tungsten. However, no metal resources are specifically identified within the Upgrade Section.

Southern Arizona produces or could potentially produce non-metallic mineral resources, including calcium, gypsum, perlite, volcanic rock, agate, fire clay, barite, fluorite, garnet, gemstones, limestone/marble, pumice, silica, and talc. No non-metallic mineral resources are specifically identified within the Upgrade Section.

EXISTING MINING DISTRICTS / MINING CLAIMS (ESPECIALLY PRE-1955 CLAIMS)

The significance of pre-1955 mining claims is described above (see New Build Section). Essentially, pre-1955 claims convey certain surface rights that post-1955 claims do not have. Using the online BLM tool (LR2000 (BLM 2012b)), mining claim locations can be narrowed down to 1-square-mile sections of land. The mining claims are inventoried by the section (1 square mile) in which they are located. Using the online LR2000 BLM tool, a search performed for mining claims within the analysis area that were staked on or before July 23, 1955 did not yield any results. No known pre-1955 mining claims are present within the analysis area of the proposed Upgrade Section.

EXISTING OIL/GAS WELLS

Nations et al. (1989) state that the area with perhaps the greatest potential for future petroleum discoveries is the Pedregosa Basin in Cochise County, which includes the analysis area. This potential is based on the stratigraphic similarity of the Paleozoic and Mesozoic sedimentary rocks of this area to the Permian Basin of west Texas and eastern New Mexico, which is a well-known prolific producer of oil and gas. The Pedregosa Basin has the same sort of source rocks, reservoir rocks, and stratigraphic and structural traps as the Permian Basin. However, as described by Greenwood et al. (1977), the volcanism and plutonism of the Basin and Range area of southeastern Arizona probably had a negative effect on petroleum accumulations; plus, many of the sedimentary rocks are covered by thick sequences of more recent (Tertiary) volcanic rocks. Greenwood et al. (1977:1464) also note that “the apparent lack of oil and gas seeps in the highly faulted Basin and Range province has prompted some geologists to doubt the presence of significant petroleum accumulations.” Rauzi (2001:figure 1), however, reports that some petroliferous shales are found near Tombstone and that a rancher reported some oily material coming initially from a fresh spring in the Swisshelm Mountains in 1934. These were the only reports of surface petroleum occurrences in Cochise County.

From the 1920s through the 1980s, there have been about 20 exploratory oil and gas wells drilled in southern Graham County and northern Cochise County, and all have been plugged and abandoned as dry holes, with no production. An Arizona well location map prepared by the Arizona Oil and Gas Conservation Commission (1987) shows the location of these dry holes. Showings of oil or gas were reported in one well drilled in 1971 in the San Simon Valley (the Ivan Tenney No. 3 State well, about 10 miles north of the analysis area) by Rauzi (2001:35), and in several holes drilled in the late 1920s (about 5 miles southeast of the Tenney well), as reported by Wilson (1996:18), who noted that all these holes from the 1920s were “ultimately unsuccessful.”

As stated by Peirce (1982:5), “Thus far, southern Arizona continues to be ore-deposit country, not petroleum. Petroleum very likely existed here prior to a series of disruptive geological events that may have dispersed much pre-existent oil and/or natural gas. Some petroleum could remain, perhaps in highly unusual places, but finding it is proving elusive and costly.” And with that, exploratory drilling for oil and gas in southern Arizona has been nonexistent since the 1980s (Arizona Oil and Gas Conservation Commission 1987; Greenwood et al. 1977; Nations et al. 1989; Rauzi 2001).

There are no oil or gas wells or any known oil or gas resources on BLM lands under the jurisdiction of the Tucson Field Office (personal communication, D. Moore, BLM, 2012). One inactive oil and/or gas well is located within route group 3 at the Adams Tap Substation (personal communication, S. Rauzi, AZGS, 2012).

There are no coal leases or any known coal resources on BLM lands under the jurisdiction of the Tucson Field Office (personal communication, D. Moore, BLM, 2012).

GEOTHERMAL RESOURCE POTENTIAL AREAS

No geothermal leases have ever been established on or near the analysis area. No commercially viable geothermal resources are located on the Arizona portion of the analysis area. GIS data obtained from the USGS Mining Resource Data System indicate that there are no geothermal resources within the ROW of the Upgrade Section. No commercially viable geothermal resources are located on the Arizona portion of the analysis area (personal communication, Larry Thrasher, BLM, 2013).

3.5 SOIL RESOURCES

This soil resource inventory presents an overview of the soils within the analysis area and addresses potential impacts to these resources from the implementation of the proposed Project or its alternatives and associated components. The primary reason to define impacts to soils is to reduce, minimize, or mitigate effects from all phases of the Project. This section analyzes the current conditions within the analysis area with regard to sensitive soils, including wind and water erosion, compaction, soil biotic crusts, and soil productivity.

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 12: Soils” (CH2M Hill 2013d). The contents of that report are used herein without specific reference.

3.5.1 Analysis Area

New Build Section

The analysis area for the New Build Section for the proposed Project and its alternatives is 1 mile on either side of the centerline. The analysis area is used to identify the soil resources that have the potential to be directly impacted by ground disturbance associated with the Project.

Upgrade Section

The analysis area for the Upgrade Section for the proposed Project and its alternatives is a 500-foot-wide corridor centered on the existing ROW (200 feet off the centerline of the existing 100-foot corridor).

3.5.2 Issues to Be Analyzed

The extent to which the proposed Project could result in potential impacts to sensitive soils is addressed in chapter 4, where potential effects with regard to soil are evaluated. Sensitive soils within this context are those where biological soil crusts exist, are susceptible to high rates of wind and/or water erosion, and have a high potential for productivity losses. In order to address these potential impacts, wind erodibility group values are analyzed in chapter 4, along with changes in soil productivity values and sustainable soil loss (T factor). These values give a good indication of the acreage of sensitive soils within the analysis area. Potential effects related to soil resources during Project construction, operation, and maintenance activities could include:

- Loss of topsoil due to construction, operation, and maintenance activities (i.e., removal or mixing of topsoil);
- Soil compaction from vehicular traffic;
- Soil erosion due to wind and water; and
- Changes in soil productivity that could result from topsoil disturbance after construction and reclamation:
    - Disturbance of sensitive soils (soils which may be difficult to reclaim); and
    - Disturbance of biotic soil crusts due to surface disturbance during Project activities.

Impacts to soil resources would be considered significant if any of the above potential effects results in major direct or indirect negative consequences. The extent to which the proposed Project could result in such effects is addressed in chapter 4, where potential changes to soil resources are described in terms of spatial extent, temporal scale, and significance, to facilitate the comparison of alternatives.

3.5.3 Analysis Area Conditions

This section details the current conditions of the analysis area as they relate to the existing soil resources. The New Build and Upgrade Sections are combined in this discussion, since both are found within the Basin and Range Physiographic Province (Fenneman 1931) of New Mexico and Arizona. This physiographic province is characterized by basins separated by north-south-trending mountain ranges. The basins are filled with alluvium of Pliocene-Pleistocene age. Playas within the basins are remnant ancient lake beds. The soil resources found within the analysis area vary by landscape; therefore, diverse soil types are found throughout both the New Build and Upgrade sections. For example, it would be expected that soils within river and stream bottoms would be highly susceptible to water erosion, while the soils found on playa plains would be more subjected to wind erosion.

The analysis area for both the New Build and Upgrade sections contains six different soil orders and over 120 different soil mapping units. The most common soil order found within the analysis area is aridisols, followed by entisols and mollisols. Other soil orders represented by a single mapped soils series within the area of the proposed Project and alternatives (based on U.S. generalized soil mapping (Natural Resources Conservation Service (NRCS) 2013a, 2013b) include vertisols, inceptisols, and alfisols. The dominant soils, aridisols, form under arid conditions, contain subsurface horizons in which clay, calcium carbonates, silica, and salts accumulate, and they contain very little organic matter, making them more prone to erosion and harder to reclaim. Revegetation of aridisols can be difficult due to lack of moisture and organic matter and therefore should be initiated during wet times of the year. All soil orders within the analysis area have the ability to support soil biotic crust; however, exact distribution of these crusts is unknown.

The 10 soil mapping units with the most coverage by area found within the New Build and Upgrade sections, and their general descriptions, are listed below in tables 3.5-1 and 3.5-2. A majority of the soils within the analysis area are of loamy or sandy textures with deep profiles, and are typically well drained. Because soils in a given area typically have similar parent materials, other area soils not listed in the tables are mostly similar in composition.

Table 3.5-1. Summary of Top 10 Soil Mapping Units within the New Build Section

Soil Unit	Percent of Analysis Area	Description
Hondale-Verhalen association	9.74	0–3% slopes, well drained, very deep soils with loam surface over clay and loam subsoil
Tres Hermanos-Upton complex	7.23	0–8% slopes, well drained, very deep soils with a gravelly sandy clay loam over gravelly clay loam subsoil
Wink-Pintura complex	7.14	0–8% slopes, well drained, very deep soils with a fine sandy loam surface and subsoil over weakly to moderately cemented caliche
Stellar-Mohave association	6.59	0–5% slopes, well drained, very deep soils with a clay loam surface and clay subsoil
Pintura-Berino complex, eroded	5.03	1–20% slopes, excessively drained, very deep soils with a loamy find sand surface over fine sand subsurface
Mohave sandy clay loam	5.00	0–8% slopes, well drained, very deep soils that have a sandy loam surface over a clay loam and loam subsurface
Signal gravelly loam	2.77	0–30% slopes, well drained, deep soils with a very gravelly loam and very gravelly clay loam surface over very gravelly sandy clay
Sonoita complex	2.65	0–20% slopes, excessively drained, deep soils with a gravelly sandy loam throughout
Tubac soils	2.17	0–8% slopes, well drained, very deep soil with a fine sandy loam and gravelly sandy loam surface over gravelly clay loam and loam
Atascosa-Graham-Rock outcrop complex	2.12	5–70% slopes, well drained shallow to very shallow soils with very gravelly sandy loam surface over very gravelly sand clay loam subsoil over bedrock

Table 3.5-2. Summary of Top 10 Soil Mapping Units within the Upgrade Section

Soil Unit	Percent of Analysis Area	Description
Anthony sandy loam	6.67	0–15% slopes, well drained, very deep soil with a sandy loam surface texture and a fine sandy loam subsurface texture
Grabe soils	6.01	0–3% slopes, well drained, very deep soils with a loam surface texture and loam and fine sandy loam subsurface textures
Delnorte-Stagecoach complex	4.51	0–30% slopes, excessively drained, deep soils with a gravelly sandy loam texture throughout
Calcigypsids-Contention-Redo complex	4.45	5–45% slopes, well drained, very deep soils with a very gravelly sandy loam to sandy surfaces textures and very to extremely gravelly loam to sand subsurface textures
Comoro sandy loam	4.03	0–8% slopes, excessively drained, very deep soils with a sandy loam surface texture and sandy loam and fine sandy loam subsurface texture
Cave-Rillito complex	3.98	0–35% slopes, very shallow, well drained soils with a gravelly sandy loam surface texture over a gravelly loam and calcium carbonate hardpan subsurface
Courtland-Sasabe-Diaspar complex	3.83	0–8% slopes, well drained, very deep soils with a sandy loam surface texture over a sand clay loam subsurface texture
Libby-Gulch complex	3.42	0–10% slopes, well drained, deep soils with a very gravelly loamy sand and very gravelly and gravelly fine sandy loam surface textures over gravelly and very gravelly sandy loams and sandy clay loams subsurface textures
Rillito gravelly sandy loam	3.30	0–5% slopes, excessively drained, very deep soils with a gravelly sandy loam surface texture over a gravelly loam to sandy loam subsurface texture
Cowan loamy sand	2.72	0–3% slopes, excessively drained, very deep soils with a sandy loam surface texture and a loamy sand subsurface texture

Construction of the proposed Project could result in disturbance to soils susceptible to high rates of wind and/or water erosion, and have a high potential for productivity losses. Identifying these areas would help contractors plan for appropriate erosion BMPs during construction, such as stormwater run-on and runoff prevention, silt fences and/or retention basins, and topsoil management and conservation practices. It would also help to plan for appropriate reclamation and revegetation activities following construction, and would identify priority areas that may warrant extra precautions. In this context, table 3.5-3 characterizes the erosivity and productivity of soils in both the New Build and Upgrade sections.

Table 3.5-3. Soil Resources Inventory Data

		Water and Wind Erosion		Productivity		Corrosivity	
Project Section	**Total Acreage**	**T-factor* (percent of area)**	**WEG† (percent of area)**	**RngProdNY‡ (acres)**	**RngProdFY§ (acres)**	**Steel**	**Concrete**
New Build	807,005	48.2%	63.5%	42.4	37.9	2% (16,875 acres)	0.1% (1,128 acres)
Upgrade	429,644	8.7%	6.5%	9.4	6.2	0.5% (2,293 acres)	0.06 % (262 acres)

*** T-factor** = 'Sustainable' soil loss factor in tons. Acreage total includes moderate (4 tons); severe (2 and 3 tons); and very severe (0 and 1 tons).

† **WEG** = Wind Erodibility Group (WEG). Acreage total includes moderately susceptible (WEGs 3, 4, and 4L) and highly susceptible (WEGs 1 and 2).

‡ **RngProdNY** = Rangeland Productivity – Normal Year. Acreage total includes moderate (500–1,000 pounds per acre (lb/acre) (dry weight)); high (1,000–2,000 lb/acre); and very high (>2,000 lb/acre).

§ **RngProdFY** = Rangeland Productivity – Favorable Year. Acreage total includes moderate (1,000–2,000 lb/acre [dry weight]); high (2,000–4,000 lb/acre); and very high (>4,000 lb/acre).

The T-factor is an estimated soil loss tolerance, measured in tons per acre (integer values of from 1 to 5 tons per acre per year [t/a/y]). It is defined as the maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained. This quality of the soil to be maintained is threefold in focus. It includes maintaining the surface soil as a seedbed for plants, the atmosphere–soil interface to allow the entry of air and water into the soil and still protect the underlying soil from wind and water erosion, and the total soil volume as a reservoir for water and plant nutrients, which is preserved by minimizing soil loss. Extremely shallow or otherwise fragile soils have a T-factor of 1 t/a/y, and very deep soils that are least subject to damage by erosion have a T-factor of 5 t/a/y ((NRCS 2013c).

Wind erodibility groups (WEGs) are a set of classes given integer designations from 1 through 8, based on the properties of the soil surface that are considered to affect susceptibility to wind erosion. The major criteria are texture, presence of carbonate, and the degree of decomposition of organic material in the soils. Associated with each WEG is a wind erodibility index. The wind erodibility index is the theoretical, long-term amount of soil lost per year through wind erosion, but assumes the soil is bare, lacks a surface crust, occurs in an unsheltered position, and is subject to the weather. Because appropriate soil management BMPs would be used during and following constructions, it is assumed that occurrences of bare unprotected soils would be infrequent and temporary. Therefore, only the WEG is analyzed herein (NRCS 2013c).

Rangeland health is thought of as the degree to which the integrity of the soil and ecological processes of rangeland systems are maintained (National Research Council 1994). In areas of similar climate and topography, differences in the kind and amount of rangeland or forest understory vegetation are closely related to the kind of soil and therefore the condition of that soil. Rangeland productivity can be measured in total dry-weight production, in pounds per acre of air-dry vegetation. This is the amount of vegetation that can be expected to grow annually in a well-managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals, and includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. For each soil type, estimates are provided for favorable, normal, and unfavorable years (above average, average, and below average growing conditions, based on how precipitation and temperatures affect available soil moisture) (NRCS 2003a).

Corrosion of steel and concrete is the potential of soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

3.6 PALEONTOLOGICAL RESOURCES

Some of the information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 9: Paleontology” (CH2M Hill 2013e). The contents of that report are used herein without specific reference.

Paleontological resources consist of fossilized remains and imprints of vertebrates, invertebrates, and plants, as well as trace fossils such as footprints. Paleontological resources are non-renewable resources that allow scientists to answer questions about what the Earth was like in the past and how it has changed over time. They include fossils themselves and the geological deposits in which the fossils are found. When assessing the significance of paleontological resources, care must be taken to consider the entire geological unit and not simply known fossil locations within the analysis area.

Two areas of concern are present within the analysis area, both of which are located in New Mexico:

- the Mojado, U-Bar (Aptian), Hell-to-Finish formations in the East Potrillo Mountains in southwestern New Mexico; and
- the Santa Fe Group in the Mesilla and Mimbres basins in New Mexico.

3.6.1 Analysis Area

The analysis area for the New Build Section of the proposed Project is 1 mile on either side of the centerline of all alternatives. This is to identify resources that could be directly impacted by ground disturbance. The analysis area for the Upgrade Section of the proposed Project is a 500-foot corridor (200 feet on either side of existing 100-foot corridor).

3.6.2 Laws, Ordinances, Regulations, and Standards

Paleontological resources are considered fragile and non-renewable resources important to scientific knowledge. Several Federal and State laws, regulations, policies, and standards are applicable to paleontological resources in the analysis area.

Federal

The following provides a summary of the relevant Federal regulations besides NEPA that concern paleontological resources on Federal land, or that are on land that is included in a Federal project. The most important of these regulations are the Antiquities Act of 1906 and the Paleontological Resources Preservation Act of 2009.

The Antiquities Act of 1906 (16 U.S.C. 431–433) regulates “objects of antiquity” found on Federal land, which includes fossils, by establishing a permitting system for excavations on Federal land. It also establishes criminal sanctions for those who remove or destroy said objects.

The FLPMA of 1976 (43 U.S.C. 1701–1782) requires that Federal land be managed in a manner that will protect the quality of their scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values. Under the FLPMA, paleontological resources fall under the category of resources of scientific value.

Title 43 CFR 8365.1–5 permits the collection of common invertebrate and common plant fossils on public lands but prohibits the collection of fossils for commercial reasons without a permit.

The Paleontological Resources Preservation Act (Title 6 of the Omnibus Public Land Management Act (H.R. 146, Subtitle D)) requires the DOI and USDA Secretaries to “manage and protect paleontological resources on Federal land using scientific principals and expertise” and to “develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources.” It also puts in place permitting requirements for collection of specimens from public land, and criminal and civil penalties for unauthorized collection.

Several BLM handbooks deal with the management of paleontological resources on Federal lands: H-8270 – “Paleontological Resource Management Handbook” (BLM 1998a); H-8270-1 – “General Procedural Guidance for Paleontological Resource Management” (BLM 1998b); IM 2008-009, “Potential Fossil Yield Classification System for Paleontological Resources on Public Lands” (BLM 2008c); and IM 2009-011, “Guidelines for Assessment and Mitigation of Potential Impacts to Paleontological Resources” (BLM 2009b).

The “Coronado National Forest Land and Resource Management Plan” (U.S. Forest Service 1986a), which is currently under revision, sets a goal for managing paleontological resources found in caves. Caves are to be preserved and protected “for their unique environmental, biological, geological, hydrological, archaeological, paleontological, cultural and recreational values.”

State

NEW MEXICO

In New Mexico, paleontological resources are under the jurisdiction of the Commissioner of Public Lands, who is responsible for managing assets on State Trust lands. Assets on State Trust land are protected from unauthorized appropriation, damage, removal, or use.

ARIZONA

ARS 41-841, “Archaeological and Vertebrate Paleontological Discoveries,” states that on State land individuals “shall not knowingly excavate in or upon any . . . vertebrate paleontological site, or site including fossilized footprints,” nor shall they collect vertebrate paleontological specimens unless authorized by the State.

Professional Standards

The Society of Vertebrate Paleontology has established guidelines and professional standards for best practices in research, analysis, publication, and curation (Society of Vertebrate Paleontology 2008), as well as guidelines for impact analysis to paleontological resources (Society of Vertebrate Paleontology 1995).

3.6.3 Issues to Be Analyzed

Several issues are to be analyzed for potential impact to paleontological resources:

- What are the effects of ground-disturbing activities from tower, substation, and access road construction on scientifically significant fossil-bearing geological units?
- Is there potential for damage to or loss of scientifically significant fossils due to construction?
- Will the proposed Project limit access to scientifically significant fossil-bearing geological units?

3.6.4 Analysis Area Conditions

This section discusses the gathering of data for determining the paleontological sensitivity of the analysis area for the proposed Project, as well as the application of those data to the BLM's Potential Fossil Yield Classification (PFYC).

Data Sources

Sources consulted to develop a paleontological inventory of the analysis area include geological maps, published and unpublished reports, and museum records. Primary maps used for geological mapping were Scholle (2003) and AZGS (2000), both of which are available online. The fossil locality and Miomap databases at the University of California Museum of Paleontology (UCMP) at Berkeley, the New Mexico Museum of Natural History and Science (NMMNH) paleontological database, the Paleobiology Database (Paleobiology) maintained by the University of California at Santa Barbara, and fossil locality data provided by the BLM Las Cruces Field Office (confidential) were consulted to identify known fossil localities in or near the analysis area. The Tucson and Safford BLM Field Offices, AZGS, New Mexico Bureau of Geology and Mineral Resources, and Arizona Museum of Natural History were also contacted for information on known fossil localities.

Paleontological Sensitivity and Potential Fossil Yield Classification

The BLM uses the PFYC system to determine the potential for the presence of fossils within certain geological formations, or its "paleontological sensitivity." The PFYC was initially developed to provide guidance in predicting and assessing paleontological resources by the FS and was adopted by the BLM (BLM 2008c). The PFYC system classifies geological units "based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. Guidelines issued by the Society of Vertebrate Paleontology (1995) state that paleontological "sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant [taxonomic], phylogenetic, ecologic, or stratigraphic data."

The classification is "applied to the geological formation, member, or other distinguishable unit, preferably at the most detailed mappable level" (BLM 2008c:attachment 1-1). By applying classifications to geological units, the system acknowledges that it is the geological unit itself that is the source of the fossils, regardless of whether or not known fossil localities are present within the analysis area, and allows scientists to predict whether or not a geological unit will be fossiliferous. Table 3.6-1 defines each PFYC class.

Table 3.6-1. Potential Fossil Yield Classes

Classification	Description	Management Concern
Class 1 – Very Low	Geological units that are not likely to contain fossils, such as igneous, metamorphic, or Precambrian-age rocks.	Negligible or not applicable
Class 2 – Low	Sedimentary geological units that are not likely to contain vertebrate or significant invertebrate or plant fossils, such as those younger than 10,000 years, recent eolian deposits, and those that have undergone physical or chemical changes.	Generally low
Class 3 – Moderate or Unknown	Sedimentary units with variable fossil content and significance or units with unknown potential.	Moderate or cannot be determined
Class 4 – High	Geological units with known fossils but with variable occurrence and predictability. The units may be at risk from human disturbance.	Moderate to high
Class 5 – Very High	Geological units that consistently and predictably produce fossils of significant scientific value and are at risk from human disturbance.	High to very high

Source: BLM (2008c).

3.6.5 Regional Overview

The analysis area is located in the southeastern portion of the Basin and Range Physiographic Province, which is typified by north-south-trending or northwest-southeast-trending mountain ranges separated by valleys (basins) and which extends across western and southern Arizona and into southwestern New Mexico. The mountains were formed primarily as a result of Middle and Late Tertiary period extensional tectonic events. The mountain ranges consist of a variety of rock types reflecting the complex geological history of the region. The oldest rocks are Precambrian metamorphic rocks brought to the surface by later tectonic events. Paleozoic marine sedimentary rocks reflect a time when warm shallow seas covered much of the region. Mesozoic volcanic and plutonic rocks are the result of the Laramide Orogeny, a mountain-building event affecting the western North American cordillera that resulted from the collision of tectonic plates. Middle Tertiary period extensional tectonics were accompanied by the emplacement of large magmatic intrusions, resulting in large granitic plutons and widespread caldera-style silicic volcanism. This was followed by Early Tertiary high-angle extensional faulting, resulting in the classic basin and range physiography observed today. Quaternary period volcanism is evidenced by the numerous cinder cone volcanoes and basaltic lava flows of the San Bernardino volcanic field of southeast Arizona and the Potrillo volcanic field south and west of Afton. Most of the sediments found in the valleys are Late Tertiary and Quaternary basin-fill piedmont alluvium, as well as localized fluvial, alluvial, and eolian deposits. Animas Playa and Willcox Playa are dry lake beds that are the remnants of much larger Pleistocene lakes, specifically Lake Animas and Cochise Lake. Late Quaternary lacustrine deposits are preserved on the valley floors around the modern-day playas. Within the analysis area, the primary landforms are small mountain ranges, pediments, alluvial fans, bajadas (coalescing alluvial fans), arroyos (dry drainage channels), bolsons (internally drained flat valley bottoms), and playas. Table 3.6-2 provides a summary of the geological formations and deposits within the analysis area that have the potential to contain fossils. For further information on the geology of the analysis area, see Section 3.4, “Geology and Mineral Resources.”

Table 3.6-2. Geological Units and Paleontological Resources in the Analysis Area

Geological Age	Geological Unit	Fossil Types Found near the Analysis Area	Number of Known Fossil Localities within the Analysis Area	PFYC	Paleontological Sensitivity
Quaternary	Surface alluvial and eolian deposits and young volcanic deposits	None	None	1 to 2	Low to Moderate or Unknown
Tertiary–Early Quaternary	Quemada Formation, Upper Santa Fe Group, St. David Formation	Mammals, birds reptiles, amphibians, fish	None	1 to 2 (AZ) to 4 (NM)	Very Low to High
Mesozoic	Mojado, U-Bar, Hell-to-Finish Formations, Bisbee Group, Mancos Shale and Beartooth and Sarten Formations	Dinosaurs, dinosaur trackways, marine reptiles, reptiles, amphibian, fish, invertebrates, plants, microfossils,	1	1 (AZ) to 4 (NM)	Very Low to High
Paleozoic	Upper Naco Group, Lower Naco Group, Paradise Formation, Escabrosa Limestone, Abrigo Formation, and Bolsa Quartzite	Fish and invertebrates	None	2	Low

3.6.6 Paleontological Potential and Fossil Localities

The following discussion of geological formations and fossil localities is presented from oldest to youngest formations.

New Mexico

Paleozoic Era (532.0–251.0 mya) deposits in southwestern New Mexico consist of the Permian San Andres, Glorieta, and Yeso Formations. During the Paleozoic, southwestern New Mexico was covered by a shallow sea, and fossils found in these formations include marine invertebrates (trilobites, echinoderms, cephalopods, gastropods, brachiopods, bivalves, anthozoans, bryozoans, and sponges) and the teeth of cartilaginous fish (Carrasco et al. 2005; NMMNH 2012; Paleobiology 2012; UCMP 2012).

Mesozoic Era (251.0–65.5 mya) formations within southwestern New Mexico include the Mancos Shale, Beartooth, and Sarten Formations and the Mojado, U-Bar, and Hell-to-Finish Formations. The Mancos Shale, Beartooth, and Sarten Formations have produced marine invertebrate (ostracods, echinoids, cephalopods, anthozoans, gastropods, and bivalves) and vertebrate fossils (selachin fish teeth) (Carrasco et al. 2005; Lucas et al. 1988; NMMNH 2012; Paleobiology 2012; UCMP 2012).

The Mojado, U-Bar, and Hell-to-Finish Formations have produced terrestrial vertebrate fossils, including trackways, as well as invertebrates and plant fossils. Footprints of ornithopod and theropod dinosaurs, reptilian swimming traces, and possible trackways of an ankylosaurian dinosaur have been recorded in the formations. Invertebrates recorded include cephalopods and bivalves, and plants include remains of tree-like ferns (Carrasco et al. 2005; Kappus et al. 2003; NMMNH 2012; Paleobiology 2012; UCMP 2012). One bivalve fossil locality was reported within the analysis area within the Mojado, U-Bar, and Hell-to-Finish Formations (confidential fossil locality data obtained from the BLM District Office in Las Cruces, New Mexico, 2012).

Cenozoic Era (65.5 mya to present) deposits are represented by Tertiary–Early Quaternary period and Quaternary period deposits. Tertiary–Early Quaternary deposits consist of the Santa Fe group in the Mimbres and Mesilla Basins of southwestern New Mexico. The Santa Fe Group has produced mammalian, avian, and reptilian fossils from Blancan- and Irvington-age (Late Pliocene to Early Pleistocene–age) deposits (table 3.6-3) (Carrasco et al. 2005; Morgan and Lucas 2003; NMMNH 2012; Paleobiology 2012; UCMP 2012).

Table 3.6-3. Fauna from the Santa Fe Group

Age	Mammals	Birds	Reptiles
Irvington (Early Pleistocene)	Gomphothere, camel, horse, ground sloth, beaver, wolf, coyote, cervid, deer	–	land tortoise
Blancan (Late Pliocene)	Gomphothere, ground sloth, glyptodont, bobcat, sabercat, horse, llama, camel, deer, rabbit, skunk, tapir, mole, ground squirrel, pocket gopher, cotton rat, and grasshopper mouse	small passerine bird	softshell turtle, emydid (pond turtle), land tortoise, snake, lizard

Sources: Carrasco et al. (2005); Morgan and Lucas (2003); NMMNH (2012); Paleobiology (2012); UCMP (2012).

Quaternary deposits include Pleistocene (1.6 mya–11,700 years before present (BP)) and Holocene (11,700 years BP to present) deposits. Holocene deposits are generally too young to contain fossils, and Pleistocene deposits in New Mexico are not favorable for preservation of fossils or have been shown to be non-fossiliferous.

Arizona

Paleozoic Era deposits in southeastern Arizona include the Cambrian-age Abrigo Formation and Bolsa Quartzite, Mississippian-age Paradise Formation and Escabrosa Limestone, and the Pennsylvanian to Permian-age Upper and Lower Naco Group. Marine vertebrate (teeth of cartilaginous fish) and invertebrates (trilobites, echinoderms, cephalopods, gastropods, brachiopods, bivalves, anthozoans, bryozoans, and sponges) have been reported from these formations (Carrasco et al. 2005; NMMNH 2012; Paleobiology 2012; UCMP 2012).

Mesozoic Era deposits in southeastern Arizona include the Bisbee Group, Amole Arkose, and Recreation Red Beds. Bisbee Group deposits have produced plant fossils (petrified wood), invertebrates (bivalves and gastropods), reptiles (crocodilians and turtles), and dinosaurs (ornithopods and sauropods) (Carrasco et al. 2005; Lucas and Heckert 2005; NMMNH 2012; Paleobiology 2012; UCMP 2012). The Amole Arkose within the Tucson Mountains has produced a partial hadrosaur (Lucas et al. 2005). The Recreation Red Beds, which underlie the Amole Arkose, have produced plant fossils, such as fern and horsetail, as well as raindrop impressions and trackways (Collins 2006; Ratkevich 2012).

Cenozoic Era (Tertiary–Quaternary) deposits in southeastern Arizona consist of the Gila Group, including the fossil-bearing St. David Formation in the Benson area. Overall, the Gila Group in Arizona is mostly unfossiliferous; only a few short stratigraphic internals, such as the St. David Formation near Benson and the 111 Ranch beds north of the analysis area in Graham County contain significant vertebrate fossils from near the beginning of the Ice Age, including a frog, a salamander, turtles, a lizard, birds, and mammals (Morgan and White 2005; NMMNH 2012; Paleobiology 2012).

Like Quaternary deposits in New Mexico, Quaternary deposits in Arizona are generally not favorable for preservation of fossils or have been shown to be non-fossiliferous. However, some limited areas of southeastern Arizona in the San Pedro Valley, Willcox Playa, and San Simon Valley, have produced mammoth, horse, bison, camel, dire wolf, peccary, and tapir remains (Haury et al. 1959; Lindsay 1984; Tegowski and White 2000). Archaeological materials have been found with four mammoth localities in southern Cochise County (Haury et al. 1959; Lindsay 1984). A mammoth skull and mud turtle remains were found during construction of the Apache Power Station (Bryan and Gidley 1926; Waters 1989). However, none of these localities would be affected by the transmission line.

3.6.7 Potential Fossil Yield Classification

New Mexico

In New Mexico, the Paleozoic San Andres, Glorieta, and Yeso Formations and the Mesozoic Mancos Shale, Beartooth, and Sarten Formations have been assigned a PFYC of 2, Low Potential. The Mesozoic Mojado, U-bar, and Hell-to-Finish Formations and the Tertiary-Quaternary Santa Fe Group have been assigned a PFYC of 4, High Potential. Quaternary deposits have been assigned a PFYC of 1 to 2, Very Low to Low Potential.

Arizona

In Arizona, the Paleozoic and Mesozoic formations all have a PFYC of 1, Very Low Potential. Only some areas of Tertiary sedimentary rocks and Quaternary sediments have a PFYC of 2 to 3, Low to Moderate Potential, with the rest of these sediments having a Very Low Potential.

3.6.8 Summary of Inventory Results

Only one fossil locality has been reported for the analysis area in New Mexico. No fossil localities have been reported within the analysis area in Arizona. PFYC classifications range from PFYC 1, Very Low, to 4, High Potential (table 3.6-4, figures 3.6-1a and 3.6-1b).

Table 3.6-4. Potential Fossil Yield Classifications by Route Group

Route Group	PFYC 1 (acres)	PFYC 2 (acres)	PFYC 3 (acres)	PFYC 4 (acres)	No. of Fossil Localities within the Analysis Area
1: Afton to Hidalgo	271,652 (63%)	14,543 (3%)	0 (0%)	146,481 (30%)	1
2: Hidalgo to Apache	413,798 (97%)	12,036 (3%)	73 (0%)*	0 (0%)	0
3: Apache to Pantano	3,177 (97%)	0 (0%)	92 (3%)	0 (0%)	0
4: Pantano to Saguaro	5,925 (100%)	0 (0%)	0 (0%)	0 (0%)	0

* Represents less than 1% of total route group acreage.

3.6.9 New Build Section

Route Group 1 – Afton Substation to Hidalgo Substation

Route group 1 – Afton Substation to Hidalgo Substation consists of segments of the proposed Project (Proponent Preferred and Proponent Alternative) and local alternative DN1. One fossil locality is found within the Afton to Hidalgo route group 2-mile-wide analysis area in the East Potrillo Mountains. The majority of the route group 1 analysis area has been assigned a PFYC of 1 to 2, with the exception of the Upper Santa Fe Group, and the Mojado, U-bar, and Hell-to-Finish Formations, which have a PFYC of 4.

Route Group 2 – Hidalgo Substation to Apache Substation

Route group 2 – Hidalgo Substation to Apache Substation consists of segments of the Proponent Preferred and Proponent Alternative, as well as local alternatives LD1, LD2, LD3, LD4, and WC1. No fossil localities were reported from the route group 2 analysis area. The majority of the route group 2 deposits have been assigned a PFYC of 1; some Quaternary deposits in the Hidalgo to Apache route group have been assigned a PFYC of 2 to 3.

3.6.10 Upgrade Section

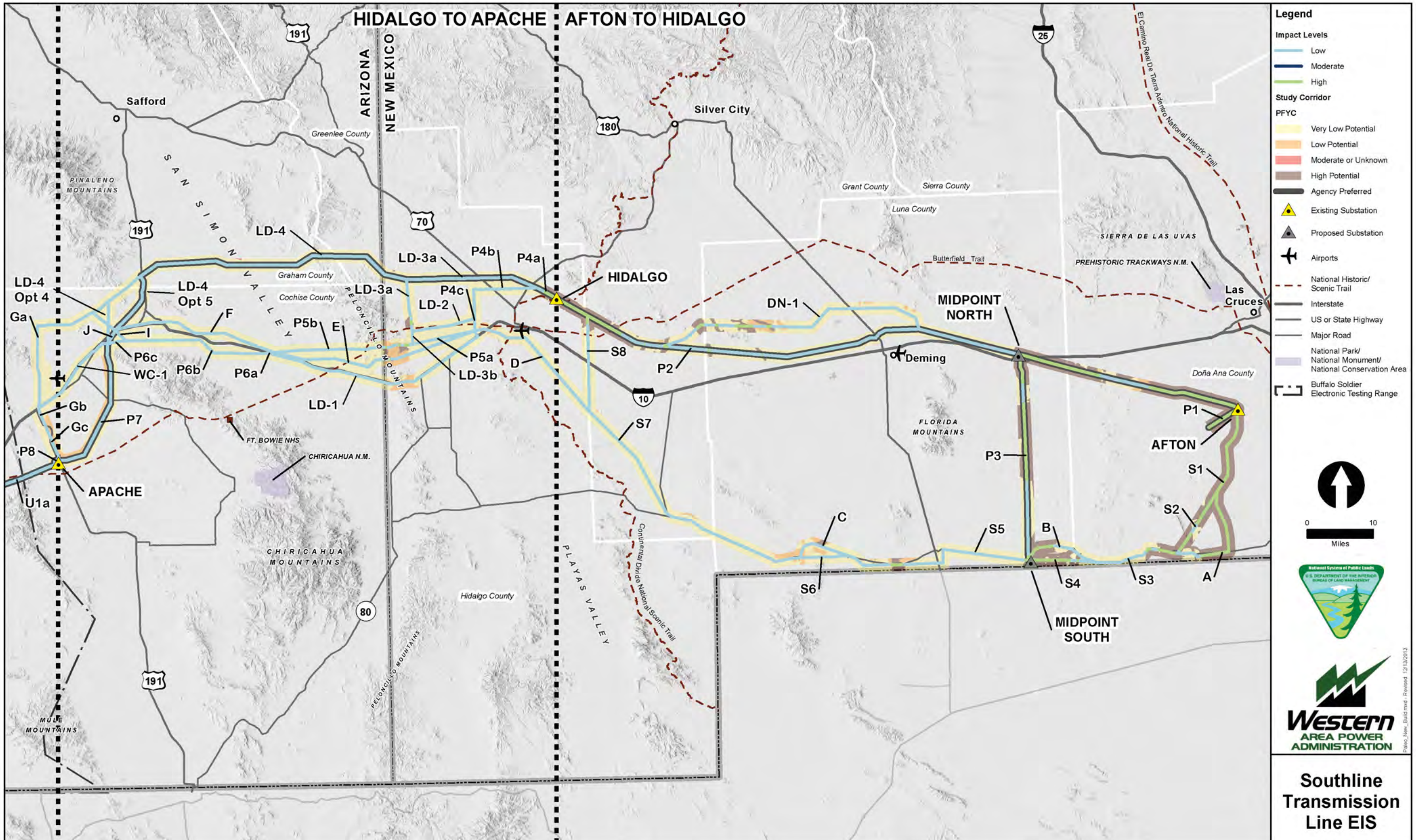
Route Group 3 – Apache Substation to Pantano Substation

Route group 3 – Apache Substation to Pantano Substation consists of segments of the Proponent Preferred and a local alternative (H). No fossil localities have been reported within the 500-foot-wide analysis area for route group 3. Most of the analysis area has been assigned a PFYC of 1; some Quaternary sediments within the analysis area have been assigned a PFYC of 3.

Route Group 4 – Pantano Substation to Saguaro Substation

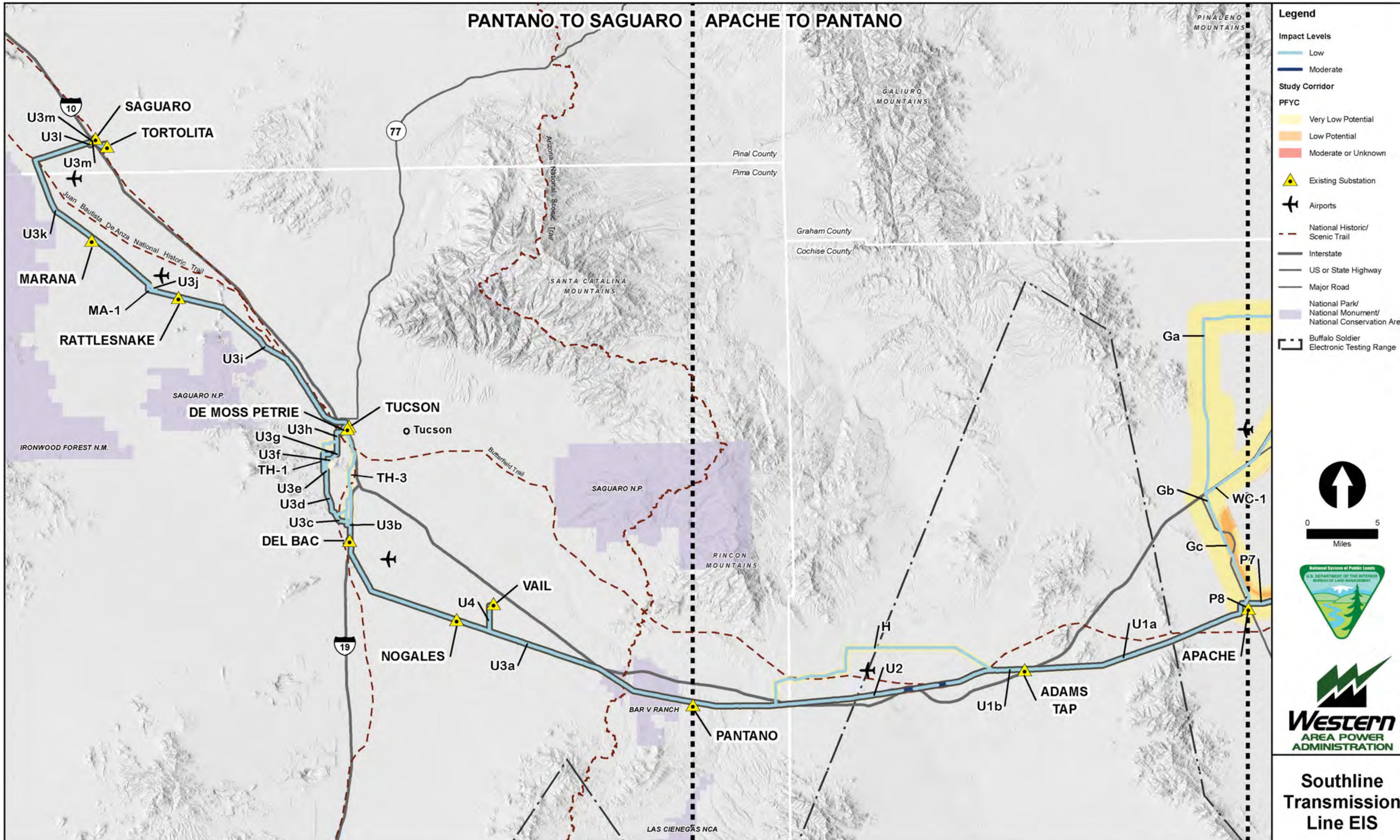
Route group 4 – Pantano Substation to Saguaro Substation route group consists of segments of the Proponent Preferred and local alternatives TH1 and TH3 and their subroutes, and MA1. No fossil localities have been recorded within the 500-foot-wide analysis area for route group 4. All of the analysis area for route group 4 has been assigned a PFYC of 1.

1 **Figure 3.6-1a.** PFYC Classifications within the New Build Section analysis area.



2

Figure 3.6-1b. PFYC Classifications within the Upgrade Section analysis area.



3.7 WATER RESOURCES

3.7.1 Groundwater, Surface Water, and Wetlands

This section describes the existing environmental conditions associated with water resources. Water resources encompass both groundwater and surface water, including WUS that are jurisdictional under the CWA, wetlands, and floodplains. Characteristics of water resources within the analysis area include the presence/absence of water, the extent of water features, quantity of water or amount of flow, and water quality.

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 17: Water Resources” (CH2M Hill 2013f). The contents of that report are used herein without specific reference.

3.7.2 Analysis Area

New Build Section

The analysis area for water resources for the New Build Section extends 1 mile on either side of the centerline of alternatives carried forward and any substation or access roads outside that corridor. This is to identify resources that could be directly impacted by ground disturbance and where construction materials, equipment, and workers may be present.

The analysis area for surface water must incorporate the potential for indirect impacts to water resources aside from direct disturbance. For surface water, this also includes any downstream drainages, limited to the downstream confluence of the next major watercourse. For groundwater, this includes any aquifers that will be affected by changes in groundwater quantity or quality, but limited just to the area of the aquifer where any impacts would affect known or existing users, or where changes in groundwater quality might migrate.

Upgrade Section

The analysis area for water resources for the Upgrade Section encompasses a 500-foot corridor, which represents 200 feet off the existing 100-foot corridor. Similar to the New Build Section, the analysis area also includes downstream drainages and aquifers.

3.7.3 Laws, Ordinances, Regulations, and Standards

Federal

CLEAN WATER ACT (33 U.S.C. 1251–1376)

The CWA and the Water Quality Act of 1987 form the major Federal legislation governing water quality. The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Important sections of the CWA are as follows.

Clean Water Act Section 401

Section 401 (Water Quality Certification) requires an applicant for any Federal permit who proposes an activity that may result in a discharge to a WUS to obtain from the appropriate State a certification that the discharge will not result in a violation of State surface water quality standards. In New Mexico, State water quality certification is outlined in NMSA Chapter 74, Article 6, and is administered by the NMED. In Arizona, State water quality certification is outlined in ARS 49-202(B)–(H) and is administered by the ADEQ. The NMED and ADEQ may certify, deny, or waive water quality certification. No Federal permit or action may be approved if the State denies certification. For most Nationwide Permits (NWPs) issued by the USACE under Section 404 of the CWA, NMED and ADEQ have conditionally certified the NWPs, and additional certification is not needed.

Clean Water Act Section 402/Arizona Pollutant Discharge Elimination System

Section 402 of the CWA establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into WUS. In New Mexico, authority for Section 402 permitting lies with Region 6 of the EPA, although assistance is provided by NMED. Since 2002, the ADEQ has had primacy in Arizona over Section 402 through implementation of the Arizona Pollutant Discharge Elimination System (AZPDES) (ARS 49-255.01).

Both the NPDES and AZPDES programs regulate discharge of pollutants into WUS. Historically, in Arizona and New Mexico virtually all waterways, including dry washes, fall under the jurisdiction of the NPDES and AZPDES programs. Both the NPDES and AZPDES programs regulate point sources of discharge. The most common source regulated is stormwater runoff from construction activities and industrial sites. Coverage under the NPDES or AZPDES programs may be obtained either through issuance of an individual permit or a general permit. There are five general permits that historically have been issued: de minimis discharges, stormwater runoff from construction activities (known as the CGP), stormwater runoff from concentrated animal feeding operations, stormwater runoff from industrial sites (known as the multisector general permit), and discharge of stormwater from municipal stormwater systems.

Linear construction activities, including road building, utility line construction, and other ground disturbance performed, would qualify for the NPDES 2012 CGP through the EPA for construction activities in New Mexico and the AZPDES CGP (AZG2013-001) through the ADEQ for construction activities in Arizona.

Clean Water Act Section 404

Section 404 of the CWA establishes a permit program for the discharge of dredged or fill material into WUS, including wetlands. This permit program is jointly administered by the USACE and EPA. The immediate regulatory decision regarding which activities fall under Section 404 of the CWA lies with the USACE Albuquerque District in New Mexico and the USACE Los Angeles District in Arizona. Typically in the desert Southwest, including New Mexico and Arizona, major dry washes are considered to be under the jurisdiction of the USACE as WUS, in addition to flowing streams, lakes, and other water bodies.

In general, there are three methods for obtaining a permit under Section 404: authorization under an NWP, authorization under a regional general permit, and issuance of an individual permit. Linear construction activities are often handled under NWP 12 – “Utility Line Activities.” NWPs are issued every 5 years by the USACE for commonplace activities that impact WUS. Based on the magnitude and type of disturbance and the conditions of the specific NWP, a preconstruction notification may or may not be required to be submitted to the USACE prior to conducting activities within a WUS.

The ability to obtain an NWP 12 for the proposed Project largely depends on the ability to meet the general conditions of the permit and any regional conditions imposed. The following are the most likely common conditions to be of concern:

- **Endangered species (NWP General Condition 18).** NWPs cannot be used when impacts are likely to directly or indirectly jeopardize the continued existence of a threatened, endangered, or candidate species under the ESA, or when they would directly or indirectly destroy or adversely modify critical habitat of those species. For impacts that "may affect" species, consultation with the FWS under Section 7 of the ESA must be completed prior to issuance of an NWP.
- **Cultural resources (NWP General Condition 20).** If Project impacts may affect properties listed, or eligible for listing, in the NRHP, an NWP cannot be used until consultation with the applicable SHPO under Section 106 of the NHPA is completed.
- **Magnitude and type of impact.** In general, for NWP 12 impacts may not exceed 0.5 acre for each "single and complete project." A single and complete project is typically interpreted as limiting impacts to any individual WUS to no more than 0.5 acre. Thus, with a linear utility line, each crossing of a wash or stream would be limited to no more than 0.5 acre of surface disturbance.
- **Special aquatic sites in Arizona (Los Angeles District Regional Condition 2).** Within the Los Angeles District of the USACE, an NWP 12 cannot be used to authorize losses of special aquatic sites. Special aquatic sites include wetlands, mudflats, vegetated shallows, or riffle and pool complexes.
- **Perennial water bodies in Arizona (Los Angeles District Regional Condition 4).** Within the Los Angeles District of the USACE, authorization of impacts to perennial water bodies requires submittal and approval of preconstruction notification to the USACE prior to disturbance.
- **Special aquatic sites, intermittent and perennial water bodies in New Mexico (Albuquerque District New Mexico Regional Condition A).** Within the Albuquerque District of the USACE, authorization of impacts of special aquatic sites and intermittent and perennial water bodies in New Mexico require submittal and approval of preconstruction notification to the USACE prior to disturbance.

Clean Water Act Section 303

The NMED and ADEQ have both developed surface water quality standards, including both numeric and narrative limitations, to define water quality goals for New Mexico and Arizona streams and lakes and provide the basis for controlling discharge of pollutants to surface waters. The 303(d) list, as required by Section 303(d) of the CWA, is a list of water bodies that have a designated beneficial use that are impaired by one or more pollutants. Water bodies included on this list are referred to as "impaired waters." New Mexico and Arizona must take appropriate action to improve impaired water bodies by establishing total maximum daily loads and reducing or eliminating pollutant discharges. In addition, potential discharges of stormwater into or near impaired water bodies have special consideration under both NPDES and AZPDES permitting.

FLOODPLAIN AND WETLAND ENVIRONMENTAL REVIEW

Portions of the proposed Project may affect floodplains and wetlands. In accordance with DOE floodplain and wetland environmental review requirements (10 CFR part 1022), this DEIS includes a floodplain and wetlands assessment. A floodplain statement of findings will be included in the FEIS (10 CFR 1022.14(c)).

EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

EO 11990 (May 24, 1977) directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial value of wetlands in carrying out programs that affect land use.

EXECUTIVE ORDER 11988 AMENDED BY EXECUTIVE ORDER 12148 (FLOODPLAIN MANAGEMENT)

EO 11988 (May 24, 1977) directs each Federal agency to take action to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.

BUREAU OF LAND MANAGEMENT GUIDANCE

The BLM manages the majority of the Federal lands within the analysis area. Two RMPs within the analysis area contain water resource features that require special management.

Mimbres Resource Management Plan

The Mimbres RMP includes all New Mexico portions of the New Build Section. Within the RMP, specific management areas are outlined, including the Lordsburg Playa Research Natural Area (RNA). The Lordsburg Playa RNA, located 10 miles west of Lordsburg, is the central of three playa lakes that encompass a total of 4,510 acres. This area is known for biological significance related to a State sensitive saltbush, as well as being an important migratory wintering site for shorebirds and waterfowl. This area is characterized topographically as a flat, relatively pristine dry lakebed, and soils in the Lordsburg Playa RNA are known for intermittent periods of inundation during periods of high runoff. One of the significant management goals and actions defined within the Lordsburg Playa RNA excludes authorizations for new ROWs, in accordance with conditions outlined in the Lands Program. This exclusion could affect one of the local alternatives for route group 2.

Riparian and Aquatic Habitat Management Plan

In August 2000, the Las Cruces Field Office proposed a Habitat Management Plan (HMP) specific to riparian and aquatic habitat. The purpose of the HMP is to provide guidance for the restoration and protection of riparian and aquatic habitats that fall under the jurisdiction of the Las Cruces Field Office. Specific management goals are to maintain, restore, improve, protect, and expand riparian areas so that they are in proper functioning condition for productivity, biological diversity, and sustainability. While applicable to all riparian habitats, the plan focuses on specific riparian areas of greater concern. The only area mentioned in the HMP applicable to this Project is Lordsburg Playa. Restrictions are similar to those described for the Mimbres RMP. Specific actions include retaining public land, keeping the area closed to vehicles, mineral leasing, and mineral sales, and ensuring the development and maintenance of natural vegetation.

Safford Resource Management Plan

The Safford RMP includes the Arizona portions of the New Build Section. Within the RMP, specific management areas are outlined, including the Willcox Playa National Natural Landmark (NNL). The Willcox Playa NNL, located 5 miles southwest of Willcox, contains about 2,475 acres of the Willcox

Playa. This area is occasionally visited by endangered whooping cranes (*Grus americana*) and has several rare endemic species of insects and crustaceans. This area is characterized topographically as a flat, relatively pristine dry lakebed. One of the special management prescriptions defined within the Willcox Playa NNL excludes authorizations for new ROWs. This exclusion could affect one of the Proponent Alternative segments for route group 2.

State

STATE OF NEW MEXICO AQUIFER PROTECTION REGULATIONS AND AQUIFER WATER QUALITY STANDARDS

Any discharge of a pollutant so that it may move directly or indirectly into groundwater requires a groundwater discharge permit from NMED. Poor-quality groundwater with concentrations of total dissolved solids (TDS) over 10,000 milligrams per liter (mg/L) are exempt from this regulation. Unless the discharge is specifically exempted (NMAC 20.6.2.3105), the discharge requires issuance of a groundwater discharge permit from NMED. Aquifer water quality standards have been also specified by the State of New Mexico (NMAC 20.6.2.3103).

STATE OF NEW MEXICO SURFACE WATER QUALITY STANDARDS

Surface water quality standards have been developed by the State of New Mexico (NMAC 20.6.4). These regulations provide specific guidance for applicable surface water quality standards for each watershed by water use. In addition, these regulations identify Outstanding National Resource Waters within the State of New Mexico; these waters have strict antidegradation standards.

STATE OF ARIZONA AQUIFER PROTECTION REGULATIONS AND AQUIFER WATER QUALITY STANDARDS

Any discharge of a pollutant from a facility either directly to an aquifer or to the land surface or the vadose zone in such a manner that there is a reasonable probability that the pollutant would reach an aquifer requires issuance of an aquifer protection permit by the ADEQ. Unless the discharge is either specifically exempted by statute (ARS 49-250), or unless the discharge is authorized under one of the general aquifer protection permits issued by the ADEQ (AAC R18-9, Article 3), the discharge requires issuance of an individual aquifer protection permit by the agency. Aquifer water quality standards have been also specified by the State of Arizona (AAC R18-11, Article 4).

STATE OF ARIZONA SURFACE WATER QUALITY STANDARDS

Surface water quality standards have been developed by the State of Arizona (AAC Title 18, Chapter 11, Article 1). These regulations provide specific guidance for applicable surface water quality standards for each water body by water use. In addition, these regulations identify Outstanding Arizona Waters within the State of Arizona; these waters have strict antidegradation standards.

Local

PIMA COUNTY RIPARIAN AND FLOODPLAIN REGULATIONS

The Pima County Regional Flood Control District regulates flooding and erosion hazards on private property within unincorporated areas of Pima County through the “Floodplain and Erosion Hazard Management Ordinance” (2010). The goal of the ordinance is twofold. The first goal is to ensure that new development within floodplains is safe from flooding and erosion hazards and does not adversely impact adjacent property. This is accomplished through implementation of the floodplain use permit process and conformance with the National Flood Insurance Program, as administered by the Federal Emergency Management Agency (FEMA). The second goal of the ordinance is to protect natural resources within flood-prone areas. These riparian areas are recognized by the County for their importance in mitigating flood hazards, providing natural erosion control, and promoting recharge into underground aquifers.

In 2001, the Pima County Board of Supervisors adopted the Conservation Lands System (CLS) regional plan policy, which applies the science-based policies and principles of conservation developed in the Sonoran Desert Conservation Plan (SDCP) (Pima 2009). Riparian areas are one of the five elements considered for conservation in the plan. As such, the Pima County Board of Supervisors has adopted maps of regulated riparian habitat throughout the county. As part of the floodplain use permit process, proposed developments are subject to review for impacts to mapped regulated riparian habitat if more than 0.3 acre of a property’s regulated riparian habitat is disturbed. In some instances where disturbed regulated riparian habitat is classified as Hydroriparian, Mesoriparian, and/or Important Riparian Area, a mitigation plan needs to be approved by the Pima County Board of Supervisors.

3.7.4 Issues to Be Analyzed

The issues to be analyzed generally encompass any potential for degradation of water quality, obstruction or degradation of water flow, or loss of waters. These issues include the following:

- The potential for contamination of surface water from erosion, stormwater runoff, or other pollutants that would result in a violation of State surface water quality standards.
- The potential for degradation of surface water quality that would cause a long-term loss of use either by humans or by aquatic wildlife and plants.
- The potential for any alteration of the existing drainage pattern to result in offsite erosion or siltation that would result in adverse effects on adjacent properties or existing water rights.
- The number, acreage, and type of WUS that are regulated under Section 404 of the CWA that would be impacted, and whether these impacts would be temporary or permanent. These may include jurisdictional waters (washes, streams, lakes, or rivers), wetlands, special aquatic sites, and sensitive aquatic habitats.
- The potential for an increase in scouring or erosion during a flood event that would result in structural or property damage.
- The modification of any floodplain that would impede or redirect flood flows that would result in offsite property damage, adversely affect the flood-carrying capacity of the floodplain, or alter the pattern or magnitude of flood flow.
- The potential for degradation of groundwater quality that would exceed State aquifer water quality standards.
- The amount of groundwater to be used and whether this would deplete groundwater resources or interfere with groundwater recharge in a way that affects existing or proposed water rights or uses of a groundwater aquifer.
- The potential to impact any highly sensitive areas or watersheds.
- The potential to impact any specially designated waters, including impaired waters, Outstanding National Resource Waters (in New Mexico), and Outstanding Arizona Waters.

3.7.5 Analysis Area Conditions

New Build Section

SURFACE WATER HYDROLOGY

Route groups associated with the New Build Section cross six surface hydrologic subbasins, which are identified by their eight-digit hydrologic unit codes (HUCs). Major linear water features within each subbasin are summarized in table 3.7-1. Surface water subbasins and major linear water features are shown in figures 3.7-1a and 3.7-1b.

Table 3.7-1. Major Linear Water Features within the Analysis Area

Project Section	Route Group	Subbasin (HUC-8)	Water Feature	Length in Study Corridor (feet)	Flow Status	Special Status
New Build	1-Afton Substation-Hidalgo Substation	Mimbres (13020202)	Mimbres River	29,996	Intermittent	None
			Wamel Canal	11,704	Intermittent	None
			Walnut Creek	14,847	Ephemeral	None
New Build	1-Afton Substation-Hidalgo Substation	Animas Valley (15040003)	Burro Cienega	74,680	Ephemeral	None
			Ninetysix Creek	28,049	Ephemeral	None
New Build	2-Hidalgo Substation-Apache Substation	Animas Valley (15040003)	Shakespeare Arroyo	11,017	Ephemeral	None
New Build	2-Hidalgo Substation-Apache Substation	Upper Gila-Mangas (15040002)	Horseshoe Wash	11,442	Ephemeral	None
New Build	2-Hidalgo Substation-Apache Substation	San Simon (15040006)	Vanar Wash	14,424	Ephemeral	None
			Steins Creek	15,611	Ephemeral	None
			San Simon River	69,655	Ephemeral	None
			Willow Springs Wash	40,409	Ephemeral	None
			Dial Wash	26,124	Ephemeral	None
			Happy Camp Wash	74	Ephemeral	None
			Buckeye Wash	22,492	Ephemeral	None
			Railroad Wash	67,692	Ephemeral	None
			Smith Wash	18,042	Ephemeral	None

Table 3.7-1. Major Linear Water Features within the Analysis Area (Continued)

Project Section	Route Group	Subbasin (HUC-8)	Water Feature	Length in Study Corridor (feet)	Flow Status	Special Status
New Build	2-Hidalgo Substation-Apache Substation	Willcox Playa (15050201)	Bee Canyon Wash	3,739	Ephemeral	None
Upgrade	3-Apache Substation-Pantano Substation	Upper San Pedro (15050202)	Jordan Wash	598	Intermittent	None
			Dragoon Wash	1,571	Ephemeral	None
			Sheep Wash	17,861	Ephemeral	None
			Pomerene Canal	551	Intermittent	None
			San Pedro River	17,733	Perennial	Impaired
			Cadillac Wash	5,792	Ephemeral	None
			Pacheco Wash	15,289	Ephemeral	None
Upgrade	3-Apache Substation-Pantano Substation	Rillito (15050302)	Cienega Creek	508	Intermittent	Outstanding Arizona Water
Upgrade	4-Pantano Substation-Saguaro Substation	Upper Santa Cruz (15050301)	Santa Cruz River	6,659	Ephemeral	None
			Julian Wash	795	Ephemeral	None
			West Branch Santa Cruz River	1,719	Ephemeral	None
Upgrade	4-Pantano Substation-Saguaro Substation	Brawley Wash (15050304)	Los Robles Wash	464	Ephemeral	None
Upgrade	4-Pantano Substation-Saguaro Substation	Lower Santa Cruz (15050303)	Santa Cruz River	623	Effluent-dominated	None

El Paso–Las Cruces Subbasin (HUC 13030102)

The Afton Substation and the far eastern portions of route group 1 lie within the El Paso–Las Cruces Subbasin. This area drains to the east toward the Rio Grande and the Mesilla Valley. However, in point of fact the area has little topographic relief, and there are relatively few extended drainage systems. Most washes occur along the alluvial fan of the West Potrillo Mountains or immediately adjacent to the Rio Grande. No major linear water features were identified within the analysis area within this subbasin.

Mimbres Subbasin (HUC 13030202)

The Mimbres Subbasin extends approximately from the West Potrillo Mountains to the Continental Divide, encompassing about 65 miles of route group 1. The area drains generally to the Mimbres River, which passes through the analysis area. The Mimbres River is a closed-basin desert stream that originates from the slopes of the Black Range and flows southward into the Mimbres Valley near Deming,

Figure 3.7-1a. Surface water features in the New Build Section.

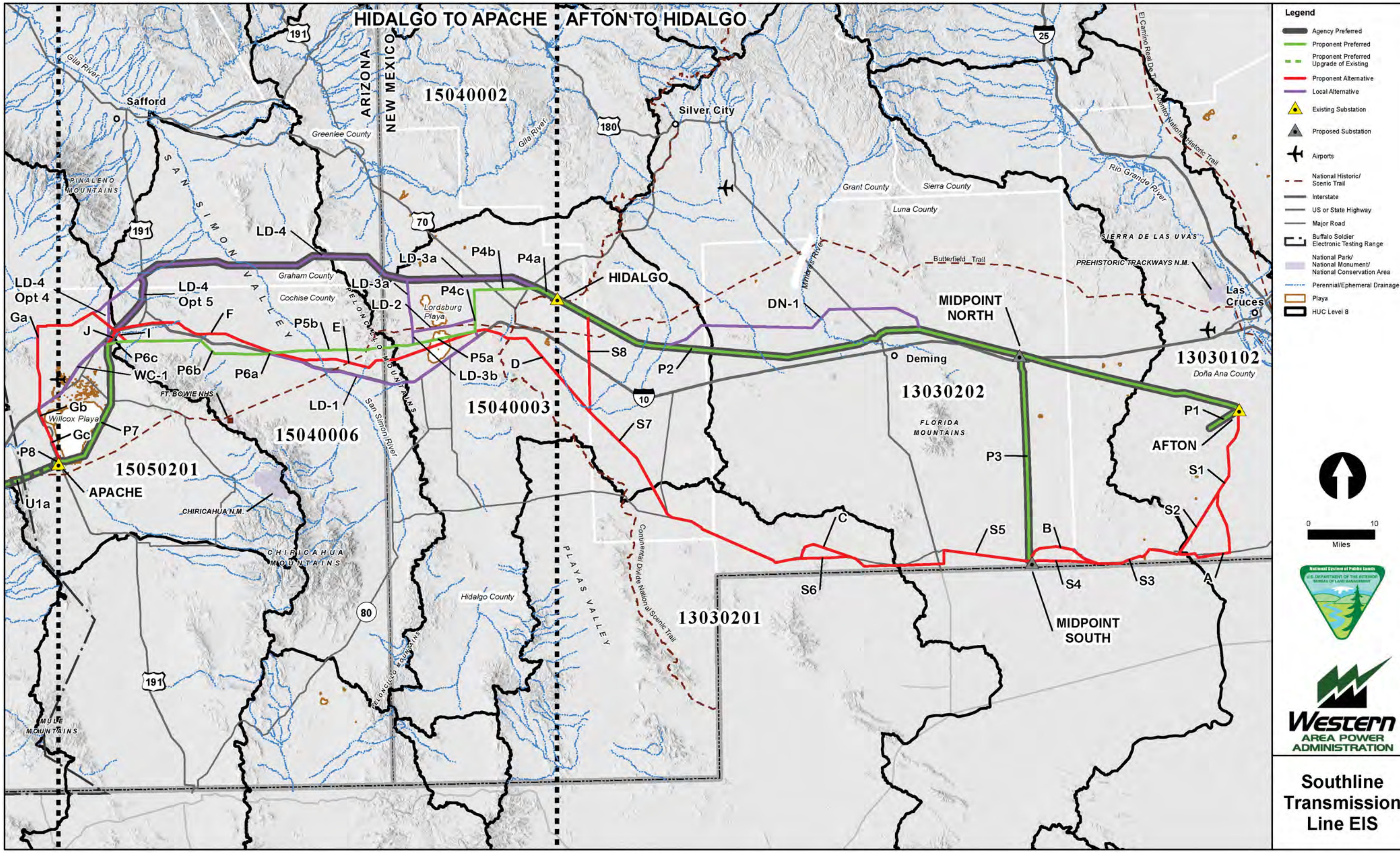
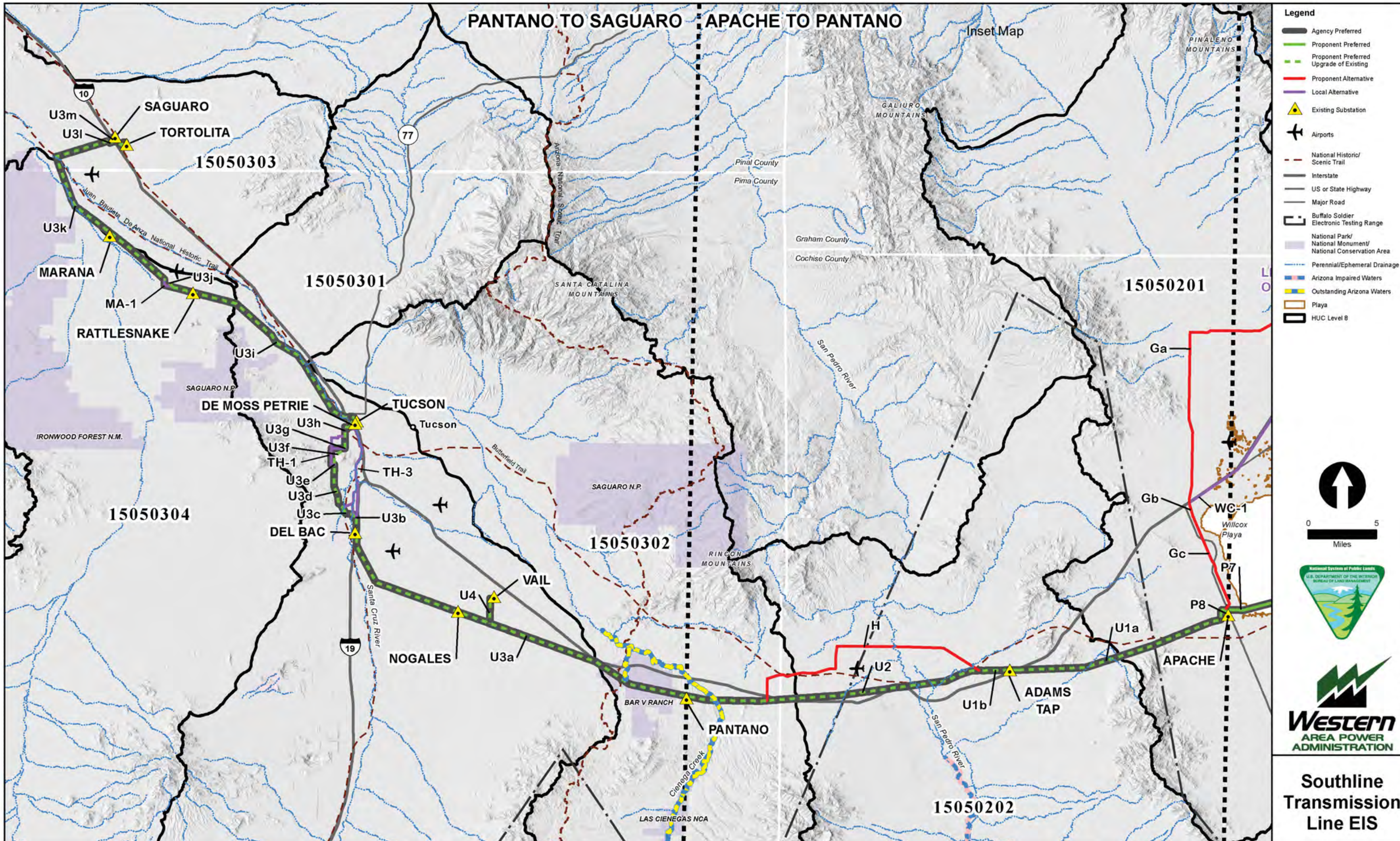


Figure 3.7-1b. Surface water features in the Upgrade Section.



eventually terminating in the Chihuahuan Desert. Upper reaches of the Mimbres River are perennial but are intermittent within the analysis area, with all flow eventually infiltrating or evaporating east of Deming. In addition to the Mimbres River, the Wamel Canal and Walnut Creek both pass through the analysis area. Wamel Canal takes water from the Mimbres River and delivers it southward to agricultural land west of Deming. Walnut Creek is similar in nature to the Mimbres River. It arises on the east flank of the Burro Mountains and flows southward before eventually terminating through infiltration or evaporation west of Deming.

Surface flow data have been measured historically (period 1963 to 1968) on the Mimbres River, both near Spalding (USGS Gage No. 08477530) and below the Wamel Canal (USGS Gage No. 08478400). Data from both gages show that the Mimbres River flows seasonally, with the lowest flow and even no flow during the late spring and early summer (May–July) and during the fall (October–November). Higher flows occur during the winter (December–April) due to frontal storms, and during the late summer (August through September) due to convective thunderstorms during the Southwest's monsoon season (USGS 2013b, 2013c).

Playas Lake Subbasin (HUC 13030201)

Approximately 40 miles of route group 1 is located within the Playas Lake Subbasin. This is a closed basin, and the area generally drains to the south toward Laguna los Moscos. No major linear water features were identified within the analysis area within this subbasin. However, there was one spring feature identified within the analysis area: Corrizalillo Spring. No flow data or water quality data were identified for this spring.

Animas Valley Subbasin (HUC 15040003)

The Lordsburg Substation is located in the Animas Valley Subbasin, as are the western portion of route group 1 and the eastern portion of route group 2. This is a closed basin, with washes and streams generally terminating in mid-basin playas. Burro Cienega arises near the Continental Divide and flows southward where it crosses the analysis area, as does Ninetysix Creek, which is a tributary to Burro Cienega. Burro Cienega terminates at a playa in the Lordsburg Valley, just southeast of Lordsburg. Shakespeare Arroyo also crosses the analysis area; it arises just southwest of Lordsburg and flows northward into Lordsburg Draw before terminating in a playa in the Animas Valley. All three of these features are ephemeral.

Upper Gila–Mangas Subbasin (HUC 15040002)

Approximately 11 miles of route group 2 group is located within the Upper Gila–Mangas Subbasin. The area drains generally to the Gila River, which is located approximately 14 miles to the north. Horseshoe Wash is an ephemeral tributary to Railroad Wash that crosses the analysis area; it arises in the Peloncillo Mountains and ultimately flows north toward the Gila River.

San Simon Subbasin (HUC 15040006)

Approximately 40 miles of route group 2 is located within the San Simon Subbasin. The area drains generally to the San Simon River, which crosses the analysis area. The San Simon River was historically perennial in some locations but now is ephemeral. The San Simon River flows to the northwest, eventually joining with the Gila River near Safford. Eight other major linear water features are located within the analysis area within the San Simon Subbasin. Vanar Wash and Steins Creek are ephemeral tributaries to the San Simon River that arise in the Peloncillo Mountains. Buckeye Wash, Railroad Wash, Smith Wash, and Happy Camp Wash arise in the Dos Cabezas Mountains and flow northeast toward the

San Simon River but typically terminate through infiltration and evaporation prior to joining the San Simon River. Willow Springs Wash and Dial Wash both arise in the Pinaleño Mountains and flow northeast toward the San Simon River. Happy Camp Wash and Buckeye Wash are intermittent in their higher reaches in the Dos Cabezas, but all of these linear water features are ephemeral where they cross the analysis area.

Surface flow data have been measured historically on the San Simon River near San Simon, Arizona (USGS Gage No. 09456000, period 1919–1941), and near Spalding, Arizona (USGS Gage No. 09456200, period 1951–1955). Data from both gages show that the San Simon River flows seasonally, with the lowest flow and even no flow during the winter and spring (December through May) and with higher flows during the summer and fall (June through November) (USGS 2013d, 2013e).

Willcox Playa Subbasin (HUC 15050201)

The Apache Substation is located in the Willcox Playa Subbasin, as is the western portion of route group 2. This is a closed subbasin, with ephemeral washes that flow toward and terminate in Willcox Playa. Only one major linear water feature was identified within the New Build Section analysis area within the subbasin. Bee Canyon Wash is an ephemeral wash that rises from the Winchester Mountains and terminates in the Sulphur Springs Valley. One spring was identified within the analysis area: Croton Springs, located close to Willcox Playa. No flow data or water quality data were identified for this spring.

SURFACE WATER QUALITY

No surface waters have been identified as impaired within the New Build Section.

WETLANDS AND WATERS OF THE UNITED STATES

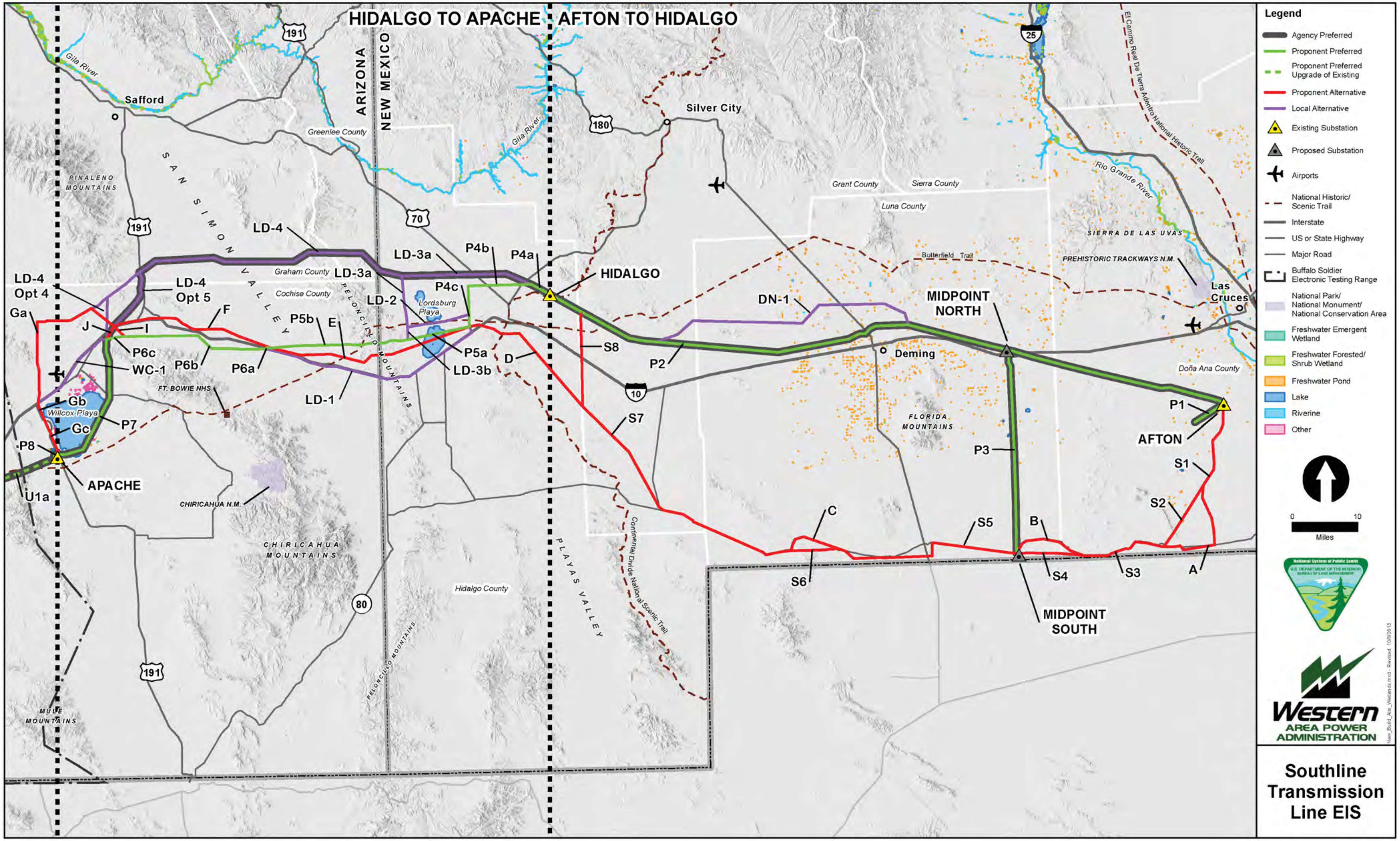
Wetlands and special aquatic sites within the New Build Section will likely be classified as WUS and require protection or compensatory mitigation if permanently impacted, pursuant to the CWA. An inventory of all wetlands within analysis area boundary from National Wetlands Inventory (NWI) maps indicates that approximately 7,639 acres of wetlands occur within the analysis area, consisting of 20 freshwater ponds (typically stock tanks), 6 lakes, 1 freshwater forested/shrub wetland, and 3 other wetland areas. Total wetland acreage, type, and number of sites within each route group are summarized in table 3.7-2. Wetland areas are shown in figures 3.7-2a and 3.7-2b.

In addition to wetlands, numerous ephemeral arroyos and drainages exist within the analysis area, and these would also likely require protection or compensatory mitigation if permanently impacted, pursuant to the CWA. Major linear water features that are likely to require permitting under Section 404 of the CWA are summarized in table 3.7-1.

FLOODPLAINS

The 100-year floodplain areas are defined as the area having a 1 percent annual chance of being inundated by a flood event. Floodplains were identified throughout the analysis area and are mostly associated with rivers, tributaries, and ephemeral washes. Most of the analysis area lies within rural areas within large, flat, alluvial valleys. These areas can be subject to shallow flow or ponding, typically 1 to 3 feet deep and spread out over extensive areas. Shallow flooding occurs primarily due to overflows of stream channels when flows exceed the capacity of the channels. However, areas of localized flooding can occur due to heavy rains and may not be represented in the 100-year floodplains mapped by FEMA.

1 **Figure 3.7-2a.** Wetlands in the New Build Section.



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1 **Figure 3.7-2b.** Wetlands in the Upgrade Section.

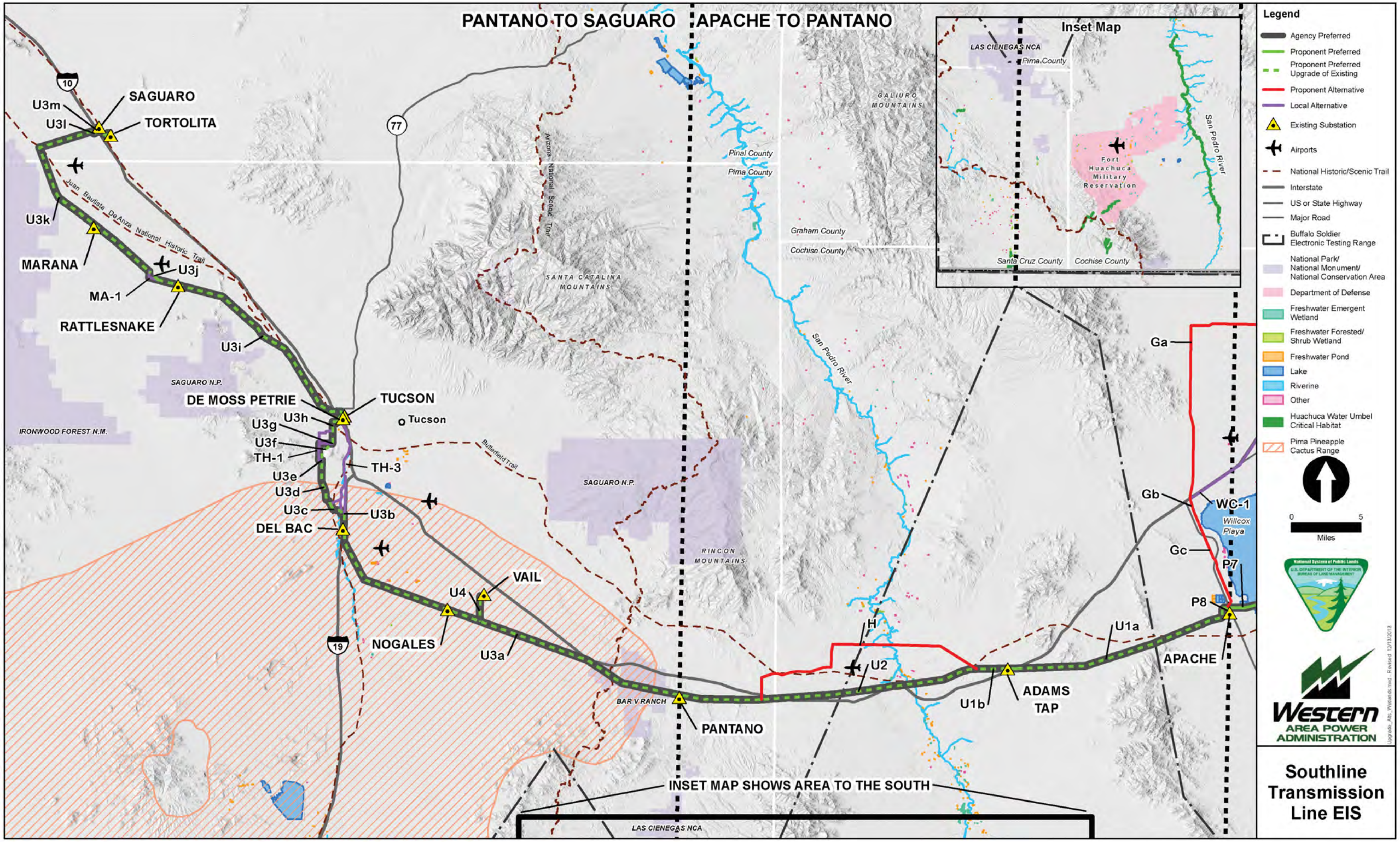

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Table 3.7-2. Wetlands and Special Aquatic Sites within the Analysis Area

Project Section	Route Group	Area within Analysis Area (acres)	Number and Type of Wetland Sites	
New Build	1-Afton Substation–Hidalgo Substation	90	Freshwater pond	17
			Lake	1
New Build	2-Hidalgo Substation–Apache Substation	7,549	Lake	5
			Freshwater pond	3
			Other	3
			Freshwater forested/shrub wetland	1
Upgrade	3-Apache Substation–Pantano Substation	9	Freshwater pond	1
			Riverine	1
Upgrade	4-Pantano Substation–Saguaro Substation	215	Riverine	9
			Freshwater pond	2
			Other	1

Major floodplain areas within the New Build Section are associated with Mimbres River, Burro Cienega, Ninetysix Creek, Black Mountain Draw, Seventysix Draw, Wamels Draw, the San Simon River, Railroad Wash, and the Willcox Playa. However, many delineated floodplain areas are not associated with any named wash or stream, and many represent areas of sheetflow. Floodplain acreage in the New Build Section is summarized in table 3.7-3.

Table 3.7-3. Floodplains within the Analysis Area

Project Section	Route Group	Area within Analysis Area (acres)
New Build	1-Afton Substation–Hidalgo Substation	43,668
New Build	2-Hidalgo Substation–Apache Substation	40,754
Upgrade	3-Apache Substation–Pantano Substation	240
Upgrade	4-Pantano Substation–Saguaro Substation	1,197

GROUNDWATER HYDROLOGY AND GROUNDWATER QUALITY

Route groups associated with the New Build Section cross five groundwater basins, which have been either declared by the State Engineer in New Mexico or designated by the ADWR in Arizona. The number of groundwater wells within the New Build Section analysis area is shown in table 3.7-4. Groundwater basins are shown in figures 3.7-3a and 3.7-3b.

Table 3.7-4. Number and Type of Production Wells within the Analysis Area

Project Section	Route Group	Number of Wells			
		Domestic/ Livestock*	Commercial/ Industrial†	Irrigation‡	Municipal Supply§
New Build	1-Afton Substation–Hidalgo Substation	374	44	117	4
New Build	2-Hidalgo Substation–Apache Substation	867	32	569	9
Upgrade	3-Apache Substation–Pantano Substation	30	0	6	1
Upgrade	4-Pantano Substation–Saguaro Substation	23	8	11	16

* Includes New Mexico use codes: DOL, DOM, MUL, PDL, PLS, STK, REC; Arizona use codes: DOMESTIC, STOCK.
† Includes New Mexico use codes: COM, IND, MIN, SAN; Arizona use codes: COMMERCIAL, INDUSTRIAL, MINING, OTHER-PRODUCTION.
‡ Includes New Mexico use code: IRR; Arizona use code: IRRIGATION.
§ Includes New Mexico use code: MUN; Arizona use codes: MUNICIPAL, UTILITY (WATER CO).

Lower Rio Grande Basin

The Afton Substation and the far eastern portions of route group 1 lie within the Lower Rio Grande groundwater basin. Groundwater use varies throughout the basin, with the majority of groundwater withdrawal for agricultural use (60 percent) and public water supply (28 percent) (Terracon 2003). Groundwater levels vary widely across the basin, with some very shallow groundwater levels immediately adjacent to the Rio Grande. However, groundwater levels beneath the analysis area are relatively deep, ranging from approximately 200 to 400 feet below ground surface (bgs) (New Mexico Office of the State Engineer (NMOSE) 2013a). No water quality data in the analysis area within the Lower Rio Grande groundwater basin were identified.

Mount Riley Basin

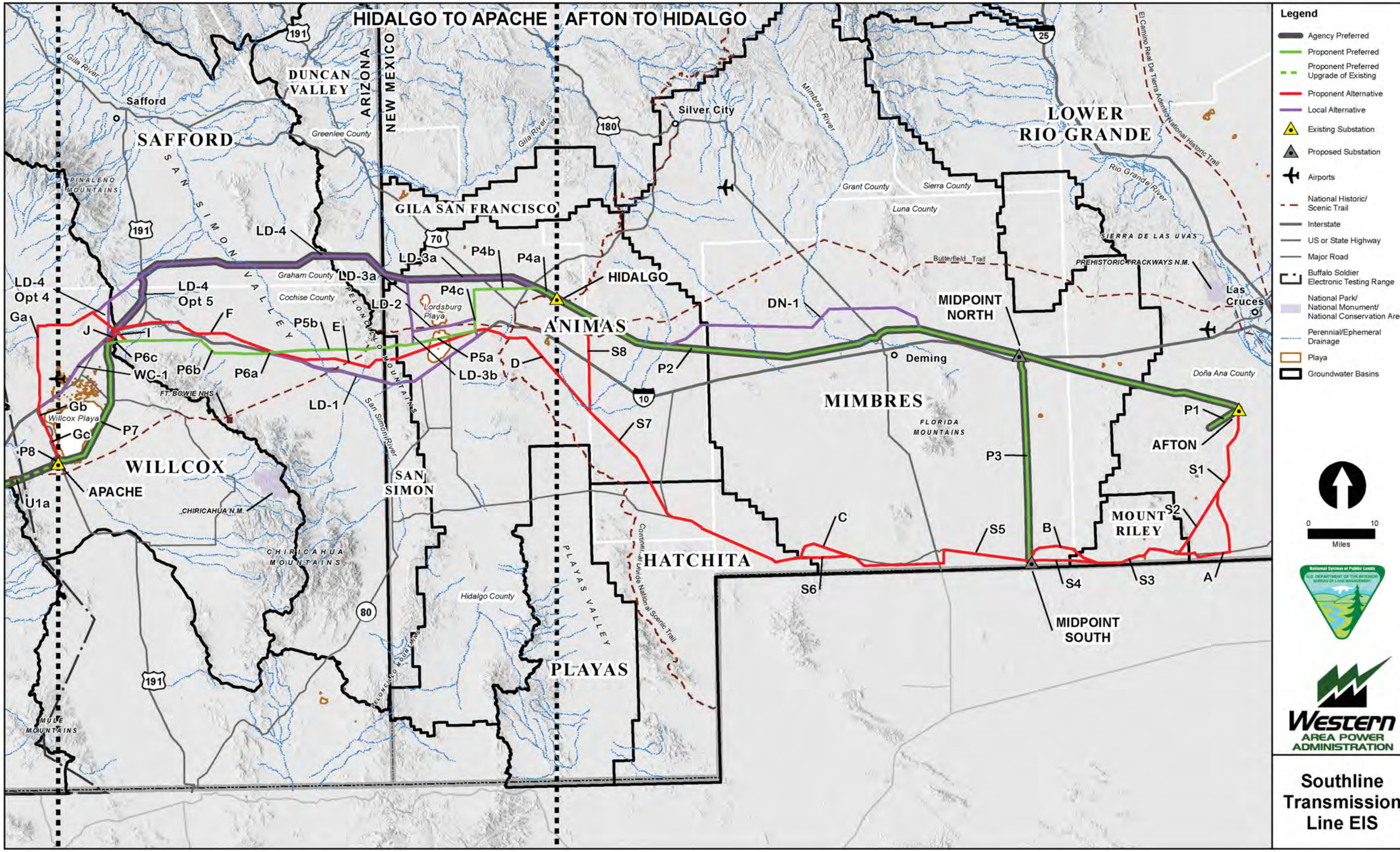
A small section of route group 1 lies within the Mount Riley groundwater basin. Relatively little information is known for this basin, either water levels or water quality. Conditions are likely similar to the adjacent Lower Rio Grande Basin.

Mimbres Basin

The Mimbres groundwater basin is geographically similar to the Mimbres surface water subbasin and extends approximately from the West Potrillo Mountains to the Continental Divide, encompassing about 65 miles of route group 1. Groundwater use varies throughout the basin, with the majority of groundwater withdrawal for agricultural use (84 percent) and mining (9 percent) (Daniel B. Stephens and Associates, Inc. 2005). Groundwater levels vary widely across the basin but tend to be relatively deep, averaging 130 feet bgs. Groundwater levels beneath the analysis area are similar, ranging from approximately 80 to 160 feet bgs (NMOSE 2013b).

Shallow groundwater quality is generally good throughout the basin, although certain areas have been impacted by septic systems and industrial contamination (Daniel B. Stephens and Associates, Inc. 2005).

1 **Figure 3.7-3a.** Groundwater features in the New Build Section.



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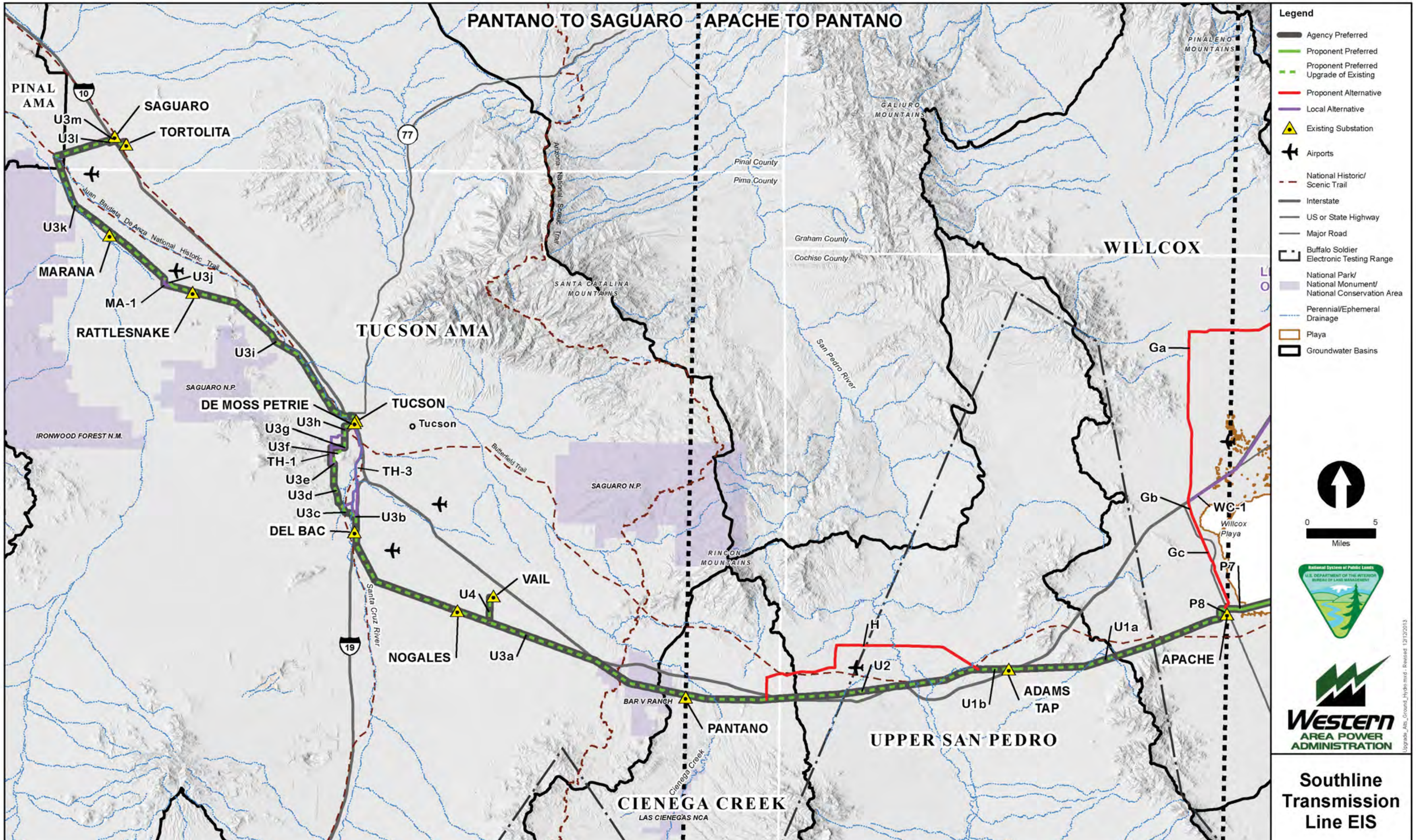
1 **Figure 3.7-3b.** Groundwater features in the Upgrade Section.



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Hatchita Basin

The Hatchita groundwater basin extends from the Cedar Mountains to the Little Hatchet Mountains, including the Hatchita Valley, and encompasses about 26 miles of route group 1. Groundwater use and groundwater quality are similar to that described for the Mimbres groundwater basin. Relatively few groundwater-level measurements are available in the Hatchita groundwater basin, but several groundwater levels beneath the analysis area indicate that water levels range from approximately 260 to 380 feet bgs (NMOSE 2013c).

Animas Basin

The Animas groundwater basin is geographically similar to the Animas surface water subbasin. The Lordsburg Substation is located in the Animas groundwater basin, as are the western portion of route group 1 and the eastern portion of route group 2. Groundwater use and groundwater quality are similar to that described for the Mimbres groundwater basin. Relatively few groundwater-level measurements are available within the analysis area in the Animas groundwater basin, although there are substantial data available farther south in the basin. Several groundwater levels beneath the analysis area indicate that groundwater levels range from approximately 180 to 260 feet bgs (NMOSE 2013d).

Duncan Valley Basin

The Duncan Valley Basin (along with the Gila–San Francisco Basin in New Mexico) is geographically similar to the Upper Gila–Mangas surface water subbasin. A small portion of route group 2 crosses the south side of the Duncan Valley Basin. Groundwater use is predominantly for agriculture (92 percent), with minor uses for public supply and industrial (ADWR 2010a). Groundwater levels vary widely, but in the southern part of the basin, groundwater levels measured within the last decade indicate that depth to water is more than 100 feet bgs (ADWR 2011a). Groundwater quality in the analysis area is good, with TDS concentrations generally less than 500 ppm (ADWR 2011b).

Safford Basin

The Safford groundwater basin is geographically similar to the San Simon surface water subbasin. Approximately 40 miles of route group 2 is located within the Safford groundwater basin. Groundwater use is almost completely for agriculture (96 percent), with minor uses for public supply (3 percent) and industrial (ADWR 2010b). Groundwater levels vary widely, with very deep groundwater levels in the middle of the basin and very shallow groundwater levels near the Gila River in the northern part of the basin. Recent groundwater levels measured within the last decade indicate that there are areas of relatively shallow groundwater beneath the analysis area, with a depth to water of 30 to 60 feet bgs, as well as areas of very deep groundwater levels beneath the analysis area that are more than 500 feet deep (ADWR 2011c). Groundwater generally flows from the margins toward the center of the basin and from southeast to northwest, toward the Gila River. Groundwater quality in the analysis area is of moderate quality, with TDS concentrations ranging from 500 to 600 ppm (ADWR 2011d). However, there are areas within the basin with relatively high levels of fluoride, arsenic, and nitrate (ADWR 2010b).

Willcox Basin

The Willcox groundwater basin is geographically similar to the Willcox Playa surface water subbasin. The Apache Substation is located in the Willcox groundwater basin, as is the western portion of route group 2. Groundwater use is predominantly for agriculture (95 percent), with minor uses for industrial (4 percent) and public supply (ADWR 2010c). Although there are some shallow groundwater levels in the basin, for the most part groundwater levels are relatively deep, more than 200 feet bgs. Recent groundwater levels measured within the last decade indicate that there are areas of relatively shallow groundwater beneath the analysis area, with depth to water of 30 to 70 feet bgs, as well as areas of relatively deep groundwater, from 100 to 200 feet bgs (ADWR 2011e). Groundwater generally flows toward the center of the basin. Groundwater quality is good in some parts of the analysis area (less than 500 ppm TDS), but some water quality measurements near Apache Substation indicate poorer water quality, with TDS concentrations greater than 1,500 ppm (ADWR 2011f).

Upgrade Section

SURFACE WATER HYDROLOGY

Route groups associated with the Upgrade Section cross six surface hydrologic subbasins, which are identified by their eight-digit HUCs. Major linear water features within each subbasin are summarized in table 3.7-1.

Willcox Playa Subbasin (HUC 15050201)

The Apache Substation is located in the Willcox Playa Subbasin, as is the eastern portion of route group 3. No major linear features were identified within the analysis area for the Upgrade Section within this subbasin.

Upper San Pedro Subbasin (HUC 15050202)

The Adams Tap Substation is located in the Upper San Pedro Subbasin, as is approximately 24 miles of route group 3. This area drains to the San Pedro River, which flows northward, eventually joining the Gila River near Hayden, Arizona. The San Pedro River crosses the analysis area. Along its length, the San Pedro varies between a perennial and intermittent stream; it is considered a perennial stream where it crosses the analysis area.

Six other major linear water features were identified within the analysis area. Dragoon Wash and Sheep Wash arise from the west faces of the Dragoon and Little Dragoon Mountains, respectively. They are ephemeral tributaries to the San Pedro River, although Sheep Wash now is intercepted by the Pomerene Canal before reaching the San Pedro River. Jordan Wash is a tributary to Dragoon Wash; it arises from the Dragoon Mountains and is considered to be an intermittent stream within the analysis area. Cadillac Wash is an ephemeral wash that arises from the Whetstone Mountains on the west side of the San Pedro Valley and tributary to the San Pedro River, joining it near Pomerene. Pacheco Wash is an ephemeral wash that is tributary to Ash Creek, which then joins the San Pedro River. The Pomerene Canal is also located within the analysis area. The Pomerene Canal takes water from the San Pedro River near Saint David and transports it northward, flowing roughly parallel to the river before terminating in Pomerene.

Surface flow data are currently being measured on the San Pedro River near Benson, Arizona (USGS Gage No. 09471800, period 2005–2011). Data show that the San Pedro River flows seasonally, with the lowest flow and even no flow during the winter and spring (October through June) and with higher flows during the late summer (July through September) due to convective thunderstorms during the Southwest's monsoon season (USGS 2013f).

Rillito Subbasin (HUC 15050302)

The Pantano Substation is located in the Rillito Subbasin, as is the western portion of route group 3 and the eastern portion of route group 4. This area drains to Cienega Creek, which crosses the analysis area. Cienega Creek is a perennial stream both upstream and downstream of the analysis area but is intermittent or ephemeral where it crosses the analysis area. Cienega Creek within the analysis area has been designated an Outstanding Arizona Water (AAC R18-11-112).

Surface flow data have been historically measured on Cienega Creek near Pantano (USGS Gage No. 09484560, period 1968–1975). Data show that Cienega Creek flows seasonally, with the lowest flow and even no flow during the winter and spring (October through June) and with higher flows during the late summer (July through September) due to convective thunderstorms during the Southwest's monsoon season (USGS 2013g).

Upper Santa Cruz Subbasin (HUC 15050301)

The Vail, Nogales, DeMoss Petrie, and Tucson substations are located within the Upper Santa Cruz Subbasin, as is approximately 40 miles of route group 4. This area drains to the Santa Cruz River, which flows northward toward the Gila River. The Santa Cruz River is ephemeral, but in the northern part of the subbasin it is effluent-dominated due to releases of wastewater from several Tucson-area treatment plants. The west branch of the Santa Cruz River and Julian Wash also cross the analysis area and are tributaries to the Santa Cruz River, joining near South Tucson.

Surface flow data are currently being measured on the Santa Cruz River near Continental (USGS Gage No. 09482000, period 1940–2012). Data show that in the past few decades, the Santa Cruz typically has flowed seasonally, with the lowest flow and even no flow during the winter and spring (October through June) and with higher flows during the late summer (July through September) due to convective thunderstorms during the Southwest's monsoon season (USGS 2013h). Surface flow data are also currently being measured on the Santa Cruz River near Cortaro (USGS Gage No. 09486500, period 1939–2012). These data show the effluent flow that is introduced into the river from several wastewater treatment plants and show consistent flow throughout the year (USGS 2013i).

Brawley Wash Subbasin (HUC 15050304)

The Rattlesnake and Marana substations are located within the Brawley Wash Subbasin, as is approximately 18 miles of route group 4. Surface water in this area drains to Los Robles Wash, which passes through the analysis area and is an ephemeral tributary to the Santa Cruz River.

Lower Santa Cruz Subbasin (HUC 15050303)

The Saguaro Substation is located within the Lower Santa Cruz Subbasin, as is the terminus of route group 4 Pantano to Saguaro route group. The Santa Cruz River passes through the analysis area within this subbasin and is effluent-dominated at this location.

SURFACE WATER QUALITY

Within the analysis area for the Upgrade Section, the San Pedro River is listed as an EPA 303(d) Category 5 Impaired Water between Dragoon Wash and Tres Alamos Wash (approximately near the city of Benson). This portion of the river is listed as impaired because of high nitrate levels. Nitrate impairment is associated with a nitrogen-based chemicals plant located southeast of Benson that has been undergoing active remediation since 2005.

WETLANDS AND WATERS OF THE UNITED STATES

An inventory of all wetlands within the analysis area boundary from NWI maps indicates that approximately 224 acres of wetlands occurs within the analysis area, consisting of 3 freshwater ponds, 10 riverine wetlands, and 1 other wetland area. Total wetland acreage within each route group is summarized in table 3.7-2.

In addition to wetlands, numerous ephemeral arroyos and drainages exist within the analysis area, and these would also likely require protection or compensatory mitigation if permanently impacted, pursuant to the CWA. Major linear water features that are likely to require permitting under Section 404 of the CWA are summarized in table 3.7-1.

FLOODPLAINS

The 100-year floodplains within the Upgrade Section are similar in nature to those within the New Build Section, and are often not associated with named washes or streams. Major floodplain areas within the Upgrade Section are associated with Sheep Wash, the San Pedro River, Cornfield Canyon, Cienega Creek, Davidson Canyon, and the Santa Cruz River. Floodplain acreage in the Upgrade Section is summarized in table 3.7-3.

GROUNDWATER HYDROLOGY AND GROUNDWATER QUALITY

Route groups associated with the Upgrade Section cross four groundwater basins that have been designated by the ADWR. The number of groundwater wells within the Upgrade Section analysis area is shown in table 3.7-4.

Willcox Basin

The Apache Substation is located in the Willcox groundwater basin, as is the eastern portion of route group 3. The Willcox groundwater basin is described above for the New Build Section.

Upper San Pedro Basin

The Upper San Pedro groundwater basin is geographically similar to the Upper San Pedro surface water subbasin. The Adams Tap Substation is located in the Upper San Pedro groundwater basin, as is approximately 24 miles of route group 3. Groundwater use is primarily for municipal supply such as that for Sierra Vista (60 percent) and agriculture (34 percent) (ADWR 2010d). There are areas of extremely shallow perched groundwater levels, as well as artesian groundwater levels, associated with the San Pedro River. Other areas, including around Sierra Vista, Arizona, have relatively deep groundwater levels (greater than 500 feet bgs) (ADWR 2010d). Beneath the analysis area, recent measurements indicate fairly deep groundwater levels at the margins of the basin (200 to 500 feet bgs) but extremely shallow water levels or flowing water near Benson and Pomerene, Arizona (ADWR 2011g). Groundwater quality in the analysis area is good, with TDS concentrations generally less than 500 ppm (ADWR 2011h). There are areas within the basin with relatively high arsenic concentrations (ADWR 2010d).

Cienega Creek Basin

The Cienega Creek groundwater basin is somewhat geographically similar to the Rillito surface water basin. The Cienega Creek groundwater basin has the same eastern boundary along the Whetstone Mountains but does not extend quite as far west as the Rillito surface water basin. The Pantano Substation is located in the Cienega Creek groundwater basin, as are the western portion of route group 3 and the eastern portion of route group 4. There is relatively little groundwater use in the Cienega Creek Basin, with some municipal and agricultural use (ADWR 2010e). Groundwater levels are fairly deep at the basin margins (250 to 350 feet bgs) but shallower in the middle of the basin around Cienega Creek (40 to 60 feet bgs) (ADWR 2011i). Groundwater quality is variable; measurements in the analysis area range from good quality (less than 500 ppm TDS) to poor (more than 1,500 ppm TDS) (ADWR 2011j).

Tucson Active Management Area

The Tucson Active Management Area (AMA) encompasses a large area that incorporates much of the Santa Cruz River valley, Avra Valley, and the Rillito watershed and includes the Tucson metropolitan area. The Tucson AMA is also a jurisdictional designation established by the Arizona Groundwater Management Act of 1980 within which water use is heavily regulated. The Saguaro Substation is located within the Lower Santa Cruz Subbasin, as is the terminus of route group 4. Groundwater use is varied, with approximately half of groundwater pumped for municipal supply and the remainder for agricultural (30 percent) and industrial (20 percent) uses (ADWR 2010f). As would be expected, groundwater levels vary greatly throughout the Tucson AMA as a whole. Within the analysis area, groundwater levels are relatively deep, ranging generally from 150 to 200 feet bgs. However, along the Santa Cruz River, there are also relatively shallow water levels of less than 50 feet bgs (ADWR 2011k). Groundwater quality is generally good, but there are also areas of known contamination within the analysis area, particularly along the Santa Cruz River near downtown Tucson.

3.8 BIOLOGICAL RESOURCES

3.8.1 Vegetation

This section describes natural vegetation communities/associations, special status species (i.e., endangered, threatened, sensitive) and noxious and exotic invasive weeds that occur across the Project.

The information provided in the following subsections is partially taken from a report titled “Southline Transmission Project Resource Report 15: Vegetation” (CH2M Hill 2013g). The contents of that report are used herein without specific reference.

Analysis Area

The analysis area for vegetation resources is divided into four route groups: route group 1 – Afton Substation to Hidalgo Substation, route group 2 – Hidalgo Substation to Apache Substation, route group 3 – Apache Substation to Pantano Substation, and route group 4 – Pantano Substation to Saguaro Substation. Within these route groups, the area is further subdivided into sections according to the type of construction: New Build Section and Upgrade Section. The route groups 1 and 2 are within the New Build Section, whereas route groups 3 and 4 are within the Upgrade Section. Access roads, substations and staging areas are included within this analysis area. The analysis for this Project will be conducted by route group and thus construction type.

NEW BUILD SECTION

The analysis area for vegetation resources of the New Build Section of this Project includes 1 mile on either side of the centerline of alternatives carried forward and any substation or access roads outside that corridor. This is to identify resources that could be directly impacted by ground disturbance and where construction materials, equipment, and workers could be present. This perimeter represents the interface between long-term and temporary disturbance to soil surfaces and vegetation communities, including special status plant species, plant community composition, and vegetation structure and species diversity, and where noxious and invasive plant species are most likely to become established and spread into adjacent habitats.

UPGRADE SECTION

The analysis area for vegetation resources of the Upgrade Section of this Project includes a 500-foot corridor (200 feet off of existing 100-foot corridor) of each alternative. The analysis area for the Upgrade Section includes the Project footprint perimeter (i.e., area of disturbance perimeter) in linear feet because this perimeter represents the interface between long-term and temporary disturbances to soil surfaces and vegetation communities, including special status plant species, plant community composition, and vegetation structure and species diversity, and where noxious and invasive plant species are most likely to become established and spread into adjacent habitats.

Laws, Ordinances, Regulations, and Standards

Various Federal, State, and local government laws and regulations apply to the vegetation that exists across the analysis area.

SPECIAL STATUS SPECIES (ENDANGERED, THREATENED, SENSITIVE)

The category of special status species includes several different designations of sensitivity and levels of protection. The FWS maintains a listing of plant and animal species that are listed as endangered or threatened, or are proposed or candidates for listing, under the Federal ESA. Other Federal agencies, including the BLM and the U.S. Forest Service, have lists of plant and animal species that are considered sensitive on lands under their respective jurisdictions. The State of Arizona maintains a list of plant species that are highly safeguarded or salvage restricted within their Heritage Database Management System (HDMS). These are afforded protection under the Arizona Native Plant Law (ANPL). Local jurisdictions may also designate sensitive species, such as those listed in the SDCP in Pima County, Arizona (Pima County 2009). Special status plant species lists are presented in appendix D, table D-1.

The potential for occurrence of special status species within the broader analysis area was categorized using the following criteria:

- None – Project is well outside the known geographic and elevational range, or lacks suitable habitat necessary for the species, or both. Plants with highly restricted ranges are considered to have no potential to occur if the proposed Project is outside its known range, even if the required habitat characteristics are present on-site.
- Unlikely – Project may contain suitable habitat for this species but is outside its known geographic and/or elevational range.
- Possible – Project is within the geographic and elevational range and has suitable habitat for the species.
- Present – The species was observed during limited field investigations conducted by CH2M Hill in 2012 for this project (CH2M Hill 2013g). A listing of special status plant species that have the potential to occur within the analysis area is presented in table D-1 in appendix D.

FEDERAL

Endangered Species Act

Species afforded protection under the Federal ESA are classified as either endangered or threatened and are regulated by the FWS. Other species identified under the ESA are those that are proposed for listing as either threatened or endangered, are candidate species, or are included in a conservation agreement.

"Endangered" is defined under the ESA as a species that is in immediate danger of becoming extinct and that needs protection to survive. "Threatened" is defined as a species that is likely to become endangered if it is not protected. Primary factors leading to a species becoming threatened or endangered include loss of habitat, illegal or unregulated hunting or collection, competition from nonnative species, and pollution. Candidate species are those believed to meet the criteria as threatened or endangered but for which a formal listing document has not been prepared or published. For certain species, FWS has identified critical habitat that also is provided a level of protection under the ESA. Critical habitat is a specific geographic area defined by FWS as being essential for the survival and recovery of a listed species. Any potential destruction or adverse modification of critical habitat by a Federal action requires formal consultation with FWS under Section 7 of the ESA.

The Arizona Ecological Services Field Office and the New Mexico Ecological Services Field Office maintain lists of endangered, threatened, and candidate species by county (FWS 2013a, 2013b). All plant species in these categories for Pinal, Pima, and Cochise counties in Arizona and Hidalgo, Grant, Luna, and Doña Ana counties in New Mexico are included in table D-1 in appendix D, which summarizes habitat requirements, geographic and elevational ranges, and the potential of listed species to occur within the analysis area. Based on this screening analysis, only two of the 11 species in table D-1 have some potential to occur within any of the proposed or alternative routes.

In 2012, the AGFD and their HDMS provided a list of special status species recorded within 3 miles of the New Build Section and 2 miles from the Upgrade Section within the Arizona portion of the proposed Project footprint (AGFD HDMS 2013a). In 2013, AGFD provided an updated list for a 3-mile buffer for both the Upgrade and New Build Sections (AGFD HDMS 2013b). This included a list of known occurrences of special status plants within specific segments.

Bureau of Land Management Sensitive Plant Species

The New Mexico and Arizona offices of the BLM maintain lists of sensitive species that are known to occur on BLM lands and are listed by BLM districts that are managed by various field offices. These species are believed to be declining in numbers and may need special conservation measures. Potential threats to these species are likely to include those for the ESA-listed species. BLM Sensitive Species in the Safford and Tucson Field Offices, which include Pinal, Pima, and Cochise counties, Arizona, are listed in the Arizona Sensitive Species List BLM (2010). Lists for the Las Cruces District, which includes Hidalgo, Grant, Luna and Doña Ana counties, New Mexico, were obtained from information compiled by the New Mexico Rare Plant Technical Council (NMRPTC) (2013). All BLM Sensitive Species for these counties in which the proposed Project lies, with information on habitat requirements, geographic and elevational ranges, and potential to be present within the analysis area are presented in table D-1 in appendix D. Based on this screening analysis, 8 of the 29 species in table D-1 have the possibility for occurring within the proposed or alternative route segments. Of the eight potential species, four are listed for Arizona and four are listed for New Mexico.

Forest Service Sensitive Species

The Coronado National Forest maintains a list of sensitive species that are known to occupy Coronado National Forest lands, which include numerous isolated units on mountain ranges in southeastern Arizona and the Peloncillo Mountains of extreme southwestern New Mexico. Potential threats to these species are likely to include those listed above for the ESA-listed species. The list of Coronado National Forest sensitive plant species was obtained from the U.S. Forest Service Southwestern Region (U.S. Forest Service 2007) and is presented in table D-1. The only area of Coronado National Forest land within the analysis area is in Upgrade Section segment U1, where it passes through about 0.5 mile of Coronado National Forest land at the north end of the Dragoon Mountains in Cochise County, Arizona. Table D-1 lists Coronado National Forest sensitive species for this county, with notes on habitat requirements and geographic distribution and an evaluation of potential presence in the portion of the analysis area within Coronado National Forest. Based on this screening analysis, 2 of the 40 species listed by the Coronado National Forest have potential to occur within Coronado National Forest in Upgrade Section segment U1a and are listed in table D-1.

STATE

New Mexico Endangered Plants Act

The New Mexico Endangered Plants Act (New Mexico Energy, Minerals, and Natural Resources Department (EMNRD) 1995) directs the EMNRD to create a list of endangered plants within the State. This act prohibits activities including the taking, possession, transportation, exportation, processing, or sale of listed plants, except those authorized by permits. The New Mexico Department of Natural Resources may issue permits for scientific research or propagation. The endangered plants list was published in Title 19, Chapter 21, Part 2 (19.21.2.9) of the NMAC (EMNRD 1995). Permits may be granted by the State forester for scientific studies or for collection of voucher specimens. Permits may also be granted by the State forester for transplanting of individual endangered plants in areas of land use conversion. Plant species on this list that could be present in Hidalgo, Grant, Luna, or Doña Ana counties are listed in table D-1. Four of the 11 species in table D-1 have some potential to occur in the analysis area, all of which are also considered BLM Sensitive.

Arizona Native Plant Law

The ANPL (Arizona Department of Agriculture (ADA) 2013a) and Revised Statutes (ADA 2013b) regulate the destruction and transportation of native plants that are growing wild in Arizona. This law establishes a list of protected plants in Arizona and prohibits removal or destruction of wild-growing, protected plants without a permit, whether on public, State, or private land. Parties interested in removing native plants in Arizona must complete an application with the ADA to receive a permit.

The ADA maintains a list of sensitive species separated into the categories of highly safeguarded, salvage restricted, salvage assessed, and harvest restricted (ADA 2013c). Highly safeguarded (HS) species are those “whose prospects for survival in this State are in jeopardy or which are in danger of extinction throughout all or a significant portion of their ranges, and those native plants which are likely within the foreseeable future to become jeopardized or in danger of extinction throughout all or a significant portion of their ranges” (ARS 3-903.B.1) (ADA 2013b). Salvage restricted (SR) species are those “which are not included in the highly safeguarded category but are nevertheless subject to a high potential for damage by theft or vandalism” (ARS 3-903.B.2) (ADA 2013b). Salvage assessed (SA) species are those “which are not included in either the highly safeguarded or salvage restricted categories but nevertheless have a sufficient value if salvaged to support the cost of salvage tags and seals” (ARS 3-903.B.3) (ADA 2013b). Harvest restricted species are those “which are not included in the highly safeguarded category but are subject to excessive harvesting or overcutting because of the intrinsic value of their by-products, fiber, or woody parts” (ARS 3-903.B.4) (ADA 2013b). Permitting procedures for collection or salvage of protected plants are provided in ARS 3-906. Table D-1 in appendix D provides a list of HS and SR plants that are known to be present in Pinal, Pima, and Cochise counties, and it notes which have been recorded within 2 miles of the Upgrade Section or within 3 miles of the New Build Section, according to the HDMS (AGFD 2013a, 2013b). Twenty-four of the 75 species with an ANPL status have some potential to occur in the analysis area.

COUNTY

Pima County Sonoran Desert Conservation Plan

The SDCP, prepared by Pima County (2009), was developed as an ESA Section 10 consultation with FWS. The plan includes 23 species in Pima County, of which 4 are plant species. These four species have potential to be present in the analysis area, and they are listed in table D-1.

Noxious Weeds and Exotic Invasive Plant Species

Noxious weeds are plant species that have been introduced deliberately or accidentally and have spread rapidly, primarily on disturbed soils. Noxious weeds can have adverse impacts on native ecosystems by outcompeting native plant species and producing fuels for wildfire**.** Noxious weeds are invasive plant species that have regulatory laws relating to their introduction, transport, or management. The 1974 Federal Noxious Weed Act (PL 93-629 (7 U.S.C. 2801 et seq.; 88 Stat. 2148), enacted January 3, 1975) defined noxious weeds as "any living stage, such as seeds and reproductive parts, of any parasitic or other plant of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation, or the fish or wildlife resources of the United States or the public health." The Federal Noxious Weed Act included a list of particular foreign noxious weeds. The Federal Plant Protection Act (2000) replaced the Federal Noxious Weed Act, and primarily regulates the importation of invasive plant species into the United States, particularly those species listed by the Federal Noxious Weed Act. The Federal Invasive Species Act (EO 13112, 1999) uses the term "invasive species" instead of "noxious weeds" and defines invasive species as: "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." The Federal Invasive Species Act does not list particular species, but rather provides measures to reduce the introduction of invasive species within the United States.

The States of Arizona and New Mexico have their own noxious weed regulations (ADA 2013d; New Mexico Department of Agriculture (NMDA) 2013). The NMDA and the ADA developed lists of species that are considered noxious weeds (ADA 2013d; NMDA 2009). The State of New Mexico defines noxious weeds as "any foreign plant (not native to the US) that has the potential to be harmful to crops, livestock, other useful plants and animals, agricultural interests, or public health" to be targeted as noxious weeds for control or eradication pursuant to the Noxious Weed Control Act of 1998 (NMDA 2013). The State of Arizona defines noxious weeds as "any species of plant that is, or is liable to be, detrimental or destructive and difficult to control or eradicate and shall include any species that the director, after investigation and hearing, shall determine to be a noxious weed." Weed species listed as noxious by the States of Arizona and New Mexico are presented in table D-2 in appendix D.

Some species of highly invasive exotic weeds are not listed as noxious weeds in Arizona or New Mexico, including Russian thistle (*Salsola tragus* (formerly species *kali*)), burning bush (*Bassia scoparius* (formerly genus *Kochia* and also referred to as "kochia" in the Southwest)) (NRCS 2013d), and Lehmann lovegrass (*Eragrostis lehmanniana*). These and other invasive exotic weed species are now so common and widespread that regulation and control of transport are considered to be impractical. However, species such as Russian thistle and burning bush are common throughout the analysis area and are likely to invade disturbed soils, potentially compete with native plants, and provide fine fuels for wildfire, and they should be considered to have potentially negative environmental impacts.

Federal Invasive Species Act, Executive Order 13112

EO 13112 of 1999 compels Federal agencies whose actions may affect the status of invasive species to employ measures to prevent the spread of invasive species, to the extent practicable and permitted by law. These measures include preventing introduction of invasive species, monitoring invasive species populations, and conducting research on techniques and technologies to prevent introduction and control existing populations of invasive species. Additionally, this order prohibits Federal agencies from authorizing, funding, or carrying out an action that may cause or promote introduction or spread of invasive species unless the agency has determined that the benefits of the action outweigh the potential harm of invasive species and that all feasible and prudent measures to minimize harm would be taken.

NEW MEXICO NOXIOUS WEEDS

The NMDA separates noxious weeds into three categories. Class A species are either not currently present in New Mexico or they have limited distribution. Preventing new infestations and eradicating existing infestations is the highest priority for this class of species. Class B species are limited to portions of the State. In areas with severe infestations, management is encouraged to contain the infestation and prevent further spread. Class C species are widespread in New Mexico, and control measures are encouraged to be undertaken at the local level, based on feasibility and level of infestation. Watch list species are of concern because of their potential to become problematic (NMDA 2013). All of these species are listed in table D-2. The NRCS (2003b) also provides a list of New Mexico noxious weeds, but this list is based on an earlier version of the NMDA list and is not current. Primary noxious weeds of concern in the vicinity of the proposed Project in New Mexico are African rue (*Peganum harmala*) and starthistles (*Centaurea* spp.).

Exotic invasive species known to occur along the proposed and alternate routes in New Mexico are Russian thistle, kochia, Lehmann lovegrass, filaree (*Erodium cicutarium*), and mustards (*Brassicaceae* spp.), but these species are not defined as noxious weeds in New Mexico.

ARIZONA NOXIOUS WEEDS

The State of Arizona prohibits noxious weeds from entering the State, and regulated noxious weeds may be controlled or quarantined to prevent further infestation or contamination. Restricted species are quarantined to prevent further infestation or contamination (ADA 2013d). These species are listed in table D-2 in appendix D. The NRCS (2006) also provides a list of Arizona noxious weeds, but that list is based on an earlier version of the ADA list and is not current. The primary noxious weed of concern in the vicinity of the analysis area in Arizona is buffelgrass (*Cenchrus ciliaris*).

Exotic invasive species known to occur along the proposed and alternate routes in Arizona are Russian thistle, filaree, and mustards, but these species are not defined as noxious weeds in Arizona.

Issues to Be Analyzed

Potential effects on vegetation as a result of the proposed Project include the following:

- Direct impacts on special status species from construction activities.
- Indirect impacts on special status species from increased access to analysis areas by ATVs or OHVs over newly constructed transmission line access roads.
- Loss of vegetation in each native plant community due to construction activities.

- Conversion of native plant communities to exotic grassland from invasion of nonnative species, such as buffelgrass, red brome (*Bromus rubens*), and/or Lehmann lovegrass, causing:
    - Direct mortality of native plants due to competition for resources.
    - Increased incidence of wildfire, to which exotic grasses such as buffelgrass and Lehmann lovegrass are adapted but many native plants are not, resulting in mortality of native plants and replacement by exotic plants.
    - Increased soil erosion in any area where construction activities and proposed Project-related road traffic would occur.
- Loss and/or degradation of wetland, xeroriparian, riparian, or other areas with special vegetation designations where the transmission line ROW crossed water bodies.
- Chemical contamination of soils and/or wetlands during construction activities.
- Postconstruction impacts on native vegetation relative to the Transmission Vegetation Management Program (NERC, FAC-003-1) for long-term management of vegetation along transmission line ROWs.

The extent to which the proposed Project would result in such effects will be addressed in section 4.8 in chapter 4 of the EIS.

Analysis Area Conditions

Descriptions of the vegetation communities that occur within the analysis area are provided in the following sections. The terms biotic communities and plant associations are additionally used below. All three terms—vegetation communities, biotic communities, and plant associations—are based on the presence of dominant plant species that characterize the species composition and physical structure of the landscapes.

Current existing large and small spatial-scale vegetation communities/associations present across the analysis area are described below.

LARGE-SCALE BIOTIC COMMUNITIES: BROWN AND LOWE BIOTIC COMMUNITIES

The map of biotic communities of the Southwest produced by Brown and Lowe (1980) and based on biotic communities described in Brown (1982) shows six communities within the analysis area (figure 3.8-1). Acreage calculations by biotic community presented below were derived for the total analysis area for both the New Build and Upgrade Sections of the transmission line. In descending order of coverage, these communities are Semidesert Grassland (533,821.4 acres), Chihuahuan Desertscrub (310,646.5 acres), Playa (15,504.8 acres), Arizona Upland Subdivision of Sonoran Desertscrub (3,580.6 acres), Lower Colorado River Subdivision of Sonoran Desertscrub (1,404.5 acres), and Madrean Evergreen Woodland (1,218.8 acres). A description of each of these communities is provided in the following paragraphs.

The coarse scale of the Brown and Lowe biotic communities does not provide the more detailed analysis possible with the finer-scale Southwest Regional Gap Analysis Project (SWReGAP) (2013) plant associations. The vegetation communities crossed by the proposed Project and its alternatives are described below as background information and to place the finer-scale SWReGAP plant associations in a broader biogeographic context, but are not addressed in the further analysis of biotic communities. Note that plant species names used below are based on those presented by Brown and Lowe (1980), and some of the plant names and taxonomic classifications have changed since then. Updated and current plant classifications and names are available at the NRCS PLANTS Database (NRCS 2013d).

Semidesert Grassland

The Semidesert Grassland biotic community comprises 61.6 percent of the analysis area and covers large areas of southeast Arizona, southwest New Mexico, West Texas, and northern parts of Sonora and Chihuahua, Mexico. This perennial, grass-shrub-dominated community is situated topographically above desert scrub communities and below evergreen woodland, chaparral, or plains grassland (Brown 1982). The upper and lower elevation limits of this community vary substantially over its distribution. The lower contact with desert scrub is generally between about 3,600 and 4,600 feet, while the upper contact with evergreen woodland or chaparral is generally between 4,920 and 5,580 feet. Average annual rainfall in this community ranges from 9.8 to 17.7 inches. This community is dominated by a variety of grasses and seasonally abundant forbs. Common shrub species include mesquites (*Prosopis* spp.), Mormon tea (*Ephedra* spp.), mimosas (*Mimosa* spp.), catclaw acacia (*Acacia greggii*), and ocotillo (*Fouquieria splendens*). Common leaf succulents include agaves (*Agave* spp.), yuccas (*Yucca* spp.), and sotols (*Dasylirion* spp.). This community is interspersed with Chihuahuan Desertscrub and covers nearly 62 percent of the analysis area, beginning just west of Las Cruces, New Mexico, and extending west until it contacts the Sonoran Desertscrub community southeast of Tucson, Arizona.

Chihuahuan Desertscrub

The Chihuahuan Desertscrub biotic community comprises 35.8 percent of the analysis area and covers large areas of southern New Mexico and West Texas, smaller areas of southeast Arizona, and a large part of the State of Chihuahua, Mexico. This community is centered in the highland plains and basins of northern Mexico, below the Semidesert Grassland community (Brown 1982). This biotic community is dominated by basin and range topography, and most of this community is underlain by limestone. The lower elevation limit of Chihuahuan Desertscrub is around 1,300 feet, while its upper limit is generally between 4,600 and 5,250 feet. Average annual rainfall in this community ranges from 7.9 to 11.8 inches. Large areas of this desert are dominated by three shrubs: creosotebush (*Larrea tridentata*), tarbush (*Flourensia cernua*), and viscid acacia (*Vachellia neovernicosa*). Honey mesquite (*Prosopis glandulosa*) and saltbush (*Atriplex* spp.) are common in some areas. Common leaf succulents include agaves, yuccas, and sotols. This community is interspersed with Semidesert Grassland and covers nearly 36 percent of the analysis area, mainly between Las Cruces, New Mexico, and Benson, Arizona.

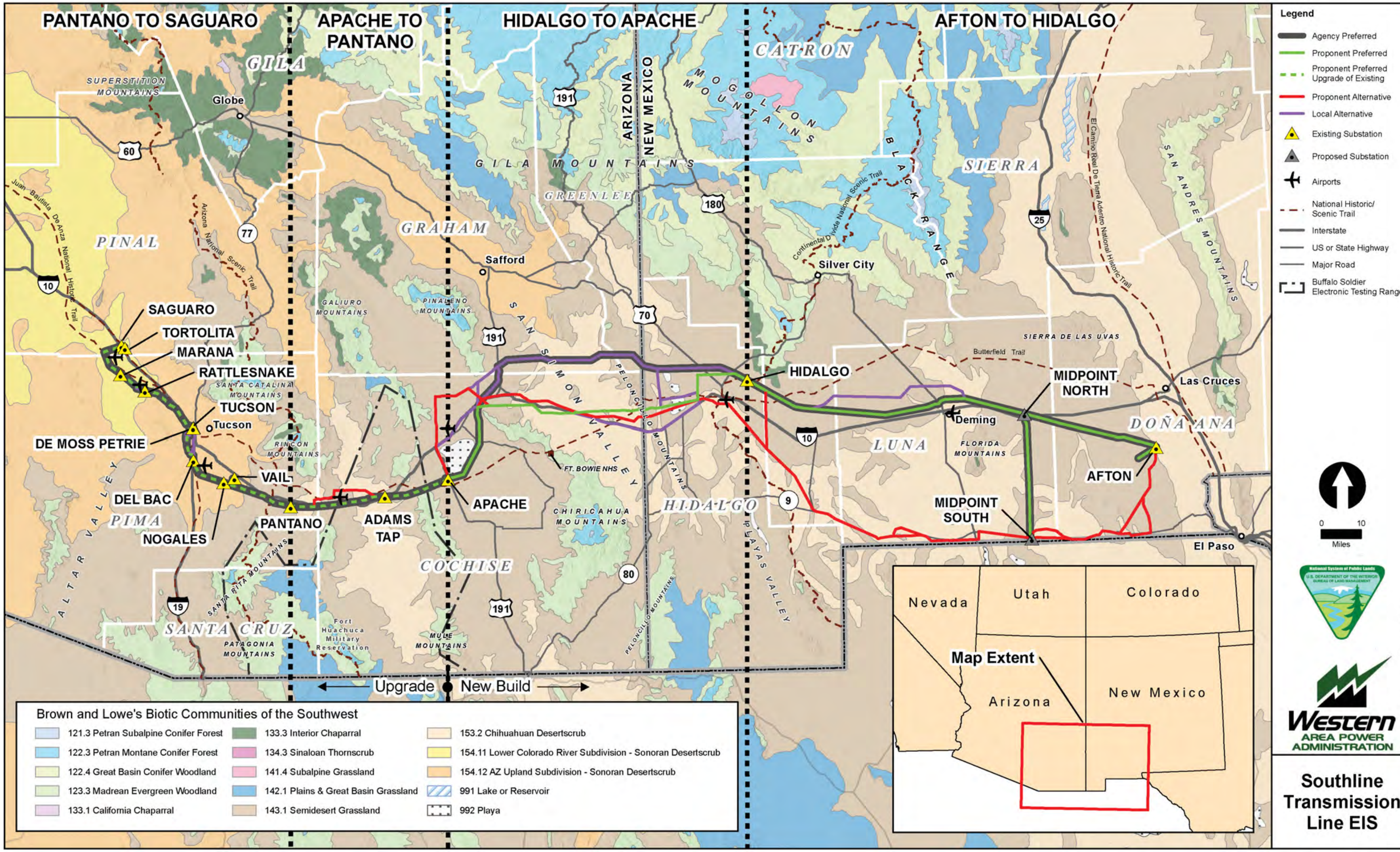
Playa

Playas, or dry lake beds, comprise 1.8 percent of the analysis area and are present in several valleys of southeast Arizona and southwest New Mexico, as well as in other parts of the Southwest. This community is not described as a separate unit by Brown (1982), although it has similarities to some features described as Sonoran Interior Strands. These features are found in closed basins, where they may accumulate water during rainy periods and then dry out by evaporation and infiltration. With fluctuating water levels, these areas remain nearly unvegetated. Playas are present in the Animas Valley (Lordsburg Playa) of New Mexico and in the Sulphur Springs Valley (Willcox Playa) of Arizona.

Sonoran Desertscrub – Arizona Upland Subdivision

The Arizona Upland Subdivision comprises only 0.4 percent of the analysis area but covers large areas of the northern and eastern parts of the Sonoran Desertscrub biotic community in Arizona and Sonora, Mexico. This subdivision is a cactus-dominated community situated topographically above the Lower Colorado River Subdivision and below Semidesert Grassland (Brown 1982). As with other communities,

Figure 3.8-1. Biotic communities in the analysis area.



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the upper and lower elevation limits of this community vary substantially over its distribution. The lower edge of this subdivision is generally between about 1,000 and 2,100 feet, whereas the upper contact with Semidesert Grassland is generally between 2,950 and 3,300 feet. Average annual rainfall in this community ranges from 7.9 to 16.7 inches. This community is dominated by a high diversity of cactus, and most of the woody shrubs have thorns. Common cactus species include saguaro (*Carnegiea gigantea*), chollas (*Cylindropuntia* spp.) and pricklypears (*Opuntia* spp.), barrel cactus (*Ferocactus* spp.), hedgehog cactus (*Echinocereus* spp.), and pincushion cactus (*Mammillaria* spp.). Some common small trees and shrubs include paloverde (*Parkinsonia* spp.), ironwood (*Olneya tesota*), velvet mesquite (*Prosopis velutina*), acacias (*Acacia* spp.), and creosotebush. In the analysis area, this community is limited to the immediate vicinity of Tucson, Arizona.

Sonoran Desertscrub – Lower Colorado River Subdivision

The Lower Colorado River Subdivision comprises only 0.2 percent of the analysis area but covers large areas of the southern and western parts of the Sonoran Desertscrub biotic community in Arizona, California, Baja California, and Sonora, Mexico. This subdivision is a shrub-dominated community situated topographically below the Arizona Upland Subdivision (Brown 1982). This community is the hottest and driest part of the Sonoran Desert, with average annual rainfall between 1.2 and 11.3 inches. Dominant shrub species include creosotebush, white bursage (*Ambrosia dumosa*), and saltbush. Other shrubs and small trees are present in xeroriparian zones along small drainages. In the analysis area, this community is limited to a relatively small area northwest of Tucson, Arizona.

Madrean Evergreen Woodland

The Madrean Evergreen Woodland biotic community comprises only 0.1 percent of the analysis area but is widespread in southeast Arizona, eastern Sonora, and western Chihuahua. This community is dominated by small evergreen tree species and is situated topographically above the Semidesert Grassland (Brown 1982). The lower elevation limit of this community is about 4,800 feet in the proposed Project vicinity. Average annual rainfall in this community ranges from about 13.0 to 40.2 inches. This community is dominated by a variety of oak (*Quercus* spp.), pines (*Pinus* spp.), and junipers (*Juniperus* spp.). In the analysis area, this community is found only at the north end of the Dragoon Mountains, southwest of Willcox, Arizona.

LARGE-SCALE BIOTIC COMMUNITIES BY ROUTE GROUP

New Build Section

The New Build Section (route groups 1 and 2) would include 240 miles of new double-circuit 345-kV transmission facilities that would cross public and private lands. Brown and Lowe communities crossed by the New Build Section in Arizona and New Mexico are primarily categorized as Semidesert Grasslands and Chihuahuan Desertscrub (see figure 3.8-1). Two areas are mapped as playa by Brown and Lowe (1980). The Lordsburg Playa is located west of Lordsburg and is crossed by segment P5 and local alternative G. The Willcox Playa is located between local alternative G and segment P7 at the western end of the New Build Section.

Upgrade Section

The Upgrade Section (route groups 3 and 4) is located within Arizona and crosses Chihuahuan Desertscrub and Semidesert Grasslands along the eastern portion (see figure 3.8-1). As the line moves west into lower elevations, it is characterized by two subdivisions of Sonoran Desertscrub: the Arizona

Upland subdivision and the Lower Colorado River subdivision. A small portion crosses Madrean Evergreen Woodland on the Coronado National Forest.

SMALL-SCALE VEGETATION COMMUNITIES

SWReGAP (2013) plant association mapping provides much more detailed vegetation communities than those provided by Brown and Lowe (1980). SWReGAP plant associations across the analysis area are presented in figures 3.8-2 and 3.8-3; wetlands are presented in figures 3.7-2a and 3.7-2b. A total of 31 land cover types, as defined by SWReGAP, is found within the analysis area. Of these, seven land cover types cover approximately 95 percent of the surface area within the analysis area. The remaining 24 types combined constitute less than 5 percent of the land cover. The 7 most common types within the analysis area, in order of dominance, are described in detail below, and all 31 land cover types within the analysis area are provided in table 3.8-1.

Table 3.8-1. Relative Percentage of Cover within the Analysis Area of each SWReGAP Plant Association

Plant Association	Total Acres	Area (%)
Apacherian-Chihuahuan Piedmont Semidesert Grassland and Steppe	361,049.2	41.74
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	156,895.9	18.14
Apacherian-Chihuahuan Mesquite Upland Scrub	150,010.0	17.34
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	104,741.1	12.11
Chihuahuan Mixed Salt Desert Scrub	26,889.7	3.11
Agriculture	17,541.0	2.03
North American Warm Desert Active and Stabilized Dune	11,179.2	1.29
Developed, Medium to High Intensity	9,013.7	1.04
Chihuahuan Succulent Desert Scrub	3,325.8	0.38
Chihuahuan Sandy Plains Semidesert Grassland	3,197.3	0.37
Sonora-Mojave Creosotebush-White Bursage Desert Scrub	2,552.8	0.33
Sonoran Paloverde-Mixed Cacti Desert Scrub	2,679.0	0.31
North American Warm Desert Volcanic Rockland	2,462.8	0.28
North American Warm Desert Wash	2,261.2	0.26
Madrean Juniper Savanna	2,102.8	0.24
North American Warm Desert Riparian Mesquite Bosque	2,066.9	0.24
Madrean Encinal	1,789.7	0.21
North American Warm Desert Bedrock Cliff and Outcrop	1,787.4	0.21
Developed, Open Space to Low Intensity	1,166.7	0.13
North American Arid West Emergent Marsh	911.3	0.11
Open Water	622.8	0.07
Sonoran Mid-Elevation Desert Scrub	66.1	0.01
Mogollon Chaparral	582.0	0.07
North American Warm Desert Pavement	429.2	0.05
Inter-Mountain Basins Semidesert Shrub Steppe	424.8	0.05
Chihuahuan Gypsophilous Grassland and Steppe	350.7	0.04
Madrean Pinyon-Juniper Woodland	308.8	0.04
North American Warm Desert Playa	253.4	0.03
North American Warm Desert Riparian Woodland and Shrubland	119.0	0.01
North American Warm Desert Lower Montane Riparian Woodland and Shrubland	53.4	0.01
Barren Lands, Non-specific	40.8	0.00
Total	**866,874.50**	**100**

Figure 3.8-2. SWReGap plant associations in the New Build Section.

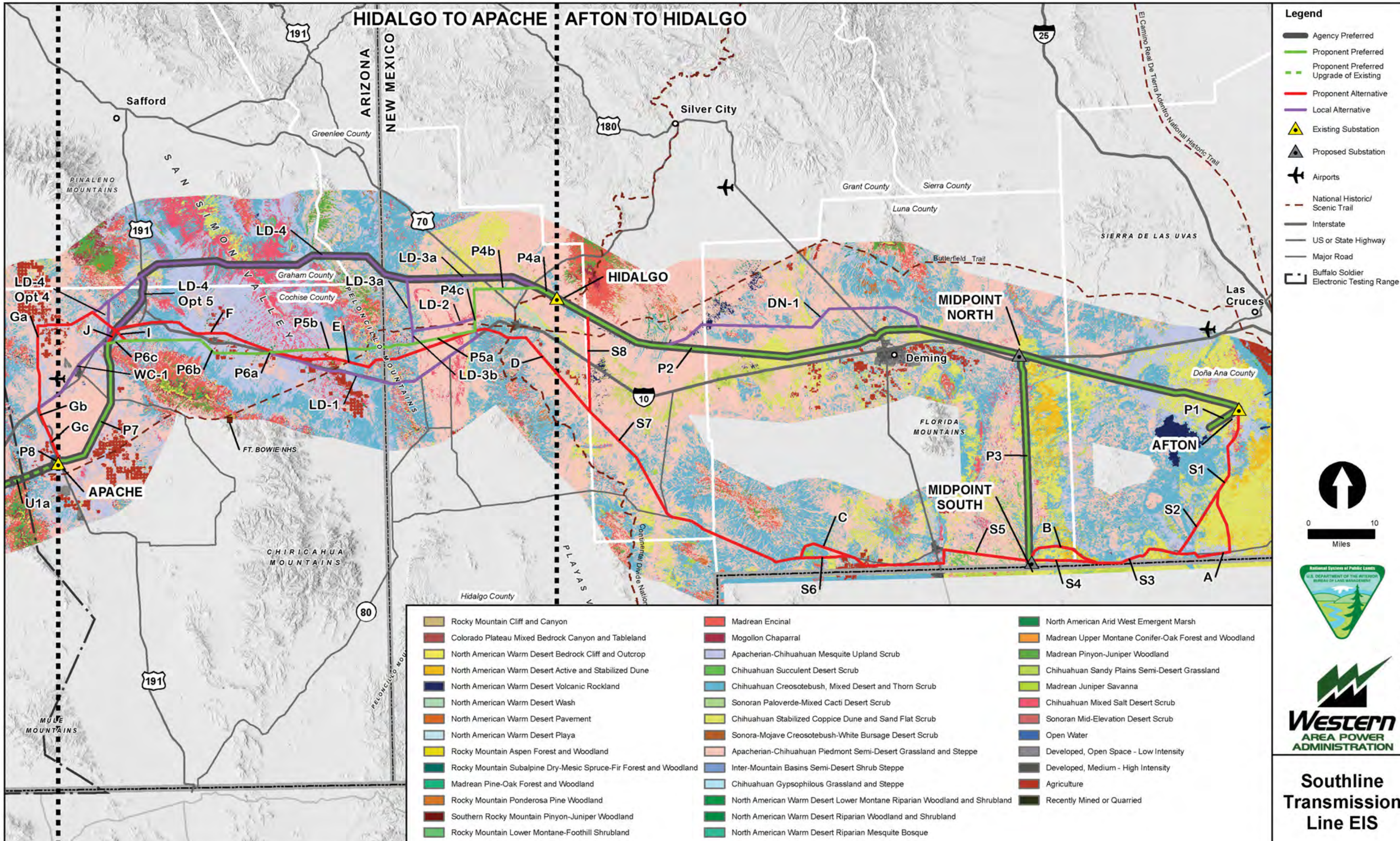
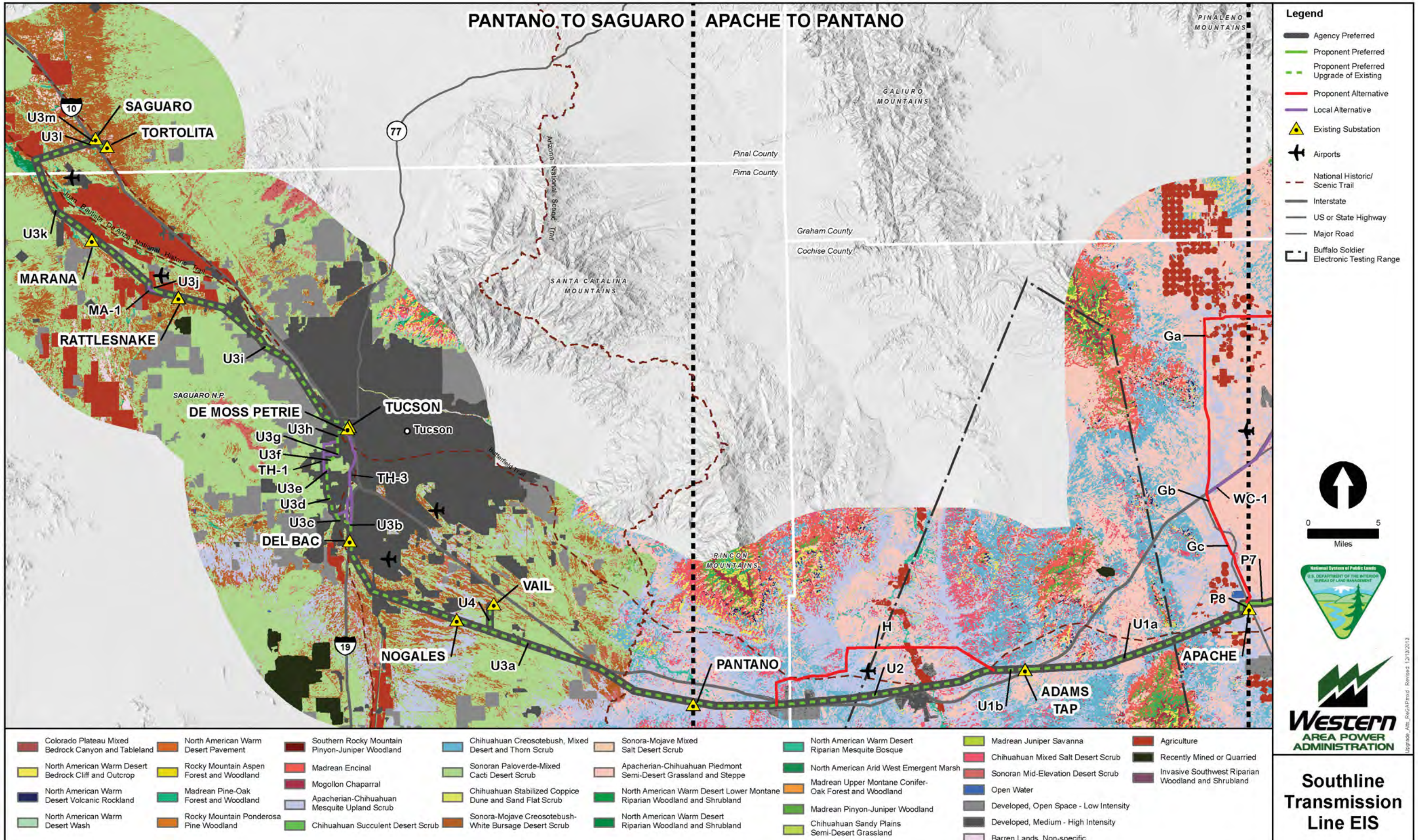


Figure 3.8-3. SWReGap plant associations in the Upgrade Section.



Apacherian-Chihuahuan Piedmont Semidesert Grassland and Steppe

The Apacherian-Chihuahuan Piedmont Semidesert Grassland and Steppe land cover type comprises 42 percent of the analysis area and includes desert grasslands and savannas with mixed shrubs and succulents or xeromorphic trees. In the Sky Islands, this community is found on bajadas that are gently sloping and have frequent fire occurrence, whereas in the Chihuahuan Desert, this cover type is typically found on steep foothill slopes. This land cover type is characterized by a diverse assortment of perennial grasses, including black grama (*Bouteloua eriopoda*), hairy grama (*B. hirsuta*), Rothrock's grama (*B. rothrockii*), sideoats grama (*B. curtipendula*), blue grama (*B. gracilis*), plains lovegrass (*Eragrostis intermedia*), bush muhly (*Muhlenbergia porteri*), curlyleaf muhly (*M. setifolia*), James' galleta (*Pleuraphis jamesii*), tobosagrass (*P. mutica*), and alkali sacaton (*Sporobolus airoides*). Common succulents include agaves, sotols, and yuccas. Shrubs and trees in this land cover type include mesquites and various oaks, such as gray oak (*Quercus grisea*), Emory oak (*Q. emoryi*), and Arizona white oak (*Q. arizonica*). This land cover type extends from the Sky Islands near the borders of Arizona, New Mexico, and northern Mexico throughout the Chihuahuan Desert, west to the Sonoran Desert, and north to the Mogollon Rim.

Chihuahuan Creosotebush Mixed Desert and Thorn Scrub

The Chihuahuan Creosotebush Mixed Desert and Thorn Scrub land cover type comprises 18 percent of the analysis area and includes dry basins and plains, as well as foothill transition zones supporting mixed desert scrub. Creosotebush is dominant throughout and may be present alone or mixed with other desert scrub and thorn scrub species. Other desert and thorn scrub species present include lechuguilla (*Agave lechugilla*), green sotol (*Dasylirion leiophyllum*), Wright's beebrush (*Aloysia wrightii*), ocotillo, American tarwort (*Flourensia cernua*), plumed crinklemat (*Tiquilia greggii*), sandpaper bush (*Mortonia scabrella*), Big Bend barometerbush (*Leucophyllum minus*), Engelmann's pricklypear (*Opuntia engelmannii*), mariola (*Parthenium incanum*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), and honey mesquite. Grasses such as black grama, sideoats grama, Chino grama (*Bouteloua ramosa*), bush muhly, tobosagrass, and low woollygrass (*Dasyochloa pulchella*) may be present, but cover less area than shrubs. This land cover type is widespread throughout southeastern Arizona, southern New Mexico, and northern Mexico.

Apacherian-Chihuahuan Mesquite Upland Scrub

The Apacherian-Chihuahuan Mesquite Upland Scrub land cover type comprises 17 percent of the analysis area and is composed of areas dominated by mesquites and succulents but generally lacks grass. In addition to honey and velvet mesquites, other dominant or codominant species include whitethorn acacia (*Acacia constricta*), viscid acacia, one-seed juniper (*Juniperus monosperma*), and redberry juniper (*J. coahuilensis*). Upland scrub is found at higher elevations than desert scrub and often in gravelly soils that allow infiltration and storage of moisture in deeper soil layers. This land cover type is widespread at mid-elevations throughout southern Arizona and New Mexico.

Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub

The Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub land cover type comprises 12 percent of the analysis area and contains the sparsely vegetated shrublands of coppice dunes and sandsheets in the Chihuahuan Desert. Honey mesquite typically dominates this land cover type, which also includes soaptree yucca (*Yucca elata*), fourwing saltbush (*Atriplex canescens*), Torrey's jointfir (*Ephedra torreyana*), longleaf jointfir (*E. trifurca*), and littleleaf sumac (*Rhus microphylla*). Additionally, broom snakeweed (*Gutierrezia sarothrae*), frosted mint (*Poliomintha incana*), and mesa dropseed (*Sporobolus flexuosus*) provide low shrub cover, though total vegetation cover is often less than 30 percent. This shrubland is most commonly found in southwestern New Mexico but also occurs sparsely in southeastern Arizona and southeastern New Mexico.

Chihuahuan Mixed Salt Desert Scrub

The Chihuahuan Mixed Salt Desert Scrub land cover type comprises only 3 percent of the analysis area and occurs on alluvial flats and around playas with finely textured, saline soils in the Chihuahuan Desert. This open landscape is characterized by halophytic shrubs such as fourwing saltbush, mound saltbush (*Atriplex obovata*), cattle saltbush (*A. polycarpa*), iodinebush (*Allenrolfea occidentalis*), tarworts (*Flourensia* spp.), glassworts (*Salicornia* spp.), and seepweeds (*Suaeda* spp.). Grass cover may be dense or sparse and includes species such as alkali sacaton, tobosagrass, and saltgrass (*Distichlis spicata*). This community is sparsely distributed across southern New Mexico, southeastern Arizona, and northern Mexico.

Agriculture

The Agriculture land cover type comprises 2 percent of the analysis area and includes landscapes altered for crop production. Agricultural lands include those being actively tilled, those planted for livestock grazing or hay production, those producing annual crops, and those with perennial woody crops such as orchards and vineyards. These lands occur throughout the West but are less common in southern Arizona and New Mexico.

North American Warm Desert Active and Stabilized Dune

The North American Warm Desert Active and Stabilized Dune land cover type comprises 1 percent of the analysis area and includes unvegetated to sparsely vegetated active dunes and sandsheets. Sandy substrates in this system are typically derived from quartz or gypsum. Low shrubs characterize the vegetation in this land cover type and generally cover less than 10 percent of the ground surface. Common species include mesquites, littleleaf sumac, creosotebush, white bursage, desert sand verbena (*Abronia villosa*), rosemary-mints (*Poliomintha* spp.), indigo bushes (*Psorothamnus* spp.), sand sagebrush (*Artemisia filifolia*), Colorado Desert buckwheat (*Eriogonum deserticola*), and big galleta (*Pleuraphis ridiga*). This community occurs in south-central New Mexico and extreme southwestern Arizona.

Other Plant Associations

Other SWReGAP land cover types comprise less than 5 percent of the analysis area but may be locally dominant. For example, Sonoran Paloverde-Mixed Cacti Desert Scrub is only 0.3 percent of the total area, but it is a dominant land cover type in locations near Tucson, Arizona.

SWReGAP Data Limitations

SWReGAP mapped vegetation communities or plant associations over the entire Southwest using interpretation of satellite images and spectral reflectance patterns at 30 x 30–meter (m) pixel resolution. Lowry et al. (2005) acknowledged that errors in mapping may occur from incorrect interpretation of spectral data. Brief field ground-truthing of SWReGAP analysis of plant associations within the analysis area appeared to be generally accurate and provides a useful tool with which to evaluate the vegetation in segments. However, some associations appeared to be overrepresented on the SWReGAP map. For example, several areas in New Mexico that were mapped as Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub, actually had very little, if any, creosotebush. Other associations appeared to be underrepresented on the SWReGAP maps. Both the Chihuahuan Gypsophilous Grassland and Steppe and the Chihuahuan Sandy Plains Semidesert Grassland were observed in areas in which they were not shown on the maps.

Two large playas, the Willcox Playa and a playa in the Animas Valley west of Lordsburg, should have been designated as North American Warm Desert Playa, but they were actually mapped as Apacherian-Chihuahuan Piedmont Semidesert Grassland and Steppe. Areas mapped as open water are either cooling water ponds associated with power plants, sewage disposal ponds, gravel pits, or artificially created ponds. The North American Arid West Emergent Marsh association also may be overrepresented by counting areas that appear to be xeroriparian vegetation in the vicinity of Bowie, Arizona.

SMALL-SCALE VEGETATION ASSOCIATIONS BY ROUTE GROUP

Route Group 1 – Afton Substation to Hidalgo Substation

Vegetation Communities

The principal SWReGAP vegetation communities that route group 1 (New Build Section) passes through are shown in figure 3.8-2, and are listed in table 3.8-2, along with acreages for each.

Table 3.8-2. Route Group 1 Afton Substation to Hidalgo Substation SWReGap Acreages

Vegetation Type	Acres
Agriculture	3,955.3
Apacherian-Chihuahuan Mesquite Upland Scrub	35,966.6
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	178,292.5
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	92,033.6
Chihuahuan Gypsophilous Grassland and Steppe	429.1
Chihuahuan Mixed Salt Desert Scrub	6,403.9
Chihuahuan Sandy Plains Semi-Desert Grassland	3,140.1
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	93,603.0
Chihuahuan Succulent Desert Scrub	2,823.2
Developed, Medium - High Intensity	1,013.3
Developed, Open Space - Low Intensity	303.8
Inter-Mountain Basins Semi-Desert Shrub Steppe	402.2
Madrean Encinal	339.3
Madrean Juniper Savanna	1,540.1
Madrean Pinyon-Juniper Woodland	104.3
Mogollon Chaparral	40.7
North American Arid West Emergent Marsh	10.7
North American Warm Desert Active and Stabilized Dune	11,031.4
North American Warm Desert Bedrock Cliff and Outcrop	194.4
North American Warm Desert Lower Montane Riparian Woodland and Shrubland	55.8
North American Warm Desert Pavement	179.2
North American Warm Desert Playa	360.3
North American Warm Desert Riparian Mesquite Bosque	34.2
North American Warm Desert Riparian Woodland and Shrubland	74.3

Table 3.8-2. Route Group 1 Afton Substation to Hidalgo Substation SWReGap Acreages (Continued)

Vegetation Type	Acres
North American Warm Desert Volcanic Rockland	3,040.6
North American Warm Desert Wash	511.0
Open Water	22.5
Rocky Mountain Lower Montane-Foothill Shrubland	1.1
Total	**435,906.5**

Special Status Plant Species

None of the plant species listed under the ESA is considered to have the potential to occur along route group 1 within the analysis area. Among the other sensitive listed plant species, the Sneed's pincushion cactus (*Escobaria sneedii*), dune pricklypear (*Opuntia arenaria*), and Gregg night-blooming cereus (*Peniocereus greggii*) all have potential to occur throughout route group 1. Additionally, among non-ESA listed plant species, Parish's alkali grass (*Puccinellia parishii*), and the Chihuahua scurf pea (*Pediomelum pentaphyllum*) have the potential to occur within this route group.

Noxious Weeds and Other Exotic Invasive Plant Species

Primary noxious weeds of concern across route group 1 are African rue and starthistles. Other exotic invasive weeds that are not classified as noxious, such as Russian thistle, kochia, filaree, and mustards, are likely to occur throughout the analysis area.

Route Group 2 – Hidalgo Substation to Apache Substation

Vegetation Communities

The principal SWReGAP vegetation communities that route group 2 (New Build Section) passes through are shown in figure 3.8-2 and are listed in table 3.8-3 along with acreages for each.

Table 3.8-3. Route Group 2 Hidalgo Substation to Apache Substation SWReGap Acreages

Vegetation Type	Acres
Agriculture	9,254.0
Apacherian-Chihuahuan Mesquite Upland Scrub	98,823.4
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	186,177.0
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	79,121.9
Chihuahuan Mixed Salt Desert Scrub	25,899.7
Chihuahuan Sandy Plains Semi-Desert Grassland	671.9
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	10,371.9
Chihuahuan Succulent Desert Scrub	184.0
Developed, Medium - High Intensity	3,978.5
Developed, Open Space - Low Intensity	256.9
Madrean Encinal	2,108.9
Madrean Juniper Savanna	535.0
Madrean Pine-Oak Forest and Woodland	26.8

Table 3.8-3. Route Group 2 Hidalgo Substation to Apache Substation SWReGap Acreages (Continued)

Vegetation Type	Acres
Madrean Pinyon-Juniper Woodland	1,455.3
Mogollon Chaparral	982.9
North American Arid West Emergent Marsh	663.4
North American Warm Desert Bedrock Cliff and Outcrop	1,261.5
North American Warm Desert Lower Montane Riparian Woodland and Shrubland	1.5
North American Warm Desert Pavement	297.3
North American Warm Desert Riparian Mesquite Bosque	1,230.1
North American Warm Desert Volcanic Rockland	570.0
North American Warm Desert Wash	1,494.2
Open Water	288.5
Sonoran Mid-Elevation Desert Scrub	6.4
Sonoran Paloverde-Mixed Cacti Desert Scrub	248.3
Total	**425,909.3**

Special Status Plant Species

None of the plant species listed under the ESA have potential to occur along the route group 2 analysis area. Of the other sensitive plant species considered in this analysis, the following species have some potential to occur within this route group:

- Sneed’s pincushion cactus;
- Gregg night-blooming cereus;
- Parish’s alkali grass;
- devilthorn hedgehog cactus (*Echinocereus pseudopectinatus*);
- San Carlos wild-buckwheat (*Eriogonum capillare*);
- slender needle corycactus (*Coryphantha scheeri* var. *valida*);
- Wilcox pincushion cactus (*Mammillaria wrightii* var. *wilcoxii*);
- varied fishhook cactus (*Mammillaria viridiflora*);
- button cactus (Epithelantha micromeris);
- playa spider plant (*Cleome multicaulis*);
- dune pricklypear (*Opuntia arenaria*); and
- needle-spined pineapple cactus (*Echinomastus erectocentrus* var. *erectocentrus*).

Noxious Weeds and Other Exotic Invasive Plant Species

Primary noxious weeds of concern in the region of the proposed Project in New Mexico are African rue and starthistles. Tamarisk (*Tamarix* sp.) is known to occur in this route group and in the San Simon Creek vicinity (NIISS 2013). The primary noxious weed of concern in the vicinity of the Project in Arizona is buffelgrass. This species is not known to occur along the analysis area. Hoary cress (*Cardaria draba*) has been documented in the Lordsburg vicinity (NIISS 2013), and it could be present within the analysis area.

Other exotic, invasive species, including Russian thistle, filaree, and mustards, occur throughout the region, but these species are not classified as noxious weeds.

Route Group 3 – Apache Substation to Pantano Substation Vegetation Communities

The principal SWReGAP vegetation communities that route group 3 (Upgrade Section) passes through are shown in figure 3.8-3, and are listed in table 3.8-4 along with acreages for each.

Table 3.8-4. Route Group 3 Apache Substation to Pantano Substation SWReGap Acreages

Vegetation Type	Acres
Agriculture	133.3
Apacherian-Chihuahuan Mesquite Upland Scrub	1,336.5
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	864.2
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	536.6
Chihuahuan Mixed Salt Desert Scrub	224.1
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	1.4
Developed, Medium - High Intensity	64.6
Developed, Open Space - Low Intensity	55.5
Madrean Encinal	7.3
Mogollon Chaparral	14.4
North American Arid West Emergent Marsh	9.4
North American Warm Desert Bedrock Cliff and Outcrop	8.1
North American Warm Desert Riparian Mesquite Bosque	9.2
Open Water	4.6
Sonoran Paloverde-Mixed Cacti Desert Scrub	0.03
Total	**3,269.2**

Special Status Plant Species

None of the plant species listed under the ESA is considered to have the potential to occur in route group 3. Of the other sensitive plant species considered in this analysis, the broadleaf ground cherry (*Physalis latiphysa*), button cactus, devilthorn hedgehog cactus, giant sedge (*Carex gigantea*), littleleaf false tamarind (*Lysiloma watsonii*), needle-spined pineapple cactus, San Carlos wild-buckwheat, San Pedro River wild buckwheat (*Eriogonum terrenatum*), varied fishhook cactus, and Wilcox pincushion cactus have some potential to occur in this route group.

The Huachuca water umbel (*Lilaeopsis schaffneriana* spp. *recurva*), listed as endangered under the ESA, has some potential to be present in this route group, if suitable habitat is available on this portion of the San Pedro River. This species is known to be present on other parts of the San Pedro River. The magenta-flowered hedgehog cactus (*Echinocereus fasciculatus*), needle-spined pineapple cactus, Wilcox pincushion cactus, San Carlos wild-buckwheat, San Pedro River wild buckwheat, button cactus, devilthorn hedgehog cactus, slender needle corycactus and varied fishhook cactus have some potential to occur in this route group.

Noxious Weeds and Other Exotic Invasive Plant Species

The primary noxious weed of concern in the vicinity of the Project is buffelgrass. Exotic, invasive species, Russian thistle occurs throughout the route group.

Route Group 4 – Pantano Substation to Saguaro Substation Vegetation Communities

The principal SWReGAP vegetation communities that route group 4 (Upgrade Section) passes through are shown in figure 3.8-3, and are listed in table 3.8-5 along with acreages for each.

Table 3.8-5. Route Group 4 Pantano Substation to Saguaro Substation SWReGap Acreages

Vegetation Type	Acres
Agriculture	290.0
Apacherian-Chihuahuan Mesquite Upland Scrub	684.0
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	183.8
Barren Lands, Non-specific	42.0
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	36.4
Chihuahuan Mixed Salt Desert Scrub	17.0
Developed, Medium - High Intensity	1,291.1
Developed, Open Space - Low Intensity	183.5
Madrean Encinal	2.8
Madrean Juniper Savanna	0.9
North American Warm Desert Bedrock Cliff and Outcrop	3.9
North American Warm Desert Riparian Mesquite Bosque	89.9
North American Warm Desert Riparian Woodland and Shrubland	55.7
North American Warm Desert Wash	2.0
Open Water	11.4
Sonora-Mojave Creosotebush-White Bursage Desert Scrub	737.0
Sonoran Mid-Elevation Desert Scrub	67.6
Sonoran Paloverde-Mixed Cacti Desert Scrub	2,226.1
Total	**5,925.1**

Special Status Plant Species

The Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*), listed as endangered under the ESA, has potential to be present on the southern parts of the analysis area, as it is known to be present in this vicinity. Additionally, the Huachuca water umbel, listed as endangered under the ESA, has some potential to be present in the analysis area if suitable habitat is present where it crosses Cienega Creek (see figure 3.7-2b). This species is known to be present on other parts of Cienega Creek. Of the other sensitive plant species considered in this analysis, the desert barrel cactus (*Ferocactus cylindraceus*), Engelmann pricklypear (*Opuntia engelmannii* var. *flavispina*), giant sedge, littleleaf false tamarind, magenta-flowered hedgehog cactus, needle-spined pineapple cactus, night-blooming cereus (*Peniocereus greggii* var. *transmontanus*), Pima Indian mallow (*Abutilon parishii*), San Carlos wild-buckwheat, San Pedro River wild buckwheat, staghorn cholla (*Opuntia versicolor*), Thornber fishhook cactus (*Mammillaria* *thornberi*), Tumamoc globeberry (*Tumamoca macdougalii)*, varied fishhook cactus, and hybrid Kelvin cholla (*Opuntia* x *kelvinensis*) have some potential to occur in the analysis area.

The Pima pineapple cactus has potential to be present. This species is known to be present in this vicinity. Of the other sensitive plant species considered in this analysis, the Engelmann pricklypear, littleleaf false tamarind, magenta-flowered hedgehog cactus, needle-spined pineapple cactus, Pima Indian mallow, San Carlos wild-buckwheat, night-blooming cereus, staghorn cholla, hybrid Kelvin cholla, Thornber fishhook cactus, and Tumamoc globeberry have some potential to occur.

Noxious Weeds and Other Exotic Invasive Plant Species

The primary noxious weed of concern in the vicinity of the analysis area is buffelgrass, which has been documented in the Tucson vicinity (NIISS 2013). Two other noxious weed species, field bindweed (*Convolvulus arvensis*) and hydrilla (*Hydrilla verticllata*), have also been documented near the Santa Cruz River on the western edge of Tucson (NIISS 2013) and could be present in the analysis area. Other invasive species in this route group include Russian thistle, filaree, and mustards, but these are not classified as noxious weeds.

3.8.2 Wildlife

This section includes documentation and analysis regarding the occurrence and distribution of wildlife species within the analysis area (as defined in section 3.8.1), including general, endangered, threatened, candidate, proposed, sensitive, and other special status wildlife species that are afforded protection within the analysis area (collectively referred to as special status species). Threatened and endangered species are those species that are protected under the ESA and include proposed, conservation agreement, and candidate species.

Sensitive species include the BLM Sensitive Species for the Las Cruces District Office of the Las Cruces District in New Mexico, BLM Sensitive Species for the Tucson and Safford Field Offices of the Gila District in Arizona, Sensitive species for the Douglas District of the Coronado National Forest, and migratory bird species protected under the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA). In addition to these Federal listings, State and local special status species were also analyzed, including Species of Greatest Conservation Need (SGCN) in New Mexico and Arizona, species listed under the New Mexico Wildlife Conservation Act of 1978 administered by the NMDGF, State of Arizona Wildlife Species of Concern, and species listed under the Pima County Multi-species Conservation Plan (MSCP).

In addition to special status wildlife species, this section also documents special designation areas, including ESA-related proposed and designated critical habitat, wildlife management areas, Pima County preserves and Biological Corridor Linkages. Wildlife habitat and distribution data were obtained from existing resource data through thorough ecological literature searches. Relevant scientific literature and agency-related wildlife management documents, such as RMPs, were used as the sources for describing species ecology, habitat needs, distribution, and management guidelines.

The information provided in the following subsections is partially taken from a report titled “Southline Transmission Project Resource Report 18: Wildlife” (CH2M Hill 2013h). The contents of that report are used herein without specific reference.

Analysis Area

The analysis area for wildlife resources of the New Build Section of the proposed Project includes 1 mile on either side of the centerline of alternatives carried forward and any substation or access roads outside that corridor. The analysis area for wildlife resources of the Upgrade Section includes a 500-foot corridor (200 feet off of existing centerline of 100-foot corridor), for each alternative. This is to identify resources that could be directly impacted by ground disturbance and where construction materials, equipment, and workers may be present.

The affected environment, with regard to wildlife resources, is the combination of naturally occurring vegetation communities, physical factors (soil, water availability, topography and elevation, weather, and climate), historical land use patterns, and prior surface disturbances that affect how wildlife use the analysis area. Wildlife species within a region will have different optimal environmental conditions (roosting, nesting, foraging, reproduction, and physical environment needs), allowing them to survive in different circumstances. Species with highly specific environmental conditions tend to have localized distributions.

Several factors influence the potential for wildlife species to occur within the analysis area. The vegetation resources present within the analysis area are a crucial component of habitat availability for wildlife species (including special status species). The proposed Project would cross (east to west) two ecoregions in New Mexico (the Chihuahuan Desert and the Apache-Highlands South) and two ecoregions in Arizona (the Apache-Highlands South and the Sonoran Desert) (AGFD 2006; NMDGF 2006) (figures 3.8-4 and 3.8-5). These ecoregions contain some of the highest vertebrate species richness (number of taxa) of the Southwestern United States (NMDGF 2006). It has been documented that at least 468 bird species have been identified in southeastern Arizona (in the Apache-Highlands South ecoregion) in the past 50 years. The Sonoran Desert’s riparian habitats are among the richest in North America in terms of breeding bird diversity and productivity (AGFD 2006).

The Chihuahuan Desert ecoregion is dominated by semidesert grasslands and desertscrub, and it lies within 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. There is a wide variation in elevation in the region. The annual precipitation, as in the other ecoregions that the analysis area crosses, is a bimodal pattern, with approximately half the precipitation coming during summer monsoons and half during winter months as gentle, steady rain events.

The Apache-Highlands South ecoregion is known for its more than 20 mountain ranges that rise abruptly from surrounding basins of grasslands and desertscrub, known as “sky islands.” Topography is varied; elevations range from 2,200 feet to over 10,700 feet. Precipitation averages between 10 and 30 inches per year, based on elevational differences of the landscape (AGFD 2006). This ecoregion also contains the Willcox Playa and Lordsburg Playas. Playas are lake beds or depressed basins that contain significant wetland habitat for many species of wildlife, including waterfowl, shorebirds, and other migratory birds (NMDGF 2006). Because of the variations in elevation and precipitation, many varied vegetation associations occur in this ecoregion.

The Sonoran Desert ecoregion occurs in southwestern Arizona and northern Sonora, Mexico. In Arizona, elevations range from around 100 to 5,900 feet and also feature Basin and Range physiography of broad valleys and rugged mountain ranges. Annual precipitation ranges from 3 to 17 inches and generally increases from west to east. Biodiversity in this ecoregion is among the highest of any desert in North America. The cactus-dominated vegetation communities of upland Sonoran desertscrub resulting from increased precipitation levels display a more diverse plant assemblage and greater vertical structural component than the desertscrub of the lower elevations (AGFD 2006).

The analysis area for wildlife resources is divided into four specific route groups (route group 1 – Afton Substation to Hidalgo Substation, route group 2 – Hidalgo Substation to Apache Substation, route group 3 – Apache Substation to Pantano Substation, and route group 4 – Pantano Substation to Saguaro Substation (from east to west)) for purposes of identifying baseline environmental conditions and for analyses of environmental consequences in section 4.8.2 in chapter 4. Within these route groups, the area is further subdivided into sections according to the type of construction: New Build Section and Upgrade Section. Route groups 1 and 2 are within the New Build Section; route groups 3 and 4 are within the Upgrade Section. The analysis for this Project will be conducted separately by route groups and thus by construction type, i.e., New Build or Upgrade Section. The analysis area for each is presented below.

NEW BUILD SECTION

Table 3.8-6 identifies wildlife movement corridors in the analysis area and tables 3.8-7 through 3.8-10 identify special status species that could occur by route group for the proposed Project.

Route Group 1 – Afton Substation to Hidalgo Substation

The route group 1 lies primarily within the Chihuahuan Desert ecoregion, with a small portion located in the Apache-Highlands in the western portion of the route group. The elevational range of this route group is 3,957 to 5,508 feet, and it contains 24 SWReGAP vegetation associations (see figure 3.8-2). This route group also crosses the Burro Mountains to Cedar Mountains Potential Cougar Corridor (figure 3.8-6), lies in the Pacific flyway bird migration corridor (figure 3.8-7), lies in a marginal high wind area (figure 3.8-8), and includes sandhill crane migratory/stopover habitat and avian protection areas/bird habitat conservation areas (figure 3.8-9). No designated critical habitat is found within the analysis area in route group 1 (figure 3.8-10).

Route Group 2 – Hidalgo Substation to Apache Substation

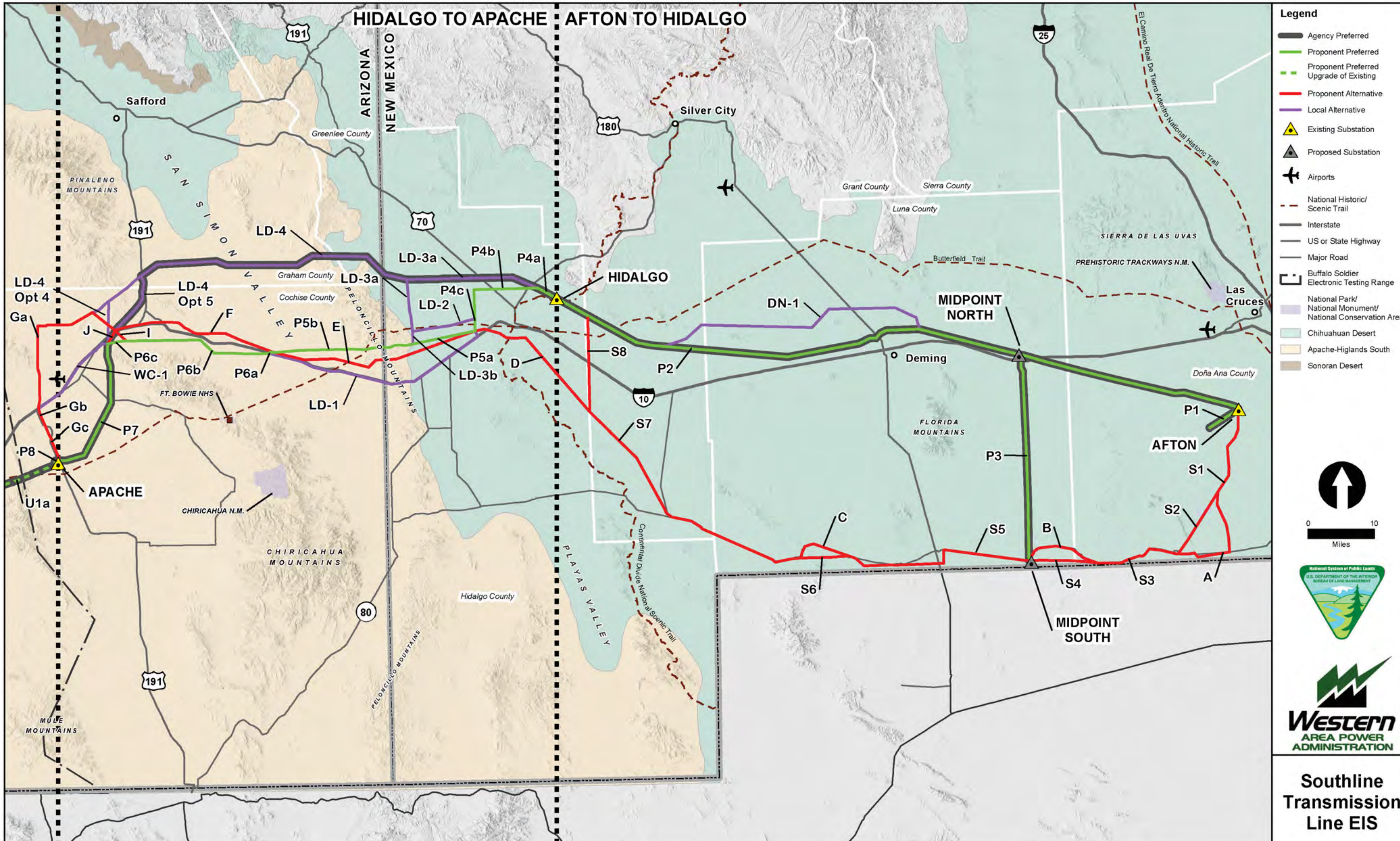
The route group 2 lies entirely within the Apache-Highlands South ecoregion. The elevational range of this route group is 3,350 to 5,512 feet. This route group contains 21 SWReGAP vegetation associations (see figure 3.8-2); the Lordsburg and Willcox Playas; and crosses the San Simon River. This route group contains marginal high wind areas at either end of the group (see figure 3.8-8) and crosses three potential wildlife linkage zones (PLZs) throughout its length, the Pinaleño-Dos Cabezas-San Simon Valley PLZ, Willcox Playa-Winchester-Pinaleño-Dos Cabezas PLZ, and the Pinaleño-Sam Simon Valley PLZ (see figure 3.8-6). Route group 2 would also intersect with sandhill crane migratory/stopover habitat wintering habitat at Willcox Playa, and avian protection areas/bird habitat conservation areas (see figure 3.8-9). No designated critical habitat is found within the analysis area in route group 2 (see figure 3.8-10).

UPGRADE SECTION

Route Group 3 – Apache Substation to Pantano Substation

The route group 3 lies entirely within the Apache-Highlands South ecoregion. The elevational range of this route group is 3,307 to 5,866 feet above mean seal level (amsl). This route group contains 17 SWReGAP vegetation associations (see figure 3.8-3) and would cross proposed critical habitat for the northern Mexican gartersnake (*Thamnophis eques megalops*) along Cienega Creek and the San Pedro River, both of which do not contain perennial water at the proposed crossing locations (figure 3.8-11). Cienega Creek and the San Pedro River also contain habitat for the endangered southwestern willow flycatcher and the western yellow-billed cuckoo, a proposed threatened species, both of which utilize riparian areas. This area includes the Bar V Ranch and the Las Cienegas National Conservation Area.

Figure 3.8-4. Ecoregions in the New Build Section.



1 **Figure 3.8-5.** Ecoregions in the Upgrade Section.

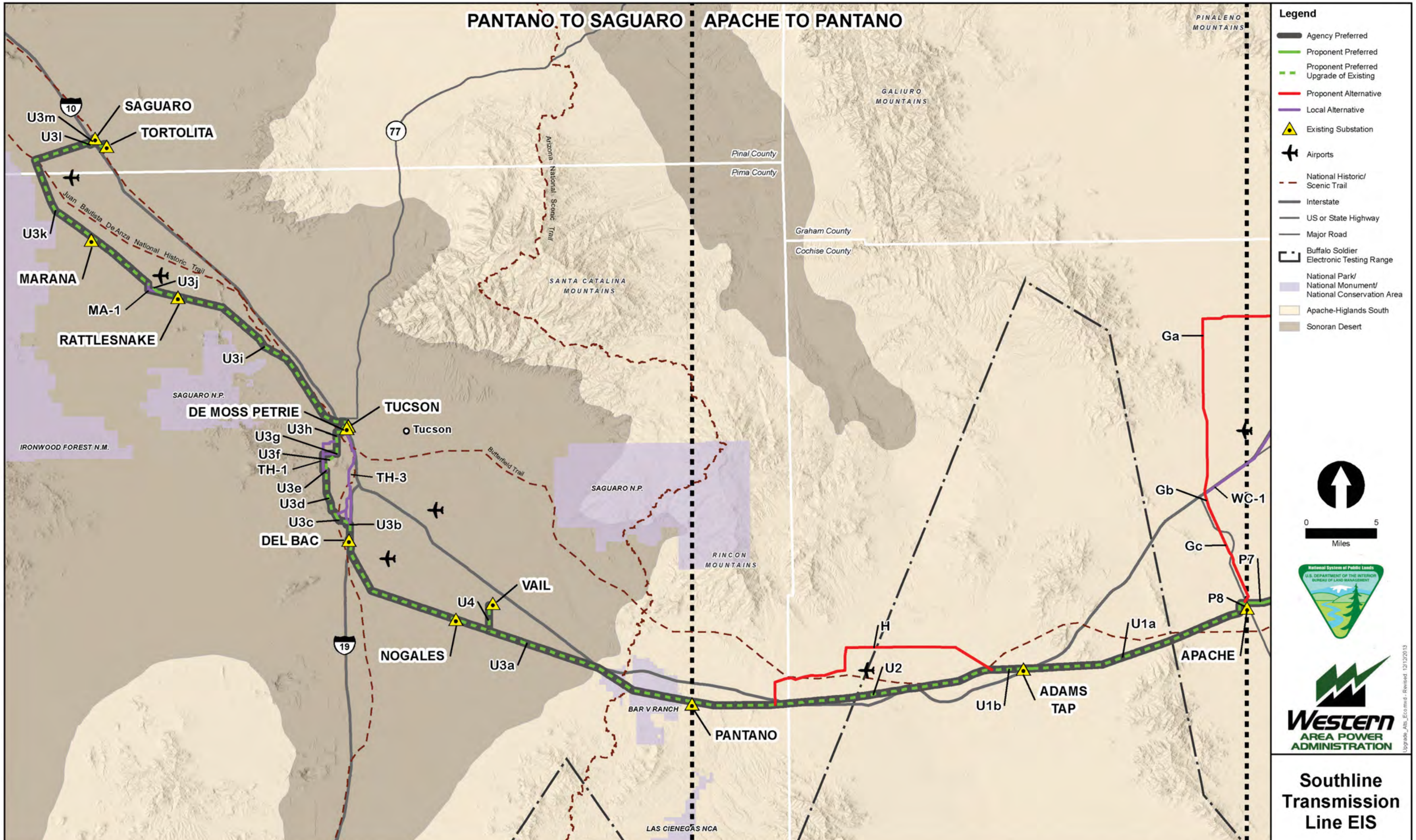


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Figure 3.8-6. Wildlife linkages in the New Build Section.

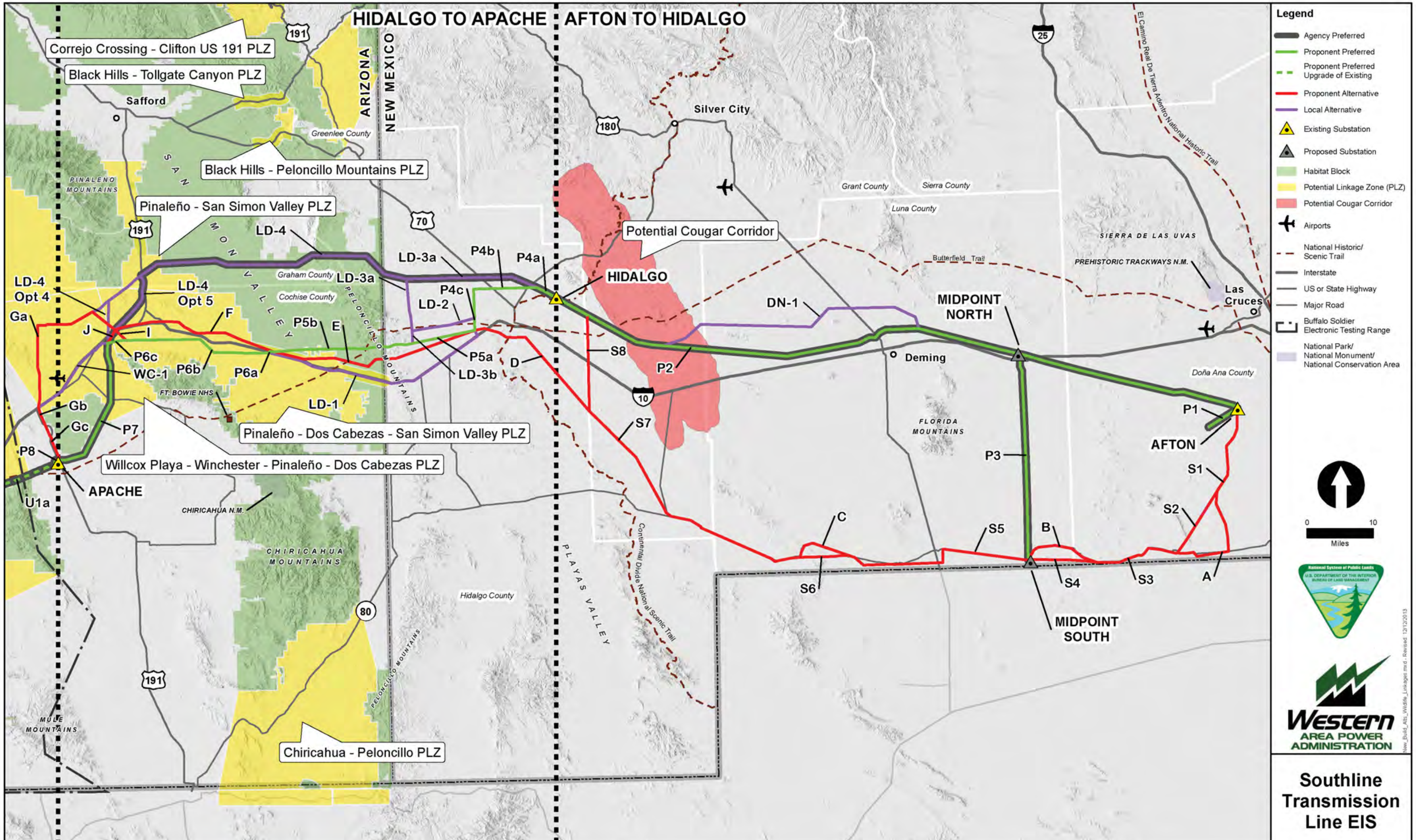


Figure 3.8-7. Pacific flyway and Central flyway areas.

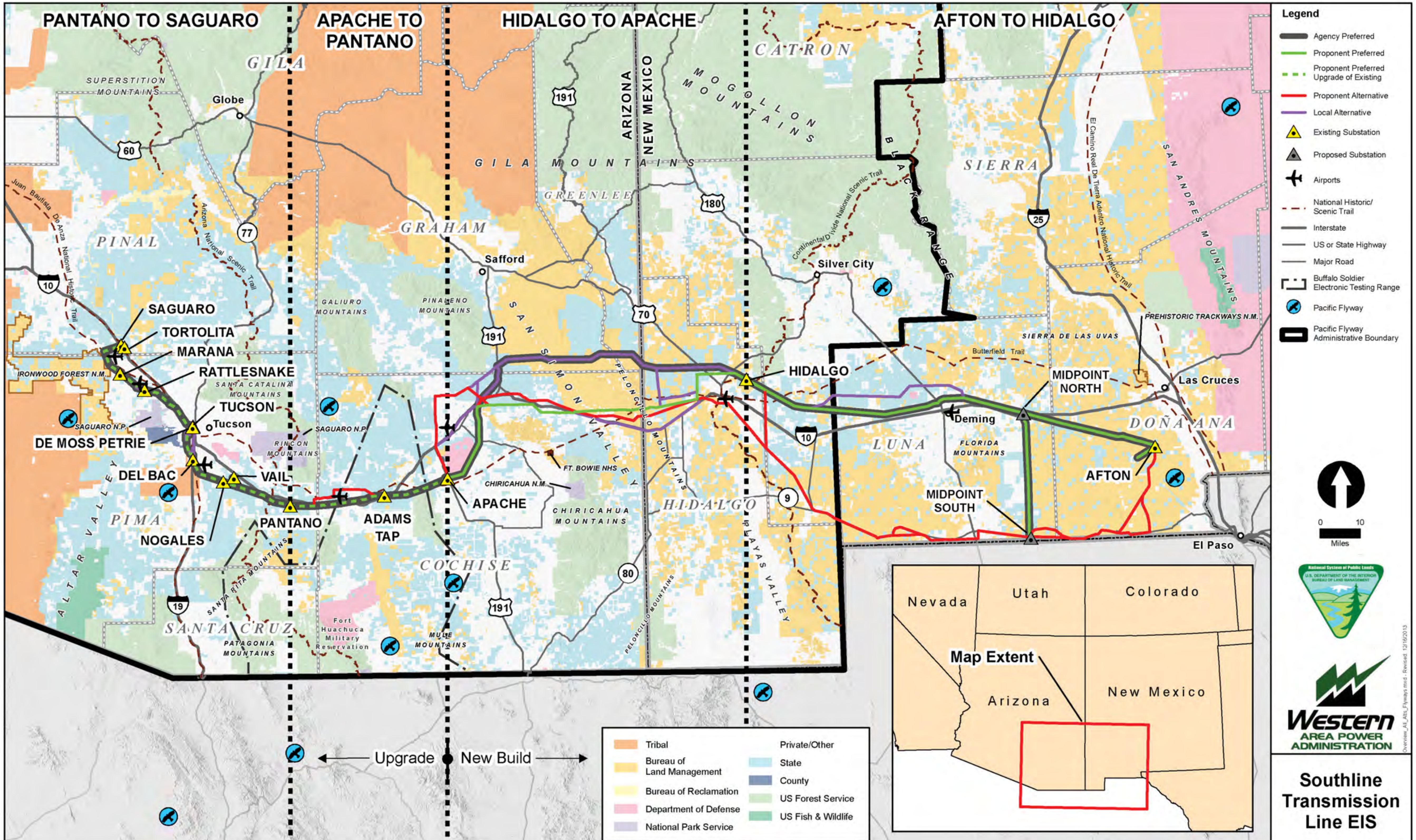
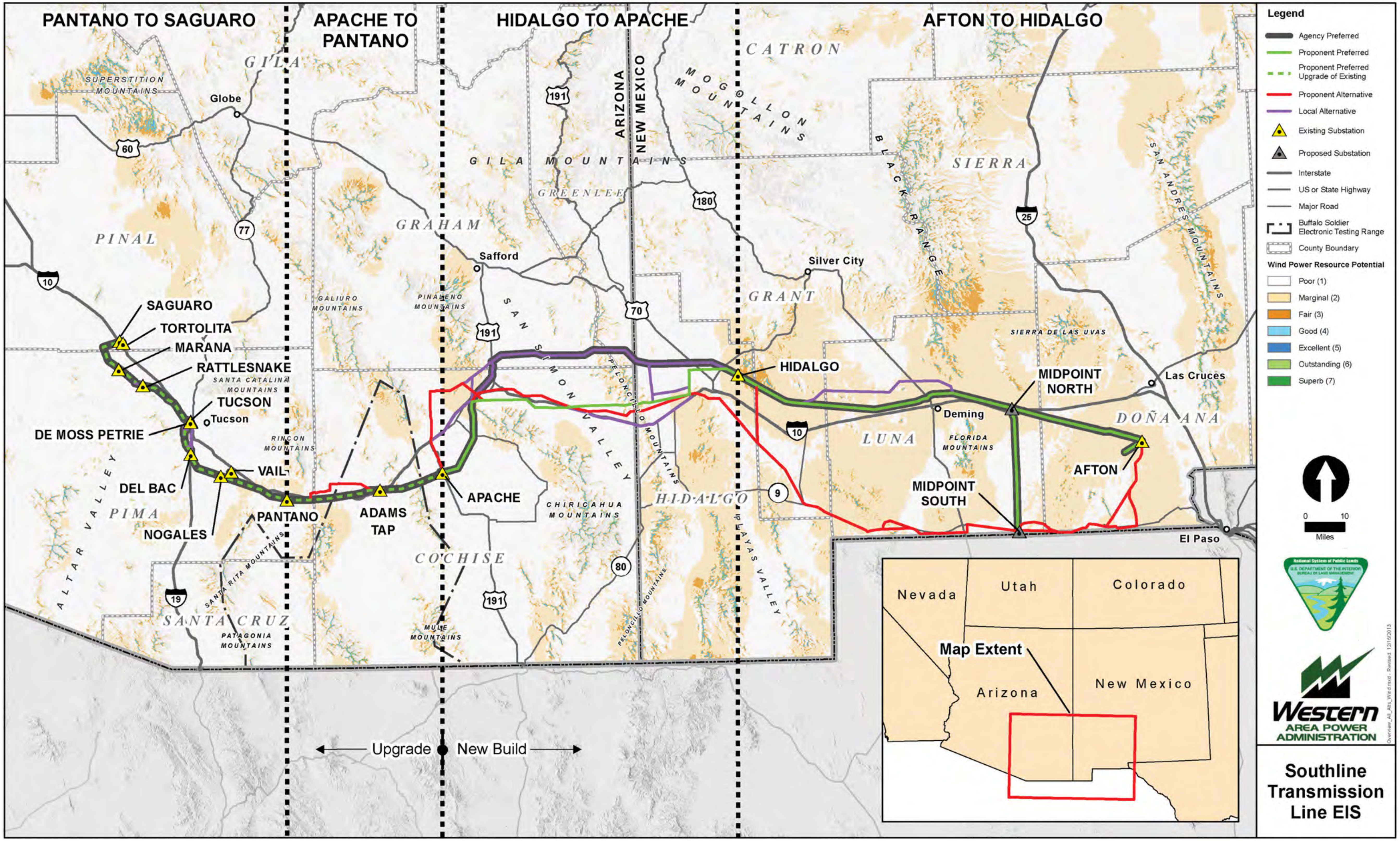


Figure 3.8-8. Wind ratings in analysis area.



1 **Figure 3.8-9.** Avian protection areas in New Build Section.

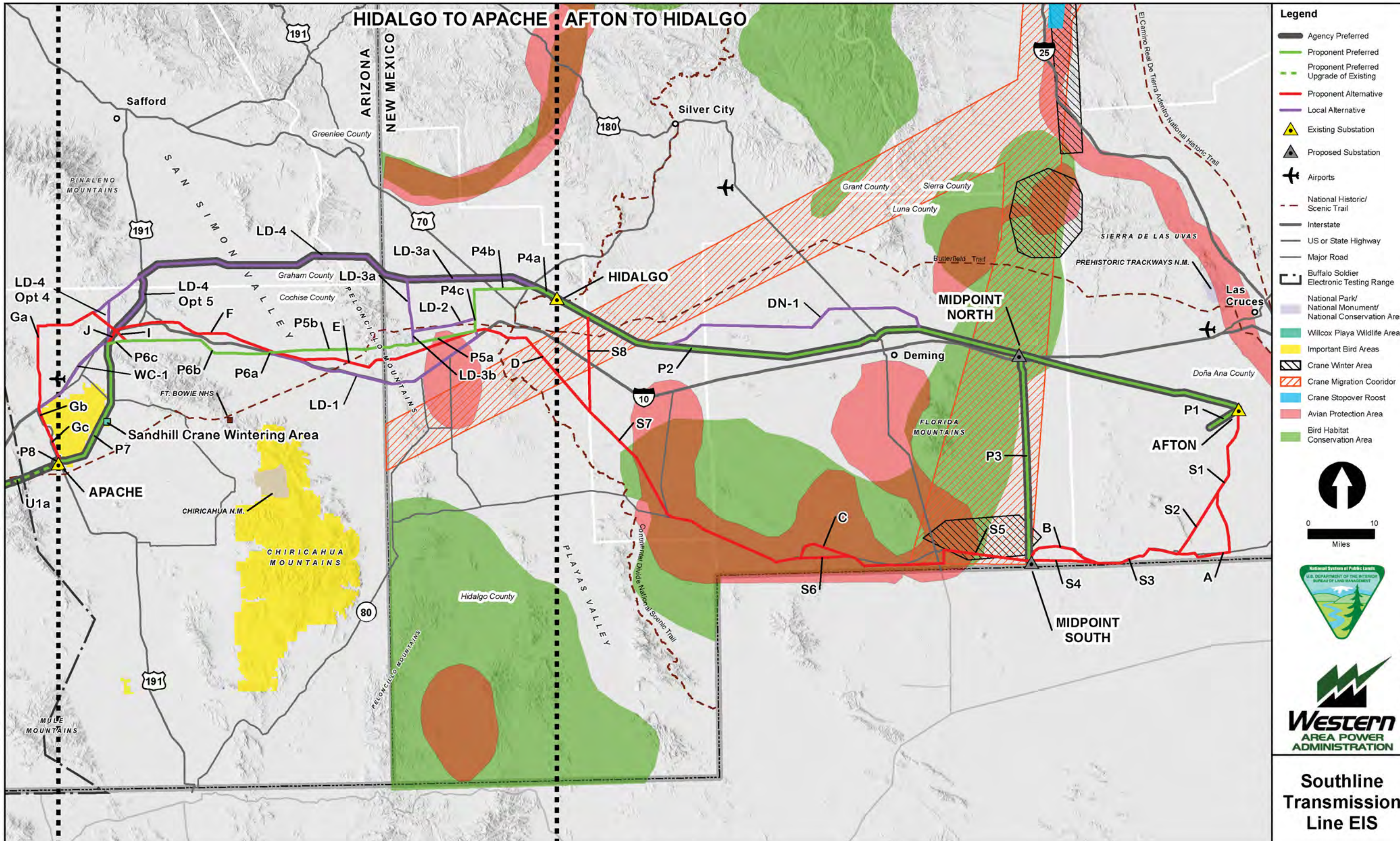


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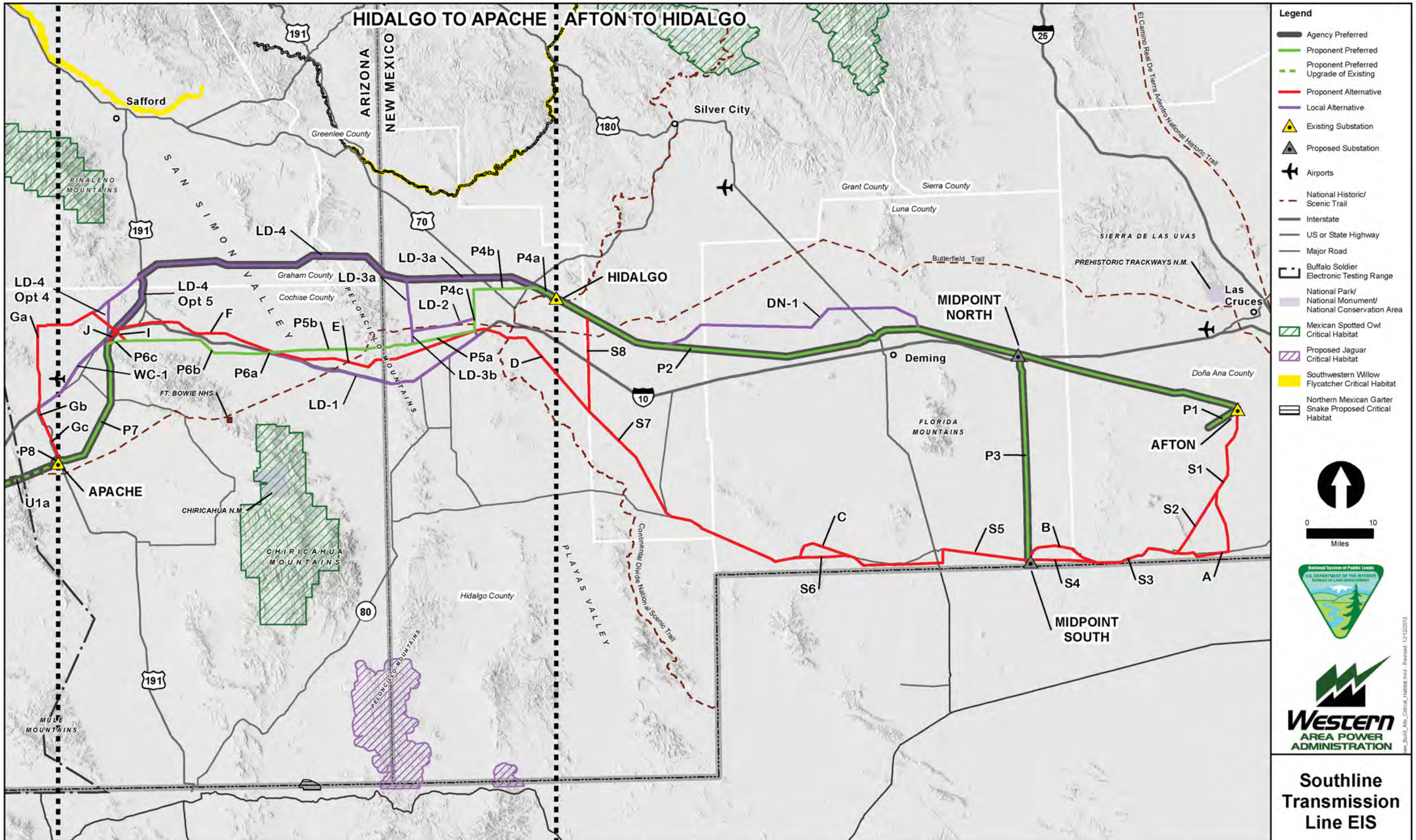
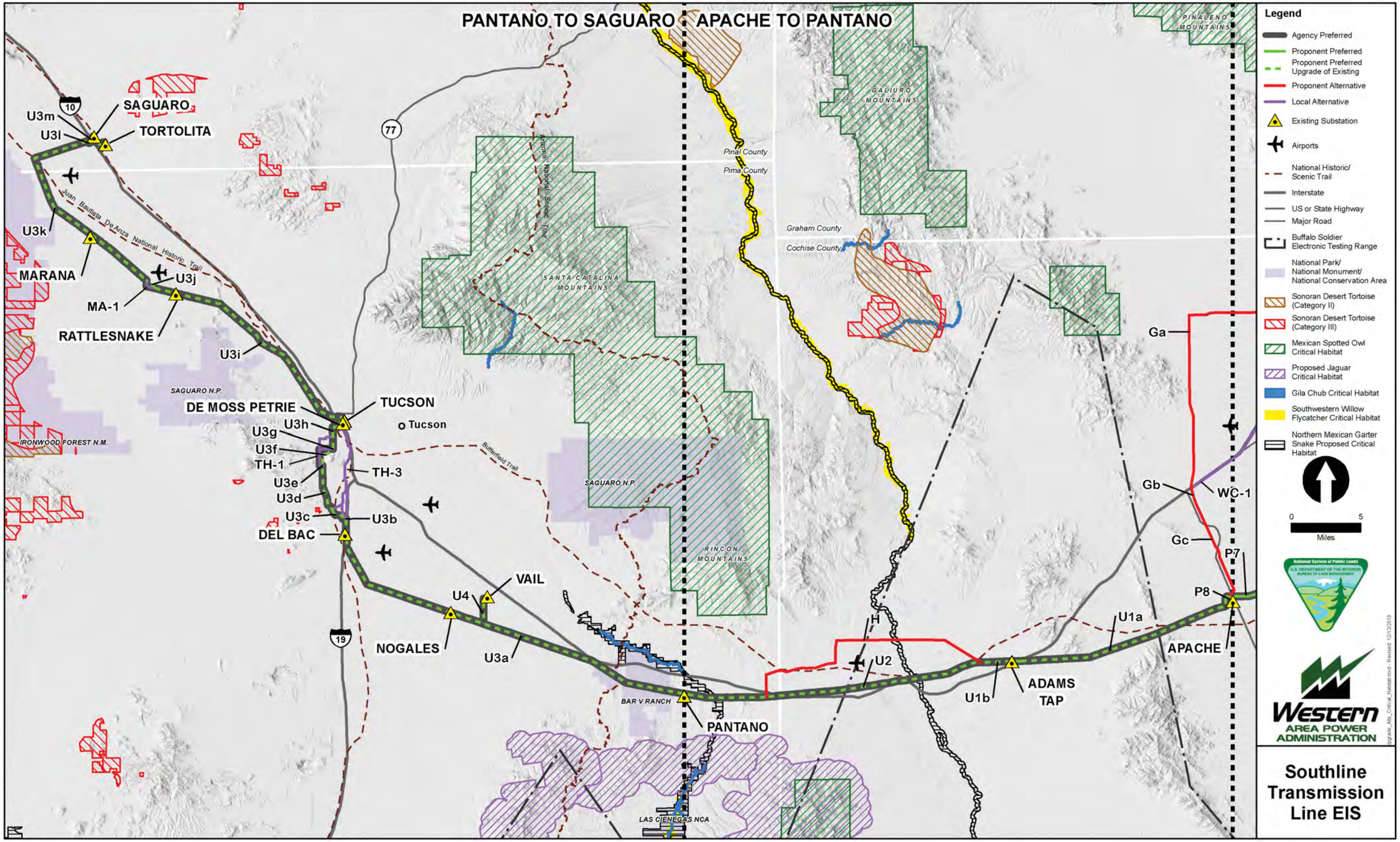
Figure 3.8-10. Critical habitat in New Build Section.



1 **Figure 3.8-11.** Critical habitat in Upgrade Section.



2

This route group is within the Pacific flyway bird migration corridor (see figure 3.8-7) and crosses two PLZs, the Galiuro-Winchester-Dragoon PLZ and the Rincons-Whetstone-Santa Rita PLZ (figure 3.8-12). It also crosses Pima County priority conservation areas (PCAs) (figure 3.8-13) and Important Bird Areas (IBAs) (figure 3.8-14).

Route Group 4 – Pantano Substation to Saguaro Substation

The route group 4 lies within a portion of the Apache-Highlands South and a portion of the Sonoran Desert ecoregions. The elevational range of this route group is 1,841 to 4,167 feet. This route group contains 15 SWReGAP vegetation associations (see figure 3.8-3) and would cross Cienega Creek and Davidson Canyon, both listed as Outstanding Arizona Waters. This route group is within the Pacific flyway bird migration corridor (see figure 3.8-7) and would also cross three PLZs, the Rincon-Whetstone-Santa Rita PLZ, Tucson Mountains-San Xavier PLZ, and Ironwood-Tortolita PLZ (see figure 3.8-12). It is also within PCAs for species covered under the SDCP (see figure 3.8-13) and includes Tucson Mountain Park and Tumamoc Hill (figure 3.8-15).

Laws, Ordinances, Regulations, and Standards

FEDERAL

- ESA of 1973, as amended: Section 7 of the ESA requires Federal agencies to consult with the FWS to ensure that undertaking, funding, permitting, or authorizing an action is not likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat, as defined under the act, exists only after FWS officially designates it. Critical habitats are (1) areas within the geographic area that have features essential to the conservation of the species and that may require special management consideration or protection; and (2) those specific areas outside the geographic area occupied by a species at the time it is listed that are essential to the conservation of the species.

- Migratory Bird Treaty Act of 1918, as amended: The MBTA gives Federal protection to all migratory birds, including nests and eggs. This law states that it is unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird" (16 U.S.C. 703). More than 800 species of migratory birds are protected under this law. The MBTA includes protection for all raptor species. This regulation does not discriminate between live or dead birds, and it also grants full protection to any bird parts, including feathers, eggs, and nests. In order to relocate or destroy any nest and maintain compliance with the MBTA, it is necessary to obtain a permit from the FWS, the responsible agency for regulating this law. Only those entities permitted by the FWS can assist in the relocation of birds or nests. Section 1 of the FWS Region 2 "Interim Empty Nest Policy" states that if the nest is completely inactive at the time of destruction or movement, a permit is not required in order to comply with the MBTA. If an active nest is observed during any activities related to the Project, measures should be taken to protect the nest from destruction and to avoid a violation of the MBTA.

- Fish and Wildlife Coordination Act of 1934, as amended: This act requires coordination with Federal and State wildlife agencies (FWS, AGFD, and NMDGF) for the purpose of mitigating losses of wildlife resources caused by a Project that impounds, diverts, or otherwise modifies a stream or other natural body of water.

- Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c), as amended: The BGEPA, as amended, prohibits “taking” bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), including their parts, nests, or eggs, without a permit from the FWS. The Act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The BGEPA defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” The FWS defines “disturb” under the BGEPA as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

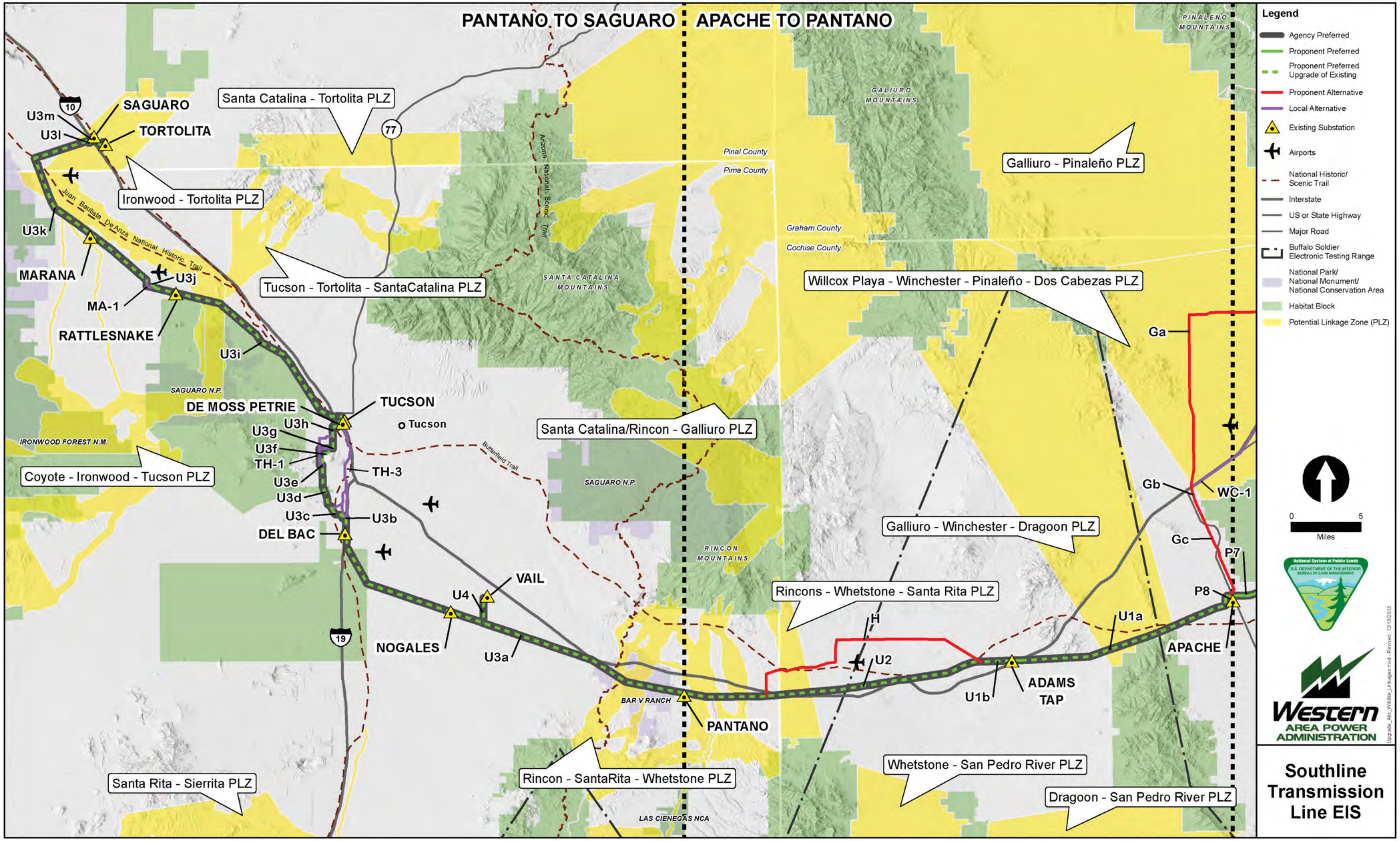
- BLM Manual 6840: BLM policy (Manual 6840) dictates that the BLM must carry out management for the conservation of State-listed plants and animals in addition to species protected under the ESA. BLM Manual 6840 is a Federal guidance document that outlines the criteria for listing species as Sensitive on BLM-administered lands and provides direction on management of these species. BLM Sensitive Species are species that the FWS currently lists under status review; species whose populations are declining rapidly and may warrant Federal protection in the future; species that have small, widely distributed populations; and species that are located in special or unique habitats.

- Mimbres RMP: The Mimbres RMP, developed in December 1993, covers the BLM lands within the Las Cruces District, called the Mimbres Resource Area. It includes all New Mexico portions of the proposed Project’s New Build Section, including the Proponent Preferred route, the Proponent Alternative, and the local alternatives. The Mimbres RMP establishes areas for limited, restricted, or exclusive uses, levels of production, allowable resource uses, resource condition objectives, program uses, program constraints, and general management direction. This RMP provides an appendix with the list of wildlife species that the BLM considers sensitive when occurring on lands administered by the Las Cruces District Office of the BLM in New Mexico.

- Safford District RMP: The Safford District RMP, finalized in December 1991, establishes management direction for lands administered by the Safford District Office, extending from the New Mexico border to west of Benson. This includes both the New Build Section and Upgrade Sections of the proposed Project and alternatives. The Safford RMP identifies objectives and policies for lands managed by the BLM and identifies avoidance and exclusion areas that include wilderness areas.

- Phoenix District RMP: The Phoenix District RMP, finalized in 1988, covers the BLM lands within the Phoenix District called the Phoenix Resource Area. It includes portions of the proposed Project’s Upgrade Section and alternatives in Pima County from east of Benson to the project terminus. The Phoenix District RMP identifies objectives and policies for lands managed by the BLM and avoidance and exclusion areas including wilderness study areas. This area is now managed by the Tucson Field Office.

Figure 3.8-12. Wildlife linkages in the Upgrade Section.



1 **Figure 3.8-13.** Pima County priority conservation areas in Upgrade Section.

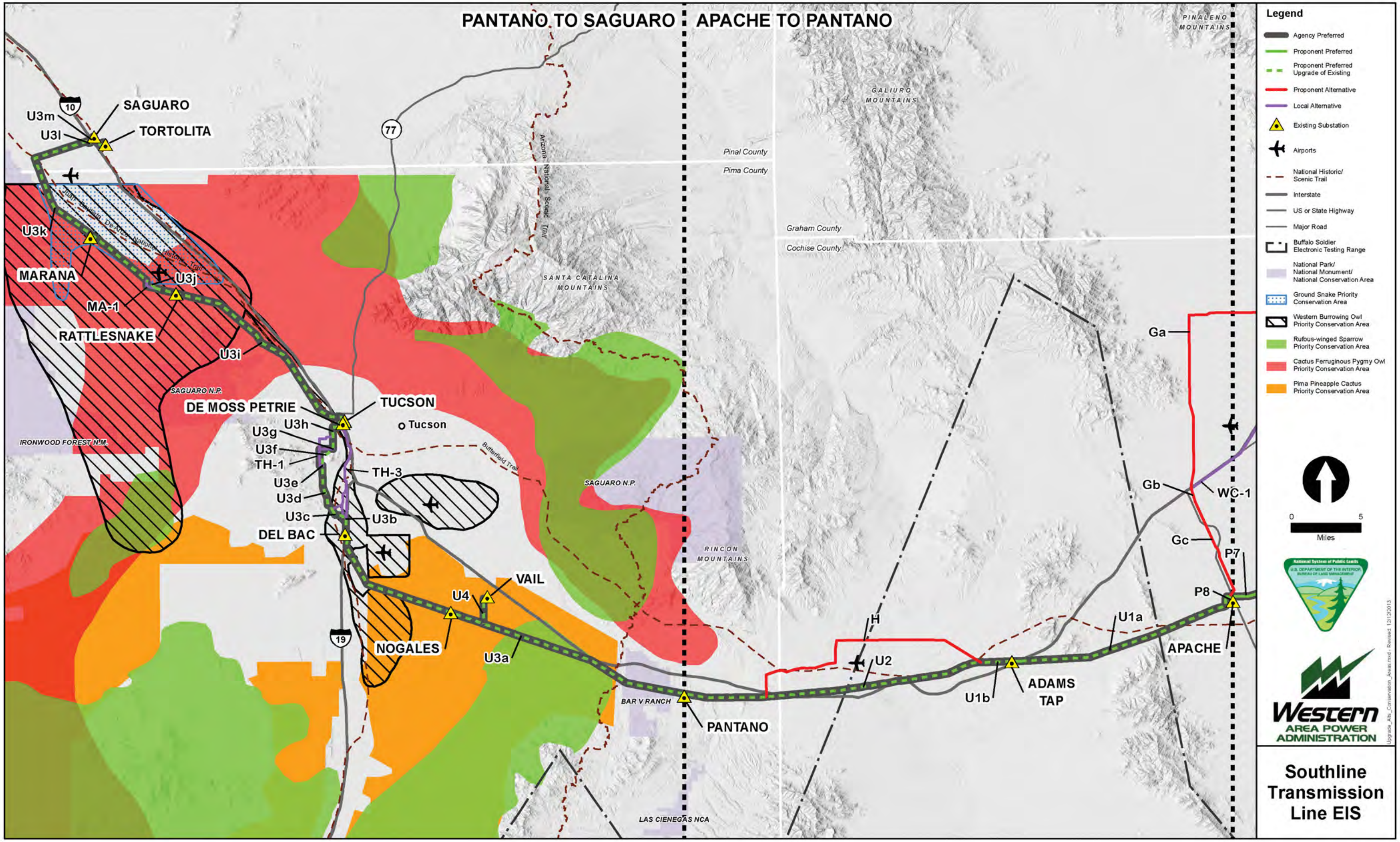


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Figure 3.8-14. Important Bird Areas in Upgrade Section.

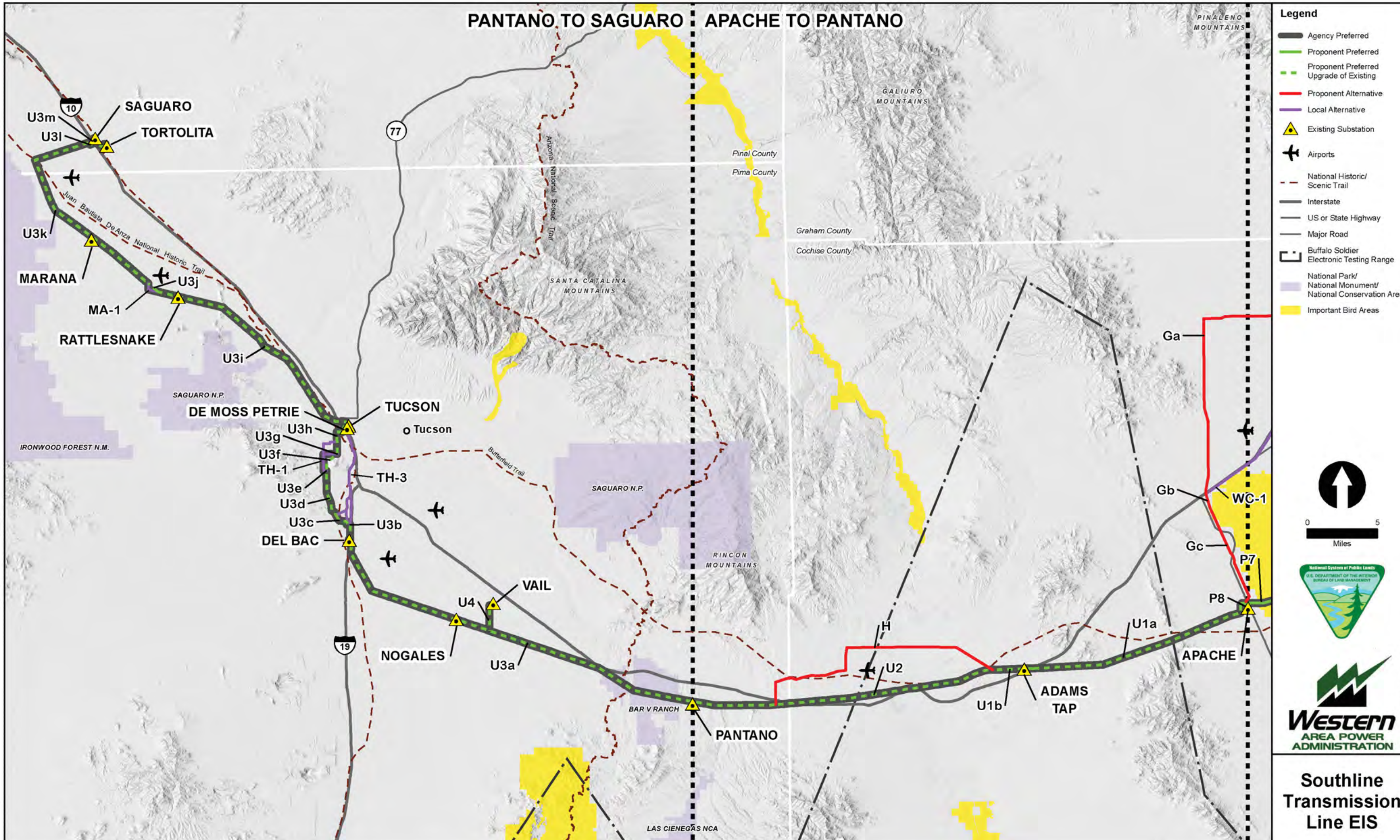
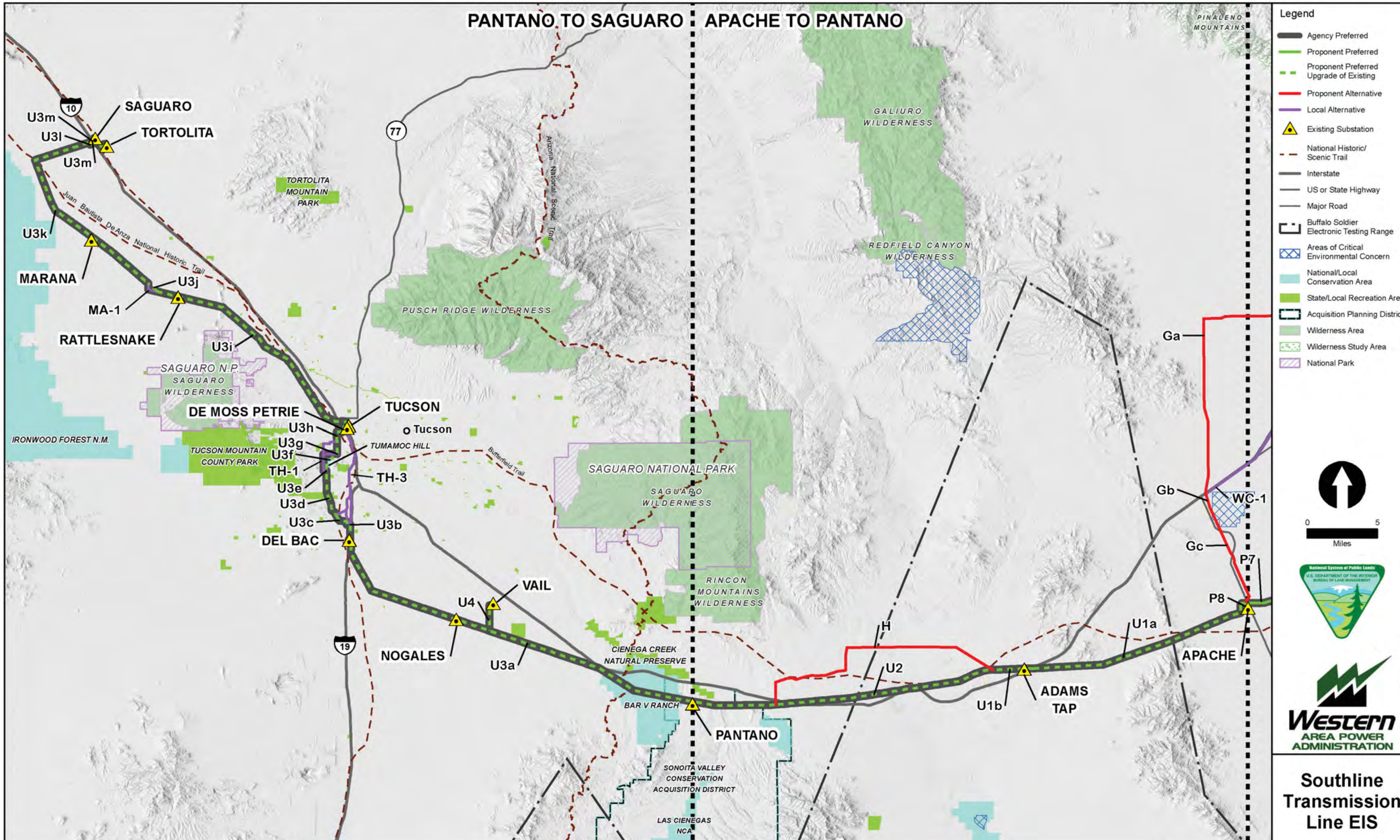


Figure 3.8-15. Preserves and parks in Upgrade Section.



- Coronado National Forest Plan, as amended: The "Coronado National Forest Land and Resource Management Plan," as amended (U.S. Forest Service 1986a), guides the long-term management of National Forest System lands on the Coronado National Forest. The Coronado National Forest Plan provides for integrated multiple use and sustained yield of goods and services from the Coronado National Forest in a way that maximizes long-term net public benefits in an environmentally sound manner (U.S. Forest Service 1986a:1). This management direction allows for a variety of uses of available National Forest System lands for appropriate public and private interests consistent with U.S. Forest Service policies. Management goals are identified for 12 different program elements, including environmentally sound energy and mineral development (U.S. Forest Service 1986a:9).
    - The role of Management Indicator Species (MIS) in U.S. Forest Service planning is described in the 1982 implementation regulations for the National Forest Management Act of 1976 (36 CFR 219.19(a)(1)) (U.S. Forest Service 1982). Forest Service Manual (FSM) 2620.5 defines MIS as "plant and animal species, communities or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (U.S. Forest Service 1991:6). These regulations require that certain vertebrate and/or invertebrate species present in the area be identified as MIS within the planning area (i.e., Coronado National Forest lands) and that these species be monitored, as "their population changes are believed to indicate the effects of management activities" (36 CFR 219.19(a)(1)).
    - Standard and Guideline No. 1 for Wildlife and Fish within the Coronado National Forest Plan (U.S. Forest Service 1986a:31-1) directs the Coronado National Forest to "maintain or improve occupied habitat of . . . listed threatened and endangered species, and MIS through mitigation of Forest activities." Standard and Guideline No. 11 for Wildlife and Fish within the Coronado National Forest Plan (U.S. Forest Service 1986a:32) further states that MIS will be monitored through "evaluation through consultation with Arizona Game and Fish Department, New Mexico Department of Game and Fish and Natural Resources, along with other wildlife and plant-oriented groups where appropriate, population viability of Management Indicator Species through determination of: (1) amount of suitable habitat; (2) distribution of suitable habitat; (3) number of individuals that support regional population goals; and (4) likelihood of continued existence." Population and habitat trends of MIS are documented as part of forest plan monitoring.
- USDA Departmental Regulation 9500 and FSM 2670: As described in FSM 2670.12 (U.S. Forest Service 2005:3), Departmental Regulation 9500-4 dictates that the U.S. Forest Service will always (1) manage "habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least minimum viable populations of such species;" (2) conduct activities and programs "to assist in the identification and recovery of threatened and endangered plant and animal species;" and (3) avoid actions "which may cause a species to become threatened or endangered." FSM 2670.22 (U.S. Forest Service 2005:4) further explains that the objectives of the FS regarding all sensitive species are to (1) develop and implement management practices to ensure that species do not become threatened or endangered because of U.S. Forest Service actions; (2) maintain at least viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on FS-administered lands; and (3) develop and implement management objectives for populations and/or habitat of sensitive species. Policy for the management sensitive species, as explained in FSM 2670.32 (U.S. Forest Service 2005:5), dictate that the U.S. Forest Service (1) assist States in achieving their goals for conservation of endemic species; (2) review programs and activities as part of the NEPA process through a biological evaluation, to determine their

potential effect on sensitive species; (3) avoid or minimize impacts to species whose viability has been identified as a concern; (4) analyze, if impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole in an attempt to avoid creating significant trends toward Federal listing; and (5) establish management objectives in cooperation with the States when projects on U.S. Forest Service–administered lands may have a significant effect on sensitive species population numbers or distributions.

STATE

- New Mexico Wildlife Conservation Act of 1978 (NMSA 1978 17-2-37 et seq.): The New Mexico Wildlife Conservation Act is administered by the NMDGF. The New Mexico Wildlife Conservation Act is the legal framework for establishing lists of species considered threatened or endangered within the State of New Mexico. ESA-listed species may be included in the list of State-identified species, as appropriate. The act requires the State to conduct a biennial review of the status of each designated threatened and endangered species, and requires the development of a recovery plan for each State-listed species. The act provides for the purchase of land and support of research to meet recovery plan goals. The director of the NMDGF is the ultimate authority for the law; and enforcement is provided by conservation officers, county sheriffs, and the New Mexico State Police. The Conservation Services Division of the NMDGF issues authorizations and permits for taking of protected wildlife, including endangered species listed under the New Mexico Wildlife Conservation Act.
- Arizona State Wildlife Action Plan: The State of Arizona lists various wildlife species as SGCN, which is an AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need. As discussed in the 2012 AGFD's Comprehensive Wildlife Conservation Strategy (AGFD 2012a), SGCN are species of vertebrates, crustaceans, and mollusks that rank high in the vulnerability category and have been identified for immediate action.
- New Mexico State Wildlife Action Plan: The State of New Mexico lists various wildlife species as SGCN, which is an NMDGF status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need. As discussed in NMDGF's Comprehensive Wildlife Conservation Strategy (NMDGF 2006), SGCN are species of vertebrates, mollusks, and crustaceans that rank high in the vulnerability category and have been identified for immediate action.

LOCAL

- SDCP/Pima County MSCP: In 1997, the Pima County Board of Supervisors initiated the development of the SDCP (Pima County 2011) to develop a region-wide plan to address the long-term conservation needs of cultural and natural resources in Pima County. Through the development of the SDCP, a goal of developing a conservation plan and obtaining an ESA Section 10 permit was established. Thus, to avoid, minimize, and mitigate the effects of future growth of the human-built environment, Pima County developed the MSCP, which is part of the SDCP, to apply for a 30-year Section 10 permit under the ESA (Pima County 2010). The MSCP identifies 49 covered Priority Vulnerable Species for the forthcoming Section 10 permit, including 4 plants, 8 mammals, 8 birds, 6 fish, 2 amphibians, 7 reptiles, and 14 invertebrates.

Issues to Be Analyzed

Potential effects on general wildlife species as a result of the proposed Project would include the following:

- Loss or degradation of habitat:
  - Loss or degradation of terrestrial habitat from clearing of vegetation during construction.
  - Degradation of terrestrial habitat due to increased soil erosion or introduction of invasive non-native plants.
  - Degradation of aquatic and wetland habitat from increased soil erosion and/or chemical contamination.
- Increased risk of electrocution, collision with transmission lines, or predation due to construction of linear transmission line.
- Increased risk of vehicular mortality (direct and indirect) due to construction activities.
- Displacement or decrease in fitness due to noise and human activity associated with all aspects of construction and operation/maintenance.
- Decreased forage availability and foraging habitat quality due to the spread of noxious weed species and the removal of habitat.
- Indirect impacts related to loss of habitat or direct loss of wildlife individuals due to increased risk of wildfire from the introduction of noxious weed species.
- Habitat fragmentation, including a decrease in function to wildlife corridors, due to the construction of linear features (power lines and roads) and large areas of habitat (power facilities and associated infrastructure).

Analysis Area Conditions

Because the proposed Project would cross a variety of habitat types within three ecoregions, many species of birds, reptiles, amphibians, fishes, invertebrates, mammals, and game species have the potential to be present within the analysis area. Below, we briefly describe each of these major groups of animals.

BIRDS

Desertscrub, grasslands, riparian (including xeroriparian) habitats, and agricultural areas throughout and adjacent to the analysis area provide habitat for a variety of bird species. Bird species have the potential to use habitats within the analysis area for nesting, foraging, and migratory stopover. The dominant habitat types within the analysis area are semidesert grassland and desertscrub communities. Birds common to these habitats include a variety of grassland sparrows, raptors, doves, hummingbirds, and quail.

The analysis area also includes several seasonal wetlands (see figures 3.7-2a and 3.7-2b in the “Water Resources” section), mainly playas, which can support a diverse avian community, particularly during migratory periods. For example, the Willcox Playa supports over 200 different species of birds, including cranes, other waterfowl, and shorebirds (Wings over Willcox 2013). Avian species that normally are found at higher elevations in southern New Mexico and Arizona could also be present in the analysis area during migration or as vagrants following storm events.

The analysis area also includes the San Pedro River, which is an important migratory route for neo-tropical bird species and hosts 345 different bird species (Tucson Audubon Society 2013).

REPTILES

Reptiles are well adapted to the dry conditions, extreme temperatures, and desertscrub and grassland habitats that are common throughout the analysis area. Most lizards in the Sonoran Desert are diurnal (active during the day), whereas snakes are primarily nocturnal (active at night). The semidesert and desertscrub habitats have the potential to support a variety of lizards, snakes, and the Sonoran desert tortoise (*Gopherus morafkai*). Seasonal water features such as playas and stock tanks may support a locally diverse assemblage of reptile species. The analysis area also includes the San Pedro River, which is habitat for more than 40 reptile species (Tucson Audubon Society 2013).

AMPHIBIANS

Amphibians are not as common in the analysis area as other groups of animals because of the limited availability of water in southwestern desertscrub and grassland habitats. Permanent and seasonal sources of water within the analysis area could support several species of native toads and frogs. In addition, the introduced bullfrog (*Lithobates catesbeiana*) and tiger salamanders (*Ambystoma tigrinum*) have the potential to occur in more perennial water features.

FISH

Because of the lack of perennial reaches of streams and rivers crossed by the analysis area, very few fish species have the potential to be present within the analysis area. In spatially intermittent streams, such as Cienega Creek, native fish may occupy perennial reaches year-round and use ephemeral reaches of the stream within the analysis area during precipitation events.

MAMMALS

A variety of common mammal species inhabit semidesert grassland and desertscrub vegetation communities within the analysis area. These species range from small rodents (e.g., mice, rats, gophers, squirrels) and bats to rabbits, skunks, raccoons, ungulates, and large predators such as mountain lions, bobcats, foxes, and coyotes. Mammals that normally inhabit higher elevations may also use lower elevation habitats to move between mountain ranges. The analysis area also includes the San Pedro River, which is habitat for more than 80 species of mammals, including 20 bat species (Tucson Audubon Society 2013).

INVERTEBRATES

Invertebrates are likely the most diverse group of animals that inhabit the analysis area. Isolated habitats, such as the mountain ranges in southern Arizona and New Mexico as well as ephemeral and perennial water sources, may support a number of endemic invertebrate species. However, because relatively few studies focus on the ranges and populations of invertebrate species, current understanding is limited. The analysis area also includes the San Pedro River, which is habitat for more than 100 butterfly species (Tucson Audubon Society 2013).

GAME SPECIES

The AGFD and NMDGF manage a wide variety of species for hunting and recreational purposes that have the potential to occur within the analysis area, including alternative segments. The proposed Project has the potential to impact select game species, particularly big-game and migratory avian game species that use large geographic areas. The analysis area also includes several seasonal wetlands, mainly playas that may be used by game species. Game species are also known to use transmission line corridors as movement corridors.

Priority big-game species with the potential to occur in the analysis area include black bear (*Ursus americanus*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis nelsoni*), javelina (*Tayassu tajacu*) and pronghorn (*Antilocapra americana*). Avian game species that could occur include waterfowl, sandhill cranes (*Grus canadensis*), and small avian species such as doves and quail. The proposed Project is not anticipated to affect aquatic game species such as fish. Game management areas are designated within Arizona and New Mexico and managed for recreation uses. See Section 3.14, “Recreation,” for more information on these recreation areas.

Wildlife Linkages

Through resource management planning in recent years, the cooperating agencies for the proposed Project (AGFD, BLM, and Pima County), along with other agencies and organizations, have identified important wildlife movement corridors throughout Arizona. During the development of the 2006 “Arizona’s Wildlife Linkages Assessment” (Arizona Department of Transportation (ADOT) 2006) and the 2012 “Pima County Wildlife Connectivity Assessment: Report on Stakeholder Input” (AGFD 2012b), numerous wildlife movement corridors have been identified as important to the conservation of species and their populations. In addition, natural topographical features, such as canyons, xeroriparian washes, mesoriparian washes, and riparian areas, have been identified that are also used as animal movement corridors. Some of these animal movement corridors have been further analyzed and modeled (CorridorDesign 2013) to refine the best biological corridor.

The analysis area includes eight wildlife linkage corridors in the vicinity of the analysis area (ADOT 2006; Menke 2008). These wildlife linkage corridors are shown below in table 3.8-6. Table 3.8-6 contains the details of animal movement corridors within the analysis area, and figures 3.8-6 and 3.8-12 depict their geographical placement in the analysis area and surrounding region.

Table 3.8-6. Animal Movement Corridors in the Analysis Area

Animal Movement Corridor Name	Source	Connection Details	Size and Land Ownership*	Focal Species	Threats and Barriers
Route Group 1 – Afton Substation to Hidalgo Substation					
Big Burro Mountains to Cedar Mountains Potential Cougar Corridor	Menke (2008)	Provides a roughly north-south linkage between the Big Burro Mountains and Cedar Mountains.	270,742 acres total; 21,703 acres (8%) in analysis area total.	Mountain lion	Existing roads, such as I-10.

Table 3.8-6. Animal Movement Corridors in the Analysis Area (Continued)

Animal Movement Corridor Name	Source	Connection Details	Size and Land Ownership*	Focal Species	Threats and Barriers
Route Group 2 – Hidalgo Substation to Apache Substation					
Linkage #90, Pinaleño-Dos Cabezas-San Simon Valley Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides north-south and east-west linkages among the habitat blocks in the Pinaleño Mountains, San Simon Valley, and Dos Cabezas Mountains.	292,315 acres total; 102,211 acres (35%) in analysis area; total area includes 57% of private land and 43% State Trust land.	-California leaf-nosed bat -Fringed myotis -Jaguar -Long-legged myotis -Mexican spotted owl -Mule deer -Ornate box turtle -Pale Townsend's big-eared bat -Texas horned lizard -White-nosed coati -Yellow-nosed cotton rat	Existing roads, such as I-10 and U.S. 191; the Southern Pacific Railroad; and expanding urban development.
Linkage #89, Willcox Playa-Winchester-Pinaleño-Dos Cabezas Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides north-south and east-west linkages among the habitat blocks in Willcox Playa, the Winchester Mountains, the Pinaleño Mountains, and Dos Cabezas Mountains.	188,700 acres total; 63,124 acres (34.5%) in analysis area; total area includes 57% of private land and 43% State Trust land. Note that this linkage has not been refined (i.e., modeled) yet, thus the details are not available.	-Bobcat -Chiricahua leopard frog -Javelina -Kit fox -Mexican spotted owl -Mountain lion -Mule deer -Ornate box turtle -Plains leopard frog -Texas horned lizard -Western burrowing owl	Existing roads, such as I-10 and SR 186; the Southern Pacific Railroad; expanding urban development; and border security/illegal immigration issues.
Route Group 3 – Apache Substation to Pantano Substation					
Linkage #89, Willcox Playa-Winchester-Pinaleño-Dos Cabezas Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides north-south and east-west linkages among the habitat blocks in Willcox Playa, the Winchester Mountains, the Pinaleño Mountains, and Dos Cabezas Mountains.	188,700 acres total; 63,124 acres (34.5 %) in analysis area; total area includes 57% of private land and 43% State Trust land. Note that this linkage has not been refined (i.e., modeled) yet, thus the details are not available.	-Bobcat -Chiricahua leopard frog -Javelina -Kit fox -Mexican spotted owl -Mountain lion -Mule deer -Ornate box turtle -Plains leopard frog -Texas horned lizard -Western burrowing owl	Existing roads, such as I-10 and SR 186; the Southern Pacific Railroad; expanding urban development; and border security/illegal immigration issues.

Table 3.8-6. Animal Movement Corridors in the Analysis Area (Continued)

Animal Movement Corridor Name	Source	Connection Details	Size and Land Ownership*	Focal Species	Threats and Barriers
Linkage #88, Galiuro-Winchester-Dragoon Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides a roughly north-south linkage among the habitat blocks in the Galiuro Mountains, Winchester Mountains, and Dragoon Mountains of Coronado National Forest.	157,103 acres total; 277 acres (0.1%) in analysis area; total area includes 59% of private land, 37% NFS land, and the remaining 4% is either State Trust of local or State Parks; 97% is natural vegetation, 0.9% is aquatic, and 0.3% is agricultural land.	-Black bear -Chiricahua leopard frog -Javelina -Mexican long-tongued bat -Mountain lion -Mule deer -Ornate box turtle -Plains leopard frog -Texas horned lizard -White-nosed coati -White-tailed deer -Grassland birds	Existing roads, such as I-10; the Southern Pacific Railroad; and expanding urban development.
Linkage #94, Rincon-Santa Rita-Whetstone Linkage	ADOT (2006); Beier et al. (2006); AGFD (2012a)	Provides a roughly north-south linkage among the habitat blocks in the Rincon Mountains, Santa Rita Mountains, and the Whetstone Mountains; includes six stands/corridors.	85,304 acres total; 1,311 acres (1.5%) in analysis area; total area includes 57% State Trust land, 24% private land, 13% BLM land, and 6% NFS land; 99.5% is natural vegetation, and 0.5% is developed land. Note that this linkage has been refined (i.e., modeled), thus the details are more specific than the others.	-Black bear -Chiricahua leopard frog -Giant spotted whiptail -Gila chub -Gila topminnow -Javelina -Lesser long-nosed bat -Longfin dace -Lowland leopard frog -Mexican long-tongued bat -Mexican spotted owl -Mountain lion -Northern gray hawk -Ornate box turtle -Sonoran desert tortoise -Western red bat -Western yellow-billed cuckoo -White-tailed deer	Existing roads, such as I-10 and SR 83; the Southern Pacific Railroad; and border security/illegal immigration issues.

1 **Table 3.8-6.** Animal Movement Corridors in the Analysis Area (Continued)

Animal Movement Corridor Name	Source	Connection Details	Size and Land Ownership*	Focal Species	Threats and Barriers
Route Group 4 – Pantano Substation to Saguaro Substation					
Linkage #94, Rincon-Santa Rita-Whetstone Linkage	ADOT (2006); Beier et al. (2006); AGFD (2012a)	Provides a roughly north-south linkage among the habitat blocks in the Rincon Mountains, Santa Rita Mountains, and the Whetstone Mountains; includes six stands/corridors.	85,304 acres total; 1,311 acres (1.5 %) in analysis area; total area includes 57% State Trust land, 24% private land, 13% BLM land, and 6% NFS land; 99.5% is natural vegetation and 0.5% is developed land. Note that this linkage has been refined (i.e., modeled), thus the details are more specific than the others.	-Black bear -Chiricahua leopard frog -Giant spotted whiptail -Gila chub -Gila topminnow -Javelina -Lesser long-nosed bat -Longfin dace -Lowland leopard frog -Mexican long-tongued bat -Mexican spotted owl -Mountain lion -Northern gray hawk -Ornate box turtle -Sonoran desert tortoise -Western red bat -Western yellow-billed cuckoo -White-tailed deer	Existing roads, such as I-10 and SR 83; the Southern Pacific Railroad; and border security/illegal immigration issues.
Linkage #79, Ironwood-Tortolita Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides a roughly northeast-southwest linkage between the habitat blocks in the Ironwood Forest National Monument and the Tortolita Mountains.	32,416 acres total; 517 acres (1.6%) in analysis area; total area includes 51% State Trust land, 43% private land, 4.5% BLM land, and 1.5% Reclamation land.	-Bighorn sheep -Bobcat -Cactus ferruginous pygmy-owl -Cave myotis -Javelina -Kit fox -Mountain lion -Mule deer -Sonoran desert tortoise -Western burrowing owl	Existing roads, such as I-10; CAP canal; the Southern Pacific Railroad; agriculture; urbanization; and border security/illegal immigration issues.
Linkage #80, Saguaro-Tortolita Linkage	Arizona's Wildlife Linkage Assessment (ADOT 2006)	Provides a roughly north-south linkage between Linkage #81, which links the habitat blocks in the Coronado National Forest, and Saguaro National Park–West.	44,322 acres total; 44 acres (0.1%) in analysis area; total area includes 68% private land, 31% State Trust land, and 1% BLM land.	-Bobcat -Cactus ferruginous pygmy-owl -Cave myotis -Javelina -Kit fox -Mountain lion -Mule deer -Pocketed free-tailed bat -Sonoran desert tortoise	Existing roads, such as I-10; the Southern Pacific Railroad; urban development; CAP canal; and agriculture.

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Table 3.8-6. Animal Movement Corridors in the Analysis Area (Continued)

Animal Movement Corridor Name	Source	Connection Details	Size and Land Ownership*	Focal Species	Threats and Barriers
Linkage #87, Tucson Mountains-San Xavier Linkage	ADOT 2006	Provides a roughly north-south linkage between the habitat blocks in Saguaro National Park–West, the Tucson Mountains, and the San Xavier Indian Reservation.	18,216 acres total; 136 acres (0.7%) in analysis area; total area includes 88% private land, 5% State Trust land, 4% BLM land, and 3% tribal land. Note that this linkage has not been refined (i.e., modeled) yet, thus the details are not as specific as the others.	-Bobcat -California leaf-nosed bat -Cave myotis -Giant spotted whiptail -Greater western mastiff bat -Mountain lion -Pocketed free-tailed bat -Sonoran desert tortoise -Western burrowing owl	Existing roads, such as SR 86; urbanization, and border security/illegal immigration issues.
Riparian Movement Area #2: Brawley Wash	AGFD (2012a)	Tohono O'odham Nation (Garcia Strip) & CAP Wildlife Mitigation Corridor – Silver Bell/Waterman Mountains/Samaniego Hills Wildland Block	14,713 acres total; 273 acres (1.9 %) in analysis area; National Forest System land, BLM land, private land, and State Trust land.	-American pronghorn; -Black bear -Chiricahua leopard frog -Migratory birds -Mule deer -Raptors -White-nosed coati -White-tailed deer	Agriculture (grazing); border activities; exotic species (Lehmann lovegrass); high-density residential development; high-traffic gravel road (Gardner Canyon Road); low-density residential development; mining; OHV use; paved road (SR 286); solar energy development; wind energy development

* Acreage calculations were based on the animal movement corridor shapefiles available online and provided by the researchers, i.e., AGFD. Then, the animal movement corridors were overlaid by the proposed Project routes and vicinity and calculations were conducted.

Special Status Wildlife

FEDERAL ENDANGERED SPECIES ACT SPECIES

The analysis area for ESA species covers portions of four counties in New Mexico and five counties in Arizona. The current FWS wildlife species lists for Doña Ana, Grant, Hidalgo, and Luna counties in New Mexico and Greenlee, Graham, Cochise, Pima, and Pinal counties in Arizona were addressed for this proposed Project. These lists include wildlife species that are currently listed under the ESA as endangered (23), threatened (9), proposed threatened (1), experimental/non-essential population (3), or conservation agreement (2) species, and also those that are listed as petitioned for listing/under review (3) or candidates (9). All combined, this is a total of 50 wildlife species, with 11 bird species, 16 fish species, 9 mammal species, 6 invertebrate species, 3 amphibian species, and 5 reptile species (appendix E). Table 3.8-7 lists ESA species that could potentially occur within each route group.

Table 3.8-7. Federal Endangered Species Act Species by Route Group

Common Name	Scientific Name	Route Group 1	Route Group 2	Route Group 3	Route Group 4
Mammals					
Jaguar	*Panthera onca*	-	-	U	U
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	-	P	P	P
Mexican long-nosed bat	*Leptonycteris nivalis*	-	P	P	U
Ocelot	*Leopardus pardalis*	-	U	U	U
Birds					
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	-	-	P	P
California least tern	*Sterna antillarum browni*	-	-	U	U
Least tern (Interior Population)	*Sterna antillarum*	U	U	-	-
Mexican spotted owl	*Strix occidentalis lucida*	-	U	U	U
Northern aplomado falcon	*Falco femoralis septentrionalis*	P	P	P	-
Southwestern willow flycatcher	*Empidonax traillii extimus*	-	U	P	P
Sprague's pipit	*Anthus spragueii*	P	P	P	P
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	-	-	P	P
Reptiles					
Northern Mexican gartersnake	*Thamnophis eques megalops*	-	-	P	-
Sonoran desert tortoise	*Gopherus morafkai*	-	U	P	P
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	-	-	-	U
Amphibians					
Chiricahua leopard frog	*Lithobates chiricahuensis*	-	P	U	U
Fish					
Gila chub	*Gila intermedia*	-	-	U	U
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	-	-	U	U

Notes: P = occurrence is probable, U = occurrence is unlikely but possible as suitable habitat parameters are present but the analysis area is outside the species' range.

Some species are considered unlikely but possibly present; this is because, although suitable habitat parameters may be present, the route group is not within the species' typical range.

BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES

The analysis area covers portions of two BLM districts and three field offices within New Mexico and Arizona: the Las Cruces Field Office of the Las Cruces District in New Mexico; and the Safford and Tucson Field Offices of the Gila District in Arizona. The Mimbres District of the Las Cruces Field Office lists 45 species as BLM Sensitive, including 1 amphibian species, 9 bird species, 6 fish species, 20 mammal species, 5 invertebrate species, and 4 reptile species. The Gila District, which includes both the

Safford and Tucson Field Offices, lists 47 species as BLM Sensitive, including 4 amphibian species, 17 bird species, 6 fish species, 5 invertebrate species, 11 mammal species, and 4 reptile species. A list of BLM Sensitive Species is included in table 18.6 of the "Southline Transmission Project Resource Report 18: Wildlife" (CH2M Hill 2013h). Differences between the table and the text here were based upon further review of available habitat parameters for BLM Sensitive Species within the route groups. Table 3.8-8 lists BLM Sensitive Species that could potentially occur within each route group.

Table 3.8-8. Bureau of Land Management Sensitive Species by Route Group

		Las Cruces Field Office Sensitive Species		**Safford and Tucson Field Office Sensitive Species**	
Common Name	**Scientific Name**	**Route Group 1**	**Route Group 2**	**Route Group 3**	**Route Group 4**
Mammals					
Allen's big-eared bat	*Idionycteris phyllotis*	P	P	P	P
Arizona myotis	*Myotis occultus*	-	-	P	P
Banner-tailed kangaroo rat	*Dipodomys spectabilis*	-	P	P	P
Big free-tailed bat	*Nyctinomops macrotis*	P	P	P	-
Black-tailed prairie dog	*Cynomys ludovicianus*	-	U	U	-
California leaf-nosed bat	*Macrotus californicus*	-	-	P	P
Cave myotis	*Myotis velifer*	P	P	-	P
Desert pocket gopher	*Geomys arenarius arenarius*	U	U	-	-
Fringed myotis	*Myotis thysanodes thysanodes*	P	P	-	-
Greater western mastiff bat	*Eumops perotis californicus*	-	P	P	P
Little brown myotis	*Myotis lucifugus occultus*	P	P	-	-
Long-legged myotis	*Myotis volans* (interior)	P	P	-	-
Mexican long-tongued bat	*Choeronycteris mexicana*	P	P	P	P
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	P	P	P	P
Spotted bat	*Euderma maculatum*	P	P	P	P
Western small-footed myotis	*Myotis ciliolabrum melanorhinus*	P	P	-	-
Yellow cotton-nosed rat	*Sigmodon ochrognathus*	-	U	-	-
Yuma myotis	*Myotis yumanensis yumanensis*	P	P	-	-

Table 3.8-8. Bureau of Land Management Sensitive Species by Route Group (Continued)

		Las Cruces Field Office Sensitive Species		Safford and Tucson Field Office Sensitive Species	
Common Name	**Scientific Name**	**Route Group 1**	**Route Group 2**	**Route Group 3**	**Route Group 4**
Birds					
American peregrine falcon	*Falco peregrinus*	-	U	P	P
Arizona Botteri's sparrow	*Aimophila botterii arizonae*	-	U	U	-
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	-	P	P	P
Baird's sparrow	*Ammodramus bairdii*	U	U	-	-
Bald eagle	*Haliaeetus leucocephalus*	-	P	P	P
Burrowing owl	*Athene cunicularia hypugaea*	P	P	P	P
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	-	-	P	P
Desert purple martin	*Progne subis hesperia*	-	-	P	P
Ferruginous hawk	*Buteo regalis*	-	U	U	-
Gilded flicker	*Colaptes chrysoides*	-	-	P	P
Golden eagle	*Aquila chrysaetos*	-	P	P	P
Loggerhead shrike	*Lanius ludovicianus*	P	P	-	-
White-faced ibis	*Plegadis chihi*	P	P	-	-
Reptiles					
Arizona striped whiptail	*Aspidoscelis arizonae*	-	P	P	P
Desert ornate box turtle	*Terrapene ornata*	-	P	P	P
Giant spotted whiptail	*Aspidoscelis burti stictogrammus*	-	U	-	-
Slevin's bunchgrass lizard	*Sceloporus slevini*	U	U	U	U
Sonoran mud turtle	*Kinosternon sonoriense sonoriense*	-	P	P	P
Texas horned lizard	*Phrynosoma cornutum*	P	P	-	-
Amphibians					
Colorado River toad	*Anaxyrus alvarius*	P	P	-	-
Lowland leopard frog	*Lithobates yavapaiensis*	-	P	P	P
Plain's leopard frog	*Lithobates blairi*	-	P	P	-
Sonoran green toad	*Bufo retiformis*	-	-	P	P
Western narrow-mouthed toad	*Gastrophryne olivacea*	-	-	P	P

Table 3.8-8. Bureau of Land Management Sensitive Species by Route Group (Continued)

Common Name	Scientific Name	Las Cruces Field Office Sensitive Species		Safford and Tucson Field Office Sensitive Species	
		Route Group 1	Route Group 2	Route Group 3	Route Group 4
Fish					
Desert sucker	*Catostomus clarki*	-	U	U	U
Gila chub	*Gila intermedia*	-	-	U	U
Longfin dace	*Agosia chrysogaster*	-	P	U	U
Invertebrates					
Animas minute moss beetle	*Limnebius aridus*	-	U	-	-

Notes: P = occurrence is probable, U = occurrence is unlikely but possible as suitable habitat parameters are present but the analysis area is outside the species' range.

Some species are considered unlikely but possibly present; this is because, although suitable habitat parameters may be present, the route group is not within the species' typical range.

FOREST SERVICE SENSITIVE AND MANAGEMENT INDICATOR SPECIES

The analysis area covers an approximately 0.5 mile section of the Douglas District within the Coronado National Forest in Cochise County, Arizona. On lands administered by the Coronado National Forest, two special status listings apply: the 2007 Coronado National Forest sensitive species list, which includes 57 wildlife species and 33 MIS in eight groups: Cavity Nesters, Riparian Species, Species Needing Diversity, Species Needing Herbaceous Cover, Species Needing Dense Canopy, Game Species, Special Interest Species, and Threatened and Endangered Species (U.S. Forest Service 1986a). The Coronado National Forest Sensitive species list is composed of 3 amphibian species, 24 bird species, 4 fish species, 1 invertebrate species, 15 mammal species, and 10 reptile species. The Coronado National Forest MIS list is composed of 4 amphibian species, 15 bird species, 6 fish species, 5 mammal species, and 3 reptile species.

Seven species listed as Forest Service Sensitive and three species listed as MIS were identified as having the potential to occur because the analysis area is within their range and suitable habitat parameters are present. The species potentially occurring are shown below in table 3.8-9.

Table 3.8-9. Coronado National Forest Sensitive Species and Management Indicator Species

Common Name	Scientific Name	Potential for Presence	
		Forest Service Sensitive Species	Forest Service MIS Species
Mammals			
Black bear	*Ursus americanus*	-	U
Chihuahuan pronghorn	*Antilocapra americana mexicana*	-	U
Cockrum's desert shrew	*Notiosorex cockrumi*	P	-
Fulvous harvest mouse	*Reithrodontomys fulvescens*	U	-
Greater western mastiff bat	*Eumops perotis californicus*	P	-

Table 3.8-9. Coronado National Forest Sensitive Species and Management Indicator Species (Continued)

Common Name	Scientific Name	Potential for Presence: Forest Service Sensitive Species	Potential for Presence: Forest Service MIS Species
Hooded skunk	*Mephitis macroura milleri*	P	-
Mexican long-tongued bat	*Choeronycteris mexicana*	P	-
Northern pygmy mouse	*Baiomys taylori ater*	P	-
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	P	-
Plains harvest mouse	*Reithrodontomys montanus*	P	-
Western yellow bat/southern yellow bat	*Lasiurus xanthinus/Lasiururs ega*	P	-
Coues white-tailed deer	*Odocoileus virginianus couesi*	-	P
Yellow cotton-nosed rat	*Sigmodon ochrognathus*	P	-
Birds			
Abert's towhee	*Melozone aberti*	P	-
American peregrine falcon	*Falco peregrinus*	P	P
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	P	-
Baird's sparrow	*Ammodramus bairdii*	U	U
Bell's vireo	*Vireo bellii*	-	P
Buff-collared nightjar	*Caprimulgus ridgwayi*	U	-
Lucifer hummingbird	*Calothorax lucifer*	U	-
Montezuma's quail	*Cyrtonyx montezumae*	-	U
Western burrowing owl	*Athene cunicularia hypugaea*	P	U
Reptiles			
Canyon (giant) spotted whiptail	*Aspidoscelis burti*	U	-
Reticulate Gila monster	*Heloderma suspectum suspectum*	U	-
Slevin's bunchgrass lizard	*Sceloporus slevini*	U	-
Sonoran desert tortoise	*Gopherus morafkai*	U	-

Note: P = occurrence is probable, U = occurrence is unlikely but possible as suitable habitat parameters are present but the analysis area is outside the species' range.

NEW MEXICO WILDLIFE CONSERVATION ACT

The NMDGF administers the New Mexico Wildlife Conservation Act and lists species as Endangered and Threatened (see table 3.8-10). This list includes a total of 119 wildlife species, of which 56 are listed as Endangered and 46 are listed as Threatened. These Wildlife Conservation Act species comprise 32 birds, 24 fish, 15 mammals, 27 invertebrates, 6 amphibians, and 15 reptiles. The species potentially occurring are shown below in table 3.8-10.

Some species are considered unlikely but possibly present; this is because, although suitable habitat parameters may be present, the route group is not within the species' typical range.

Table 3.8-10. New Mexico Wildlife Conservation Act Species by Route Group

Common Name	Scientific Name	State of New Mexico Listed Species	
		Route Group 1	Route Group 2
Mammals			
Desert bighorn sheep	*Ovis canadensis mexicana*	P	P
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	-	P
Spotted bat	*Euderma maculatum*	P	-
Western yellow bat	*Lasiurus xanthius*	P	P
Birds			
Abert's towhee	*Melozone aberti*	P	P
American peregrine falcon	*Falco peregrinus*	P	P
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	-	P
Bald eagle	*Haliaeetus leucocephalus*	U	U
Baird's sparrow	*Ammodramus bairdii*	U	U
Bell's vireo	*Vireo bellii*	P	P
Costa's hummingbird	*Calypte costae*	U	U
Gila woodpecker	*Melanerpes uropygialis*	P	P
Gray vireo	*Vireo vicinor*	-	P
Least tern (Interior Population)	*Sterna antillarum*	U	U
Lucifer hummingbird	*Calothorax lucifer*	P	P
Northern aplomado falcon	*Falco femoralis*	P	P
Southwestern willow flycatcher	*Empidonax traillii extimus*	-	P
Varied bunting	*Passerina versicolor*	P	P
Reptiles			
Canyon spotted whiptail	*Aspidoscelus burti*	-	U
Gila monster	*Heloderma suspectum*	P	P
Slevin's bunchgrass lizard	*Sceloporus slevini*	U	U
Amphibians			
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*	P	P
Lowland leopard frog	*Lithobates yavapaiensis*	-	P

Note: P = occurrence is probable, U = occurrence is unlikely but possible as suitable habitat parameters are present but the analysis area is outside the species' range.

STATE OF NEW MEXICO SPECIES OF GREATEST CONSERVATION NEED

The NMDGF developed a "Comprehensive Wildlife Conservation Strategy" for New Mexico (NMDGF 2006). This document was developed as directed by a national initiative for accomplishing wildlife conservation through Congressional interest in the State Wildlife Grants program, which aims at conserving biodiversity and thereby precluding the necessity of listing more species under the ESA. Within the document, the State of New Mexico was mapped by ecoregions as well as watershed drainages. Subsequently, species associated with these ecoregions and watershed drainages were listed as SGCN for those areas. The analysis area for this Project is within the Chihuahuan Desert and Apache Highlands ecoregions and the Rio Grande, Mimbres, and Gila watershed drainages (NMDGF 2006).

It should be noted that many of these species are also listed under various other special status designations, such as the ESA.

New Build Section

Route group 1 is within the Chihuahuan Desert and Apache Highlands ecoregions, and the Rio Grande and Mimbres watershed drainages. Thus, the species that have the potential to occur in this route group within the Chihuahuan Desert and Apache Highlands ecoregions include a total of 62 wildlife species, composed of 22 bird species, 16 mammal species, 11 invertebrate species, 3 amphibian species, and 10 reptile species. And the species that are possible to occur in this route group within the Rio Grande and Mimbres watershed drainages include a total of 64 wildlife species, composed of 6 bird species, 8 fish species, 8 mammal species, 18 invertebrate species, 14 amphibian species, and 10 reptile species.

Route group 2 is within the Apache Highlands ecoregion, and also within the Gila watershed drainage. Thus, the species that are possible to occur in this route group within the Apache Highlands ecoregion include a total of 49 wildlife species, composed of 22 bird species, 15 mammal species, 3 invertebrate species, 1 amphibian species, and 8 reptile species. And the species that have the potential to occur in this route group within the Gila watershed drainage include a total of 49 wildlife species, composed of 17 bird species, 11 fish species, 8 mammal species, 4 invertebrate species, 6 amphibian species, and 3 reptile species.

STATE OF ARIZONA WILDLIFE SPECIES OF CONCERN

The State of Arizona lists wildlife species of concern for species whose occurrence in Arizona is or may be in jeopardy, or has known or perceived threats or population declines.

New Build Section

A review of the list of wildlife species of concern identified eight species possibly occurring in route group 2. This includes six bird species and two mammal species in route group.

Upgrade Section

A review of the list of wildlife species of concern identified 20 species possibly occurring in Upgrade Section. This includes 6 bird species, 8 mammal species, 5 reptile species, and 1 amphibian species in route group 3 and 5 bird species, 7 mammal species, 11 reptile species, and 2 amphibian species in route group 4.

STATE OF ARIZONA SPECIES OF GREATEST CONSERVATION NEED

The State of Arizona also lists various species as SGCN, which is an AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need. As discussed in the AGFD's "Comprehensive Wildlife Conservation Strategy" (AGFD 2006), SGCN are species of vertebrates, crustaceans, and mollusks that rank high in the vulnerability category and have been identified for immediate action. It should be noted that many of these species are also listed under various other special status designations, such as ESA listings.

New Build Section

The HabiMap SGCN query results indicated that 69 SGCN species could possibly occur within the Arizona portion of route group 2. This list includes 30 bird species, 23 mammal species, 3 amphibian species, and 13 reptile species. Many of these species are also listed under other special status categories, including ESA listings, BLM Sensitive, or Forest Service Sensitive.

Upgrade Section

The HabiMap SGCN query results indicated that 76 SGCN species could possibly occur within route group 3, including 15 Tier 1a and 61 Tier 1b species. This list includes 35 bird species, 2 fish species, 25 mammal species, 3 amphibian species, and 11 reptile species in route group 3. Many of these species are also listed under other special status categories, including ESA listings, BLM Sensitive, or Forest Service Sensitive.

The HabiMap SGCN query results indicated that 88 SGCN species could possibly occur within route group 4, including 22 Tier 1a and 66 Tier 1b species. This list includes 35 bird species, 4 fish species, 25 mammal species, 5 amphibian species, 1 invertebrate species, and 18 reptile species in route group 4. Many of these species are also listed under other special status categories including ESA listings, BLM Sensitive, or Forest Service Sensitive.

LOCAL SONORAN DESERT CONSERVATION PLAN/PIMA COUNTY MULTI-SPECIES CONSERVATION PLAN

The analysis area for this proposed Project includes covered portions of the Pima County MSCP, which is part of the SDCP (Pima County 2010). The MSCP identifies 45 wildlife species as covered Priority Vulnerable Species for their forthcoming Section 10 permit, including 8 mammals, 8 birds, 6 fish, 2 amphibians, 7 reptiles, and 14 invertebrates. It should be noted that the majority of the 45 wildlife species listed as Priority Vulnerable Species under the MSCP are also covered under other special status listings.

The only portion of the analysis area where the MSCP applies is the portions of route groups 3 and 4 within Pima County. Within these route groups, 17 species were identified as having the potential to occur because the analysis area is within their range and suitable habitat parameters are present. These species include the western yellow bat/southern yellow bat (*Lasiurus xanthinus/Lasiururs ega*), western red bat (*Lasiurus blossevillii*), Mexican long-tongued bat (*Choeronycteris mexicana*), western burrowing owl (*Athene cunicularia hypugaea*), lowland leopard frog (*Lithobates yavapaiensis*), Abert’s towhee (*Melozone aberti*), rufous-winged sparrow (*Aimophila carpalis*), pale Townsend’s big-eared bat (*Corynorhinus townsendii pallescens*), California leaf-nosed bat (*Macrotus californicus*), northern Mexican gartersnake, desert box turtle (*Terrapene ornate*), Bell’s vireo (*Vireo bellii*), ground snake (*Sonora semiannulata*), Merriam’s mesquite mouse (*Peromyscus merriami*), giant spotted whiptail (*Aspidoscelis burti stictogrammus*), Swainson’s hawk (*Buteo swainsoni*), and Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*).

In addition, four other species—the Allen’s lappet-browed bat (*Idionycteris phyllotis*), red-backed whiptail lizard (*Cnemidophorus burti xanthonotus* (*Aspidoscelis xanthonota*)), longfin dace (*Agosia chrysogaster*), and desert sucker (*Catostomus clarki*)—could also occur but are considered unlikely to occur because, although suitable habitat parameters are present, the analysis area within this route group is not within the species’ typical range.

MIGRATORY BIRDS

Most migratory bird species in the United States are protected by the MBTA, which implements treaties for the protection of shared migratory bird resources signed by the United States with Canada, Japan, Mexico, and Russia. Specific provisions in the statute include the establishment of a Federal prohibition, unless permitted by regulations, to “pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention…for the protection of migratory birds . . . or any part, nest, or egg of any such bird" (16 U.S.C. 703).

The actual list of migratory birds protected by the MBTA is published in 50 CFR 10.13. Excluded from that list are nonnative species such as the European starling (*Sturnus vulgaris*) and the Eurasian collared-dove (*Streptopelia decaocto*).

Issues related to potential impacts of the proposed Project to migratory birds are listed below:

- Direct (due to collision or burial for burrowing or ground-nesting species) and indirect (injury caused by collision) mortality of migratory bird species in foraging, shelter, breeding, dispersal, and/or migratory habitat from construction and operation/maintenance.
- Loss or degradation of special designation areas from construction and operation/maintenance.
- Increased risk of electrocution or predation due to construction of linear transmission lines.
- Increased risk of vehicular mortality (direct and indirect) due to construction of access roads and associated vehicular traffic.
- Displacement or decrease in fitness due to noise and human activity associated with all aspects of construction and operation/maintenance.

One of the main potential impacts of the proposed Project is related to the risk of avian collision with transmission lines. That risk varies by species based on several factors, including body size, maneuverability, flight pattern, behavior, and habitat use (APLIC 2012). For example, birds with a high wing loading (ratio of body weight to wing area) such as ducks and grebes are more susceptible to collisions than birds with a low wing loading. Birds with a low aspect ratio (ratio of the square of the wing span to the wing area), such as vultures, herons, and cranes, are similarly more prone to collisions. Birds with both a high wing loading and a low aspect ratio are classified as "poor fliers" and must be considered particularly vulnerable to the risk of collision (APLIC 2012). Poor fliers include turkeys, pheasants, and grouse, but also doves and woodpeckers.

Flocking is an additional risk factor for avian collisions with transmission lines and structures, as are flying at night and spending a large amount of time in the air, as opposed to being perched or foraging on the ground (APLIC 2012). Flocking birds such as waterfowls and wading birds are more vulnerable to the risk of collision than nonflocking species. The density of birds in large flocks leaves little room to maneuver around obstacles, especially among the trailing birds, which have obstructed views of upcoming obstacles. This is true in particular of flocks of sandhill cranes, already at risk due to low maneuverability in flight. A high collision incidence has been observed in this species, including in several instances collisions between birds trying to maneuver around power lines. Sandhill cranes also illustrate another risk factor during migration. They are daily migrants rather than long-distance migrants. They take shorter flights and numerous stops to rest and feed, each time risking collisions in areas with power lines. Other daily migrants include ducks, geese, and some raptors.

Another group of birds with higher susceptibility to collisions is that of aerial predators, birds that tend to exhibit high flight maneuverability and acute vision. Because they chase prey at high speed, however, they may not perceive power lines in time to avoid a collision. Birds that nest close to power lines also incur a higher risk of collision, an important consideration for birds that nest in colonies such as herons and egrets. Ducks have eyes adapted to underwater vision but are slightly near-sighted in air, a trait that probably affects their ability to detect wires in time to maneuver around them. Finally, immature birds are more likely to collide with power lines than the more experienced adults (APLIC 2012).

The Project intersects the administrative boundary between the Pacific flyway and the Central flyway (see figure 3.8-7). Based on band recoveries, most migratory birds in the Project vicinity are likely to be using the Pacific flyway, but because of the mobility of long-distance migrants and the potential effects of weather conditions and storm events, Central flyway birds could also easily be present wintering in or passing through the analysis area. The Willcox and Lordsburg playa systems, which are discussed in this section, are key locations for wintering and migratory birds along these flyways.

The dominant habitat types within the analysis area are semidesert grassland and desertscrub communities (see table 3.8-1). Birds common to these habitats include a variety of grassland sparrows, raptors, doves, hummingbirds, and quail. The proposed Project would also include several seasonal wetlands, mainly playas, which can support a diverse avian community, particularly during migratory periods. For example, the Willcox Playa supports more than 200 different species of birds, including cranes, other waterfowl, and shorebirds (Wings over Willcox 2013). Avian species that normally are found at higher elevations in southern New Mexico and Arizona could also be present in the analysis area during migration or as vagrants following storm events.

Below is a description of sites known to be important for migratory birds and located along some of the proposed routes. They include high ridges and low passes, often used as migration routes; and prairie dog towns, which tend to attract predators such as raptors. Areas of high wind are also mentioned, as they may compound the risk of collision with power lines where these occur. All of these landscape features are examined for each route group from east to west.

New Build Section

Route Group 1 – Afton Substation to Hidalgo Substation

The analysis area for route group 1 encompasses sections of four Counties in New Mexico, from east to west Doña Ana, Luna, Grant, and Hidalgo counties. It intersects the administrative boundary between the Central and Pacific flyways. In Doña Ana County, the Afton Generation Station lies on the edge of the Rio Grande Valley, an important migration corridor in particular for neotropical migrants, which use the river channel, cottonwood groves, willow stands, and/or nearby agricultural fields as stopover habitat (Yong and Finch 2002).

Stopover habitats along sandhill crane migration routes tend to consist of large open lakes and riparian wetlands near agricultural areas (Krapu et al. 1984). From the Rio Grande Valley in the Las Cruces area, sandhill crane fall migration routes extend south to the Deming-Columbus Valley, where the species overwinters, and southwest to southeastern Arizona (Mitchusson 2003). These two flyways intersect with the Afton to Hidalgo route group (see figure 3.8-7).

The Deming-Columbus agricultural area in Luna County is a broad to gentle sloping semidesert plain between 4,000 and 5,000 feet in elevation used by wintering sandhill cranes (Mitchusson 2003). The size of the local wintering crane population varies in part as a function of seasonal precipitation. Agricultural lands near Columbus are used for foraging while playas on both sides of the U.S.–Mexico border serve as roosting locations (Mitchusson 2003).

Two small playas in Mexico, one about 8 miles south of Columbus and the other about 15 miles southwest of Columbus, both represent potential roosting locations for sandhill cranes wintering near Columbus. Both of these playas appear to be less than 1,500 acres in size. Other migratory waterfowl and shorebirds could also use these playas and nearby agricultural areas, depending on seasonal conditions and water availability. Because of their relatively small size, compared with the Willcox and the Lordsburg playa systems, these playas would be expected to support much smaller numbers of wintering cranes and other waterfowl.

Much of the analysis area contains western burrowing owl habitat. Where they occur, prairie dog towns and colonies of other sciurid rodents likely attract raptors such as golden eagles, bald eagles, ferruginous hawks, and red-tailed hawks (*Buteo jamaicensis*) (Cartron 2010). The spotted ground squirrel (*Spermophilus spilosoma*), which is a raptor prey species, occurs in Doña Ana, Luna, and Grant counties (NMDGF 2010).

High ridges include the Aden Hills, the highest ridge in the East Potrillo Mountains, and the highest ridge of Camel Mountain. They also include the highest ridge in the Carrizalillo Hills and the highest ridges in the Cedar Mountains and Flat Hill in Luna County. Low passes occur in the Carrizalillo Hills or between the Cedar Mountains and the Carrizalillo Hills. Some areas classified as wind power class 3 or higher by the National Renewable Energy Laboratory (NREL) occur in the area traversed by the Afton to Hidalgo route group. Those include the Carrizalillo Hills in Luna County. Areas with wind, a high wind power class, and/or low passes would be areas where bird species could be more susceptible to collisions with transmission lines.

Agricultural lands are present throughout the analysis area, including near Columbus, Mimbres, Separ, and Lordsburg (see figure 3.8-2). SWReGAP mapping shows 591.5 acres of agricultural lands southeast of Lordsburg in particular. According to SWReGAP mapping, playas, emergent wetlands, and riparian shrublands, woodlands, and mesquite bosque all occur within the analysis area between Afton and Hidalgo. The Lordsburg Playa is an ephemeral, shallow alkaline lake located approximately 10 miles west of Lordsburg, New Mexico, in Hidalgo County, north of I-10. The total area of the playa is approximately 8,000 acres, which is dry much of the year, but can be inundated due to runoff following seasonal rainfall events.

A portion of the Lordsburg Playa is within a Special Management Area (SMA) and an RNA managed by the Las Cruces District Office of the BLM (BLM 2000a). Much of the area is designated for multiple uses, including recreation and grazing, though the RNA is closed to OHV use. The edges of the playa may support riparian or wetland vegetation, although no obligate riparian species are present and the majority of the area is characterized by Chihuahuan Desert and alkali sacaton flats. Migrating shorebird and waterfowl may be observed in the area during wet years (BLM 2000a). Suitable habitat for the western burrowing owl is located in the area around the Lordsburg Playa system.

Route Group 2 – Hidalgo Substation to Apache Substation

Willcox Playa and Twin Lakes

The Willcox Playa is located on the north end of Sulphur Springs Valley. It is an interior lake that drains portions of the Dragoon Mountains to the south and west and the Dos Cabezas and Chiricahua Mountains to the south and east. The playa itself constitutes the remnant of a prehistoric lake formed at a time when the region received more precipitation. Today, Willcox Playa is an ephemeral wetland (though it is identified as a lake by the NWI) supported by seasonal rain and snowfall, which means that it remains dry for large portions of the year. Nevertheless, the playa and the surrounding vegetation, as well as the agricultural fields in the immediate vicinity, support large numbers of avian migrants, particularly migratory waterfowl (table 3.8-11).

The Willcox Playa and surrounding areas form a matrix of lands owned by the DOD, BLM, AGFD, ASLD State Trust, and private landowners. Because of its biological value, the Willcox Playa is designated by several governmental agencies and non-governmental organizations (NGOs) as a unique biological feature important to a variety of species. The northern section of the playa is administered by the BLM to conserve the vegetation and wildlife associated with the lake bed and is designated by the NPS as an NNL and an Area of Critical Environmental Concern (ACEC) by the BLM. The AGFD owns and administers the Willcox Playa Wildlife Area on the southern edge of the playa for hunting and wildlife recreation.

The National Audubon Society considers the Willcox Playa as an IBA of global priority because of the large concentration (> 1 percent of the North America population simultaneously or > 5 percent of the entire population over a single season) of sandhill cranes that use the playa as overwintering habitat (National Audubon Society 2013). Ducks Unlimited (2013) considers the playa as an important part of the Pacific flyway for waterfowl and performs some habitat projects in the area, though it does not consider the flyway where the playa is situated to be one of high conservation concern. Local birding organizations, including Wings over Willcox (2013), consider the playa and immediately adjacent habitats to be important for bird populations. The Willcox Playa is also designated as an Arizona Heritage Water due to its hydrologic, cultural and biological significance (Northern Arizona University 2011a).

The alkaline lakebed itself supports large numbers (5,000 to 9,000) (see National Audubon Society 2013) of roosting sandhill cranes in the winter months, which garners much of the attention of birding enthusiasts. However, when the lakebed fills with water from seasonal precipitation it also supports thousands of waterfowl, gulls, and other shorebirds of more than 100 species, particularly during migratory periods. While the lakebed is sparsely covered by a variety of grasses, the shrub cover on its margins can be quite extensive, consisting of saltbush, mesquite, and tamarisk (*Tamarix ramosissima*). A few Goodding's willows (*Salix gooddingii*) and Fremont cottonwoods (*Populus fremontii*) also persist in the drainages ditches that have been constructed around the playa (Northern Arizona University 2011b). These habitats support a variety of avian species ranging from migrating warblers to several raptor species.

Waterfowl and other non-passerine birds recorded at Willcox Playa from 2007 through 2011 are listed in table 3.8-11 below. Nearly all of them are associated with a higher risk of collision with power lines.

Table 3.8-11. Non-passerine Birds Recorded at Willcox Playa from 2007–2011

Common Name	2007	2008	2009	2010	2011
Greater white-fronted goose	x				
Snow goose	x	x	x	x	x
Ross's goose	x	x	x	x	x
Canada goose	x	x	x	x	x
Cackling goose				x	
Tundra swan			x		
Wood duck			x		x
Gadwall	x	x		x	x
American wigeon	x	x	x	x	x
Mallard	x	x	x	x	x
Cinnamon teal	x	x	x	x	x
Northern shoveler	x	x	x	x	x
Northern pintail	x	x	x	x	x
Green-winged teal	x	x	x	x	x
Canvasback	x	x	x	x	x
Redhead	x	x		x	x
Ring-necked duck	x	x	x	x	x
Greater scaup				x	x

Table 3.8-11. Non-passerine Birds Recorded at Willcox Playa from 2007–2011 (Continued)

Common Name	2007	2008	2009	2010	2011
Lesser scaup	x	x	x	x	x
White-winged scoter					
Bufflehead	x	x	x	x	x
Common goldeneye		x			
Hooded merganser		x			
Common merganser	x	x	x	x	x
Ruddy duck	x	x	x	x	x
Wild turkey			x	x	
Scaled quail	x	x	x	x	x
Gambel's quail	x	x	x	x	x
Montezuma quail	x				
Pied-billed grebe	x	x	x	x	
Eared grebe	x	x	x	x	
Western grebe				x	x
Clark's grebe					x
Great blue heron	x	x	x	x	x
Great egret				x	
Snowy egret				x	
Cattle egret					
Green heron			x	x	
Black-crowned night-heron		x	x		x
White-tailed kite		x			
Bald eagle	x	x	x	x	x
Northern harrier	x	x	x	x	x
Sharp-shinned hawk	x	x	x	x	x
Cooper's hawk	x	x	x	x	x
Northern goshawk			x		
Harris's hawk	x	x	x	x	x
Red-tailed hawk	x	x	x	x	x
Ferruginous hawk	x	x	x	x	x
Rough-legged hawk		x			x
Golden eagle	x		x	x	x
Crested caracara			x	x	
American kestrel	x	x	x	x	x
Merlin	x	x	x	x	x
Peregrine falcon		x	x	x	x
Prairie falcon	x	x	x	x	x
Virginia rail		x	x	x	x
Sora		x	x	x	x

Table 3.8-11. Non-passerine Birds Recorded at Willcox Playa from 2007–2011 (Continued)

Common Name	2007	2008	2009	2010	2011
Common moorhen	x			x	
American coot	x	x	x	x	x
Sandhill crane	x	x	x	x	x
Killdeer	x	x	x	x	x
Mountain plover		x		x	x
Greater yellowlegs			x		x
Spotted sandpiper	x	x	x	x	
Long-billed curlew	x	x		x	x
Western sandpiper				x	
Least sandpiper	x	x	x	x	x
Long-billed dowitcher	x	x	x		x
Wilson's snipe	x	x	x	x	
Bonaparte's gull	x				
Ring-billed gull	x			x	
Rock pigeon	x	x	x	x	x
Band-tailed pigeon		x			
Eurasian collared-dove	x	x	x	x	x
White-winged dove	x	x	x	x	x
Mourning dove	x	x	x	x	x
Inca dove		x			x
Ruddy ground-dove				x	
Greater roadrunner	x	x	x	x	x
Barn owl	x	x	x	x	x
Western screech-owl				x	
Great horned owl	x	x	x	x	x
Burrowing owl		x	x	x	
Long-eared owl		x			
Short-eared owl			x		
White-throated swift		x		x	x
Acorn woodpecker	x	x	x	x	x
Gila woodpecker	x	x	x	x	
Williamson's sapsucker	x				x
Red-naped sapsucker	x	x	x	x	x
Ladder-backed woodpecker	x	x	x	x	x
Hairy woodpecker				x	
Arizona woodpecker	x	x	x	x	x

Source: Wings over Willcox (2013).

Also in the immediate vicinity of the Willcox Playa are two networks of manmade lakes named Twin Lakes or Cochise Lakes. They are located just south of Willcox, Arizona, near a municipal golf course and are fed by effluent discharges from the nearby wastewater treatment plant and the golf course. The second network was created by the Arizona Electric Power Cooperative near the Apache generating station on the west side of the playa. Both of these wetlands support foraging habitat for migrating waterfowl and shorebirds.

The surrounding agricultural fields, particularly corn fields, provide considerable foraging habitat for sandhill cranes as well as other migrating waterfowl (National Audubon Society 2013). In addition, the abundance of shorebirds and other wildlife likely presents ample hunting opportunities for both bald eagle and golden eagle. These agricultural fields are the main focus of conservation concern for birds wintering in the Willcox Playa/Twin Lakes area (National Audubon Society 2013). Their loss could severely limit foraging habitat for cranes in particular and hamper their ability to overwinter in large numbers at Willcox Playa.

Other Notable Areas

Suitable burrowing owl habitat occurs throughout much of the analysis area from Hidalgo to Apache. Black-tailed prairie dogs (*Cynomys ludovicianus*) occurred historically in Cochise County, Arizona, but are thought to be now extirpated from the county (AGFD 2004).

In Hidalgo County, the analysis area intersects a portion of the highest ridge in the Pyramid Mountains and the Roostercomb Ridge in the Peloncillo Mountains, and a portion of the highest ridge in the Circle I Hills all areas classified as wind power class 3 or higher by the NREL (see figure 3.8-8). A portion of Powers Canyon constitutes a low pass in the Peloncillo Mountains. In Cochise County, Arizona, the analysis area would intersect a portion of the highest ridge in the Dos Cabezas Range as well as a low pass within the range. Areas classified as wind power class 3 or above by NREL (see figure 3.8-8) are located in the Dos Cabezas Mountains. Areas with wind a high wind power class and/or low passes would be areas where bird species could be more susceptible to collisions with transmission lines.

Near San Simon in Cochise County are 1,899.9 acres of agricultural lands, as identified by SWReGAP mapping. Near Bowie also in Cochise County, Arizona, are 1,493.3 acres of agricultural lands and northwest of Willcox lie an additional 1,900.4 acres mapped by the SWReGAP. Riparian mesquite bosque is present, as are wetlands and ponds or playas.

Upgrade Section

Route Group 3 – Apache Substation to Pantano Substation

The analysis area for route group 3 intersects the Pacific flyway. It encompasses stretches of the San Pedro River, an important migration corridor at the scale of southwestern North America for warblers in particular. Species of raptors that nest on the lower San Pedro River include gray hawk (*Buteo nitidus*), Mississippi kite (*Ictinia mississippiensis*), common black-hawk (*Buteogallus anthracinus*), and zone-tailed hawk (*Buteo albonotatus*). The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) nests in numbers on the lower reaches of San Pedro River.

Suitable western burrowing owl habitat exists throughout much of the analysis area from Apache to Pantano. Black-tailed prairie dogs occurred historically in southeastern Arizona, but are thought to be extirpated from that area (AGFD 2004).

Agricultural lands are found in the Sulphur Springs Valley and near Benson in Cochise County. Marshes, riparian woodlands and shrublands, and riparian mesquite bosques are present in the analysis area from Apache to Pantano. Riverine wetlands are located along the San Pedro River and some freshwater ponds occur, including in association with a sewage treatment plant immediately west of the river (see figure 3.7-2b in the “Water Resources” section).

The analysis area encompasses a low pass located between the Dragoon Mountains and the Gunnison Hills (see figure 3.8-8). Areas with wind a high wind power class and/or low passes would be areas where bird species could be more susceptible to collisions with transmission lines.

Route Group 4 – Pantano Substation to Saguaro Substation

The analysis area for route group 4 is all within Arizona. SWReGAP mapping of the analysis area shows the existence of agricultural lands near Marana in Pima County, as well as within Avra Valley. Riparian areas, wetlands, and ponds are found along this route group, including along an ephemeral reach of the Santa Cruz River that passes through Tucson (see figure 3.7-2b in the “Water Resources” section).

Black-tailed prairie dogs occurred historically in southeastern Arizona, in which this segment is located, but are thought to be extirpated from the area currently (AGFD 2004).

According to USGS topographic maps, the analysis area intersects an unnamed ridge near Ajo Way and Rattlesnake Pass in the Tucson Mountains. Portions of ridgelines and low passes also intersect the analysis area where it bisects the Little Dragoon and Big Dragoon mountains, specifically portions of Adams Peak, Texas Canyon, the northern tip of the Gunnison and Red Bird Hills, and the valley separating the Steel Hills from the Red Bird Hills. Areas classified as wind power class 3 or higher by the NREL are found in association with the high ridges of the Dragoon Mountains and Gunnison Hills (see figure 3.8-8). Areas with wind, a high wind power class, and/or low passes would be areas where bird species could be more susceptible to collisions with transmission lines.

3.9 CULTURAL RESOURCES

Some of the information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 2: Cultural Resources” (CH2M Hill 2013i). The contents of that report are used herein without specific reference.

3.9.1 Analysis Area

Cultural resources are the physical manifestations of the activities of past or present cultures, including archaeological sites, historic buildings and structures, trails, and other places of traditional cultural or religious importance. Cultural resources can be human-made or natural features and are, for the most part, unique, finite, and nonrenewable.

The proposed Project has the potential to impact cultural resources both directly and indirectly. Resources of particular concern in the analysis area include the Tumamoc Hill Archaeological District and the Desert Laboratory NHL, the Anza Trail corridor, and the Butterfield Trail (see also Appendix F, “National Scenic and Historic Trails Assessment”).

The analysis area for direct disturbance is 1 mile on either side of the centerline (2-mile corridor) for all alternatives in the New Build Section. This is to identify resources that could be directly impacted by ground disturbance from the power line installation, including access routes and staging areas. The analysis area for direct disturbance for the Upgrade Section is within the existing 500-foot ROW corridor. A Class I records search was performed for this analysis area that included all data from previous Class III pedestrian surveys within the analysis area (see below).

The analysis area for visual and indirect effects is 5 miles on either side of the centerline (10-mile corridor). This is to identify resources whose character-defining properties could be adversely impacted by Project viewshed effects, and other less direct effects. A 10-mile corridor is necessary in order to allow for relatively subtle but potentially important visual effects, as well as for errors or ambiguities in the recorded locations and boundaries of some resources.

3.9.2 Laws, Ordinances, Regulations, and Standards

Several Federal, State, and tribal laws, regulation, and policies that protect cultural resources are applicable to the proposed Project.

Federal

In addition to NEPA, other laws, ordinances, EOs, policies, and agreements applicable to this Project include:

- American Antiquities Act of 1906 (16 U.S.C. 431–433), which protects archaeological sites and historic structures on Federal lands by allowing the President to declare them national monuments and establishing a permitting requirement for excavation and collection of objects of antiquity from sites on Federal lands;
- National Historic Preservation Act of 1966 (16 U.S.C. 470x–6), as amended, Regulations Implementing Section 106 of the National Historic Preservation Act (36 CFR 800), and Regulations Implementing the Curation of Federally Owned and Administered Archaeological Collections (36 CFR 79), which created policies for the preservation of historic properties throughout the nation, put in place the Section 106 review process (see below), and established the NRHP, ACHP, and the State Historic Preservation Officers/Tribal Historic Preservation Officers;
- National Trails System Act of 1969 (16 U.S.C. 1241–1251), which establishes the National Trails System and National Scenic Trails "to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas;"
- EO 11593 (May 13, 1971), "Protection and Enhancement of the Cultural Environment," directs Federal agencies to responsibly manage cultural properties on Federal land for future generations by inventorying properties under their management and establishing procedures for the maintenance and recordation of those properties;
- American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C. 1996), which, among other things, protects Native American access to sacred sites;
- Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470aa–470mm), Archaeological Resources Protection Act Uniform Regulations (43 CFR 7), and Regulations Implementing the Curation of Federally Owned and Administered Archaeological Collections (36 CFR 79), which was designed to protect archaeological resources on Federal and Indian lands and establishes procedures for permitting archeological work on Federal or tribal lands in order to curtail unauthorized collection;
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 U.S.C. 3001–3013) and Regulations Implementing the Native American Graves Protection and Repatriation Act (43 CFR 10), which "gives ownership and control" of Native American human remains and associated objects excavated on Federal and Indian lands to Native Americans;

- Religious Freedom Restoration Act of 1993 (42 U.S.C. 21B) was designed to prevent the Federal Government from placing substantial burden on a person's religious exercise;
- EO 13007 (May 24, 1996), "Indian Sacred Sites," which was designed to protect, when practical, access to Native American sacred sites on Federal land.
- EO 13175 (November 6, 2000), "Consultation and Coordination with Indian Tribal Governments," which encourages the strengthening of government-to-government relations between the United States Government and Indian tribes;
- The "Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in which the BLM Will Meet its Responsibilities under the National Historic Preservation Act, February 2012," lays out the roles of the BLM, the SHPOs, and the ACHP concerning undertakings that have a potential to affect historic properties on land administered by the BLM;
- The BLM has issued several manuals that are relevant to the proposed Project, including "MS-8100: The Foundation for Managing Cultural Resources" (BLM 2004b), "MS-8110: Identifying and Evaluating Cultural Resources" (BLM 2004c), "MS-8120: Tribal Consultation under Cultural Resources" (BLM 2004d), "MS-8140: Protecting Cultural Resources" (BLM 2004e), "MS-6250: National Scenic and Historic Trails Administration (Public)" (BLM 2012c), and "MS-6280: Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation (Public)" (BLM 2012d) ;
- Several BLM land use plans detail framework for managing public lands within the proposed analysis area: Mimbres RMP (BLM 1993), Safford RMP (BLM 1991), Las Cienegas RMP (BLM 2003), and Phoenix RMP (BLM 1988a); and
- The Coronado National Forest Plan (U.S. Forest Service 1986a), as amended, which is currently under revision, provides guidance for managing cultural resources when evaluating projects on Coronado National Forest land.

Most pertinent to the proposed Project is Section 106 of the NHPA, which requires Federal agencies to take into account the effects of their undertakings on historic properties, defined in 36 CFR 800.16(l) as any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP. The Section 106 process requires that if a project has the potential to affect historic properties, the Federal agency must, in consultation with the SHPO or Tribal Historic Preservation Office (THPO) and other interested parties, establish the area of potential effects (APE), identify historic properties within the undertaking's APE, assess what, if any, effects the undertaking may have on historic properties in the APE, and attempt to resolve adverse effects through avoidance, minimization, or mitigation of the adverse effects.

The NPS has issued a series of bulletins to provide guidance on matters of importance to historic properties and the NRHP. Relevant bulletins include "Bulletin 15: How to Apply National Register of Historic Properties Criteria" (NPS 1997), "Bulletin 36: Guidelines for Evaluating and Registering Archaeological Properties" (Little et al. 2000), and "Bulletin 41: Guidelines for Evaluating and Registering Cemeteries and Burial Places" (Potter and Boland 1992). Additionally, "Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties" (Parker and King 1998) provides valuable guidance and information on recognizing and evaluating traditional cultural properties (TCPs).

State

Both Arizona and New Mexico have State laws protecting cultural resources and human remains on State and private land.

NEW MEXICO

New Mexico Cultural Properties Act of 1978 (NMSA 18-6-1 through 18-6-23) declares that the historical and cultural heritage of the State is one of the State's most valued and important assets; that the public has an interest in the preservation of cultural properties for their scientific and historical information and value; and that the neglect, desecration, and destruction of historical and cultural sites results in an irreplaceable loss to the public. Its purpose is to provide for the preservation, protection, and enhancement of structures, sites, and objects of historical significance within the State, in a manner conforming to the provisions of the NHPA. It establishes the Cultural Properties Review Committee, requires review of State undertakings, establishes penalties for destruction of cultural properties, and requires permits for archaeological work on State lands or for mechanical excavation of archaeological sites on private lands.

New Mexico Prehistoric and Historic Sites Preservation Act of 1978 (NMSA 18-8-1 through 8) has as its purpose to acquire, stabilize, restore, or protect historic and prehistoric sites. The law prohibits State funding for projects on State land with State- or NRHP-listed historic properties unless there are no other alternatives.

New Mexico Cultural Properties Protection Act of 1995 (NMSA 18-6A-1 through 6), like the 1978 version discussed above, directs State government divisions to develop procedures to identify and protect cultural resources from inadvertent damage under their jurisdiction in conjunction with the Historic Preservation Division. The 1995 statute also establishes a fund for grants for interpretation, restoration, preservation, stabilization, and protection of resources on State property.

ARIZONA

Arizona Antiquities Act of 1960 (ARS 41-841 through 844) protects archaeological and paleontological resources on State lands by requiring authorization prior to excavation or collection on State lands (ARS 41-841) and prohibits defacing of sites or objects on State land (ARS 41-843). The act stipulates that any institution undertaking archaeological work on State or local lands acquire a permit from the Arizona State Museum (ASM) (ARS 41-842) and requires that all discoveries, including human remains and funerary objects, on State land be reported to the ASM (ARS 41-844).

State Historic Preservation Act of 1982 (ARS 41-861 through 41-865) created the Arizona Register of Historic Places and requires that the effects on cultural properties be considered at all levels of planning and development by agencies that manage State land. ARS 41-865 also requires that landowners report human remains or funerary objects found on their lands to the ASM.

Tribal

TOHONO O'ODHAM

Title 8, Chapter 1, "Archaeological Resources Protection" (Ordinance No. 06-84), prohibits archaeological work, including the removal of artifacts, on the reservation by non-tribal members unless a permit is granted by the Chairman, unless they are employees or agents of the Federal Government or tribal members.

3.9.3 Definition of Terms Used

NEPA and the NHPA use different terminology to discuss the effects of a Federal action on cultural resources and/or historic properties. Table 3.9-1 provides definitions for similar terms under NEPA and NHPA.

Table 3.9-1. Comparison of NEPA and NHPA Terminology for Project Effects

NEPA	NHPA
Cultural resources – includes archaeological sites, historic built environment resources such as buildings or structures, TCPs, natural features, and traditional use areas	Historic properties – means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP
Significance – refers to the context in which an action is to be evaluated and the intensity (or severity) of impacts	Historical significance – districts, sites, buildings, structures and objects that (a) are associated with events that have made significant contribution to the broad patterns of history; (b) and associated with lives of persons significant in our history; (c) that embody the distinctive characteristics of a type, period, or method of construction; and/or (d) that have yielded or may yield important information about the past.
Eligible – resources that are listed in or eligible for the NRHP according to the NHPA; resources with unknown eligibility are treated as eligible during the NEPA process	Eligible – properties that meet the criteria for inclusion in the NRHP, both those determined eligible in accordance with regulations and those recommended eligible.
Impacts – results of actions on the environment (natural resources, cultural resources, social, health, economic, etc.); can be direct, indirect, or cumulative.	Effects – any alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP
Adverse Impacts – actions that have a negative effect on a resource	Adverse Effects – effects that may result in the loss of NRHP eligibility by diminishing the property's integrity of location, design, feeling, association, setting, materials, and/or workmanship. Adverse effects are determined by the lead Federal agency through consultation with the SHPO, tribes, and other interested parties.
Mitigation – actions that avoid an impact, minimize the impact, reduce impact over time, or rectify or compensate for the impact	Resolution of Adverse Effects – adverse effects may be resolved through measures to avoid, minimize, or mitigate the effects

A property of traditional religious and cultural importance (PTRCI) is a resource important to an Indian tribe that may be eligible for the NRHP. A TCP, as discussed in National Parks Bulletin 38, is "eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). Some agencies prefer the term Traditional Cultural Places in order to deemphasize the concept of these locations as being "owned." A *traditional use area* is one which a community uses for resource gathering or other activity. A *sacred site* is a specific location identified by an American Indian tribe as being sacred because of its religious or ceremonial significance.

3.9.4 Issues to Be Analyzed

- The disturbance to or loss of archaeological sites listed in or eligible for the NRHP by the Project construction (including access roads and staging areas).
- The disturbance to or loss of historic built environment resources listed in or eligible for the NRHP by the Project construction (including access roads and staging areas).

- The disturbance to or loss of PTRCIs or TCPs listed in or eligible for the NRHP by the Project construction (including access roads and staging areas).
- The disturbance to or loss of American Indian critical resources (e.g., plants and springs) by the Project construction (including access roads and staging areas).
- The visual effects (alterations of setting) of the Project on cultural resources listed in or eligible for the NRHP.
- The Project's direct, visual, and recreational impact to historic trails and National Historic Trail (NHT) corridors.

3.9.5 Class I Records Search Methods

Inventory Methods

Data for this analysis were collected from several sources: (1) State databases; (2) Federal agencies; (3) tribal nations; (4) local governments and organizations; and (5) published maps. Information was then incorporated into a Project-specific database. Information on archaeological sites, the historic built environment, districts, and previous surveys was obtained from the New Mexico and Arizona State databases: the New Mexico Cultural Resources Information System (NMCRIS) and AZSITE. NMCRIS data also included historic properties registered on the NRHP and the New Mexico Register of Historic Properties. Data was also gathered from the Arizona's SHPO database. Information was obtained from the following Federal sources: the Las Cruces BLM Field Office, the Safford BLM Field Office, the Tucson BLM Field Office, the Coronado National Forest, and the NRHP database maintained by the NPS. Peter Steere, the Tohono O'odham Nation's Tribal Historic Preservation Officer, was contacted by CH2M Hill for information about resources on tribal lands. In addition, the City of Tucson provided information on State- and NRHP-listed properties in Tucson and Pima County.

Six NPS-certified local governments were contacted for information on local cultural resources: Benson, Arizona; Pima County, Arizona; Tucson, Arizona; Willcox, Arizona; Columbus, New Mexico; and Deming, New Mexico. Several museums, civic organization, historical societies, and individuals were also contacted for further information.

Published maps consulted included General Land Office (GLO) maps, USGS maps, and pre-1960 highway maps. Potential cultural resources were digitized off the maps and added to the GIS database.

It must be noted that data from the different databases are of variable quality and reliability. This is especially true of older data, which were recorded prior to the use of global positioning system (GPS) technology. When possible, original survey reports and hard-copy site cards were consulted to resolve any ambiguities or missing or overlapping data. In some cases, Federal or State databases may not have been completely up to date as well. All efforts were made to acquire as accurate and up-to-date information as possible from hard-copy records.

Archaeological sites and historic built environment sites were classified in the database as "Determined Eligible," "Determined Not Eligible," "Unevaluated," or "Unknown." Only properties evaluated by the SHPO were classified in the "Determined Eligible" and "Determined Not Eligible" categories. Properties that have been recommended eligible or recommended not eligible were classified as "Unevaluated."

Sensitivity Measures

Data gathered from the above sources were used by CH2M Hill to estimate the potential number of resources for areas not previously surveyed. After correction for sample bias, survey area shape, and site size, an "effective" coverage inventory area was ascertained. CH2M Hill then used "this effective coverage area . . . to establish the effective sampling fraction by dividing the effective coverage area by the project segment's area. To forecast the total number of resources in the segment, the actual number of resources in the inventory areas, including the linear resources, is multiplied by 1 divided by the effective sampling fraction ($Forecast\ resources = number\ of\ resources\ \times \frac{1}{effective\ sampling\ fraction}$)" (CH2M Hill 2013i:20).

In 2012 Statistical Research, Inc. (SRI), under contract to the BLM New Mexico State Office, created a quantitative sensitivity model for the southern portion of the State within the jurisdiction of the Las Cruces and Pecos district offices (Heilen et al. 2012). The sensitivity model was designed to predict the probability of occurrence of a variety of site types from multiple prehistoric and historic time periods. Probability values were generated in a 30-m raster dataset covering the entire New Mexico portion of the proposed undertaking.

As an additional measure of cultural resources sensitivity, an archaeological sensitivity analysis was performed on the data collected for the Class I inventory. A relative value (unknown to high) was assigned to each site based on the site type and its characteristics. By adding the number of each value, each alternative segment can be assigned an overall relative sensitivity for comparison.

This archaeological sensitivity analysis follows that presented in BLM (2013a) but modified to accommodate the data gathered for this Project. All archaeological sites within the 2-mile analysis area were assigned a sensitivity value from 0 to 5 or unknown to high. Values were based on NRHP eligibility, site type, site physical characteristics, and special values such as NHL status. Values are as follows:

- Unknown Sensitivity (0) – Includes sites in data set with no known site type and cultural/temporal affiliation.
- Low Sensitivity (1) – Includes sites that have been determined not eligible for the NRHP.
- Low to Moderate Sensitivity (2) – Includes prehistoric artifact scatters with only non-diagnostic artifacts and historic artifact scatters with or without features.
- Moderate Sensitivity (3) – Includes prehistoric artifact scatters with diagnostic artifacts, prehistoric non-habitation sites with features, prehistoric camp sites, multicomponent sites with or without features, bedrock mortars, prehistoric trails, historic homesteads, historic non-homestead structures and buildings, historic transportation or utility related sites, and potential routes of historic trails.
- Moderate to High Sensitivity (4) – Includes prehistoric habitation sites, multicomponent sites with features, petroglyph sites, rock shelters and caves, Paleoindian sites, historic trails, historic ranches, and historic internment camps.
- High Sensitivity (5) – Includes listed prehistoric and historic sites, prehistoric sites with known human remains, historic townsites, NHTs, NHLs, and historic cemeteries or gravesites.

Percentages for the assigned values were calculated for the analysis area by route group and the representative ROW by alternative (see chapter 4) to compare the relative sensitivities of route groups and alternatives. All three sensitivity measures described above are used in chapter 4 (see section 4.9) to estimate the relative cultural resource sensitivity of each alternative.

ARCHAEOLOGY SOUTHWEST'S CULTURAL RESOURCES PRIORITY AREAS

In addition, Archaeology Southwest has recently published an analysis of archaeological data in which they recommend Cultural Resources Priority Areas (CRPAs) in southern Arizona and New Mexico (Laurenzi et al. 2013) (figures 3.9-1a and 3.9-1b). These CRPAs were designed to encompass areas with significant archaeological sites or clusters of sites or areas with the potential to have significant resources. The CRPAs were created to assist planners in Arizona and New Mexico to identify areas that may be of higher cultural sensitivity and to target areas where future research is needed.

Visual Impacts Inventory Methods

For the visual impacts analysis, data were gathered from State and Federal databases and registers within 5 miles on either side of the proposed Project centerline. Because of the great amount of data within the analysis area, analysis was restricted to the following types of historic properties:

1. Historic properties listed in State or Federal registers within the 10-mile corridor; and
2. Historic properties determined or recommended eligible under Criterion A, B, or C (i.e., those for which location, setting, association, and/or feeling are important characteristics) within the 2-mile direct effects analysis area.

3.9.6 Analysis Area Conditions

Culture History

SOUTHWESTERN NEW MEXICO

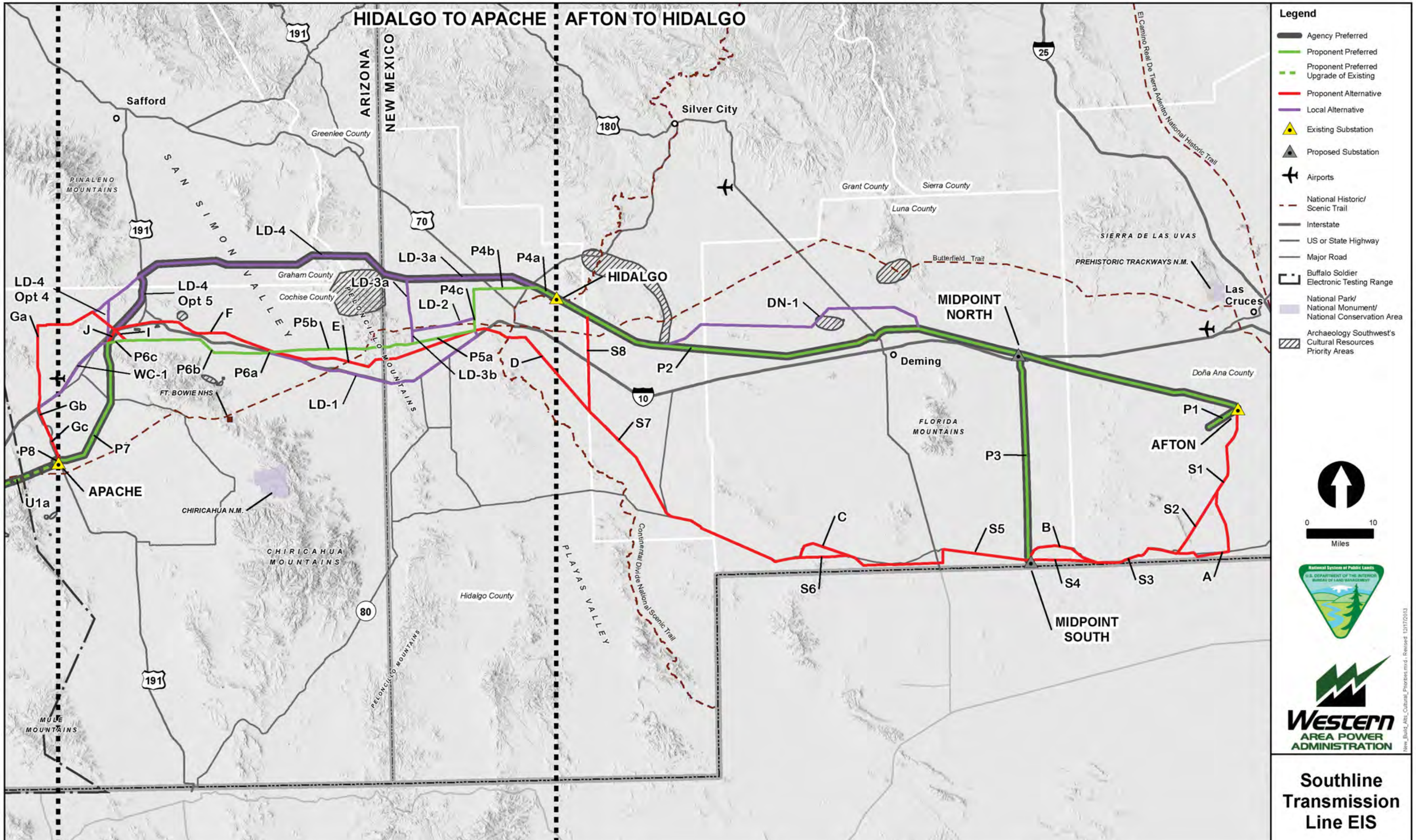
The following culture history for southwestern New Mexico is taken in modified form from CH2M Hill (2013i).

Paleoindian Period (ca. 9500 through 5500 B.C.)

Remains left by Paleoindian migrants into present-day New Mexico are often found in eroded terrain, where older landforms have been re-exposed (Cordell 1984; Weber 1973, 1997). Traces of the Clovis hunters of 9500 to 9000 B.C. have been excavated at a few sites in the region primarily from kill sites (Bonnichsen and Turmire 1991; Boldurian and Cotter 1999; Irwin-Williams and Haynes 1970). Most archaeologists agree that these earliest Paleoindian populations hunted the extinct mammoth, although bison, horse, and smaller fauna have been recovered at Clovis sites (Tainter and Levine 1987:12).

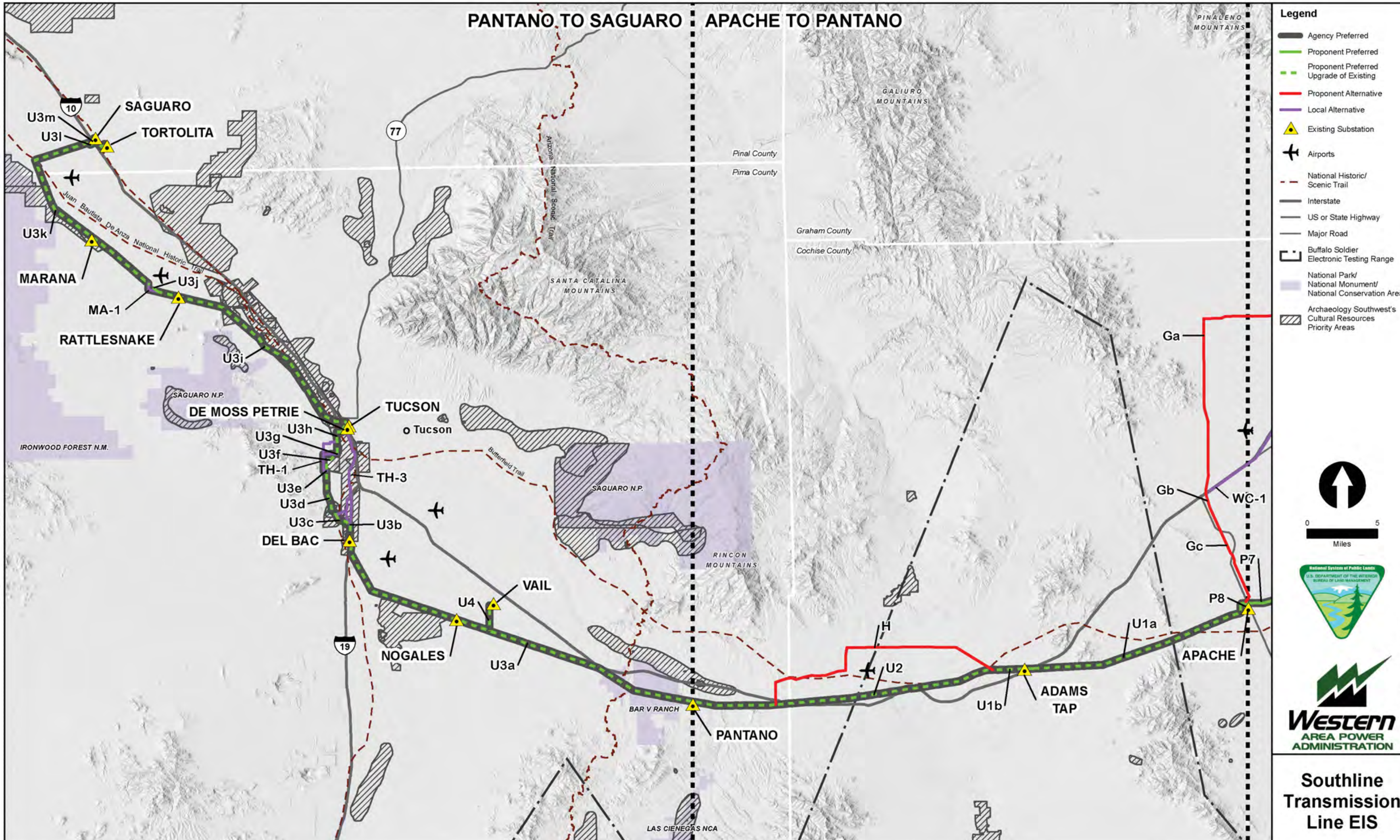
Gradual changes in the environment in the American Southwest resulted in the extinction of the mammoth, camel, horse, and many other Pleistocene fauna. The Folsom and later Midland subsistence systems (dated to 9000 to 8000 B.C.) were a modification of previous technologies adapted to exploit *Bison antiquus*, a now-extinct form of bison, as well as other quarry. The Paleoindian occupation in southwestern New Mexico is known from a limited number of excavated sites and an extensive distribution of distinctive spear points (Nelson 1980). As the climate became drier and the extant grasslands shrank toward the east, Paleoindian hunters either migrated with the bison or adapted to new quarry and to the intensified gathering and storage of wild plant products.

1 **Figure 3.9-1a.** Archaeology Southwest's Cultural Resources Priority Areas in the New Build Section.



2

Figure 3.9-1b. Archaeology Southwest's Cultural Resources Priority Areas in the Upgrade Section.



Archaic (ca. 5500 B.C. through A.D. 200)

The local Archaic sequence is not well defined and is understood primarily from work in adjacent areas. The Archaic adaptation of southwestern New Mexico was first defined by Sayles and Antevs (1941) as the Cochise culture, based on work in southeastern Arizona. More recently, work by MacNeish and Beckett (1987) has defined another adaptation, the Chiricahua tradition, based on sites in south-central New Mexico. However, some debate remains regarding the efficacy of these divisions, and many researchers use Huckell's (1984) Early, Middle, and Late Archaic divisions instead.

The Early to Middle Archaic represented a shift from a hunting-based economy to a gathering-based economy. The primary evidence for this change is the increase in grinding stones and roasting pits for the processing of plant materials; however, Early and Middle Archaic populations were still highly mobile. By the Late Archaic, agriculture had been introduced and pit structures began to appear, suggesting more permanent or semi-permanent settlement.

The Archaic occupation (6000 B.C. to A.D. 200) of the analysis area indicates a small hunting-and-gathering population that exploited resources on a fairly extensive seasonal round. Late Archaic remains show changes to a semi-sedentary population living in ephemeral pit houses (as well as rock shelters) (Minnis 1980:86, 87). These later groups incorporated agricultural products such as maize, beans, and squash into a diet of collected plant resources such as mesquite and agave (Minnis 1980:77–85).

Formative Period (A.D. 200 through 1450) – Southern Mogollon Tradition

Drought conditions commenced 1,900 years ago (A.D. 100) and lasted 400 to 600 years (to A.D. 500 to 700). Local cultures apparently responded with increased dependence on domesticated resources. Cultural complexity increased, with greater numbers of people gathering at locations of higher agricultural potential and forming semi-sedentary villages at or near agricultural locations. By about A.D. 200, small pit house villages occupied some of these areas and ceramics appear, signaling the beginning of the Mogollon culture.

Pithouse Period

The Pithouse period (A.D. 200 to ca. 1000) of the Mogollon is widely distributed throughout the New Mexico Bootheel and southeastern Arizona. The Early Pithouse period appears to be the first fully sedentary occupation in the area, dating from approximately A.D. 200 to 500 through 550. Sites generally are located on the knolls, mesas, and high ridges that occur within the river valleys with access to agricultural land (LeBlanc and Whalen 1980:112). The structures were round pit houses clustered in small villages averaging 17 pit houses and lacking superimposition, which suggests a single episode of occupation per village. Large pit rooms (kivas) have been suggested to be communal redistribution or ceremonial centers that were organized perhaps along lineage or clan lines. One of the most marked changes from the Early to Late Pithouse is the change in village location. Late Pithouse villages are located on river terraces and low ridges within river valleys. The architecture during the Late Pithouse period evolved from round to rectangular and semi-subterranean pit houses with ramp entrances. Both villages and communal structures got larger, indicating a population increase; grave goods were frequently placed with burials; and the types of trade goods increased.

Pueblo Period

The Classic Mimbres (A.D. 1000 to 1130–1150) is marked by masonry surface dwellings in blocks of rooms, a general lack of kivas, Mimbres Black-on-white pottery, and evidence of irrigation. Architecture became square-walled, aboveground masonry walls forming contiguous roomblocks. The reasonably large rooms have been postulated to indicate nuclear families organized at the household level.

Dependence on corn apparently decreased, as did the consumption of deer and cottontails, whereas the reliance on jackrabbits and birds increased.

The Classic Mimbres phase reflects a population increase from the Pithouse period. Occupation of major river valleys continued, with the population spreading to secondary drainages and to both higher and lower elevations (LeBlanc and Whalen 1980:113). The larger pueblos of Mimbreños were abandoned about A.D. 1130 to 1150. What caused this abandonment is the subject of considerable debate (Lekson 1992). The most common explanation is environmental stressors in conflict with an expanded population that was already using all available resources.

The Post-Mimbres Occupation

Larger settlements began to appear again on the landscape after A.D. 1200. Large multiroom pueblos (up to 250 rooms) with compounds were constructed of puddled adobe, rather than cobblestones and pueblos were generally U-shaped or entirely enclosed a plaza. Smaller villages or hamlets have contiguous and/or noncontiguous rooms with cobble foundations. At two sites, possible ball courts, a common feature of Casas Grandes sites, have been recorded. A possible reservoir was noted at one large site, and small water-control features may also exist.

The Protohistoric Period and the Historic Native American Period (A.D. 1540 through the present)

By the time of Spanish exploration of the New World, the entire Mogollon culture area had been abandoned by pueblo-dwelling populations. It is postulated that the agricultural groups had either moved north or adapted to a foraging strategy (Stuart and Gauthier 1981; Upham 1984).

This foraging strategy is consistent with evidence of Native American occupations at the time of Spanish contact. Spanish explorers noted the presence of small groups of hunter-gatherers along the margins of the Rio Grande. Variously termed Apache, Jumano, or Quemanderos, these groups lacked settled agricultural villages suitable for Spanish colonization and, accordingly, were ignored by the Spanish until the 1700s. Archaeological studies of this time period are lacking, and what is known is based on historical research (Beckett and Corbett 1992; Hammond and Rey 1929).

According to Beckett and Corbett (1992:3):

> At the time of Spanish contact, several indigenous cultures existed in the northern half of the area known to botanists as the Chihuahuan Desert. Although Spanish expeditions through the region began in 1581, they left only meager descriptions of the area's inhabitants. A number of different groups are mentioned as inhabiting the area. These include the Chinarra, Concho, Jano, Jocome, Manso, and Suma. All of these were hunting and gathering people. North of the Chihuahuan Desert lived the sedentary, pueblo-dwelling Piro. To the east were the buffalo-hunting Jumano. In the mountains to the southwest lived the Tarahumara and to the west dwelled the Opata and Sobaipuri.

As missions were established near El Paso, Manso and Suma peoples were actively recruited and converted to Catholicism. Before long, missionaries had gathered many of the Manso, whereas others were reportedly found living in the Mesilla Valley (Forbes 1960:162).

Historic Apache (A.D. 1600 through the present)

The Apache, Athabascans from the north who possibly entered the Southwest by way of the eastern slopes of the Rocky Mountains, had probably migrated to the area by about A.D. 1500 (Opler 1983;

Willey 1966:233). By A.D. 1600, they employed a hunting-and-gathering subsistence strategy to exploit large areas with varied resources for scheduled seasonal harvesting (Lekson 1985:149–162). Such strategies resulted in intensive use of various environmental zones.

The Mimbres, Copper Mine, or "Warm Springs" Apache

According to ethnographer Morris Opler, the term "Apache" is the Spanish rendition of a Zuni word meaning Navajo (Opler 1983:418). Related by similar Athabascan languages, the Apache and Navajo had long maintained separate tribal identities. The Apache who lived in the Santa Rita area were known as the Mimbres Apache, a subdivision of the larger Chiricahua Apache group. The Mimbres Apache are further categorized as Eastern Chiricahua, and their band name is alternately rendered as Gila, Coppermine, Mimbreño, Warm Springs, or Ojo Caliente (Thrapp 1974:3).

Historical land use studies by Basehart (1959) revealed that this group used a large portion of southwestern New Mexico and northern Chihuahua on a seasonal basis, with some permanent residents in the mountains west of the Rio Grande. The very names for this band seem to indicate a focus of activity in the general area of Santa Rita, New Mexico. The Mimbres River flows southward east of Santa Rita and the Gila River flows westward to the north of the town and the famous copper deposits at Santa Rita were worked by Native American (Thrapp 1974:18).

During the nineteenth century, relations between the Apache and, first, Mexicans, and, later, Americans were antagonistic and often violent. After the end of Mexican–American war, conflicts between the Apache and American soldiers led up to more than 20 years of warfare, ending with the surrender of Geronimo in 1886. Today the Mimbres Apache now live at Fort Sill, Oklahoma, or on the Mescalero Indian Reservation in south-central New Mexico.

Historic Euro-American Occupation (A.D. 1540 through the present)

The Spanish launched several expeditions into the Southwest, including the efforts of Friar Marcos de Niza (1539), Francisco Vasquez Coronado (1540 to 1542), Francisco de Ibarra (1565), Fray Agustin Rodriguez and Francisco Sanchez Chamuscado (1581 to 1582), Antonio de Espéjo and Fray Bernardino Beltran (1582 to 1583), and Gaspar Castaño de Sosa (1589). Of these expeditions, certainly Coronado's explorations of the American Southwest are the best documented (Bolton 1964; Ellis 1971:5–16; Hammond and Rey 1940). Most of these early expeditions followed the Rio Grande north, except for Coronado, who entered New Mexico via eastern Arizona. Colonization of New Mexico began with the Juan de Oñate expedition in 1598, which also followed the Rio Grande. Oñate's greatest contribution to the settlement of northern New Mexico was establishing the Camino Real along the Rio Grande. By 1610, Santa Fe was the northern capital and remained the center of political and economic control for Spanish and Mexican rule until the mid-19th century.

Between 1610 and the Pueblo Revolt of 1680, the northern province was extremely isolated and continually harassed by native nomadic peoples. As early as the late 1620s, the Franciscans began their efforts to convert the natives in the southern Rio Grande Valley to Christianity. The most important of these Franciscans was Father Alonso de Benavides, who established relations with the indigenous Mansos and recommended missionary activity among them (Wilson et al. 1989:7). Relations with other native groups were extremely strained. In particular, the Gila Apache to the west of the Rio Grande presented problems to colonists and missionaries alike. Reports of Apache depredations continued until the Pueblo Revolt of 1680, when attentions turned to the northern pueblos. After the Spaniards were expelled from the northern province, the Spanish established their base of operations at El Paso del Norte. From the reconquest of New Mexico in 1692 into the mid- to late 18th century, Apache hostilities in the south plagued colonial rule. Attempts to control the Gila and Mimbres Apache had limited success under

Colonel Hugo O'Conor in the 1770s. These efforts concentrated in the Alamo Hueco, the Florida Mountains, and the Big and Little Hatchet ranges of southwestern New Mexico (Couchman 1990:18).

Progress in bringing some political and economic stability to New Mexico was enhanced by the renewed exploration and integration of the region between northern Chihuahua, Sonora, and California. New routes between Santa Fe, New Mexico, and Arizpe, Sonora, and between Janos, Chihuahua, and the Santa Rita Copper Mine were opened (Couchman 1990:19–21). These routes crossed in the area approximately 32 km (20 miles) west of Columbus, New Mexico. Between 1804 and the 1830s, the Janos route provided access to the rich copper mines of present-day central New Mexico until Apache depredations again increased dramatically and forced the mine to close. The copper mine remained uninhabited until the 1850s (Couchman 1990:24).

In 1821, Mexico gained its independence from Spain; however, political anarchy and economic problems followed. Texas' independence in 1836 and President Polk's expansionistic ideas of the 1840s provided an impetus for the Mexican War. The only fight in the region was the Battle of Brazito that took place in Vado, New Mexico Territory (Couchman 1990:43). The signing of the Treaty of Guadalupe Hidalgo ended the Mexican–American War in 1848.

Significant for the next 40 years was the Mormon Battalion's opening of Cooke's wagon road through the American Southwest to San Diego in 1846 and 1847. The battalion's leader lent his name to Cooke's Spring, located at the base of Cooke's Peak, which was the major water source between the Rio Grande and the Mimbres River. After the Mexican War and by 1854, the Gadsden Purchase secured the southern boundary of New Mexico and provided the United States with a southern route for a future continental railroad. Brevet Major Emory was assigned the task of surveying the newly acquired land, which he completed in October 1855 (Ames 1977:432). Many of the stone boundary monuments that Emory established were destroyed by the Apache or the elements and were not redressed or reconstructed until Barlow's expedition in 1892.

From 1857 to 1861, mail service and transportation across the southern Southwest was provided primarily by the San Antonio-San Diego Mail Company and the Butterfield Overland Mail Company. These services entered New Mexico by way of El Paso, followed the Rio Grande north to Mesilla, and turned west to Cooke's Spring. From there, the lines crossed the Mimbres River and ventured into Arizona by way of Apache Pass. Disruption of mail and transportation service began with the Confederate invasion of New Mexico in 1861. Although short lived, southern New Mexico and Arizona were part of the secessionist Confederacy until the Confederates' expulsion in 1862 (Wilson 1975).

After the Civil War, homesteaders, miners, and entrepreneurs alike began to settle in New Mexico. However, between 1863 and 1886, Apache unrest plagued southern New Mexico, with hundreds on both sides killed. Such uneasiness resulted in the establishment of several frontier forts in this corner of New Mexico, including Fort Cummings (1863), Fort Seldon (1865), Fort Bayard (1866), and Fort West (1863) (Couchman 1990:168). By 1880 to 1881, rail service had begun in many parts of southern New Mexico, and by 1886, with Geronimo's surrender, peace was finally at hand.

By the end of the 19th century and the first few years of the 20th, New Mexico grew because of its mining, ranching, and herding industries. Mining districts—such as Cooke's Peak, Lake Valley, Apache Hills, Santa Rita, Tyrone, Stein's Pass, Shakespeare, and Hatchita—provided some economic success and stability to the region. By 1902, the El Paso and Southwestern Railway southern route (eventually, the Southern Pacific "South Line") was completed between Douglas, Arizona, and El Paso, Texas (Myrick 1970; Wilson 1975:90). This line brought ore from the mines to the smelter in El Paso. Service on the line was discontinued in 1963, and many of the railroad sidings lie in ruin today.

Many large ranches in southern and southwestern New Mexico began during this same period. Rich grama-grass rangeland and mild winters encouraged the establishment of such ranches as the WS Ranch (1881), Slocum or Mason Ranch (1870), Las Uvas Ranch (1888), and Corralitos (1912), to name a few (Wilson 1975:98–106).

Probably the most significant event of the 20th century along the U.S.–Mexico border was Francisco “Pancho” Villa’s raid on the small border town of Columbus, New Mexico. Between 1910 and 1920, the Mexican Revolution provided a stage for border activities from Brownsville, Texas, to Douglas, Arizona. The United States maintained thousands of National Guardsmen along the entire border, in case of trouble. Trouble hit on March 9, 1916, when Villa hit Columbus to restock his army and to retaliate against the United States’ recognition of the Carranza government. Villa’s raid was generally a failure, as he lost hundreds of men in the process. Following the raid, “Black Jack” Pershing and a “punitive expedition” pursued Villa until February 1917 (Hall and Coerver 1990:77). Pershing’s return ended much of the United States’ intervention in Mexico because the war in Europe took attention away from the revolution. Camp Furlong in Columbus was the staging base for Pershing’s expedition and was staffed until 1923.

In 1917, the U.S. Government established Camp Cody near Deming, New Mexico, approximately 56 km (35 miles) north of the border. This camp trained soldiers to fight in the European campaigns of World War I. Again in World War II, the border area provided training exercises for young airmen. Desolate areas north and east of Deming, New Mexico, were used as target locations (Couchman 1990:237). In addition, Japanese, German, and Italian prisoners of war were housed at internment camps in Lordsburg, Deming, and the Mesilla Valley.

Today, in many places along the border, there are no roads, fences, or signs of human life. Most of the country to the north of the border is still used for grazing, with limited mining. Some families in the Playas and Animas Valleys turned to farming using pump water for irrigation and to stockfeeding operations during the 1930s and 1950s; however, these are for the most part gone (Wilson 1975:96). Current land use is primarily either grazing or mining.

SOUTHEASTERN ARIZONA AND THE TUCSON BASIN

The following chronology has seven temporal subdivisions: the Paleoindian (11,000 to 8000 B.C.), Archaic (8000 to 300 B.C.), early Formative (300 B.C. to A.D. 800), late Formative/Preclassic (A.D. 800 to 1150), Classic (A.D. 1150 to 1450), Protohistoric (A.D. 1450 to 1854), and Historic (A.D. 1854 to 1950) periods.

Paleoindian Period (11,000 to 8000 B.C.)

The Paleoindian period is generally considered to cover the span of time from 11,000 to 8000 B.C. in southeastern Arizona (Agenbroad 1970). Like in New Mexico, the archaeological record suggests that Paleoindian populations were small and dependent on the exploitation of megafauna and wild plants. Several sites have been excavated in southeastern Arizona where mammoths and other extinct megafauna were found in association with Clovis points and other artifacts (Faught and Freeman 1998; Haury et al. 1959; Haynes 1973; Haynes and Huckell 2007). The high degree of technological conformity and continental distribution of sites and isolated points indicate that this cultural complex was specialized, widespread, and highly mobile.

Archaic Period (8000 to 300 B.C.)

As discussed for New Mexico, after about 8000 B.C., the Paleoindian complex gave way to numerous regional expressions assigned to the Archaic period (8000 to 300 B.C). Dates for the beginning of the

Early Archaic period are not well established in southern Arizona, but the available evidence suggests that it began around 8000 B.C. The Early Archaic period is poorly documented in southern Arizona (Huckell 1984:137), probably because of its general underrepresentation and low visibility. In southern Arizona, the Middle Archaic period is better represented than the Early Archaic period.

Like in New Mexico, hunting and gathering strategies in the Archaic focused on smaller game and locally available plant resources. Artifact assemblages reflect this economic orientation, with an increased emphasis on plant-processing tools, such as grinding. Middle Archaic period socioeconomic adaptation in southern Arizona exploited a wide range of plants and animals in complementary environmental zones. Middle Archaic assemblages from southern Arizona frequently include large numbers of projectile points and slab metates, as well as introducing basin metates, mortars, and pestles.

As in New Mexico several changes in artifact assemblages, cultural features, and the introduction of maize agriculture, signifying changes in settlement and subsistence patterns, appeared in the beginning of the Early Agricultural period. Sites are characterized by relatively small domestic structures with small, interior, bell-shaped storage pits, abundant flaked stone artifacts, simple shell jewelry, clay objects, utilitarian seed milling equipment, and maize cultivation, suggesting some level of sedentism (Huckell et al. 1995; Huckell and Huckell 1984).

Early Formative (A.D. 200 to 800)

The Early Formative period is characterized by the formation of a rather uniform cultural expression in southeast and central Arizona, as well as in southern New Mexico and northwestern Mexico. In the Tucson Basin, the Early Formative period marks the transition between the Early Agricultural period and the subsequent Hohokam Pioneer period. Plain brown ware ceramics and red-slipped plain ware and vessel shapes that include primarily seed jars and occasional outcurved-rim bowls characterize the Early Formative. With the advent of ceramic vessels came a significant change in storage technology. The increased use of ceramic storage vessels corresponds to a decrease in the use of large storage pits.

Many Early Formative pit structures were square to rectangular, with formal, plastered hearths centered on the entryway. Formalization in architecture suggests greater residential stability. The non-random organization of space within the community, which began as early as the Early Agricultural period, continued, with discrete courtyard groups, large open areas (plazas), and large communal houses.

Late Formative Period (A.D. 800 to 1050/1150)

The Late Formative period is defined by increased cultural differentiation throughout southeastern Arizona. It is also distinguished by the implementation of irrigation systems and changes in ceramic production and exchange, as well as in settlement patterns.

The Hohokam archaeological culture of the Tucson and Gila-Salt basins developed out of the Early Ceramic period. The Hohokam sequence in the Preclassic is composed of three periods: Pioneer (A.D. 650 to 750); Colonial (A.D. 750 to 950); and Sedentary (A.D. 950 to 1150). The Pioneer period is marked by the beginning of pottery with simple geometric designs.

Population rapidly increased during the Colonial period. By A.D. 800 a number of settlements had become established along the Santa Cruz River. Doelle and Wallace (1991) suggest a fourfold increase in the number of sites. Ball court villages dating to the Colonial period are known in the western Tucson Basin and other areas (Czaplicki and Ravesloot 1989; Doelle and Wallace 1991; Downum 1993). These ball court villages were composed of larger communities that included farmsteads and field houses, as well as loci for wild plant procurement.

The Sedentary period witnessed a substantial growth in the size of existing villages and an increase in the number of ball court villages in both the Tucson and Gila-Salt basins. Irrigation systems were expanded, and settlements extended away from riverine environments to secondary drainages and bajadas. The growing populations also fostered the expansion of trade networks, and by the middle of the Sedentary period, the Hohokam regional system had reached its maximum extent (Crown and Judge 1991; Wilcox 1991).

In the Tucson Basin, widespread abandonment of the existing courtyard groups occurred, and a large number of other changes made their appearance. New architectural types, new modes of interment, and changes in subsistence and economic pursuits were introduced, following changes in settlement structure. Changes in architecture included the addition of various types of adobe-wall constructions, and inhumations were added to the mortuary complex. Changes in subsistence pursuits included the significant increase in use of wild species, specifically agave (Wallace 1995:806–810).

During the Preclassic period, the San Simon branch of the Mogollon demonstrates both continuity with local traditions and peripheral cultural differentiation influenced by Mimbres culture the Hohokam. Early in the Preclassic, domestic structures consist of wood frame houses that are covered by grass and/or reed mats and adobe plaster and have fire pits, hearths, entries, and subfloor pits. Although basin metates and grinding slabs remain dominant, slight changes in the subsistence patterns are indicated by the adoption of shallow trough metates and rectangular two-hand manos. During the later Preclassic, the San Simon Mogollon organized into large permanent communities, developed upland agricultural systems, and constructed ball courts. Changes in material culture included the introduction of clay figurines (with “coffee-bean” eyes), carved stone bowls and palettes, pottery paddles, tabular tools, an influx of Mimbres ceramics, and an increase in the amount and variety of stone and shell jewelry. This period culminates in the abandonment of large portions of the San Simon and Sulphur Springs valleys around A.D. 1050 (Gilman 1997, 2011). Although permanent settlements continued, villages tended to be smaller than those documented earlier and are relatively concentrated within the upper bajada zone.

Classic Period (A.D. 1050/1150–1450)

Regionalism, agricultural intensification, and exchange/alliance networks define the Classic period. These processes are distinguished by specific and rapid changes in ceramic production and exchange, as well as repeated reorganization of settlement patterns, the integration of upland dry-farming systems, and the adaptation of upland irrigation. This period culminates in the abandonment of most of southeastern Arizona around A.D. 1450.

For the Hohokam, the Classic period was a time of major change. In the Tucson Basin, design styles of red-on-brown ceramics (specifically Tanque Verde Red-on-brown) became simpler and more rectilinear. Tanque Verde Red-on-brown pottery expanded beyond the Tucson Basin, appearing in low frequencies in the Gila Basin and the western Papaguería (Harry 1997).

During the Classic period, inhumation became the dominant mode of burial. Additional architectural forms appeared, including adobe-walled pit houses and, later, aboveground structures of adobe and stone masonry. These structures were often incorporated in compounds that were surrounded, entirely or in part, by adobe and stone walls. Ball court construction ceased, and earthen platform mounds, indicators of larger community organization, became the focal point of communal activities. At the end of the Classic period, residential units, possibly elite residences, were built on some of the mounds. The Hohokam aggregated into larger primary villages located along the major drainages, possibly as a result of an increase in warfare (or threat thereof) (Doelle and Wallace 1991). Maize, beans, squash, and cotton continued to dominate agricultural production, but a wider variety of cultivars and wild-plant resources were exploited.

The Classic period was a time of population migration, most likely prompted by increased environmental fluctuation, especially drought. Evidence of population relocation from northern and central Arizona has been documented in southeastern Arizona in the San Pedro River valley and possibly the eastern Tucson Basin (e.g., Clark 2001; Di Peso 1958; Slaughter and Roberts 1996; Woodson 1999). The changes in the Classic period material culture, site structure, and settlement patterns may result from sociopolitical and economic reorganization prompted by the influx of new people to the region.

In southeastern Arizona, the San Simon Valley was essentially abandoned during the Classic period; however, in the beginning of the Classic period local traditions begin to emerge within the major drainage throughout southeastern Arizona. These represent populations residing in large, formal communities that appear to form large cooperatives. At the regional scale these appear to have been loosely integrated and indirectly affiliated with a regional system centered in northwestern Chihuahua and northeastern Sonora.

The most important aspect of this period is the formation of relatively large year-round agricultural communities and agricultural use of the uplands, either by dry farming or irrigation (Sauer and Brand 1930). Clusters of small, compact, residential compounds, characterize early Classic habitation sites. These consist of two or three groups of rooms (both rectangular surface rooms and pit rooms) arranged around a large courtyard. By the later Classic, settlements are large, aggregated villages of residential compounds situated in both basin and upland environmental zones, the expansion of upland farming systems (Sauer and Brand 1930),

The Protohistoric Period and the Historic Native American Period (A.D. 1540 through the present)

The Protohistoric period, from the end of the Hohokam occupation around A.D. 1450 to Spanish contact at the end of the 16th century, is little understood in southern Arizona. Historical documents from the earliest Spanish contact suggest that the Sobaipuri, a Piman group, occupied the area at the end of the Protohistoric period (Doelle 1984). Kino first encountered the Sobaipuri in 1691, although current research indicates their occupation of the area has significantly greater time depth (cf. Seymour 2007). Archaeological evidence is sparse for the period, in part because of recent agricultural practices and urban expansion. Doelle (1984) also suggests that the material culture and architecture of the Sobaipuri were quantitatively less than that of the Hohokam, resulting in ephemeral, hard-to-find sites. Sobaipuri settlement has long been thought to be concentrated in villages located along the major watercourses of the Tucson Basin. In part based on accounts of traditional Tohono O’odham subsistence, a bimodal settlement pattern has been suggested, with villages along the major watercourses and small, seasonal occupations located in the foothills and on the bajadas (Harry 1993). A recent, and ambitious, reevaluation of the evidence argues that some Sobaipuri sites were larger, and more enduring, than their visibility in the archaeological record suggests (Seymour 2011a). Diagnostic artifacts associated with the Sobaipuri include Whetstone Plain and Sobaipuri Plain ceramics and small triangular points with deeply notched bases and serrated edges (Masse 1981:44).

Little is known about southeastern Arizona during the time of the arrival of the Spaniards (A.D. 1535 to 1540). Cabeza de Vaca and Coronado may have traveled through the region, but their route is uncertain. To the south, along what is believed to be the Rio Sonora, early explorers described the area as “thickly settled” with evenly spaced large towns and smaller settlements in-between. The region’s inhabitants employed irrigation to grow maize and beans (e.g., Reff 1981). The large towns were later interpreted as regional religious and socioeconomic centers by archaeologists (e.g., Pailes 1978). These centers were architecturally complex and nucleated, with large-scale public architecture. One village was said to have 200 terraced houses, and another regional center was described as a fortress with enclosing walls, 2 small towers, and 4 room blocks that surrounded a central plaza. The historical residents of the Rio Sonora and neighboring Rio Bavispe and Rio Moctezuma Valleys (Amsden 1928) were referred to as the Opata. In the early 1640s, Spanish attempts to subdue the upper Opata alliance failed, but the area was opened to missionization and became a staunch Spanish ally after 1650.

After 1651, the demands of the Spanish military, economic, and administrative systems, European disease, internal conflict, and incessant raiding by Apaches significantly weakened the Opata and the Sobaipuri (a point contested by some scholars, cf. Seymour 2011b). Possibly as early as the 1670s, the northern Opata villages of the Bavispe region came under increasing attack from the northern raiders. After 1690, outlying upper Opata villages in the Carretas and Bavispe basins were abandoned, and the population was relocated to settlements that could be defended with greater ease (Reff 1981). In a similar fashion, the Sobaipuri villages along the San Pedro Valley witnessed increased devastating Apache raiding; finally, the San Pedro Sobaipuri were resettled in the Tucson area (Dobyns 1976).

Although small bands of Apaches frequented southeastern Arizona by 1675, they did not assume a dominant role until after 1700. In the period following 1697, the conflict between the Spanish affiliates, the Sobaipuri and Opata, and individual Suma groups intensified. The opportunistic Apaches appear to have exploited the internal divisions and conflicts within the Spanish administration, the Native allies, and the various Suma groups at several different levels. The Apache were the ultimate victors in this conflict and appear to have rapidly assimilated members of the dissolved anti-Spanish Suma confederation. By the middle of the 18th century, the Apaches occupied and effectively controlled southeastern Arizona.

Historic Euro-American Occupation (A.D. 1540 through the present)

Spanish colonization of what is now known as southern Arizona began in the 1690s with the travels of the Jesuit missionary Eusebio Francisco Kino. Kino first traveled as far north as the Tucson Basin in 1692 and 1694 (Doelle 1984). The mission at San Xavier del Bac in the southern Tucson Basin was established under Kino's influence in 1700. In 1775, a presidio was established in Tucson to protect the missions at San Xavier and San Agustín from Apache attack (Harry and Ciolek-Torrello 1992). Small numbers of Spanish settlers populated the Santa Cruz Valley after the establishment of the presidio, but settlement slowed after Mexican independence and renewed Apache attacks (Clemensen 1987; Harry and Ciolek-Torrello 1992).

The American period began with the Gadsden Purchase, when southern Arizona became U.S. territory in 1854. The discovery of gold in California, the 1862 Homestead Act, and development of gold and silver mines near Tombstone heralded the arrival of a large number of Euro-American settlers by the middle 1870s. The population expanded but remained centered on the town of Tucson until the 1870s because of Apache raids. The earliest occupants of the eastern Tucson Basin and the analysis area arrived after the Apache truce of 1872, when an increased military presence at Fort Lowell helped control Apache raiding (Clemensen 1987; Harry 1993).

In the Sulphur Springs Valley, the first silver-lead-copper deposits were discovered in 1877. The socioeconomic system of the Apache was severely disrupted when they were barred from their traditional hunting, gathering, and agricultural areas and prevented from raiding. A system of military bases was organized in order to provide settlement and transportation networks and protection from continued raids. The Chiricahua homeland was recognized in 1872, and 2 years after the death of Cochise in 1874, the Chiricahua Apache were moved to reservations in the San Carlos area by the U.S. military.

Construction of the Southern Pacific Railroad from 1878 to 1880 accelerated the transformation of the regional economy by providing access to the mines, farms, and ranches of the West by the factories and markets of the East. The arrival of the railroad in Tucson in 1880 initiated the transformation of Tucson, with its population of 8,000, into a more modernized city.

The main line of the Southern Pacific Railroad was built through the Willcox Basin in 1880. Soon, mining camps were established at Gleeson, Pearce, Bisbee, and Courtland and by the early 1900s, a smelter was built at Douglas to process the ore supplied by the nearby mines. The El Paso and Southwestern Railroad originated as the Arizona and South Eastern Railroad, a small local line built in 1888–1889 to serve the copper mines at Bisbee. The line had extended north to the town of Fairbank, along the San Pedro River, to meet up with the New Mexico and Arizona railroad, which then shipped the ore to Nogales (Myrick 1975). In 1894, due to a dispute with the New Mexico and Arizona Railroad, it was decided that a connection between Fairbank and the Southern Pacific mainline at Benson was needed (Myrick 1975). Following several setbacks, including washouts, floods, and labor unrest, the line was completed in October of that year (Myrick 1975). Around the turn of the 20th century, the Arizona and South Eastern changed hands to the El Paso and Southwestern Railroad Company. In 1911 plans were initiated to extend the line from Benson to Tucson, and this line was completed on October 31 the following year (Myrick 1975). For a time, Tucson served as the hub of three separate bustling railroad lines, however, in 1924, the El Paso and Southwestern was acquired by Southern Pacific (Myrick 1975). Following the merger, the two sets of line between Tucson and Mescal were used as a double track, and portions remain in use today (Myrick 1975).

After the arrival of the railroad came the construction of St. Mary's Hospital, which is at the base of Tumamoc Hill, electric streetlights, a system of street naming and numbering, and a State university to Tucson. By 1950, the population of Tucson had grown to nearly 120,000.

Historic Trails and National Historic Trail Corridor

One important historic trail corridor, the Juan Bautista de Anza National Historic Trail corridor, and four historic trails are crossed by the current analysis area in several places: the Butterfield Trail, the Mormon Battalion Trail, Janus Copper Road, and the Zuñiga Trail. Following is a discussion of these trails. Appendix F, "National Scenic and Historic Trails Assessment," also discusses the Anza Trail and the Butterfield Trail, as well as other scenic trails in the analysis area.

JUAN BAUTISTA DE ANZA NATIONAL HISTORIC TRAIL

The Anza Trail historic corridor commemorates Anza's 1775 to 1776 expedition to lead settlers to the San Francisco area through what is now Arizona and California. Congress designated the trail as an NHT in 1990, as part of the National Trails System. The trail begins at Nogales, Arizona, ends in San Francisco, and is approximately 1,200 miles long.

The purpose of the Anza expedition was to establish a trail from Sonora, Mexico, to the San Francisco area so that the Spanish could successfully settle Alta California (Gough 2012). The 1775 to 1776 expedition was actually Anza's second expedition to cross the desert into California. His first expedition left Tubac, Arizona, for Monterey, California, in early 1774, and reached San Gabriel, California, in March (Gough 2012). Not long after his return from California, Anza was commissioned to travel once again to California, this time to establish a mission with settlers in the San Francisco area. Families were recruited from towns in what is now Mexico. Anza and the settlers then traveled to Tubac to meet up with the two friars who would be establishing the mission. Two hundred forty people, including 153 women and children, set out from Tubac in October 1775. The members of the expedition encountered many hardships such as extreme cold weather, lack of water, treacherous terrain, and disease; however, they reached Monterey in March 1776 (Gough 2012). Anza returned to Mexico City not long after that; the settlers continued their journey to San Francisco, arriving in June. The Anza Trail was used by colonists journeying to California for several years and was crucial to the establishment of the Spanish in Alta California.

The Anza Trail consists of three parts: the trail corridor, which represents an approximation of the route taken by the expedition; a recreation trail managed by the NPS in cooperation with local land managers and agencies; and an auto tour route, which follows the corridor via roadways.

The BLM manages the portions of the trail that lie within its jurisdiction. The "Juan Bautista de Anza National Historic Trail Comprehensive Management and Use Plan" is the current guiding and managing document for the trail, and the plan states the following vision:

> A traveler will be able to hike, ride horseback, bicycle, and drive on a marked route from Nogales to San Francisco and the loop in the eastern portion of San Francisco Bay. Along the way, the visitor can experience landscapes similar to those the expedition saw; learn the stories of the expedition, its members, and descendants; better understand the American Indian role in the expedition and the diversity of their cultures; and appreciate the extent of the accomplishments of Juan Bautista de Anza and his colonizers. (NPS 2006:7)

BUTTERFIELD OVERLAND MAIL AND STAGE ROUTE

The Butterfield Overland Mail and Stage Route, also known as the Butterfield Trail, the Oxbow Route, the Butterfield Overland Mail, or the Butterfield Stage, was a stagecoach route used between St. Louis, Missouri, Memphis, Tennessee, and San Francisco from 1858 to 1861 (Norris 2013). John Butterfield won a government contract to carry mail from two eastern points (St. Louis and Memphis) to San Francisco for 6 years in September 1857 (Norris 2013; Talbot 2002 [1992]). Because the terms of the contract stipulated that service begin within a year of the contract award, Butterfield and his Overland Mail Company quickly set up routes and stations, many in unfriendly territory (Norris 2013; Talbot 2002 [1992]). Passengers were accepted to ride the coach with the mail for approximately $200 per person. A chain of stations that provided food, ammunition, water, and accommodations was constructed along the trail and operated for 2.5 years until the Civil War (Talbot 2002 [1992]). The route itself follows several older trails, including Cooke's Mormon Battalion Trail (see below) in some places in Arizona. The NPS is currently conducting a feasibility study for the designation of the Butterfield Overland Stage and Mail Route as an NHT.

In New Mexico, the Butterfield Overland Stage and Mail Route runs west from Las Cruces passing north of Deming to Lordsburg. It then continues west to Arizona, where it crosses near Stein's Peak (Talbot 2002 [1992]). The trail then travels along southern Wilcox Playa and continues roughly west until it reaches the Rincon Mountains, where it turns northwest toward Tucson. Physical traces of the Butterfield Overland Stage and Mail Route exist in New Mexico and Arizona today; these portions of the trail are considered linear historic resources. In New Mexico, the trail is listed in the State Register (SR-173), and different segments have been assigned site numbers LA 173985, LA 173986, LA 173988, and LA 173989. In Arizona, portions of the trail have been assigned site numbers AZ T:14:61(ASM) and AZ T:15:32(ASM).

ZUÑIGA TRAIL

In an effort to establish a reliable trade route between Sonora and the northern reaches of the Spanish empire at Santa Fe, Captain Don Jose de Zuñiga and 20 men left the Presidio in Tucson in April 1795 to rendezvous with soldiers and Apache scouts from 5 other presidios at Santa Cruz on the San Pedro River south of present-day Saint David (Madsen 2012). Madsen has reconstructed the expedition route from the diaries of the participants and has determined that the first day camp of the soldiers from Tucson was southwest of present-day Benson in Davidson Canyon. The group then traveled northeast to the San Pedro River north of Benson, turning south to rendezvous with the main expeditionary force at the Presidio of Santa Cruz, located on the San Pedro south of present-day Saint David. From this point, the group traveled back to Saint David and turned to the northeast, passing the eastern edge of the Wilcox Playa and heading north toward the foot of the Winchester Mountains. From this point, the expedition traveled northeast across the San Simon Valley to the Gila River near present-day Duncan. One of the purposes of the expedition was to mark a trail that could be followed later by others. Although it is doubtful that physical remnants of this trail are still visible today, it may be possible to locate trail markers in the form of rock cairns along the reconstructed route, which crosses the analysis area.

MORMON BATTALION TRAIL

During the Mexican–American War, 500 Mormon soldiers marched approximately 1,850 miles from Iowa to California (Kimball 1979). They had been requested by President James K. Polk to help in the war effort in 1846. They marched beginning in July 1846 in Council Bluffs, Iowa, arriving in San Diego, California, in January 1847 (Easton Black n.d). The original commander, Lt. Col. James Allen, died en route to Santa Fe. The first soldiers arrived in Santa Fe in October 1846 and, once in Santa Fe, command was handed over to Lt. Col. Philip St. George Cooke. Cooke sent a detachment of ill soldiers to Colorado and marched the remaining soldiers down the Rio Grande del Norte and across New Mexico into Arizona (Talbot 2002 [1992]). The soldiers constructed a wagon road along the way to allow their supply wagons to pass. By mid-November they had arrived at Cooke's Spring, northeast of what is now Deming, New Mexico, and by the beginning of December they crossed into Arizona (Talbot 2002 [1992]). As they traveled along the San Pedro River on the way to Tucson, the company was attacked by bulls on December 11, and two soldiers were injured in the "Battle of the Bulls" (Easton Black n.d; Talbot 2002 [1992]). This would be the only battle they would see, for the Mexican soldiers who were garrisoned at Tucson fled as the company arrived in December. By January, the company had crossed the Colorado River and arrived in California.

Traces of the Mormon Battalion Trail can be found in Arizona and New Mexico. Later routes such as the Butterfield Overland Stage and Mail Route followed the trail marked by the Mormon Battalion through this area.

JANOS COPPER ROAD OR TRAIL

The Janos Copper Road or Trail was the primary route for the transportation of copper ore from the Santa Rita del Cobre mine in New Mexico to smelters in Janos, Chihuahua, in the early 19th century (Silver City 2004). At the end of the 18th century, Lt. Col. Jose Manuel Carrasco obtained the Santa Rita mine; he then sold a portion of it to Don Francisco Manuel Elguea, who began taking copper ore to Janos by mule train. Soon, a Spanish garrison was established at Santa Rita, and the military used prisoners to work the mine. After the War of Independence from Spain in 1821, the mines were controlled by the Mexican government, who used the ore to mint coins (Silver City 2004). The mines were abandoned and the mule trains south stopped by the 1840s because of the threat from the Apache and problems within the Mexican government.

3.9.7 Cultural Resource Types

Archaeological Site Categories

AMERICAN INDIAN SITE CATEGORIES

Habitation sites are those with evidence of permanent or semi-permanent human occupation. Habitation sites vary greatly in size, density, and length of occupation, and in the number of types of features that may be present. Types of habitations that may be encountered in the analysis area include field houses (single-room masonry structures), room blocks (consisting of two or more adjacent rooms), and pit houses (semi-subsurface structures). Habitations may also have hearths, pits, roasting pits, middens, burials, and occupational surfaces. Site types that indicate habitations include artifact scatters, artifact scatters with features, features, habitations, and cremations.

Rock shelter and *cave sites* are short-term habitation or camp sites located in rock shelters or caves. They often have features such as middens, burials, or hearths.

Agricultural sites are those features related to the cultivation of domestic crops such as check dams or rock piles. These sites may be viewed usefully from the perspective of water use and technology. Site types that indicate agricultural activity include artifact scatters, artifact scatters with features, features, rock piles, canals, and other agricultural sites.

Resource procurement and/or processing sites are short-term occupation or activity sites with evidence of the processing of plant or animal resources. Plant gathering sites often have manos or metates used for grinding seeds and other plant material. Hunting sites may have flaked stone tools used for cutting and processing meat. Site types that indicate resource procurement include artifact scatters and artifact scatters with features.

Lithic manufacture sites consist primarily of flaked stone scatters of debitage from the making or repairing of flaked stone tools. Often these sites are seen as one or more knapping stations where the debitage is from one or two raw materials. Site types that indicate resource procurement include artifact scatters, artifact scatters with features, and quarries.

Trails are linear sites along which people traveled in prehistoric times. Trails can show evidence of clearing and often have campsites or other small sites along their routes. Many prehistoric trails were used into historic times as well.

EURO-AMERICAN SITE CATEGORIES

Homesteads (habitation) are the remains of early settlement in the Southwest. They may be complex sites with features like foundations, wells, outbuildings, fences, and landscape modifications, or they may be simply a tent platform and some trash. Most homesteads can be associated with a Federal land patent.

Mining sites are the result with mining activities such as hardrock mining. Mining sites can consist of features like adits and mining claim cairns, large sophisticated operations with mills and other buildings, or campsites and company towns. Mining sites can often be associated with mining claims filed with the Federal Government.

Ranching sites are those associated with animal husbandry such as corrals, barns, pastures, ranch houses, and outbuildings. *Agriculture sites* consist of farmhouses, outbuildings in association with irrigation structures and fields.

Water control sites are those associated with directing and containing the flow of water. These sites include dams, canals, and water tanks.

The term *transportation site* encompasses linear sites used for the movement of people such as roads, railroads, and trails. Features associated with transportation sites include railroad tracks and stations, culverts, bridges, trestles, walls, etc. Many transportation sites may still be used today and are also considered part of the historic built environment.

Infrastructure sites are utilities such as telephone lines and electric lines. Like transportation sites, these may still be in use.

Military sites are the result of military activities such as forts, bases, training facilities, and airfields. Military sites in the Southwest range from evidence of early campaigns against American Indians to World War II auxiliary airfields.

Town sites are large settlement sites that consist of several different property types: transportation, infrastructure, and historic built environment property types. Town sites may still be occupied or abandoned. Often, historic town sites are discussed as districts rather than as individual property types because of their complexity.

Cemeteries are locations where people interred their dead. They can be found freestanding or associated with a town or church.

Trash dumps/scatters (limited activity) are locations where trash was dumped in one or more episodes and cannot be definitely associated with one of the above historic site categories.

Historic Built Environment Property Types

Historic built environment property types can also be homesteads, mining sites, ranching sites, transportation sites, infrastructure sites, town sites, military sites, and cemeteries, like archaeological sites. However, they must have standing buildings or structures.

Buildings are construction designed to shelter human activity, whereas *structures* are constructions not designed to shelter human activity. For example, a house or a railroad station would be considered a building, and an irrigation system or a mining headframe would be considered a structure.

Historic Trails

Historic trails are special types of transportation sites that are particularly significant to our history and are either subject to specific management guidelines by the BLM and/or NPS (for those designated as NHT or under study) or the NHPA. For the purpose of this EIS, the term historic trail is used to describe known important historic trails with physical traces, such as the Butterfield Trail, as well as designated NHT corridors such as the Anza Trail.

Property of Traditional Religious or Cultural Importance

PTRCIs are places of importance to American Indian tribes or Native Hawaiian organizations. According to NHPA Section 101(d)(6)(B), a Federal agency must consult with any American Indian tribe that attaches religious or cultural significance to a PTRCI.

Traditional Cultural Property

According to NPS Bulletin 38, TCPs are extremely varied, but they must possess traditional cultural significance to a community (Parker and King 1998). That means they must embody or be associated with beliefs, customs, and practices of a community that are essential to that community's identity. TCPs include natural features or landscapes, buildings or entire communities, places where ceremonial activity takes place, or many other types of places.

American Indian Critical Resource Types

The term *American Indian critical resource* encompasses places and things not thought of as TCPs but that are still important to traditional beliefs and lifeways. Springs are often considered critical resources in the desert Southwest; they may also be sacred sites. Places where medicinal and edible plants are gathered or where certain animals are hunted can also be considered critical resources, as well as places where clay, stone tool raw materials, and plants used for building material, basketry, or clothing are found.

3.9.8 Known Cultural Resources

A total of 977 archaeological sites and/or historic built environment resources has been previously recorded within the 2-mile analysis area. Of those, 3 have been listed in State or Federal registers, 109 have been determined eligible for listing, 47 have been determined not eligible, and 814 are unevaluated or unknown.

Only 7 percent of the analysis area has been previously surveyed; survey coverage varies greatly across the analysis area (table 3.9-2). In New Mexico, less than 4 percent of route group 1 analysis area and less than 10 percent of the route group 2 analysis area has been previously surveyed. In Arizona, the survey coverage is better: 50 percent of the route group 3 analysis area and 65 percent of the route group 4 analysis area has been previously surveyed.

The 100-foot ROW was surveyed from the Tucson to Saguaro substations in 1985; 11 sites were recorded within the 100-foot ROW (Effland and Greene 1985). Two recent surveys have been performed along the existing transmission line in the Upgrade Section (Goldstein 2008; Hart 2012). Goldstein (2008) conducted a Class III pedestrian survey along the existing Tucson–Apache 115-kV transmission line. The survey covered approximately 80 miles within a 200-foot-wide corridor from the Tucson Substation to the Apache Substation. Fifty-three sites were recorded: 18 sites were recommended eligible for the NRHP; 30 sites were recommended not eligible; and 5 sites were undetermined. Hart (2012) conducted a Class III survey of a 100-foot access road ROW between several pole structures along the line between the Tucson and Apache substations for a total of 4.45 miles. An additional check for sites along the ROW from the Tucson Substation to the Saguaro Substation was conducted in 2012 by a Western archaeologist, but no survey corridor width was specified and no report was generated (personal communication, Maria Martin, Galileo 2013).

Table 3.9-2. Previous Survey Acreage by Route Group

Route Group No.	Route Group	Acres Surveyed	Total Acres in Route Group	Percentage Surveyed
1	Afton to Hidalgo	16,167	435,949	3.7
2	Hidalgo to Apache	38,888	425,909	9.1
3	Apache to Pantano	1,644	3,270	50.3
4	Pantano to Saguaro	3,869	5,925	65.3
	Total	**60,568**	**871,053**	**7.0**

3.9.9 New Build Section

Route Group 1 – Afton Substation to Hidalgo Substation

Route group 1 consists of segments of the proposed Project (Proponent Preferred and Proponent Alternative), as well as all of local alternative DN1. Within the analysis area (2-mile corridor), 277 archaeological surveys have been previously conducted; 16,167 acres of the 435,949 analysis area (less than 4 percent) have been surveyed. These surveys and other documentation have resulted in the recordation of 403 archaeological sites and/or historic built environment resources. One resource, the

Village of Columbus and Camp Furlong NHL, is listed. Fifty-seven of these resources are determined eligible for the NRHP, 20 are determined not eligible, and 326 of the resources are unevaluated or unknown. Of the previously recorded sites, 173 are prehistoric, 99 are historic, 33 have both a prehistoric and historic component, and 97 are of unknown temporal affiliation. For the unknown sites, no additional data were available.

Twenty-six of the 173 prehistoric sites have been determined eligible for the NRHP, 7 have been determined not eligible, and 140 are unevaluated or unknown. Two sites have both a Paleoindian and Mogollon component. Eighteen of the 173 sites are Archaic; 9 are Archaic and Mogollon. Ninety-eight of the 173 prehistoric sites are classified as Mogollon: 20 are Jornada Mogollon, 2 are Mimbres, 1 is Casas Grandes, and 75 are unspecified. The remaining 46 prehistoric sites are classified as Native American or unknown.

The eligible and unevaluated/unknown prehistoric sites fall into five site types: artifact scatter, artifact scatter with features, features (ash feature, hearths, fire-cracked rock), camp, and habitation (table 3.9-3).

Table 3.9-3. Prehistoric Site Types within the Route Group 1 Analysis Area

Site Type	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Artifact scatter	8	92	**100**
Artifact scatter with features	15	28	**43**
Features	1	2	**3**
Camp	0	6	**6**
Habitation	2	1	**3**
Unknown	0	11	**11**
Total	**26**	**140**	**166**

Of the 99 historic sites and/or built environment resources, 25 have been determined eligible for the NRHP, 10 have been determined not eligible, and 64 are unevaluated or unknown. Two of the historic sites are or may be Apache. Fifty-two of the historic sites are nonnative or Euro-American, 7 are Hispanic or Mexican-American, and 26 are unknown.

Historic site categories for determined eligible or unevaluated/unknown resources include habitation, industrial, limited-activity, ranching, town, transportation, utility, and unknown (table 3.9-4).

Table 3.9-4. Historic Archaeological Sites and Built Environment Resources in the Route Group 1 Analysis Area

Resource Category	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Habitation	3	4	**7**
Industrial	6	2	**8**
Limited activity	6	26	**32**
Ranching	0	5	**5**
Town	4	2	**6**
Transportation	3	3	**6**
Utility	0	1	**1**
Unknown	3	21	**24**
Total	**25**	**64**	**89**

In addition to the above resources, 662 features were digitized from historic maps (table 3.9-5). These features represent potential historic-age resources; however, their existence has not been verified by field visits.

Table 3.9-5. Potential Historic Features in the Route Group 1 Analysis Area, Digitized off Historical GLO and USGS Maps

Resource	Count
Airfield	1
Canal	3
Cemetery	1
Corral	1
Ditch	1
Fence	62
Gas line	2
Mining feature/claim	6
Pipeline	3
Pumping station	2
Railroad feature	20
Ranch	7
Reservoir	1
Road	367
Structure	136
Tank	14
Target	2
Telegraph line	3
Town	13
Trail	3
Well	3
Windmill	9
Other	2
Total	**662**

HISTORIC TRAILS

Three historic trails cross the route group 1 analysis area: the Butterfield Overland Stage and Mail Route, the Mormon Battalion Trail, and the Janos Copper Road route.

ARCHAEOLOGY SOUTHWEST'S CULTURAL RESOURCES PRIORITY AREAS

Two CRPAs are found within the route group 1 analysis area: Black Mountain and Burro Creek (see figure 3.9-1a).

Route Group 2 – Hidalgo Substation to Apache Substation

Route group 2 consists of segments of the Proponent Preferred and the Proponent Alternative, as well as local alternatives LD1, LD2, LD3, LD4, and WC1. Within the 2-mile-wide analysis area, 269 archaeological surveys have been conducted; 38,888 acres of the 425,909 acres has been surveyed (9 percent). These surveys and other documentation have resulted in the recordation of 413 archaeological sites and historic built environment resources. Three resources are listed in State or Federal registers: Shakespeare Ghost Town, Shakespeare Cemetery, and the Cochise Hotel. All three listed resources are historic. Twenty-five resources are determined eligible for listing on the NRHP, 23 are determined not eligible, and 362 are unevaluated or unknown.

One hundred forty-one sites are prehistoric; 118 are historic; 20 have both a prehistoric and a historic component; and 134 are unknown.

Of the 141 prehistoric sites, 8 have been determined eligible, 1 has been determined not eligible, and 132 are unevaluated or unknown. Seventeen of the prehistoric sites are attributed to the Archaic culture. Two sites have both an Archaic and a Mogollon component. Thirty-seven sites are Mogollon; 2 are Hohokam. Eighty-three sites are classified as Native American or unknown.

The 140 eligible or unevaluated/unknown sites fall into 9 site types: artifact scatter, artifact scatter with features, camp, cave or rock shelter, habitation, petroglyph site, quarry, rock piles, or unknown (table 3.9-6).

Table 3.9-6. Prehistoric Site Types within the Route Group 2 Analysis Area

Site Type	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Artifact scatter	3	80	**83**
Artifact scatter with features	4	21	**25**
Camp	0	7	**7**
Cave or rock shelter	0	2	**2**
Habitation	0	15	**15**
Petroglyph site	0	2	**2**
Quarry	1	0	**1**
Rock piles	0	1	**1**
Unknown	0	4	**4**
Total	**8**	**132**	**140**

Of the 118 historic sites and/or built environment resources, 3 are listed in State or Federal registers, 15 have been determined eligible, 21 have been determined not eligible, and 79 are unevaluated or unknown. One hundred nine resources are Euro-American; 1 has both Euro-American and American Indian components. One is Asian-American and two are Hispanic. The cultural affiliation of the remaining seven sites is unknown.

Listed, determined eligible, or unevaluated/unknown resource fall into 11 categories: cemetery, habitation, industrial, limited activity, mining, ranching, structure, town, transportation, utility, and unknown (table 3.9-7).

Table 3.9-7. Historic Archaeological Sites and Built Environment Resources in the Route Group 2 Analysis Area

Resource Category	No. of NRHP-Listed Sites	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Cemetery	1	0	0	**1**
Habitation	1	3	3	**7**
Limited Activity	0	1	23	**24**
Mining	0	2	5	**7**
Ranching	0	0	7	**7**
Structure	0	0	2	**2**
Town	1	0	0	**1**
Transportation	0	9	20*	**29**
Utility	0	0	6	**6**
Water control	0	0	3	**3**
Unknown	0	0	10	**10**
Total	**3**	**15**	**79**	**97**

* Includes a segment of the Butterfield Overland Stage and Mail Route.

Twenty sites have both a prehistoric and a historic component. Two of those sites are determined eligible; the remaining 18 are unevaluated or unknown. Thirteen of those sites are artifact scatters or artifact scatters with features representing limited activity. Three are historic features such as mining features, roads, or water control features with prehistoric artifacts; four are habitation sites.

Digitized features from historic maps total 2,016 potential resources (table 3.9-8).

Table 3.9-8. Potential Historic Features in the Route Group 3 Analysis Area, Digitized off Historical GLO and USGS Maps

Resource	Count
Airfield/Airport	3
Cemetery	4
Compound	9
Corral	1
Dike	3
Ditch	2
Fence/Fenceline	150
Land claim	4
Levee	4
Mill	1
Mine/mining feature	55
Oil well	1
Park	1
Pipeline	5
Railroad/railroad feature	41

Table 3.9-8. Potential Historic Features in the Route Group 3 Analysis Area, Digitized off Historical GLO and USGS Maps (Continued)

Resource	Count
Ranch	10
Reservoir	1
Road	962
Stage route	1
Structure	441
Tank	161
Telegraph line	10
Town	10
Trail	28
Transmission line	1
Utility line	22
Well	36
Windmill	49
Total	**2,016**

HISTORIC TRAILS

Two historic trails cross the Hidalgo to Apache route group analysis area: the Butterfield Overland Stage and Mail Route and the Zuñiga Trail.

ARCHAEOLOGY SOUTHWEST'S CULTURAL RESOURCES PRIORITY AREAS

Four CRPAs are found within the route group 2 analysis area: Krider, San Simon Village, Fischer Hills, and Peloncillo North (see figure 3.9-1a).

3.9.10 Upgrade Section

Route Group 3 – Apache Substation to Pantano Substation

Route group 3 consists of segments of the Proponent Preferred and local alternative H. Within the analysis area (500 feet of existing ROW corridor), 44 Class III archaeological surveys have been previously conducted, including the recent survey of 200-foot and 100-foot corridors along the existing transmission line (Goldstein 2008; Hart 2012); 1,644 acres of the 3,270 analysis area (50 percent) have been surveyed. These surveys account for the larger percentage of coverage for this route group. The previous surveys and other documentation have resulted in the recordation of 38 archaeological sites and/or historic built environment resources. Four of these resources are determined eligible for the NRHP; 34 of the resources are unevaluated or unknown.

Eight of the sites are prehistoric. All eight are unevaluated and classified as Native American, but are likely to be Hohokam. Four of the sites are artifact scatters, two are artifact scatters with features, and two are bedrock mortars.

Nineteen of the sites or resources are historic: 4 are eligible and 15 are unevaluated (table 3.9-9).

Table 3.9-9. Historic Archaeological Sites and Built Environment Resources in the Route Group 3 Analysis Area

Resource Category	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Limited activity (artifact scatter)	0	2	**2**
Mining	0	1	**1**
Transportation	4*	4	**8**
Utility	0	2	**2**
Water control	0	6	**6**
Total	**4**	**15**	**19**

* Includes the Butterfield Overland Stage Route.

One site has both a prehistoric and historic component and is unevaluated. Ten sites are of unknown temporal affiliation and are unevaluated for the NRHP.

Features digitized off historic maps total 79 features. These features represent potential historic-age resources; however, their existence has not been verified by field visits. The majority of the resources are roads (table 3.9-10).

Table 3.9-10. Potential Historic Features in the Route Group 3 Analysis Area, Digitized off Historical GLO and USGS Maps

Resource	Count
Acequia	2
Mine or mine features	2
Pipeline	4
Railroad feature	4
Ranch	1
Road	60
Town	2
Trail	4

HISTORIC TRAILS

Three historic trails are present within the analysis area for route group 3: the Butterfield Overland Mail and Stage Route, the Crook’s Wagon/Mormon Battalion Trail, and the Zuñiga Trail.

ARCHAEOLOGY SOUTHWEST’S CULTURAL RESOURCES PRIORITY AREAS

The Middle Santa Cruz, Valencia, and Zanardelli Priority Areas are within the route group 3 analysis area (see figure 3.9-1b).

Route Group 4 – Pantano Substation to Saguaro Substation

Route group 4 consists of segments of the Proponent Preferred and Proponent Alternative, as well as local alternatives TH1 and subroutes, TH3 and subroutes, and MA1. Within the analysis area (500 feet of existing ROW corridor), 218 archaeological surveys have been previously conducted, including the recent survey of 200-foot and a 100-foot corridors along the existing transmission line from the Apache to Tucson substations (Goldstein 2008; Hart 2012), a portion of the existing ROW from the Tucson to Saguaro substations (personal communication, Maria Martin, Galileo 2013), and the entire 100-foot ROW from Tucson to Saguaro substations (Effland and Green 1985); 3,869 acres of the 5,925 analysis area (65 percent) have been surveyed. The recent surveys and their location in the Tucson area account for the larger percentage of coverage for this route group. These surveys and other documentation have resulted in the recordation of 123 archaeological sites and/or historic built environment resources. Four of these resources or sites are listed in State or Federal registers: AZ AA:11:25(ASM) (Los Robles Archaeological Area), AZ BB:13:15(ASM) (Valencia Site), the Empirita Ranch Historic District, and the Tumamoc Hill Archaeological District and Desert Laboratory NHL.

Of the remaining resources or sites, 23 have been determined eligible for the NRHP, 4 are ineligible, and 92 are unevaluated or unknown. Sixty-four sites are prehistoric; 34 are historic; 13 have both a prehistoric and a historic component; and 12 are of unknown temporal affiliation.

All of the prehistoric sites are listed, eligible, or unevaluated/unknown. One site is Cochise, 34 are Hohokam, and 29 are classified as Native American or unknown. The prehistoric sites fall into eight site types: agricultural, artifact scatter, artifact scatter with feature, bedrock mortar, canal, cremation (burial), habitation, and rock piles/features (table 3.9-11).

Table 3.9-11. Prehistoric Site Types within the Route Group 4 Analysis Area

Site Type	No. of NRHP-Listed Sites	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Agricultural	1	0	1	**2**
Artifact scatter	0	9	22	**31**
Artifact scatter with feature	0	1	11	**12**
Bedrock mortar	0	0	1	**1**
Canal	0	0	1	**1**
Cremation	0	0	1	**1**
Habitation	3	1	9	**13**
Lithic procurement	0	0	1	**1**
Rock piles/features	0	0	2	**2**
Total	**4**	**11**	**48**	**64**

Of the 34 historic sites or built environment resources, 32 are listed, eligible, or unevaluated/unknown; 2 are ineligible. All but four are attributed to Euro-American culture; one is Asian-American, one is Mexican-American, and two are Tohono O’odham.

Historic site and built environment types are variable, but they fall into nine general categories within the analysis area: habitation, industrial, limited activity, ranching, structures, towns, transportation, utility, and water control (table 3.9-12).

Table 3.9-12. Historic Site and Built Environment Categories within the Route Group 4 Analysis Area

Site Category	No. of NRHP-Listed Sites	No. of NRHP-Eligible Sites	No. of NRHP Unevaluated/ Unknown Sites	Total
Habitation	0	2	0	**2**
Industrial	0	0	2	**2**
Limited Activity	0	1	2	**3**
Ranching	1	0	2	**3**
Structure	0	0	1	**1**
Town	0	0	1	**1**
Transportation	0	3*	7	**10**
Utility	0	2	4	**4**
Water Control	0	0	4	**4**
Total	**1**	**8**	**23**	**32**

* Includes the Butterfield Overland Stage Route.

Thirteen sites have both a Hohokam or other Native American occupation and a later Euro-American occupation. Three of those sites are eligible; 10 are unevaluated. Most of these sites are earlier artifact scatters or artifact scatters with features/habitations with later historic camps or ranches. Twelve sites are currently classified as having an unknown temporal framework: 2 are eligible, 10 are unevaluated.

Features digitized off historic maps total 468 features. These features represent potential historic-age resources; however, their existence has not been verified by field visits. The majority of the resources are roads and structures, but canals, fences, railroads, and other features are also found (table 3.9-13).

Table 3.9-13. Potential Historic Features in the Route Group 4 Analysis Area, Digitized off Historical GLO and USGS Maps

Resource	Count
Camp Huachuca	1
Canal	3
Compound	4
Fence	7
Mine features	2
Pipeline	1
Railroad feature	9
Road	321
Structure	107
Trail	2
Tucson Military Reservation	1
Utility Line	6
Well	4

HISTORIC TRAILS

Four historic trails or trail corridors are present within the analysis area for route group 4: the Anza Trail corridor, the Butterfield Overland Mail and Stage Route, the Cooke's Wagon/Mormon Battalion Trail, and the Zuñiga Trail.

ARCHAEOLOGY SOUTHWEST'S CULTURAL RESOURCES PRIORITY AREAS

Six CRPAs are found within the route group 4 analysis area: Los Robles, Los Morteros, River Confluence, Middle Santa Cruz, West Branch, and Valencia (see figure 3.9-1b).

3.9.11 Archaeological Sensitivity Analysis

Table 3.9-14 presents the archaeological sensitivity of the analysis area by route group. Thirty-two to 47 percent of sites in each route group were classified as level 3: Moderate sensitivity. Route group 4 has the largest percentage of level 5: High sensitivity, at 6 percent. Please note that for route group 2, 36 percent of sites were classified as level 0 or unknown, meaning no data were available for analysis.

Table 3.9-14. Number and Percentage of Archaeological Sites by Sensitivity Level

Sensitivity Level	Route Group 1 (%)	Route Group 2 (%)	Route Group 3 (%)	Route Group 4 (%)
Unknown (0)	74 (17%)	132 (36%)	13 (17%)	8 (9%)
Low (1)	38 (8%)	4 (1%)	0 (0%)	2 (2%)
Low to Moderate (2)	84 (19%)	68 (18%)	14 (18%)	6 (7%)
Moderate (3)	200 (45%)	119 (32%)	37 (47%)	38 (42%)
Moderate to High (4)	40 (9%)	46 (12%)	11 (14%)	31 (34%)
High (5)	9 (2%)	2 (1%)	3 (4%)	5 (6%)

3.9.12 Tribal Concerns

Tribal consultation is ongoing and being conducted through the BLM New Mexico State Office and the Las Cruces District Office.[7] Twenty-one American Indian tribes and groups have been invited to participate in the NEPA and Section 106 consultation processes:

- Ak-Chin Indian Community
- Comanche Nation
- Fort Sill Apache Tribe of Oklahoma
- Gila River Indian Community
- The Hopi Tribe
- Kiowa Tribe of Oklahoma
- Mescalero Apache Tribe
- Navajo Nation

[7] Please note that tribal consultation, including government-to-government consultation meetings, will continue throughout the NEPA and Section 106 processes.

- Pascua Yaqui Tribe
- Pueblo of Acoma
- Pueblo of Isleta
- Pueblo of Laguna
- Pueblo of Tesuque
- Pueblo of Zuni
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- Tohono O'odham Nation
- Tonto Apache Tribe
- White Mountain Apache Tribe
- Yavapai-Apache Nation
- Ysleta del Sur Pueblo

Correspondence

On March 23, 2012, the BLM sent the above tribes a letter introducing the proposed Project and initiating consultation under NEPA and Section 106. Letter responses from the Hopi Tribe, White Mountain Apache Tribe, and Ysleta del Sur Pueblo were received on April 2, April 4, and April 7, 2012, respectively. Email responses from the BLM were sent to the Pascua Yaqui Tribe and the Tohono O'odham on April 22, 2012 and July 3, 2012, regarding consultation.

Meetings

The following meetings have been held with the BLM:

- October 4, 2011, with representatives from the San Carlos Apache Tribe and the White Mountain Apache Tribe. The purpose of the meeting was to give an overview of the Project.
- July 18, 2012, with representatives from the Tohono O'odham Nation. The purpose of the meeting was to give an overview of the Project.
- July 20, 2012, with the Four Southern Tribes Cultural Resources Working Group to give an update of the Project.
- August 28, 2012, with the Pueblo of Zuni to give an introductory presentation on the Project.
- October 15, 2012, with the Ysleta del Sur Pueblo representatives. The purpose of the meeting was to give an introduction to the Project.
- October 18, 2012, with representatives from the San Carlos Apache Tribe. The purpose of the meeting was to give an introduction to the Project.
- November 9, 2012, with representatives of the Ysleta del Sur Pueblo.
- April 23, 2013, with all stakeholders interested in the Project impacts to Tumamoc Hill. Peter Steere, the Tribal Historic Preservation Officer for the Tohono O'odham Nation, was in attendance.

- August 8, 2013, Section 106 kick-off meeting in Albuquerque with representatives from the ACHP, Acoma Pueblo, Archaeology Southwest, National Trust for Historic Preservation, New Mexico Historic Preservation Division, New Mexico SHPO, NMSLO, NPS, San Carlos Apache Tribe, and USACE.
- August 15, 2013, Section 106 kick-off meeting in Tucson with representatives from the ACHP, Ak-Chin Indian Community, Arizona SHPO, ASM, ASLD, City of Tucson, Gila River Indian Community, Mescalero Apache Tribe, National Park Service, Pima County, Tohono O'odham, Town of Marana, Tumamoc Hill (University of Arizona), and the U.S. Forest Service (Coronado National Forest).

Resources of Concern to Tribes

Although no formal specific concerns have been raised at this early stage of consultation, two resources that are known concerns to tribal groups exist in or near the analysis area: Tumamoc Hill is of concern to O'odham groups and Mount Graham to Apache groups. Further concerns may be brought forth during the ongoing tribal consultation.

The Tumamoc Hill Archaeological District (AZ AA:16:6(ASM)) is a listed property within the Pantano to Saguaro route group. Prehistoric sites found throughout the district include trincheras, bedrock grinding areas, petroglyphs, habitation structures, agricultural terraces, walls, and trails. Terrace and wall constructions at the site date to as early as the Cienega phase of the Early Agricultural period (Fish et al. 2007). The Tortolita phase occupation of the hill (A.D. 500 to 700) consisted of a large village on the hilltop, numbering 150 or so houses. During the Protohistoric and Historic period, the hill was also used by the Tohono O'odham, as evidenced by talus pits containing Tohono O'odham ceramics (University of Arizona 2008).

Mount Graham has been determined eligible for the NRHP under Criterion A, as a TCP for its importance to the Western Apache (NPS 2002). The boundary of the TCP is the administrative boundary of the Pinaleño Mountains unit of the Coronado National Forest, which is located just north (but outside) of the visual analysis area for the Hidalgo to Apache route group. Although it is outside the visual analysis area, it is included in this analysis because of its importance to the Western Apache.

3.9.13 Visual Effects

The analysis area for visual effects for the New Build Section (route groups 1 and 2) and the Upgrade Section (route groups 3 and 4) is 5 miles on either side of the centerline (10-mile corridor). Because of the large size of the visual analysis area, data for the visual analysis were limited to historic properties listed in State or Federal registers within the 10-mile corridor and properties determined eligible under Criterion A, B, or C within the 2-mile direct effects corridor. Visual impacts to historic properties are those that alter the characteristics of a property that make it eligible for the NRHP by diminishing the integrity of the property's location, setting, association, or feeling.

Route Group 1 – Afton Substation to Hidalgo Substation

LISTED HISTORIC PROPERTIES

Twenty-seven listed historic properties were found within the 10-mile corridor analysis area for route group 1. Six of those properties were listed in the NRHP; 21 were listed in the New Mexico State Register of Historic Places (table 3.9-15).

1 **Table 3.9-15.** Listed Properties within the Visual Analysis Area for Route Group 1

Property
NRHP-Listed Historic Properties
Deming Armory
Seaman Field House
Luna County Courthouse and Park
Mahoney Building
Deming Main U.S. Post Office
Village of Columbus and Camp Furlong NHL*
Deming Armory
State Register–Listed Historic Properties
Hoover Hotel
105–107 North Silver Avenue, Deming, New Mexico
Baker Hotel
Columbus Village Jail
Diamond Furniture Warehouse (112–114 South Silver Avenue Deming, New Mexico)
Deming Art Council (100 South Gold Avenue, Deming, New Mexico)
Waymaker Christian Store (110 South Gold Avenue, Deming, New Mexico)
Mimbres Valley Brewing Company (200 South Gold Avenue, Deming, New Mexico)
Liberty Finance (202 South Gold Avenue, Deming, New Mexico)
Old Deming National Bank
Palmas Restaurant
The New T-Shirt Print Shop (118 East Pine Street, Deming, New Mexico)
Railroad Station Complex, Columbus, New Mexico
Star Barber Shop (Possible location (?) 116 North Silver Avenue, Columbus, New Mexico)
Tinaja Alta Trading Co. (116 North Silver Avenue, Deming, New Mexico)
Antique Shop (Silver Avenue, Deming, New Mexico)
112–120 East Spruce Street, Deming, New Mexico
Delaney & Hernandez (113 East Spruce Street, Deming, New Mexico)
United States Army Headquarters, Columbus, New Mexico
United States Custom House, Columbus, New Mexico (Museum and Visitor Center of Pancho Villa State Park)
Camp Furlong Recreation Hall

2 * Within direct effects analysis area.

3 DETERMINED ELIGIBLE HISTORIC PROPERTIES

4 Two historic properties which have been determined eligible under Criterion A, B, or C are located within
5 the direct effects analysis area for route group 1: LA 12839 and LA 164811. LA 12839 is the El Paso and
6 Southwestern Railroad and the Southern Pacific Railroad's Columbus Station. LA 164811 is the Cambray
7 Civilian Conservation Corps Camp (G-174-N).

Route Group 2 – Hidalgo Substation to Apache Substation

LISTED HISTORIC PROPERTIES

Twenty-one State or federally listed historic properties are found within the visual analysis area for route group 2. Eighteen are listed in the NRHP; 3 are listed in the New Mexico State Register of Historic Places (table 3.9-16).

Table 3.9-16. Listed Properties within the Visual Analysis Area for Route Group 2

Property
NRHP-Listed Historic Properties
Hidalgo County Courthouse
Hidalgo County Library, Lordsburg
Benjamin E. Briscoe House
Cochise Hotel*
Crowley House
John Gung'l House
Hecker House
Hooker Town House
Tillotson House
Joe Mee House
Morgan House
John H. Norton and Company Store
Harry Saxon House
Schwertner House
Pablo Soto House
Willcox Women's Club
J. C. Wilson House*
Shakespeare Ghost Town
State Register–Listed Historic Properties
Shakespeare Cemetery*
Lordsburg Coaling Tower (no longer existing)
Stein's Peak Station, Lordsburg, New Mexico (Possible location)

* Within direct effects analysis area.

DETERMINED ELIGIBLE HISTORIC PROPERTIES

Within the route group 2 direct effects analysis area, six historic properties have been determined eligible for the NRHP under Criterion A: LA 50129, LA 111003, LA 129569, AZ Z:2:40(ASM), AZ CC:3:91(ASM), and AZ FF:1:34(ASM).

LA 50129 is a Hispanic homestead. LA 111003 is the Arizona & New Mexico Railroad and the Lordsburg & Hachita Railroad. LA 129569 is an unattributed railroad bed.

AZ Z:2:40(ASM) is the Southern Route of the Southern Pacific Railroad Mainline. AZ CC:3:91(ASM) is the historic route of U.S. 191 and U.S. 71. AZ FF:1:34(ASM) is an Arizona & Colorado Railroad Company railroad.

Route Group 3 – Apache Substation to Pantano Substation

LISTED HISTORIC PROPERTIES

Eleven State-listed or federally listed historic properties were found within the analysis area for direct effects or within the 10-mile corridor for visual effects for route group 3: the Benson Railroad Historic District, the Cienega Bridge, the Cochise Hotel, the Hi Wo Company Grocery, the W.D. Martinez General Merchandise Store, the Oasis Court, the Old Vail Post Office, the Redfield-Romine House, the Smith-Beck House, the Max Treu Territorial Meat Company, and the Empirita Ranch Historic District. (The Empirita Ranch Historic District is within the analysis area for direct effects.) No State Register–listed properties are located within the visual analysis area.

DETERMINED ELIGIBLE HISTORIC PROPERTIES

Four historic properties which have been determined eligible under Criterion A, B, or C by the Arizona SHPO are present within the 2-mile direct impacts corridor: AZ EE:3:74(ASM), AZ FF:9:17(ASM), AZ T:14:61(ASM), and AZ Z:2:40(ASM). All four sites are linear sites. AZ EE:3:74(ASM) and AZ Z:2:40(ASM) are both railroads: the El Paso and Southwestern Railroad and the Southern Pacific Railroad Mainline–Southern Route respectively. AZ FF:9:17(ASM) is SR 80, and AZ T:14:61(ASM) is the Butterfield Overland Stage and Mail Route.

Route Group 4 – Pantano Substation to Saguaro Substation

One hundred eleven State- or NRHP-listed or pending listing properties were identified within the visual analysis area for route group 4 (table 3.9-17).

Table 3.9-17. State- or NRHP-Listed Properties within the Visual Analysis Area for Route Group 4

NRHP-Listed Historic Properties
4th Avenue
Arizona Daily Star Building
James P. and Sarah Adams House
Arizona Hotel
Arizona Inn
Armory Park Historic Residential District
Barrio Anita Historic District
Barrio El Hoyo Historic District
Barrio Libre
Barrio El Membrillo Historic District
Barrio Santa Rosa Historic District
Bear Down Gym
Binghampton Rural Historic Landscape
Blenman-Elm Historic District

Table 3.9-17. State- or NRHP-Listed Properties within the Visual Analysis Area for Route Group 4 (Continued)

NRHP-Listed Historic Properties
Blixt-Avitia House
Boudreaux-Robison House
Bray-Valenzuela House
Dr. William Austin Cannon House
Erksine P. Caldwell House
Catalina American Baptist Church
Catalina Vista Historic District
Colonia Solana Residential Historic District
Copper Bell Bed and Breakfast
Cordova House
Coronado Hotel
John P. and Helen S. Corcoran House
Dodson-Esquivel House
Don Martin Apartments
Downtown Tucson Historic District
Eckbo Landscape
El Encanto Estates Residential Historic District
El Encanto Apartments
El Conquistador Water Tower
El Montevideo Residential Historic District
El Paso and Southwestern Railroad Depot
El Paso and Southwestern Historic District
El Presidio Historic District
El Tiradito
Empirita Ranch Historic District*
First Hittinger Block
First Joesler House
P.W. Fletcher House
Fourth Avenue Underpass
Fox Commercial Building
Fox Theatre
Gabel House
Ghost Ranch Lodge
Arthur C. Hall and Helen Neel House
Haynes House
Hotel Congress
Hotel Heidel (MacArthur Hotel, Iron Horse Hotel)
Sam Hughes Neighborhood Historic District

Table 3.9-17. State- or NRHP-Listed Properties within the Visual Analysis Area for Route Group 4 (Continued)

NRHP-Listed Historic Properties
Iron Horse Expansion Historic District
J. C. Penney-Chicago Store
Jefferson Park Historic District
Julian-Drew Building
Los Robles Archaeological Area*
Levi H. Manning House
Marist College Historic District
Antonio Matus House and Property
Menlo Park Historic District
Men's Gymnasium, University of Arizona
Miracle Mile Historic District
Old Adobe Patio
Old Library Building
Old Main, University of Arizona
Owen Homesite
Pascua Cultural Plaza
Pie Allen Historic District
Pima County Courthouse
Ramada House
Rebeil Block
Rialto Building
Rialto Theatre
Rillito Racetrack-Chute
Rincon Heights Historic District
Ronstadt House
Ronstadt-Sims Adobe Warehouse
Sabedra-Huerta House
San Agustin del Tucson
San Xavier del Bac
Santa Cruz Catholic Church
Schwalen-Gomez House
Sixth Avenue Underpass
Professor George E. P. Smith House
Sosa-Carrillo-Fremont House
Southern Pacific Railroad Locomotive No. 1673
Speedway-Drachman Historic District
John Spring Neighborhood Historic District
St. Philip's in the Hills Episcopal Church

Table 3.9-17. State- or NRHP-Listed Properties within the Visual Analysis Area for Route Group 4 (Continued)

NRHP-Listed Historic Properties
Stone Avenue Underpass
Type A Joesler
Type B Joesler
Tucson Warehouse Historic District
Tumamoc Hill Archaeological District and Desert Laboratory NHL*
U.S. Post Office and Courthouse
University Heights Elementary School
University of Arizona Campus Historic District
University Library, Arizona State Museum, North
USDA Tucson Plant Materials Center
Valencia Site*
Valley of the Moon Historic District
Valley National Bank Building
Velasco House Warehouse District
Solomon Warner House and Mill
West University Historic District
Winterhaven Historic District

* Within direct effects analysis area.

DETERMINED ELIGIBLE HISTORIC PROPERTIES

Three historic properties within the direct effects analysis area have been determined eligible under Criterion A, B, or C: AZ Z:2:40(ASM), AZ AA:2:118(ASM), and AZ AA:8:366(ASM). AZ Z:2:40(ASM) is the Southern Route of the Southern Pacific Railroad Mainline. AZ AA:2:118(ASM) is the historic alignment of SR 84; and AZ AA:8:366(AMS) is the Saguaro-Oracle 1150-kV transmission line.

3.10 VISUAL RESOURCES

This section includes a VRI and visual characterization of the existing aesthetic conditions of the landscape. Some of the information provided within this visual resources analysis was excerpted from “Southline Transmission Project Resource Report 16: Visual Resources” (CH2M Hill 2013j). The contents of the resource report are used herein without specific reference.

Consistent with methods based on BLM’s VRM guidance (BLM H-8410-1,1986a), the visual resources analysis focused on a visual inventory and site analysis to characterize the affected environment for all landscapes, regardless of jurisdiction. The VRI provided a baseline of existing resources evaluated in terms of scenic quality, sensitivity, and distance zones. The site analysis is a focused study of the proposed Project landscape and includes a description of existing scenic qualities of the affected visual environment and the identification of visually sensitive gathering points, populations, and visually sensitive landscape features. Results of public scoping and consultation with key stakeholders were also included in the site analysis and resulted in the identification of several critical visual areas, which included designated scenic trails (i.e., the CDNST, Butterfield Trail, Anza Trail, and Arizona Trail); designated special management areas (SMAs) and WSAs; the Coronado National Forest; Saguaro National Park (west); and Tumamoc Hill and Tucson Mountain Park.

3.10.1 Analysis Area

The visual resources evaluation is based upon both spatial (landscape) and temporal (time) limits. The analysis area for visual resources was generally 5 miles on either side of centerline (10 miles total) for the New Build Section and 2 to 5 miles on either side of centerline (4 to 10 miles total) for the Upgrade Section and all alternatives. The rationale for a reduced analysis area for the Upgrade Section is that the basic physical elements are already part of the visual landscape, unlike the New Build Section, where nothing like it existed previously. In the Upgrade Section, the analysis area goes out to a distance where the project structures might be viewed in detail and where the visual change would be most noticeable to the public (e.g., in the foreground and in certain locations, the middleground distance zones). The visual resources analysis also included viewing locations and key observation points (KOPs) located outside the 2- to 5-mile buffer. These views were identified based on the potential visibility of the proposed Project and to inform the assessment of effects on the viewing public as a result of the proposed Project. The analysis area for visual resources was determined through the application of visibility mapping, field reconnaissance, and distance zones.

Given the long, linear nature of the proposed Project, the analysis area for visual resources was segmented into sections based on similar scenic quality or landscape character. Visibility mapping indicated that the proposed transmission line would not be visible, or would be negligibly visible, beyond the 10- to 18-mile threshold.

The visual resources analysis is largely documented from the KOPs or critical viewpoints identified as being important to the landscape and affected public. The most critical KOP views that represent areas of public sensitivity or heightened scenic quality were selected for simulation to illustrate the introduction of the proposed Project features into the existing environment and to guide the impacts analysis.

3.10.2 Laws, Ordinances, Regulations, and Standards

The laws, ordinances, regulations, and standards—the regulatory framework that governs visual resources throughout the analysis area and within the geographic region of southwestern New Mexico and southeastern Arizona—includes Federal, State, regional, and local plans and policies. The following section includes all applicable laws, ordinances, regulations, and standards for visual resources.

Federal Regulations

Federal regulations pertaining to the proposed Project include the FLPMA and NEPA. The BLM and Western serve as co-lead Federal agencies for this EIS and must carry out administrative requirements in accordance with FLPMA and NEPA.

FLPMA provides that “the public lands be managed in a manner that will protect the quality of the . . . scenic values” and identified “scenic values” as one of the resources for which public land should be managed. FLPMA requires that the BLM prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including scenic values). This inventory is referred to as VRM and is described in BLM Manual 8400 – “Visual Resource Management,” and BLM IM 2009-167, “Application of Visual Resource management Program to Renewable Energy.” The BLM VRM system requires the inventory of scenic resources (VRI) and the establishment of land management objectives

(VRM classes) reported in the RMPs conducted and updated for all BLM Field Offices. A VRI is required to be completed to process all permit applications; for field offices that have an out-of-date or incomplete VRI, an inventory would be completed (BLM FLPMA 2001).

NEPA, as amended, requires that the Federal Government use all practicable means to ensure citizens "safe, healthful, productive, and aesthetically pleasing surroundings." NEPA requires Federal agencies to analyze the potential environmental effects of proposed actions and their alternatives, to avoid or minimize adverse effects of proposed actions, and to restore and enhance environmental quality as much as possible.

All Federal lands crossed by the analysis area in New Mexico are managed by the BLM and are managed by the Las Cruces District Office. The Las Cruces District Office manages lands within Doña Ana, Luna, Grant, and Hidalgo counties under the 1993 Mimbres RMP, which currently establishes visual policies and objectives for the analysis area in New Mexico (BLM 1993). The Mimbres RMP identifies VRM goals and planned actions for specially designated areas located within the proposed Project analysis area: Aden Lava Flow RNA and WSA; West Potrillo Mountains WSA, Butterfield Trail SMA, CDNST, Northern Peloncillo Mountains ACEC, and Lordsburg Playa RNA.

The Las Cruces District Office is currently updating the Mimbres RMP via the draft Tri-County RMP/EIS and has issued an updated VRI that covers the New Mexico portion of the analysis area (BLM 2013b).

The 2009 "Comprehensive Plan for the Continental Divide Trail" provides direction or coordination between the various agencies that manage different portions of the trail, including the U.S. Forest Service, BLM, and NPS (U.S. Forest Service 2009). However, the portions of the trail that would be crossed by the proposed Project are all on BLM, State, or private lands. As described in the plan, the purpose of the trail is to provide scenic hiking and horseback riding opportunities and to conserve natural, historic, and cultural resources along the trail corridor.

In Arizona, the majority of Federal lands crossed are administered by the BLM (Tucson and Safford Field Offices), and a small stretch of Coronado National Forest land is crossed in southeastern Arizona for approximately 0.5 mile. The 1991 Safford RMP is the plan that identifies VRM policies and goals for this portion of the analysis area. Visually sensitive areas identified by the Safford RMP within the project analysis area include the Peloncillo Mountains Wilderness, and the Willcox Playa NNL/ACEC (BLM 1991). A wilderness management plan exists for the Peloncillo Mountains Wilderness. In 2011, a VRI was issued by the Safford Field Office that covers the analysis area in the Safford Field Office area (BLM 1994).

Although no elements of the project intersect BLM land in the Tucson Field Office the analysis area east of the Safford Field Office area in western Cochise County, Pima County, and southern Pinal County is managed by the Tucson Field Office. Visual resources along the analysis area in the Tucson Field Office area are managed under the 1988 Phoenix RMP (BLM 1988a). The Phoenix RMP was developed by the BLM Phoenix District Office to manage the former Phoenix Resource Area, a portion of which is now managed by the Tucson Field Office. BLM has not conducted a VRI for the Tucson Field Office. Initial inventory data were supplied by the BLM for use in this analysis but are currently incomplete; therefore, an interim VRI was conducted at the project level for the approximately 73-mile long route group 4.
The analysis area crosses 0.5 mile of the Coronado National Forest. The 1986 "Coronado National Forest Land and Resource Management Plan," amended through 2009, provides management direction for national forest lands in southeastern Arizona and southwestern New Mexico (U.S. Forest Service 1986a). It is currently undergoing revision in a draft plan. Visual resources are a key issue in both the existing and draft plans, with utility corridors specifically addressed. In the current plan, existing utility corridors are identified as the preferred location for new utility lines.

3.10.3 State and Regional Plans

No State or regional plans were identified for New Mexico. In Arizona, ADOT published a “Corridor Management Plan for the Patagonia-Sonoita Scenic Road” (ADOT 2003) that sets goals and objectives for managing this scenic route from the intersection of SR 83 and I-10.

3.10.4 County and Regional Plans

In New Mexico, Comprehensive Plans exist for Doña Ana, Luna, Grant, and Hidalgo, counties (Doña Ana County 2011; Grant County 2012; Hidalgo County 2011; Luna County 1999). In Doña Ana County, the primary goal is to protect and maintain county resources by designated scenic highway to preserve the historic nature of rural communities. Doña Ana County has established several goals pertaining to preserving and respecting scenic views, sites, and corridors, including the support of a “visually cohesive region respecting the character of communities that make them unique” and “promoting development that reflects the region’s vision which generally relates to a territorial agricultural, historic, and rural character” (Doña Ana County 2011:122–123). In Luna County, emphasis on publicizing local and regional parks (e.g., Rockhound Park, Spring Canyon Park, and Poncho Villa Park) should be made available to the public (Luna County 1999). Grant and Hidalgo counties have references to aesthetics or visual resources in the planning documents (Grant County 2012; Hidalgo County 2011).

In Arizona, county planning documents exist for Pinal County (2010a), Pima County (2009), Cochise County (2006), and Graham County (1996). The Pinal County Comprehensive Plan indicates goals to protect scenic viewsheds and dark skies through the implementation of context sensitive design, as well as limiting development intensity, site coverage, vegetation removal, and protection of open space and ecological, geological, archaeological, historic, or cultural features with importance to natural resources.

In Pima County, the Comprehensive Plan recommends reducing the visual impact of development on scenic vistas and entry points by providing design guidance and requiring more intensive restoration of graded areas.

The Cochise County Comprehensive Plan recommends reduction of light pollution, maintaining rural character, and maintaining a trail network while protecting wildlife, pathways, green open spaces, and dark skies.

One of the goals of the Graham County Comprehensive Plan is to conserve natural resource, preserve scenic beauty, and to promote recreational opportunities. The plan also includes an outdoor lighting code to protect and maintain access to dark night skies.

3.10.5 Local Plans

The analysis area passes through Deming, Lordsburg, and Columbus, New Mexico, and Benson, Willcox, Tucson, and Marana, Arizona. Each of these municipalities has a general plan and municipal code.

3.10.6 Issues to Be Analyzed

The issues to be analyzed include the following:

- Identification of the visual extent of the proposed activity

- Identification of visually sensitive publics/stakeholders whose scenic values are likely to be affected by the proposal
- Identification of visually sensitive landscape features and areas of highly intact landscapes (such as natural, rural or heritage scenic landscapes; prominent views, landmarks, or landscape icons, special area designations, etc.)
- Identification of public concerns about effects that the proposed Project will have on scenic values
- Conformance with the respective BLM RMP VRM Class objectives
- Assess impacts on scenic values held by visually sensitive publics as a result of this proposal
- Assess impacts to the scenic value of public lands caused by the act of introducing long-term utility disturbance in an otherwise undisturbed and intact landscape
- Assess impacts to scenic values as a result of amending VRM Classes to allow this proposal

3.10.7 Inventory Methods

The visual resources evaluation begins with establishing the area of exposure, identifying the sensitive receptors within the area of exposure, identifying issues of concern as expressed during scoping, KOP selection based on public sensitivity and landscape character, public outreach, field reconnaissance, and any specific communications with vested stakeholders, an assessment of scenic values (as expressed by the public), and the assessment and description of the degree of effect on public scenic value as required by NEPA.

3.10.8 Establishing the Area of Exposure

Evaluation of the area of exposure for the site analysis involved the creation of viewshed mapping rendered using a typical span of 1,000-foot pole points along the length of the proposed Project (i.e., Proponent Preferred, Proponent Alternative, and agency alternatives). The viewshed map included a buffered area within 10 miles of the centerline and a 30-m digital elevation model was used to provide a macro-level viewshed screening of both BLM and non-BLM lands to establish the area of exposure (figures 3.10-1 through 3.10-8).

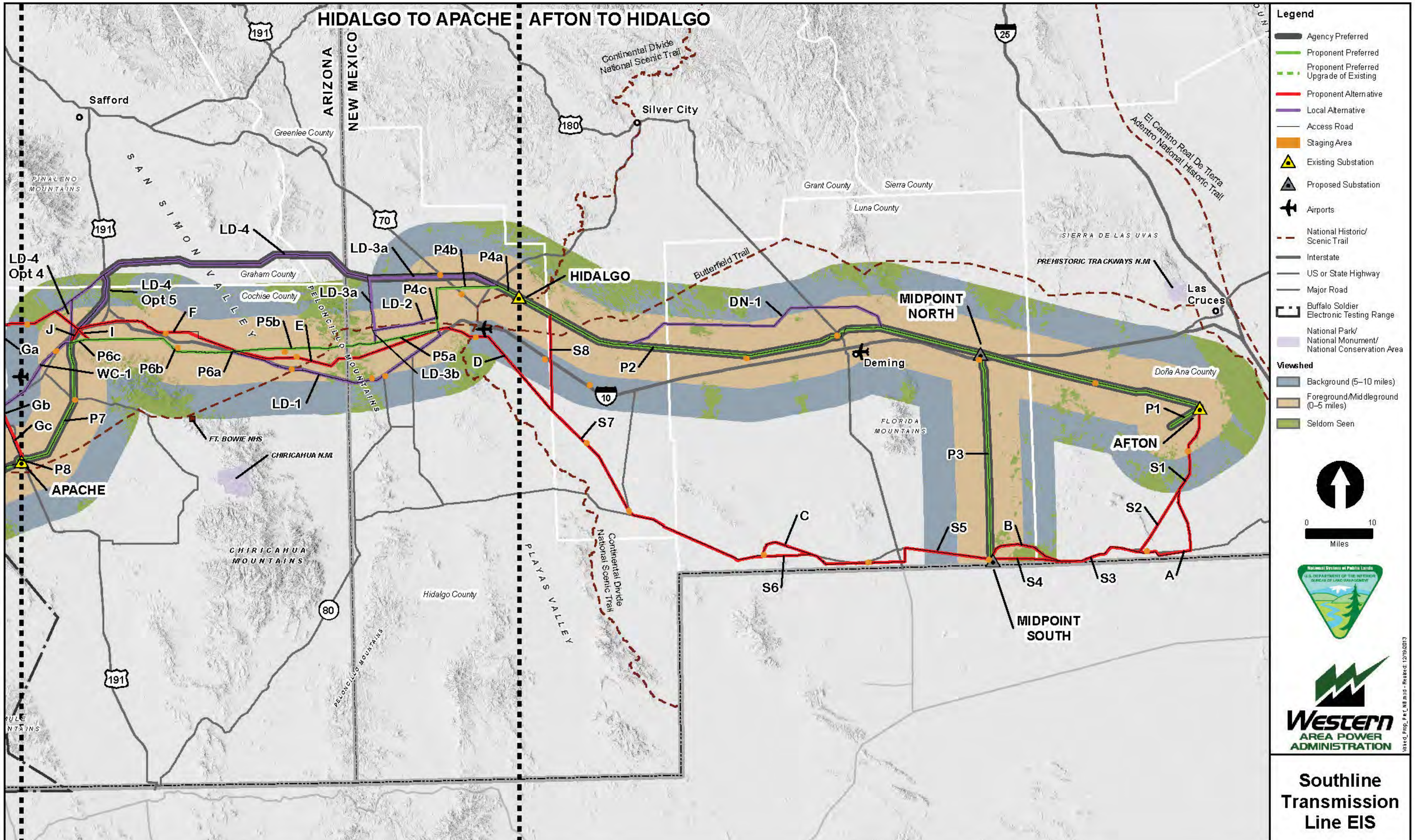
3.10.9 Identifying the Sensitive Receptors within the Area of Exposure

The area of exposure is used to identify areas of critical public concern (as represented by the KOPs). Concern levels and public awareness (which includes visitation, frequency of viewers, relative visibility, and noticeability) also was determined to identify the sensitive receptors.

3.10.10 Identifying Concern Levels

Concern levels were determined through coordination with stakeholders such as the Tumamoc Hill working group, community representatives, scoping comments, other Federal agencies, and local planning documents. In tandem, the VRI sensitivity level rating analysis also provides additional necessary detail to inform the VRI as well as to provide a basis for KOP selection reflective of concern levels.

1 **Figure 3.10-1.** Proponent Preferred viewshed in the New Build Section.



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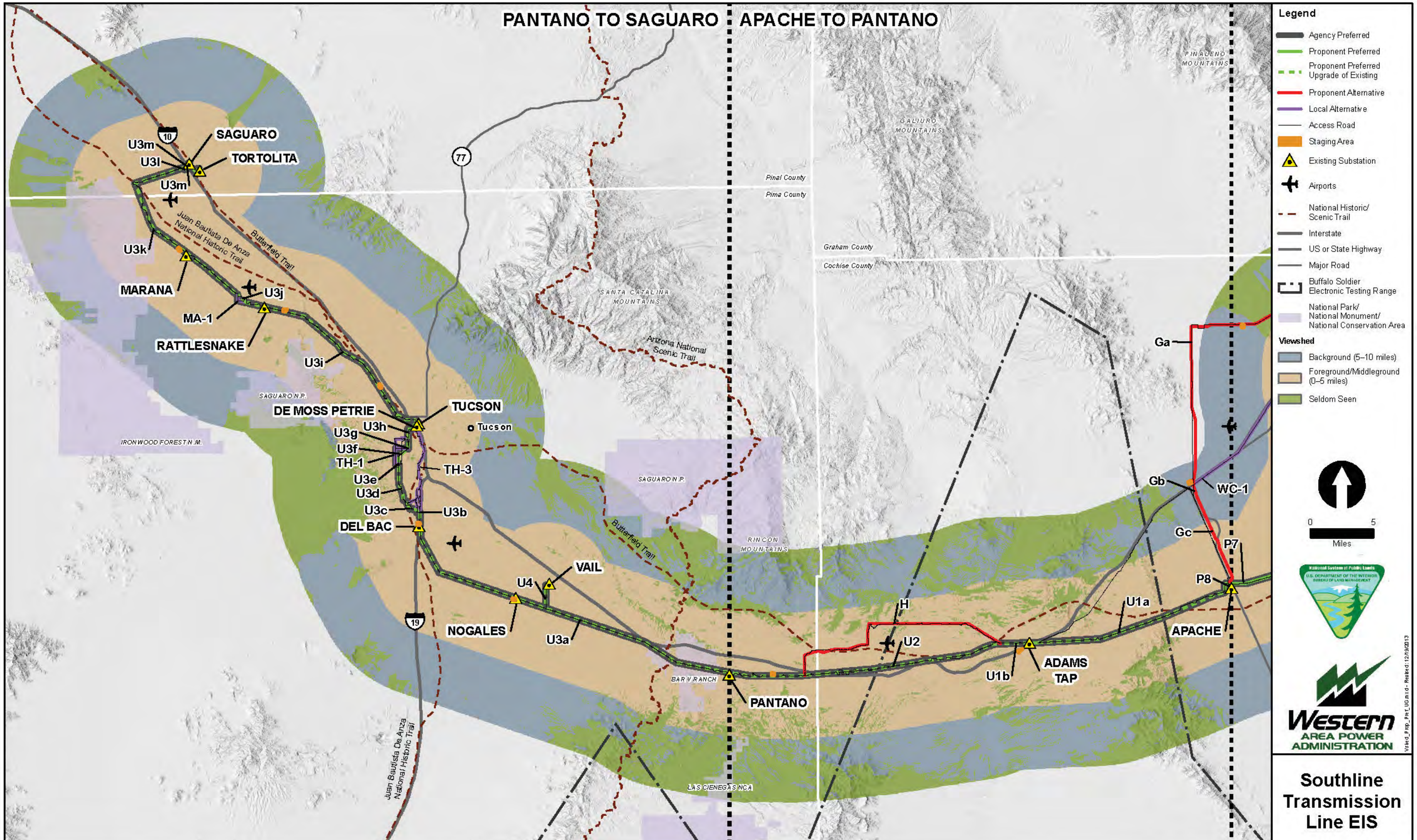
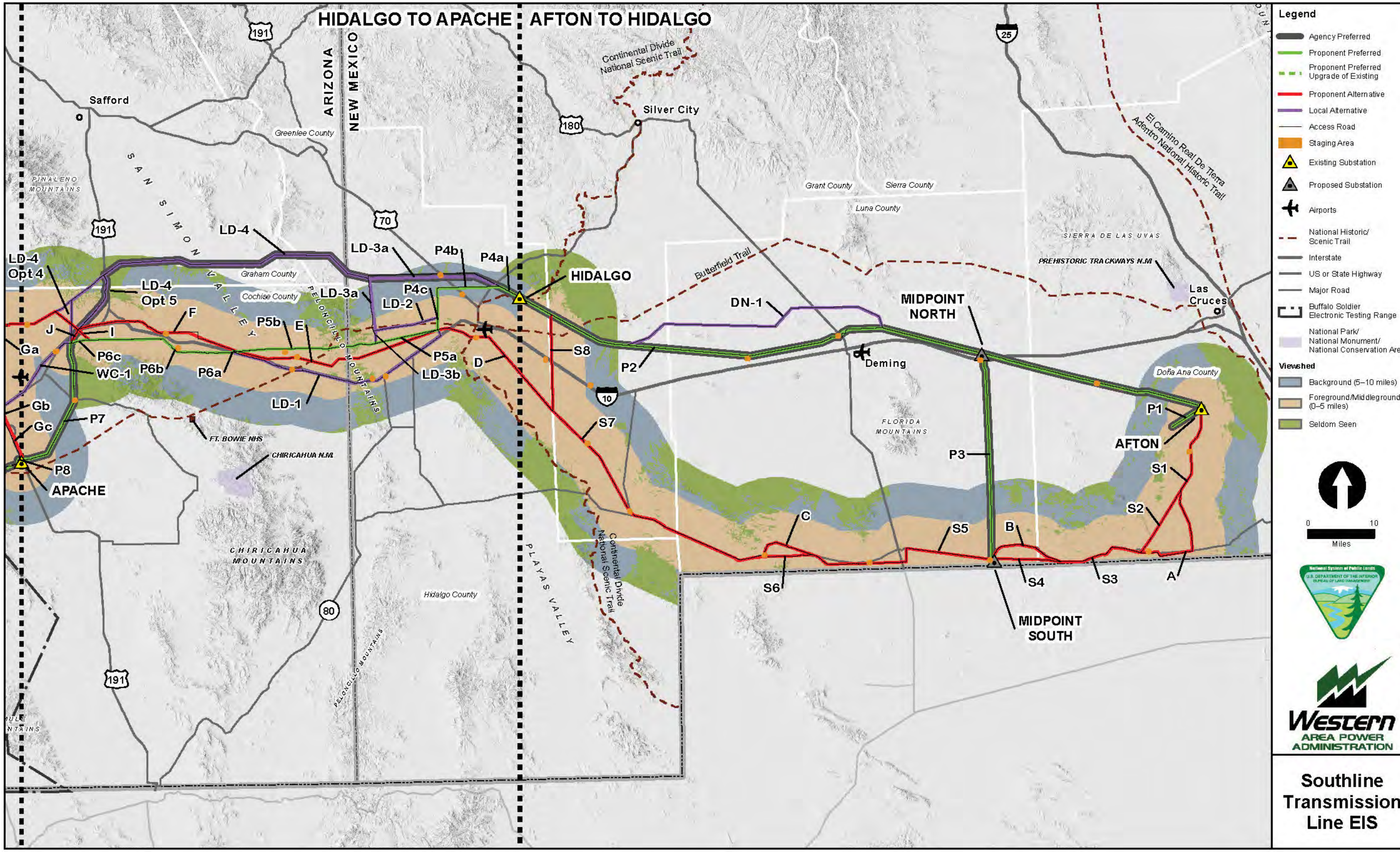
1 **Figure 3.10-2.** Proponent Preferred viewshed in the Upgrade Section.

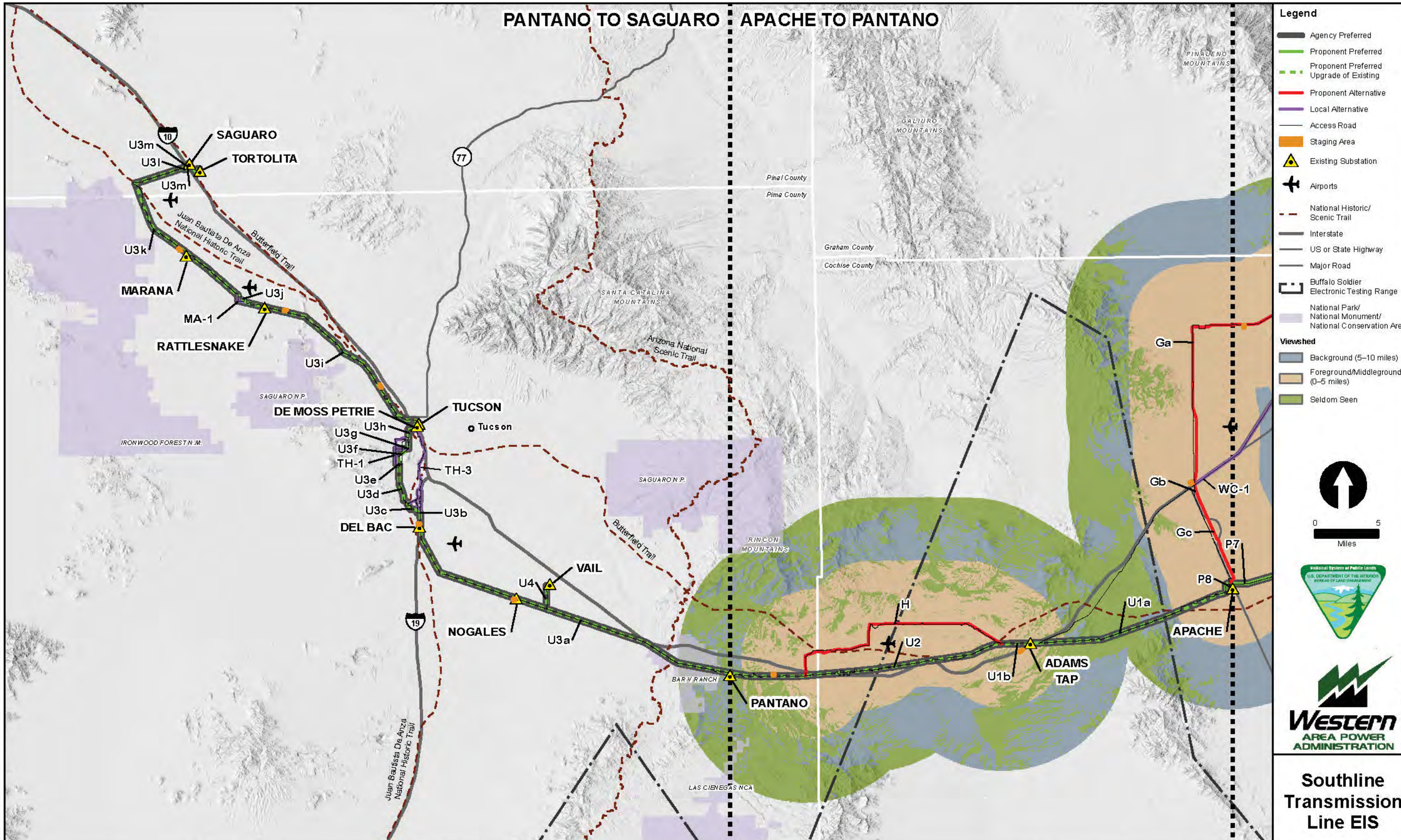


2

Figure 3.10-3. Alternative action viewshed in the New Build Section.



1 **Figure 3.10-4.** Alternative action viewshed in the Upgrade Section.



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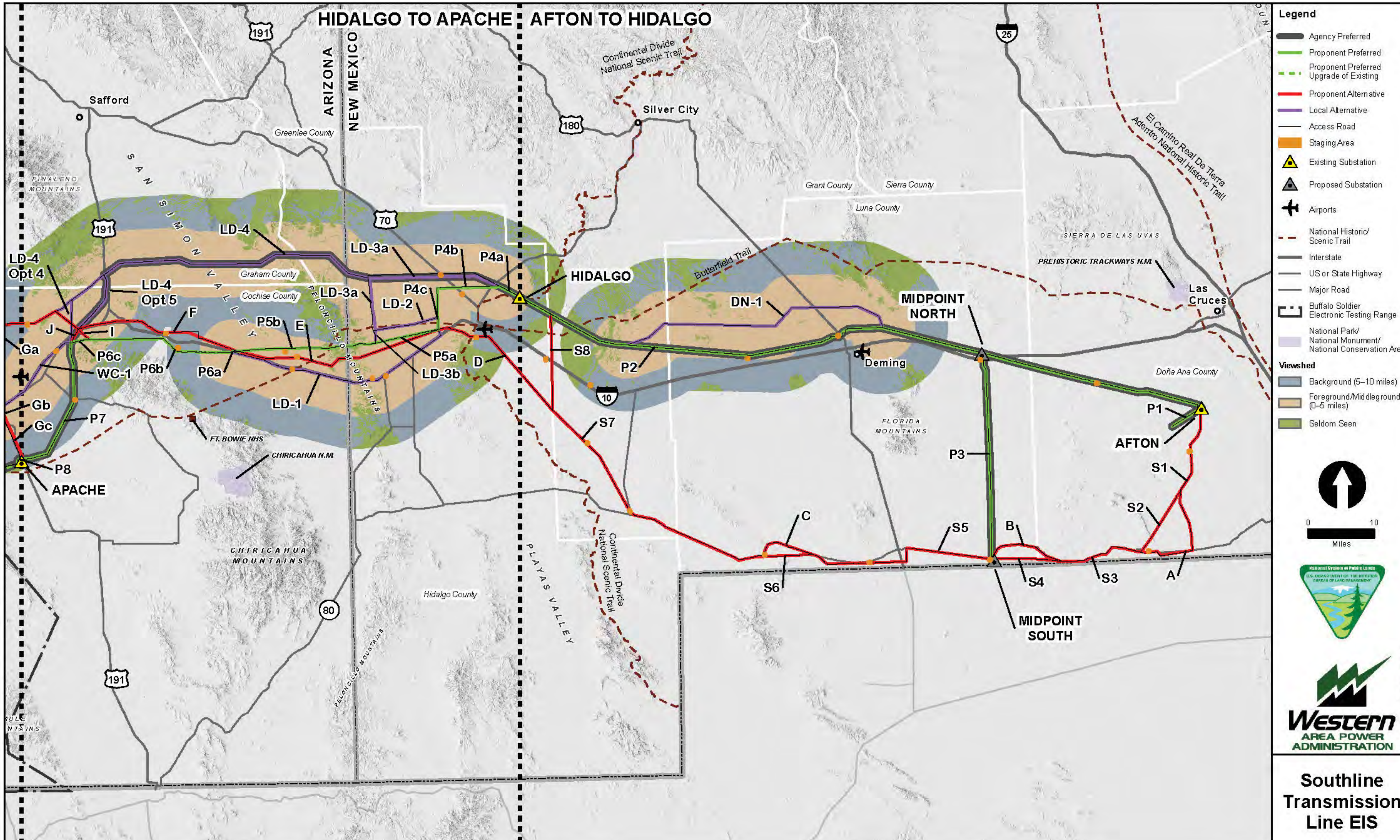
1 **Figure 3.10-5.** Agency alternatives viewshed in the New Build Section.



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1 **Figure 3.10-6.** Agency alternatives viewshed in the Upgrade Section.

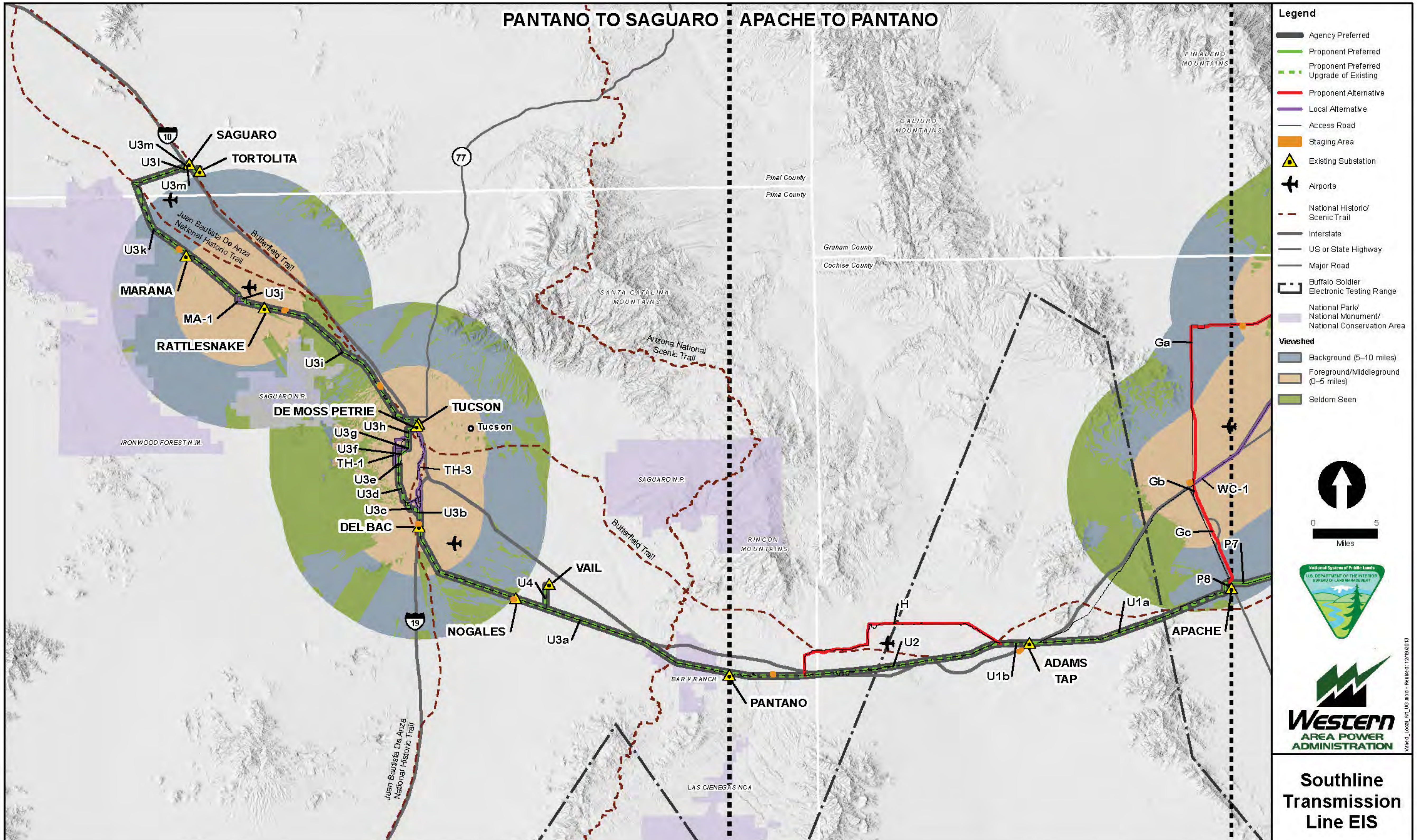

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Figure 3.10-7. Agency Preferred Alternative viewshed in the New Build Section.

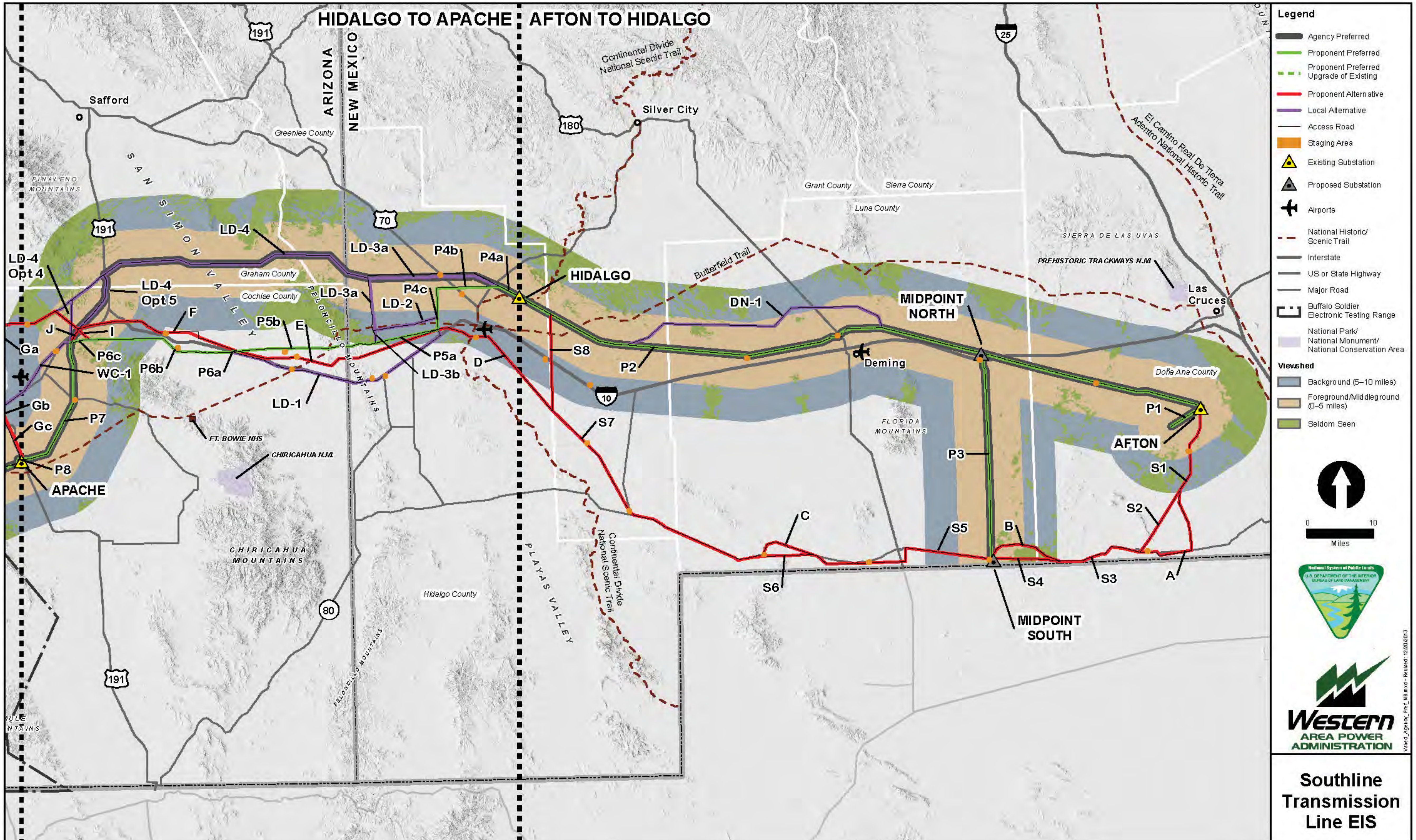
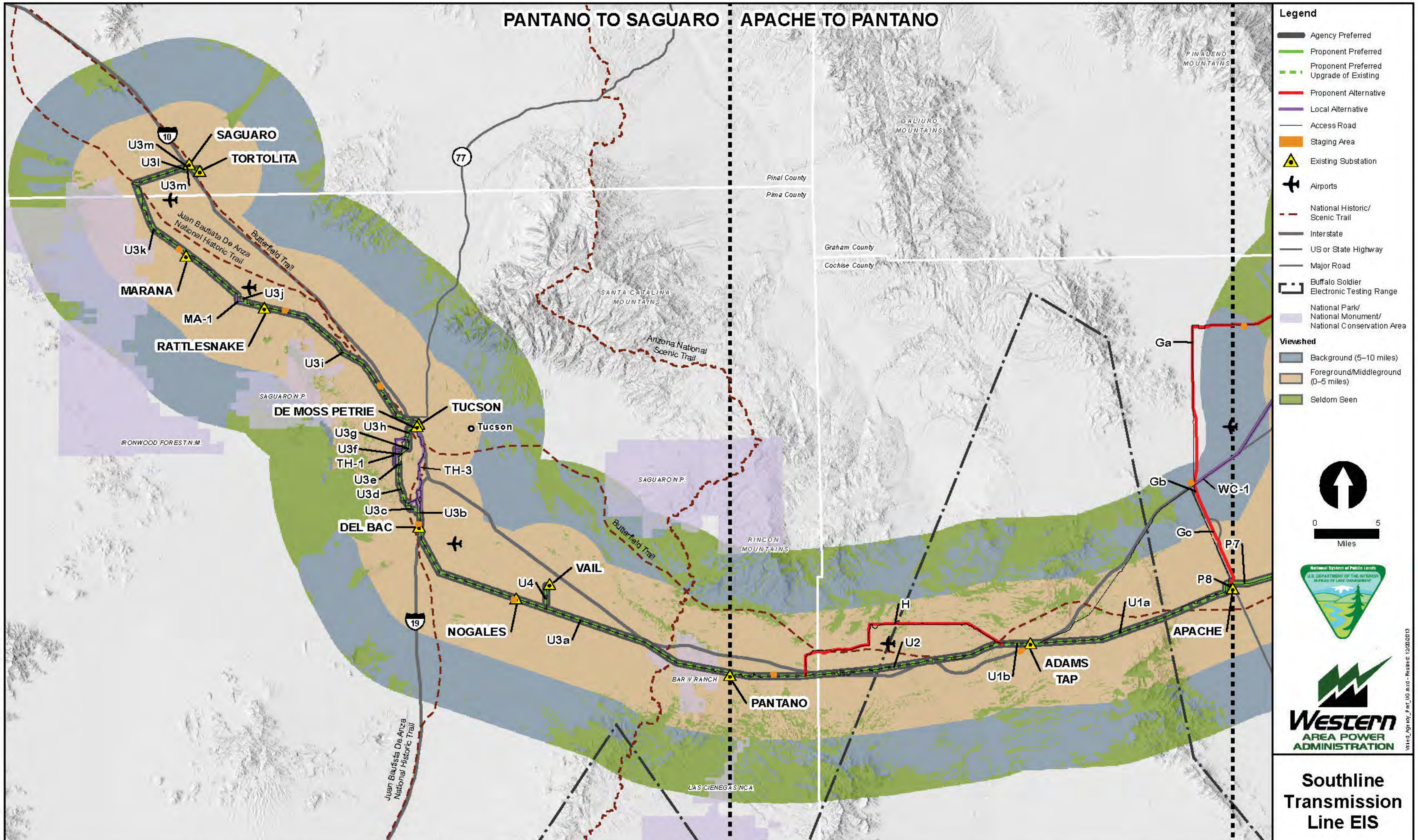


Figure 3.10-8. Agency Preferred Alternative viewshed in the Upgrade Section.



3.10.11 Methods for KOP Selection

Selection of KOPs occurred within the proposed area of public exposure and relates to locations of visually sensitive publics or visually sensitive locations. The initial step to identify locations from where to conduct a focused study of the affected visual environment was done using a desktop analysis. The desktop analysis involved the use of:

- Viewshed mapping rendered from a 30-m digital elevation model for the entire analysis area to delineate the areas from which the Project would be visible.
- Scenic quality rating unit (SQRU) mapping rendered using a combination of viewshed mapping, topographic mapping, and professional knowledge of the landscape to delineate landscape character for the entire analysis area.
- Sensitivity mapping rendered to indicate point features where sensitive populations and gathering places are located throughout the entire analysis area.

The KOPs described here were reviewed by BLM and additional agency cooperators and participants, and were finalized for use in this analysis (see appendix I). Locations of the highest visual sensitivity and the highest visually sensitive landscape features were selected for photographic simulation(s) (figures 3.10-9 and 3.10-10). The derivation of the KOPs analyzed in this section is the result of comprehensive and extensive field reconnaissance, desktop analysis, and GIS mapping. As such, additional views were considered, documented, and eliminated from the final set of KOPs selected for further detailed study, but are considered supplemental critical viewpoints and are included in the proposed Project record.

3.10.12 Assessment of Scenic Values

VRM guidance set forth by the BLM includes an assessment of scenic values, which is referred to as the VRI. Management objectives for visual resources are derived subsequent to the VRI and establishment of scenic values. A combination of scenic quality, sensitivity levels, KOPs, public concern levels, and exposure analysis[8], was used to compose the scenic values evaluation and is described later in this resource section.

3.10.13 Assessment and Description of the Degree of Effect on Public Scenic Value

The VRI and all components that form the proposed Project-specific VRI are used to evaluate the effects of change on scenic value, compared with the existing environment. Further detail regarding the degree of effect on public scenic value is explored in chapter 4. Project contrasts would result from modifications to landform, removal of vegetation, or introduction of new structures to the existing landscape. Determination of a substantial effect on visual resources could be mitigated for the purposes of reducing contrast.

3.10.14 Bureau of Land Management Direction

In addition to assessing the degree of effect on scenic value, BLM sets objectives for management of landscape preservation and change through its land use planning process as described in section 3.10.2.

[8] The exposure analysis refers to how much of the Project would be perceived by members of the public in the course of their normal interactions in proximity to the proposed Project, such as length of time in view, frequency of view, angle of observation.

All BLM lands are placed into one of four classes, Classes I through IV. These classes identify the degree of acceptable landscape change, or alteration, giving consideration to the scenic value of the landscape and other resource values and uses of the land. Class I objectives are established in areas in which no landscape change is desired. Classes II objectives are established in areas in which the level of change to the existing landscape should be low. Class III objectives are established in areas where the level of change to the existing character of the landscape should be moderate. Class IV objectives are set for landscapes that BLM manages for uses that will result in substantial landscape changes.

3.10.15 Analysis Area Conditions

This section will present the VRI (or existing conditions) based on the following factors:

- Scenic quality rating
- Sensitive viewers
- Distance zones
- Visual contrast ratings
- A viewshed map will be created showing the potential for visibility within a 10-mile, 5-mile, and 2-mile buffer to indicate potential for views within the foreground, middleground, background, and seldom seen zone.

New Build Section

The proposed New Build Section would be a 205-mile, 345-kV double-circuit transmission line, between the Afton Substation, located in Doña Ana County in southeastern New Mexico, and the Apache Substation, located in Cochise County in southeastern Arizona. The New Build Section also includes an approximately 30-mile segment between NM 9 and I-10, which would enable potential access to the renewable resource areas of southern New Mexico. The Project's proposed plan of service would also include a 5-mile in-and-out loop between the Afton Substation and the Luna-Diablo 345-kV transmission line to strengthen the existing electrical system.

The New Build Section also consists of the alternative southern route from the Afton Substation to the city of Lordsburg.

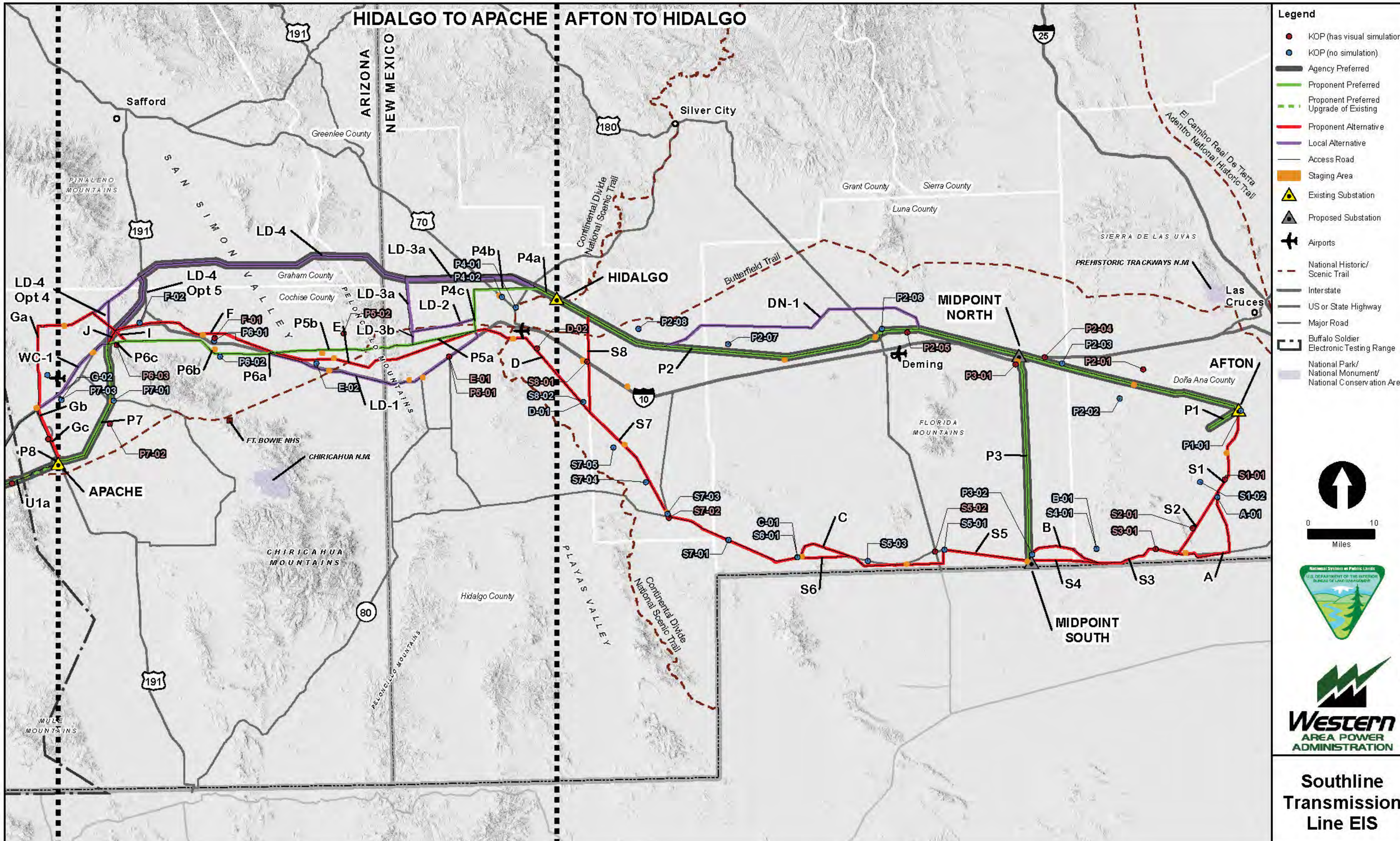
ROUTE GROUP 1 – AFTON SUBSTATION TO HIDALGO SUBSTATION

The Afton to Hidalgo route group of the New Build Section would start at the Afton Substation in New Mexico and go northwest along existing railroad lines, transmission line corridors, and I-10.

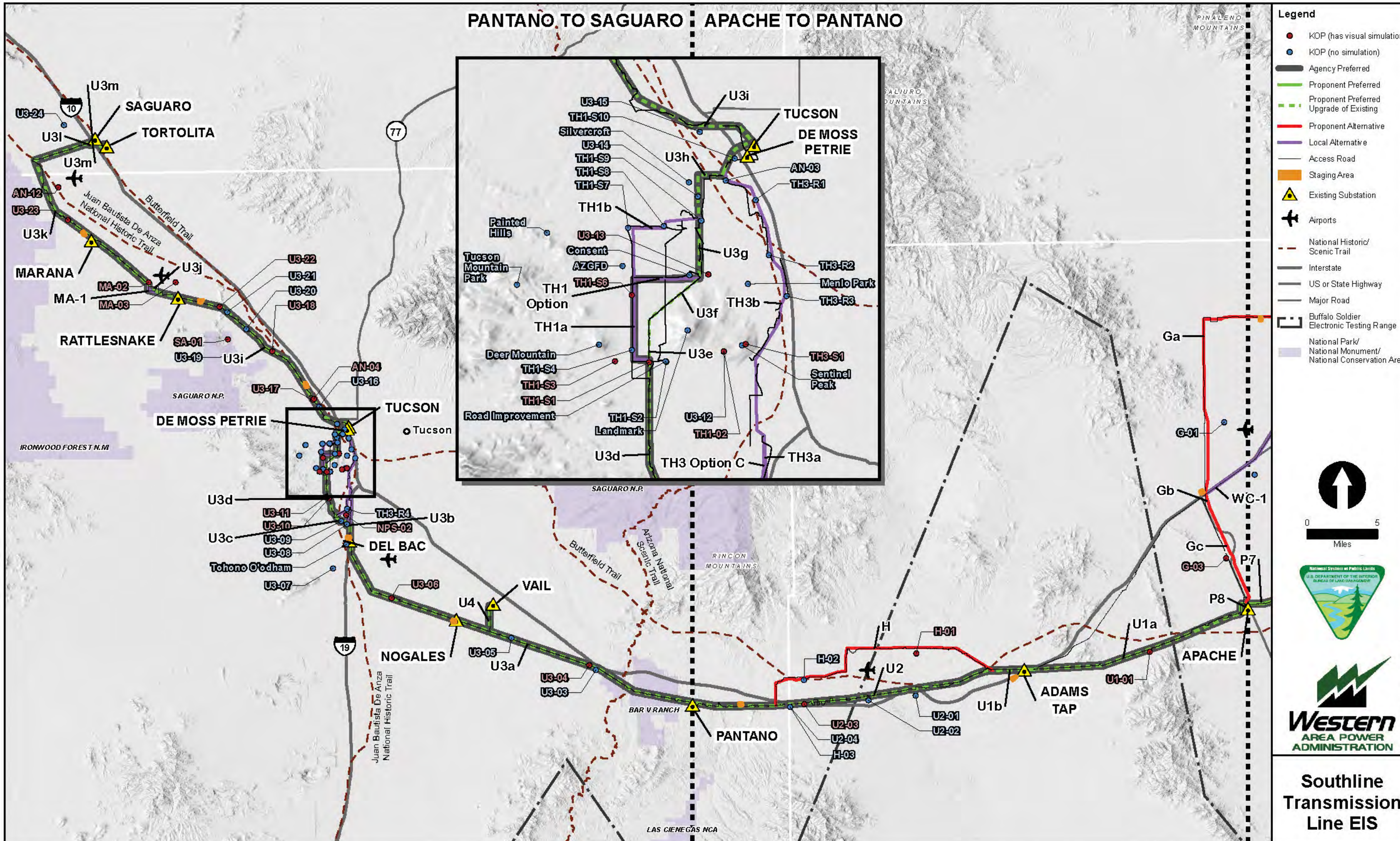
The Afton to Hidalgo route group and alternative southern route are located entirely within the Chihuahuan Desert and cross three north-south-trending valleys: Afton, Deming, and Lordsburg. These three valleys are defined by mountain ranges and occasional volcanic cones rising from the valley floors. There is a notable lack of surface water, and typical vegetation along the route group is characterized by low-lying grass and shrub communities.

Several population centers occur along interstate or state highways along the route group and alternative. The cities of Deming (population 14,963) and Lordsburg (population 2,278) are along I-10. The smaller communities of Columbus (population 1,678) and Hachita (population 49) are along NM 9 along the U.S.–Mexico border. Outside these population centers, only isolated, rural residences are known to occur.

1 **Figure 3.10-9.** Locations of the KOPs in the New Build Section.



1 **Figure 3.10-10.** Locations of the KOPs in the Upgrade Section.



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Several recreational attractions are known throughout this region. There are dispersed recreation opportunities located in the East Potrillo Mountains. In addition, there are recreation opportunities at Pancho Villa State Park in Columbus, the Pyramid Mountains south of Lordsburg, and the CDNST. There are hiking opportunities at the Aden Lava Flow Wilderness Study Area, Kilbourne Hole volcanic crater, and Hunt's Hole volcanic crater. There are also motorized trails within the Aden Hills Open Area between Deming and Las Cruces.

The Proponent Preferred alternative within the Afton to Hidalgo route group passes through 64.8 miles of BLM-managed land. Of that BLM-managed land, 45 percent is managed as VRM Class IV, and the remaining 55 percent is managed as VRM Class III. The alternative southern route would pass through 80.9 miles of BLM-managed land, of which 32 percent is managed as VRM Class IV. The remaining lands are managed as VRM Class III (44 percent), and VRM Class II (24 percent).

Subroute 1.1 – Proponent Preferred

The Proponent Preferred alternative within the Afton to Hidalgo route group is 138.2 miles long and crosses Doña Ana and Luna counties in New Mexico. The Proponent Preferred alternative originates at the Afton Substation and continues on toward the Hidalgo Substation and the city of Lordsburg.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The Proponent Preferred alternative crosses the Afton, Deming Valley, and Lordsburg SQRUs, all rated as BLM Class C scenic quality (figure 3.10-11). The SQRUs are typical of the Chihuahuan Desert landscape, broken by occasional volcanic cones and buttes rising from the desert valley floor. All three SQRUs are characterized by low, rolling landscape, minimal vegetation, muted colors, and open desert. It is not an area known for scenic quality. The Aden Lava Flow WSA is located 7 miles to the west, the Florida Mountains are located more than 10 miles to the west, and the West Potrillo Mountains are more than 10 miles to the east. There are no existing substations or other transmission lines. In addition, KOPs were established in the Lordsburg Mesa and West Potrillo Mountains SQRUs to capture additional views of the area. The SQRUs are summarized in table 3.10-1.

Table 3.10-1. Subroute 1.1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Afton	C	Flat to gently rolling desert landscape with little color contrast between the soils and low-growing vegetation.	P1-01, P2-01, P2-03, P2-04, P3-01, P3-02
Deming Valley	C	Deming Valley is characterized by flat to gently rolling desert landscape with little color contrast between the sandy soils and low-growing desert vegetation.	P2-05, P2-06, P2-07
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	None
Lordsburg Mesa	B	Lordsburg Mesa is adjacent to Lordsburg Valley and is differentiated from the valley by more eroded and rolling topography rising up to the higher mountainous SQRUs and the National Forest.	P2-08
West Potrillo Mountains	B	The West Potrillo Mountains are characterized by low volcanic peaks. The volcanic cones of the West Potrillo Mountain WSA are located 2 miles to the north of subroute 1.1.	P2-02

Sensitivity

The Proponent Preferred alternative crosses the Afton, I-10 Deming to Lordsburg, and Deming Valley sensitivity level rating units (SLRUs) (figure 3.10-12). The Afton SLRU is used primarily as range land interspersed with isolated rural residences. The area has low levels of public use, primarily ranching and some OHV activity. The area has low viewer sensitivity. The I-10 to Deming SLRU is a major travel corridor with high viewer sensitivity. Once past Deming, the Proponent Preferred alternative follows an existing 345-kV transmission line. The Deming Valley SLRU is an area with rural residential, agricultural, and some industrial uses with medium viewer sensitivity. There are no known residences or other occupied areas in the southern half. Travel routes along this segment are limited to I-10 in the north, NM 9 in the south, and a sparse unpaved county road network throughout. There are recreational opportunities, including the Aden Hills OHV Open Area, and dispersed recreation opportunities in the Florida Mountains. The Butterfield Trail also crosses the Langford Mountains.

In addition, KOPs were established in the East Potrillo Mountains and Lordsburg Mesa SLRUs to capture additional views of the area. The SLRUs are summarized in table 3.10-2.

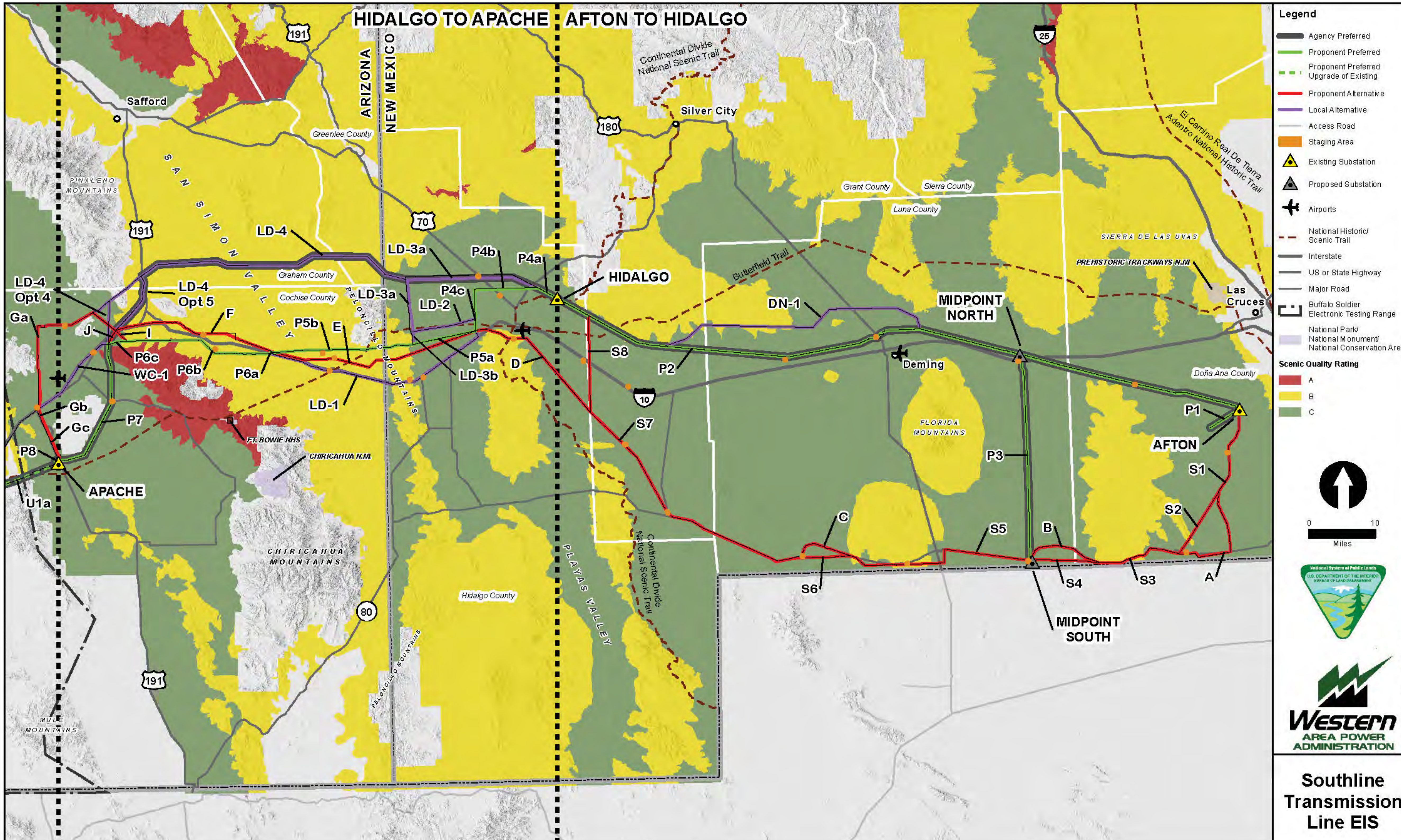
Table 3.10-2. Subroute 1.1 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
Afton	Low	The unit is primarily used for ranching and has some OHV activity. The area is isolated, has no large population centers, few rural residences, and limited recreational opportunities.	P1-01, P3-02
I-10 Deming to Lordsburg	High	The unit is a heavily traveled corridor for local residents and tourists.	P2-01, P2-03, P2-04, P2-05, P2-06 P3-01, P3-02
East Potrillo Mountains	High	The East Potrillo Mountains are considered a scenic destination near to the population centers of El Paso and Las Cruces, and are considered a high viewer sensitivity area. Nearby recreation opportunities include day hikes at Mount Riley and Cox Mountain in the East Potrillo Mountains. Hunt’s Hole and Kilbourne Hole are regional tourist draws for the scenic and geologic interest.	P2-02
Deming Valley	Medium	The unit contains rural residential, agricultural, and industrial land uses.	P2-07
Lordsburg Mesa	Low	Unit has very low use.	P2-08

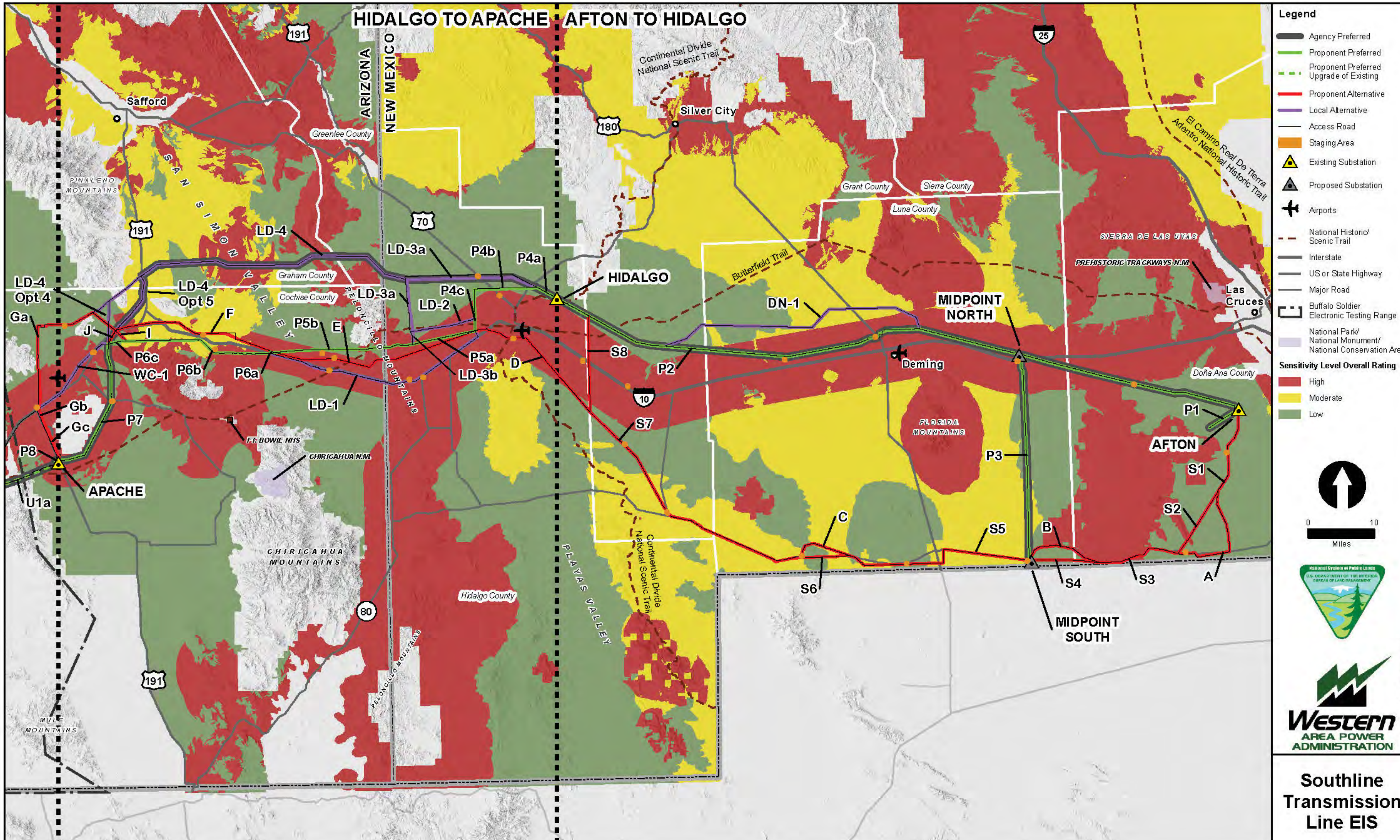
Key Observation Points

Dispersed rural residences are located along portions of the proposed route. There are concentrations of residences in the community of Deming. High concern sensitive viewing areas for the proposed route include the I-10 travel corridor, Aden Hills OHV area, Aden Lava Flow, West Potrillo Mountains, Florida Mountains WSA, and access to the CDNST. The KOPs for the proposed route are summarized in table 3.10-3.

Figure 3.10-11. Scenic Quality Rating Units in the New Build Section.



1 **Figure 3.10-12.** Sensitivity Level Rating Units in the New Build Section.



2

Table 3.10-3. Subroute 1.1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
P1-01	No	Afton	Afton	Foreground/ Middleground of the proposed route	View represents the Afton Substation from background. Approximately 6 miles from the San Jose Catholic Church Historical Site and VRI/VRM Class II, High Sensitivity, Class B Scenic Quality. Approximately 8 miles from Aden Lava Flow (VRI/VRM Class III).
P2-01	Yes	Afton	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	2.2 miles from Aden Hills OHV, simulation represents VRI/VRM Class III OHV area.
P2-02	No	West Potrillo Mountains	East Potrillo Mountains	Foreground/ Middleground of the proposed route	View from West Potrillo Mountains directly adjacent to VRI/VRM Class II, High Sensitivity, Class B Scenic Quality lands.
P2-03	No	Afton	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	Located near several private properties outside of BLM lands on the boundary between Luna and Doña Ana counties. This view is from NM 549, approximately 0.36 mile from an existing monopole line, and 0.6 mile from existing railroad tracks.
P2-04	Yes	Afton	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	This view is from within the I-10 transportation corridor approximately 0.85 mile from the proposed line and is located within/adjacent to VRI/VRM Class III landscape.
P2-05	Yes	Deming Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	This is the closest view in the Deming area (approximately 3.7 miles due north). Several potentially sensitive receptors (including local parks, churches, cemetery, and residences) exist in Deming. This is also the closest point to the Florida Mountains (identified as a well-used recreation area and VRI/VRM Class II).
P2-06	No	Deming Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	View is from Padre Hill Drive NW and Overhill Drive located directly north of a residential driveway and approximately 0.5 mile from the proposed line.
P2-07	No	Deming Valley	Deming Valley	Foreground/ Middleground of the proposed route	KOP within VRI/VRM Class IV landscape and adjacent to (within 500 feet of) VRI/VRM Class III landscape. This view is located along an unpaved county road at the foot of Grandmother Mountain. This roadway heads west and north and provides access to a single ranch and largely open/vacant lands. This view is 2 miles east of the CDNST.
P2-08	No	Lordsburg Mesa	Lordsburg Mesa	Foreground/ Middleground of the proposed route	Located on a small parcel of BLM land (VRI/VRM Class IV). No immediate sensitive receptors; landscape is very rural and largely vacant.

Table 3.10-3. Subroute 1.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
P3-01	No	Non-BLM land	Non-BLM land	Foreground/ Middleground of the proposed route	Located on non-BLM land with views to the west from Geronimo Road and Ojo Road. Rural residential area with racetrack to the northwest (approximately 0.5 mile).
P3-02	No	Non-BLM land	Non-BLM land	Foreground/ Middleground of the proposed route	Florida Mountains lie 6 miles to the west and could afford direct long-distance views of the line. From the east (looking west) at the West Potrillo Mountains between 7 and 12 miles away, direct views of the line would likely occur due to “superior” viewing locations and visual impacts from the substation expansion.

Bureau of Land Management Visual Resource Management

The Proponent Preferred alternative, subroute 1.1, crosses 35.9 miles of VRM Class III and 28.9 miles of VRM Class IV BLM-managed lands. Lands not managed by the BLM are generally State-owned or privately owned (figures 3.10-13 and 3.10-14).

Subroute 1.2 – Proponent Alternative

Subroute 1.2, the Proponent Alternative, would also start at the Afton Substation, but would go south, intersecting NM 9 and following the highway west along the U.S.–Mexico border.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The Proponent Alternative southern route crosses 10 SQRUs: the Afton, East Potrillo Mountains, West Potrillo Mountains, Deming Valley, Hermanas Mountains, Cedar Mountains, Hachita Valley, Lordsburg Valley, Pyramid Mountains, and I-10 Deming to Lordsburg SQRUs (see figure 3.10-11). The scenic rating and brief description of each SQRU that the alternative crosses is provided in table 3.10-4.

Sensitive Viewers

The Proponent Alternative southern route crosses the Afton, East Potrillo Mountains, Deming Valley, Hermanas Mountains, Cedar Mountains, Hachita Valley, Lordsburg Valley, and I-10 Lordsburg to Deming SLRUs (see figure 3.10-12). The sensitivity level rating and a brief description of each SLRU is provided in table 3.10-5.

Key Observation Points

Dispersed rural residences are located along portions of the alternative southern route. There are concentrations of residences in the communities of Lordsburg, Columbus, and Hachita. High concern sensitive viewing areas for the alternative southern route include the I-10 travel corridor, Pancho Villa State Park, and the CDNST. KOPs for the alternative southern route are summarized in table 3.10-6.

Figure 3.10-13. Visual Resource Inventory classes in the New Build Section.

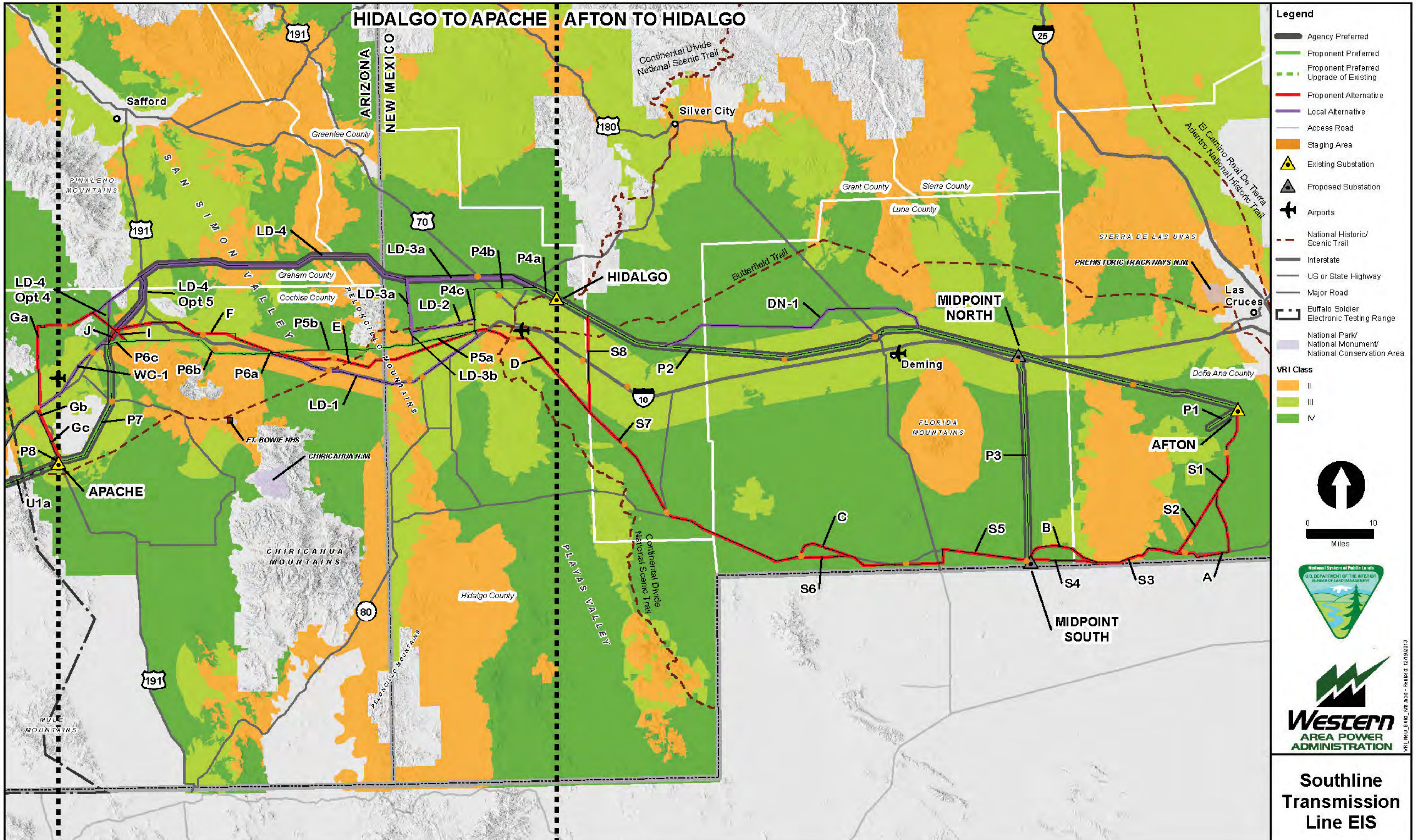


Figure 3.10-14. Visual Resource Management classes in the New Build Section.

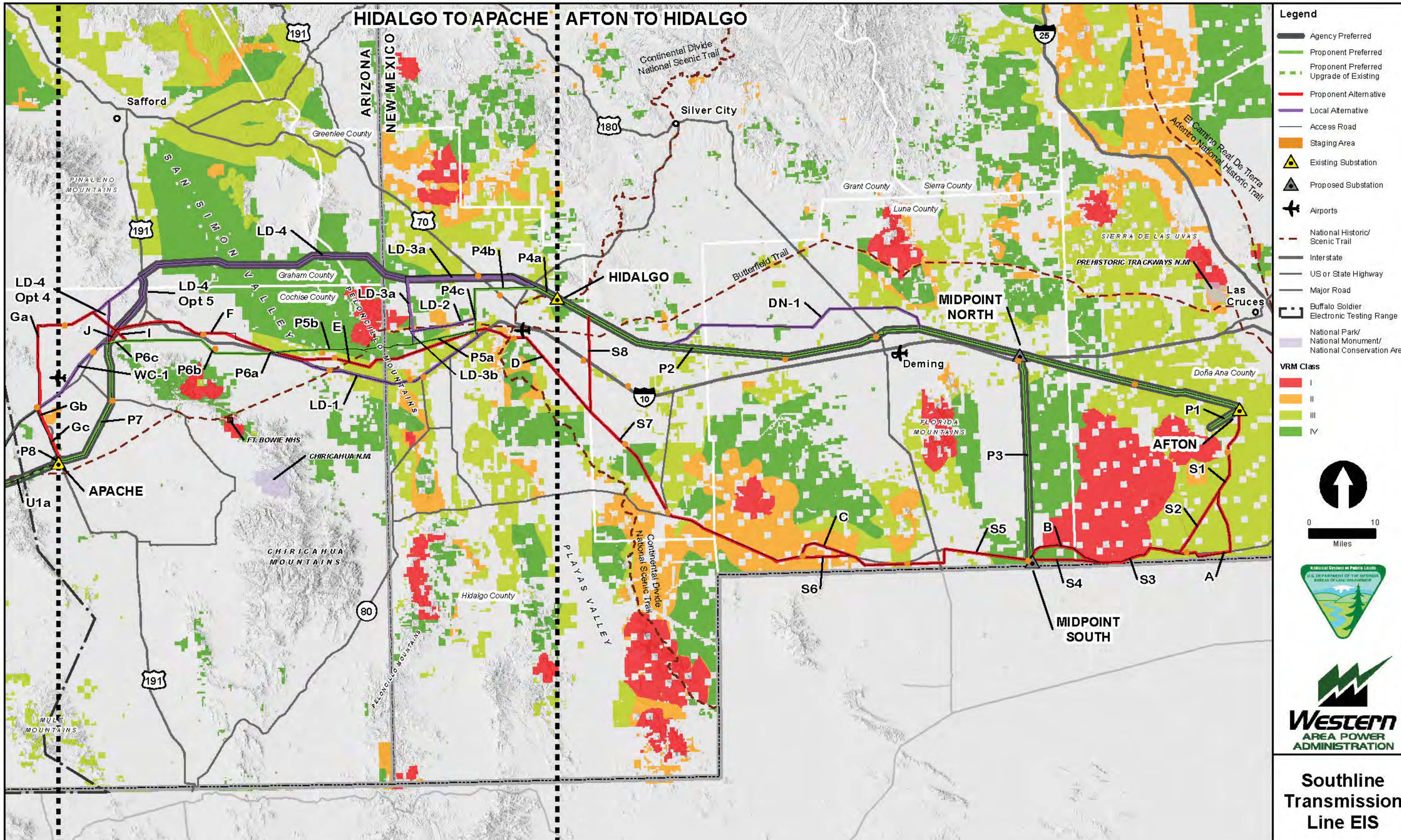


Table 3.10-4. Subroutes 2.1 and 2.2 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Afton	C	Flat to gently rolling desert landscape with little color contrast between the soils and low-growing vegetation.	P1-01, S1-01, S1-02, S2-01, S3-01, P3-02
East Potrillo Mountains	B	Low, rounded hills with two prominent, conical peaks; Cox Mountain and Mount Riley.	None
West Potrillo Mountain	B	The West Potrillo Mountains are characterized by low volcanic peaks. The volcanic cones of the West Potrillo Mountain WSA are located 2 miles to the north of the alternative.	S4-01
Deming Valley	C	Deming Valley is characterized by flat to gently rolling desert landscape with little color contrast between the sandy soils and low-growing desert vegetation.	S5-01, S5-02, S5-03
Hermanas Mountains	B	The Hermanas Mountains are characterized by low rounded hills with three distinct conical peaks. Ranches and agricultural fields surround most of the town of Columbus.	None
Cedar Mountains	C	The Cedar Mountains are characterized by a small pyramidal series of mountains running diagonally from the Mexican border between the Deming and Hachita valleys.	None
Hachita Valley	C	Hachita Valley is characterized by low, flat valleys, with little variation in topography, color, or vegetation. There are no existing transmission lines or substations.	S6-01, S7-01, S7-02, S7-03, S7-04
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	S7-05, S8-01, S8-02
Pyramid Mountains	B	The Pyramid Mountains are known for complex landforms and adjacent scenic mountain range and valley.	None

Table 3.10-5. Subroutes 2.1 and 2.2 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
Afton	Low	The area is primarily used for ranching and has some OHV activity. The area is isolated, has no large population centers, few rural residences, and limited recreational opportunities.	P1-01, S1-01, S1-02, S2-01, S3-01, P3-02
East Potrillo Mountains	High	The East Potrillo Mountains are considered a scenic destination near to the population centers of El Paso and Las Cruces and are considered a high viewer sensitivity area. Nearby recreation opportunities include day hikes at Mount Riley and Cox Mountain in the East Potrillo Mountains. Hunt’s Hole and Kilbourne Hole are regional tourist draws for the scenic and geological interest.	S4-01
Deming Valley	Medium	Contains rural residential, agricultural, and industrial land uses.	S5-01, S5-02, S5-03
Hermanas Mountains	Low	There are low numbers of users in the area.	None
Cedar Mountains	Low	There are low numbers of users in the area.	None
Hachita Valley	Medium	Includes the presence of rural residences in other parts of the valley. Contains rural residential land uses sensitive to change.	S6-01, S7-01, S7-02, S7-03, S7-04
Lordsburg Valley	Low	The Lordsburg Valley SLRU is rated as low viewer sensitivity because of the development that occurs in the area. Lordsburg Valley includes the town of Lordsburg and surrounding rural-residential communities, cultivated farmlands, and ranching.	S7-05, S8-02
I-10 Lordsburg to Deming	High	The unit is a major travel corridor with high viewer sensitivity. The CDNST crosses northeast of Lordsburg where the trail enters the Langford Mountains.	S8-01

Table 3.10-6. Subroutes 2.1 and 2.2 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
S1-01	Yes	Afton	Afton	Foreground/ Middleground of the alternative southern route	No highly sensitive receptors. Class IV BLM lands.
S1-02	No	Afton	Afton	Foreground/ Middleground of the alternative southern route	View from foot of Kilbourne Hole.
S2-01	Yes	Afton	Afton	Foreground/ Middleground of the alternative southern route	No highly sensitive receptors.
S3-01	Yes	Afton	Afton	Foreground/ Middleground of the alternative southern route	View is located along NM 9 and is oriented westward along roadway along the Proponent Alternative. View is located outside of any sensitive locations, or unique landscape.
S4-01	No	West Potrillo Mountains	East Potrillo Mountains	Foreground/ Middleground of the alternative southern route	View is located approximately 2.2 miles from the Proponent Alternative line and 2.5 miles from the U.S.–Mexico border. Landscape is largely flat and common; few sensitive viewers are located in this area as it is highly monitored by the U.S. Border Patrol.
S5-01	No	Deming Valley	Deming Valley	Foreground/ Middleground of the alternative southern route	View is located along NM 9 oriented southward away from the community of Columbus. This view does not represent a sensitive location.
S5-02	Yes	Deming Valley	Deming Valley	Foreground/ Middleground of the alternative southern route	View is 1.26 miles from the Proponent Alternative line and simulation shows a “superior” view from atop a mountain within the Pancho Villa State Park (just southwest of Columbus). Recommend further determination of park users and sensitivity from this location.
S5-03	No	Deming Valley	Deming Valley	Foreground/ Middleground of the alternative southern route	Though located 43 miles to the west, this view is very similar to S5-01 and does not represent a sensitive viewpoint or distinctive lands.
S6-01	No	Hachita Valley	Hachita Valley	Foreground/ Middleground of the alternative southern route	Also located on NM 9, view is representative of a slightly different landscape character than S5-03 but does not represent sensitive viewing conditions.
S7-01	No	Hachita Valley	Hachita Valley	Foreground/ Middleground of the alternative southern route	Very similar view to S5-03.
S7-02	Yes	Hachita Valley	Hachita Valley	Foreground/ Middleground of the alternative southern route	Simulation shows view from Hachita oriented northward within a rural residential community.

Table 3.10-6. Subroutes 2.1 and 2.2 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
S7-03	No	Hachita Valley	Hachita Valley	Foreground/ Middleground of the alternative southern route	View is over 0.5 mile north of Hachita oriented toward the town. 180 degrees north of the viewpoint is a large proposed staging area.
S7-04	No	Hachita Valley	Hachita Valley	Foreground/ Middleground of the alternative southern route	View is located immediately adjacent to the CDNST and is 0.5 mile from the Proponent Alternative.
S7-05	No	Lordsburg Valley	Lordsburg Valley	Foreground/ Middleground of the alternative southern route	View is located 1.5 miles from Proponent Alternative and is indicative of a slightly more vegetated landscape; however, no sensitive viewers are located nearby.
S8-01	Yes	Lordsburg Valley	I-10 Lordsburg to Deming	Foreground/ Middleground of the alternative southern route	Located along I-10; simulation depicts Proponent Alternative crossing the I-10 at a perpendicular angle.
S8-02	No	Lordsburg Valley	Lordsburg Valley	Foreground/ Middleground of the alternative southern route	Located at Muir Road, view is oriented to the south looking toward agricultural fields.

Bureau of Land Management Visual Resources Management

The Proponent Alternative southern route crosses 19.3 miles of VRM Class II, 36.1 miles of VRM Class III, and 25.5 miles of VRM Class IV BLM land. Local route alternative segments (A,B,C, and D) within the alternative southern route cross 5.5 miles of VRM Class II, 17.0 miles of VRM Class III, and 11.9 miles of VRM Class IV lands. Lands not managed by BLM are generally State owned or privately owned (see figures 3.10-13 and 3.10-14).

Local Alternative DN1

Segment DN1 is 41.1 miles long and is an alternative to the proposed route. Segment DN1 is a joint use of a ROW with a portion of the SunZia project agency preferred alternative and is further north of I-10 than the proposed route.

Scenic Quality

Segment DN1 crosses the Deming Valley, Lordsburg Valley, Lordsburg Mesa, and Grandmother Victoria SQRUs, all rated as BLM Class B and Class C scenic quality (see figure 3.10-11). The SQRUs are typical of the Chihuahuan Desert landscape broken by occasional volcanic cones and buttes rising from the desert valley floor. All SQRUs are characterized by low, rolling landscape, minimal vegetation, muted colors, and open desert. The Lordsburg Mesa, which is rated as Class B scenic quality, is characterized by higher mountains and more diverse topography. It is not an area known for scenic quality. There are no existing substations or other transmission lines. The SQRUs are summarized in table 3.10-7.

Table 3.10-7. Local Alternative DN1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Deming Valley	C	Deming Valley is characterized by flat to gently rolling desert landscape with little color contrast between the sandy soils and low-growing desert vegetation.	None
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	None
Lordsburg Mesa	B	Differentiated from Lordsburg Valley and Deming Valley by more eroded and rolling topography rising up to higher mountains units and National Forest.	None
Grandmother	C	Unit consists of Grandmother Mountains and Victoria Mountains split by I-10. Mountains are surrounded by lower valley units.	None

Sensitivity

Segment DN1 crosses the I-10 Deming to Lordsburg, Deming Valley, Grandmother Victoria, and Lordsburg Mesa SLRUs (see figure 3.10-12). The I-10 to Deming SLRU is a major travel corridor with high viewer sensitivity. The Deming Valley SLRU is an area with rural residential, agricultural, and some industrial uses with medium viewer sensitivity. Both the Grandmother Victoria and Lordsburg Mesa SLRUs are areas of very low use and low viewer sensitivity. The SLRUs are summarized in table 3.10-8.

Table 3.10-8. Local Alternative DN1 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
I-10 Deming to Lordsburg	High	The unit is a heavily traveled corridor for local residents and tourists.	None
Deming Valley	Medium	The unit contains rural residential, agricultural, and industrial land uses.	None
Grandmother Victoria	Low	Not a well-used area, or an area well known for visual sensitivity.	None
Lordsburg Mesa	Low	Unit has very low use.	None

Key Observation Points

No critical KOPs were identified for segment DN1. The area has no known populations, and KOPs P2-05, P2-06, and P2-07 established for the proposed route may be used for the alternative.

Bureau of Land Management Visual Resource Management

Segment DN1 crosses 4.0 miles of VRM Class III and 2.9 miles of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative A

Segment A is 17.5 miles long and is an alternative to the Proponent Alternative route segment S2 in subroute 1.2.

Scenic Quality

Segment A crosses lands identified as BLM Class C scenic quality (see figure 3.10-11). The SQRUs are typical of the Chihuahuan Desert landscape, broken by occasional volcanic cones and buttes rising from the desert valley floor. All SQRUs are characterized by low, rolling landscape, minimal vegetation, muted colors, and open desert. It is not an area known for scenic quality. There are no existing substations or other transmission lines.

Sensitivity

Segment A passes few residences and no known recreational resources. Segment A would follow County Road A015 and NM 9 for its entire length.

Key Observation Points

Segment A passes no residences and no other critical KOPs were identified. The area has no known populations.

Bureau of Land Management Visual Resource Management

Segment A crosses 14.7 miles of VRM Class III BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative B

Segment B is 12.2 miles long and is an alternative to the Proponent Alternative route segment S4 in subroute 1.2.

Scenic Quality

Segment B crosses Class B and Class C scenery, similar to segment S4. Portions of segment B follow the West Potrillos WSA boundary. The SQRUs are typical of the Chihuahuan Desert landscape, broken by occasional volcanic cones and buttes rising from the desert valley floor. All SQRUs are characterized by low, rolling landscape, minimal vegetation, muted colors, and open desert. The area is not known for scenic quality. There are no existing substations or other transmission lines.

Sensitivity

Segment B follows NM 9 and portions of the West Potrillos WSA boundary, and there would be higher viewer sensitivity from the WSA.

Key Observation Points

No critical KOPs were identified for segment B. The area has no known populations.

Bureau of Land Management Visual Resource Management

Segment B crosses 10.0 miles of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative C

Segment C is 9 miles long and is an alternative to the Proponent Alternative route S6 in subroute 1.2.

Scenic Quality

Segment C crosses lands rated as BLM Class C scenic quality (see figure 3.10-11).

Sensitivity

Segment C follows NM 9 for its entire length. There are no residences or known recreation resources that occur along segment C, and there are areas of very low use and low viewer sensitivity.

Key Observation Points

No critical KOPs were identified for segment C. The area has no known populations.

Bureau of Land Management Visual Resource Management

Segment C crosses 3.7 miles of VRM Class II BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative D

Segment D is 22.8 miles long and is an alternative to the Proponent Alternative route S8 in subroute 1.2.

Scenic Quality

Segment D crosses lands rated as BLM Class C scenic quality and is not an area known for scenic quality. There are no existing substations or other transmission lines.

Sensitivity

Segment D crosses perpendicular to the CDNST, where sensitivity would be moderate. There are few rural residences in the area, and few other dispersed recreation resources.

Key Observation Points

KOP D-01for the proposed route may be used for the alternative.

Bureau of Land Management Visual Resource Management

Segment D crosses 1.8 miles of VRM Class II, 2.3 miles of VRM Class III, and 1.9 miles of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

ROUTE GROUP 2 – HIDALGO SUBSTATION TO APACHE SUBSTATION

Subroute 2.1 – Proponent Preferred

Subroute 2.1 is approximately 104 miles long, originating near the western boundary of Grant County, New Mexico, and crossing west and south to the Willcox Playa in Arizona. There is approximately 36.6 miles of the proposed route that crosses BLM land.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Subroute 2.1 crosses a diversity of landscapes. The Dos Cabezas Mountains are rated as Class A scenic value and are characterized by the highly varied landscape of the Dos Cabezas Mountains (see figure 3.10-11). The Peloncillo Mountains and San Simon Valley are rated as Class B scenic value and are characterized by steep undulating ridgelines, low rounded hills, and eroded rocky peaks. The Lordsburg Valley and Sulphur Springs Valley are rated as Class C areas and are generally characterized by flat desert valleys and playas surrounded by mountains, including the Willcox Playa. There are a number of areas along the proposed route analysis area where existing transmission lines, substations, and other developments do exist. The SQRUs are described in table 3.10-9.

Table 3.10-9. Subroute 2.1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	P4-01, P4-02, P5-01
Peloncillo Mountains	B	A long, complex mountain range running from the Mexican border northwest to the Arizona border. Two lower valleys to the east and west.	None
San Simon Valley	B	Large river valley between mountain ranges on west and east. San Simon River is not evident through most areas in the valley.	P5-02, P6-01, P6-02
Dos Cabezas Mountains	A	Prominent and distinctive mountain range dividing the Sulphur Springs Valley and San Simon Valley. Proposed route briefly intersects.	None
Sulphur Springs Valley	C	Limited scenic qualities, although Willcox Playa ACEC is an NNL. Most of the playa is a designated bombing range. Fragmented BLM parcels in wide valley with mountain ranges on the east and west sides. Large semidesert grassland.	P6-03,P7-01, P7-02, P7-03
Willcox Playa	C	Limited scenic value; most adjacent land is agricultural.	None

Sensitivity

Subroute 2.1 crosses 11 SLRUs with low, moderate, and high sensitivity (see figure 3.10-12). High sensitivity areas include major travel corridors along I-10 with views of the proposed route alternative in the foreground and middle ground. Tourist attractions and recreation sites along the proposed route with high viewer sensitivity include the Fort Bowie Historic Site, Dos Cabezas Wilderness Area, hiking opportunities in the Langford Mountains, the CDNST, and Willcox Playa Wildlife Area. There are several rural communities, including Lordsburg, San Simon, and Bowie. Widely dispersed rural residences and agricultural development occur along the remainder of the proposed route. The SLRUs crossed by the proposed route alternative are described in table 3.10-10.

Table 3.10-10. Subroute 2.1 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
Lordsburg Valley	Low	Valley has development.	None
I-10 Deming to Lordsburg	High	Travel corridor for local residents and tourism.	P4-01, P4-02, P5-01
Animas Valley	High	Scenic area enjoyed by local residents and tourists to the area.	P5-02
I-10 Willcox to New Mexico	High	Major transportation route with scenic areas visible from the highway,	
Apache Pass	High	Historic pass through Dos Cabezas and Chiricahua Mountains.	None
Dos Cabezas	High	Access to Dos Cabezas Mountain Wilderness.	P6-02
U.S. Route 191 Safford to I-10	High	Major transportation route with scenic areas visible from the highway.	None
Haekel and Fan Roads	Moderate	San Simon Creek area and moderately used access route to Hot Well Dunes Recreation Area. Popular dispersed recreation area with good access to highways.	P6-01
I-10 Willcox to Texas Canyon	High	Major transportation route with scenic areas visible from the highway.	P6-03
Sulphur Spring	Low	Low-use and population area with small parcels of BLM among State and private lands. Sulphur Springs contains mostly private and State lands. The small amount of BLM within the unit is located near the community of Pearce and around mining claims in the Swisshelm Mountains.	None
Willcox Playa Wildlife Area	High	A popular birding location for sandhill cranes, and hunting area.	P7-01, P7-02, P7-03

Key Observation Points

There are concentrations of residences in the communities of Lordsburg, San Simon, and Bowie. Dispersed rural residences are located in the analysis area along the remainder of the proposed route. High sensitivity viewing areas within the analysis area for the proposed route include the I-10 travel corridor, the CDNST, the Peloncillo Mountains, Dos Cabezas Wilderness, Fort Bowie, and the Willcox Playa. The KOPs for subroute 2.1 are summarized in table 3.10-11.

Table 3.10-11. Subroute 2.1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
P4-01	No	Lordsburg Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	View is not from BLM land and is located along a portion of the CDNST that parallels NM 90 approximately 0.25 mile northeast of the intersection with NM 70. Very few residents or destinations are located along NM 90. There is no marked trailhead located here, and landscape is characterized by large expanses of open space. Recreators seeking a solitary experience on the CDNST may use this portion of the trail.
P4-02	No	Lordsburg Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	Located at the intersection of Hook and Anchor Road and NM 70 (Duncan Highway). This view is oriented north approximately 0.4 mile from the proposed line. There is one rural residence 0.3 mile south of this view. A potential staging area is 0.45 mile northwest of this KOP on NM 70. Few sensitive receptors and common landscape character represent this view.

Table 3.10-11. Subroute 2.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
P5-01	Yes	Lordsburg Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	Located on LD1 (bypass of Lordsburg Playa) within VRI/VRM III, Scenic Quality C, and High Sensitivity.
P5-02	Yes	San Simon Valley	Animas Valley	Foreground/ Middleground of the proposed route	Adjacent to VRI/VRM Class II, Scenic Quality B, High sensitivity lands, located in VRI/VRM Class III. View is located in a wash southwest of Peloncillo Mountains. Simulation is rendered 2.3 miles from proposed line, views of Chiricahua Mountains in the background distance zone (beyond 20 miles south).
P6-01	No	San Simon Valley	Fort Bowie National Historic Site	Foreground/ Middleground of the proposed route	Located 6 miles from VRI/VRM Class II landscape, and 8 miles from Dos Cabezas. View is from residential community within town of Bowie.
P6-02	No	San Simon Valley	Dos Cabezas	Foreground/ Middleground of the proposed route	View is from roadway that accesses Fort Bowie.
P6-03	Yes	Sulphur Springs Valley	I-10 Willcox to Texas Canyon	Foreground/ Middleground of the proposed route	View is oriented 0.5 mile from VRM Class II lands looking north away from Dos Cabezas toward Pinaleño Mountains.
P7-01	No	Sulphur Springs Valley	Willcox Playa Wildlife Area	Foreground/ Middleground of the proposed route	This view is due west of Willcox Playa; Dos Cabezas Mountains are 180 degrees east from this point. View is 0.5 mile from line, proposed staging area would be in the immediate foreground.
P7-02	Yes	Sulphur Springs Valley	Willcox Playa Wildlife Area	Foreground/ Middleground of the proposed route	Not on BLM lands. Approximately 2 miles from edge of Willcox Playa and 4 miles north of Butterfield Trail. Surrounded by agricultural fields. Facing north-northwest.
P7-03	No	Sulphur Springs Valley	Willcox Playa Wildlife Area	Background	1.4 miles from BLM Class II VRI/VRM on west side of Willcox Playa. KOP oriented 8 miles from line to the southeast and 1 mile from agency route alternative.

Bureau of Land Management Visual Resource Management

Subroute 2.1 crosses 21.0 miles of VRM Class III, and 14.9 miles of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Subroute 2.2 – Proponent Alternative

Subroute 2.2 is approximately 96 miles long, originating near the western boundary of Grant County, New Mexico, and crossing west and south to the Willcox Playa in Arizona. Approximately 21.9 miles of the proposed route crosses BLM land.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Subroute 2.2 crosses a diversity of landscapes. There are 49.0 miles of subroute 2.2 that cross Class C scenery (51 percent of the subroute), and 47.6 miles that cross Class B scenery (49 percent of the subroute) (see figure 3.10-11). The Peloncillo Mountains and San Simon Valley are rated as Class B scenic value and are characterized by steep undulating ridgelines, low rounded hills, and eroded rocky peaks. The Lordsburg Valley and Sulphur Springs Valley are rated as Class C areas and are generally characterized by flat desert valleys and playas surrounded by mountains, including the Willcox Playa. There are a number of areas along the proposed route analysis area where existing transmission lines, substations, and other developments exist. The SQRUs are described in table 3.10-12.

Table 3.10-12. Subroute 2.1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	None
Peloncillo Mountains	B	A long, complex mountain range running from the Mexican border northwest to the Arizona border. Two lower valleys to the east and west.	None
San Simon Valley	B	Large river valley between mountain ranges on west and east. San Simon River is not evident through most areas in the valley.	E-01, E-02, F-01, F-02
Sulphur Springs Valley	C	Limited scenic qualities, although Willcox Playa ACEC is an NNL. Most of the playa is a designated bombing range. Fragmented BLM parcels in wide valley with mountain ranges on the east and west sides. Large semidesert grassland.	G-01, G-02, G-03
Willcox Playa	C	Limited scenic value; most adjacent land is agricultural.	None

Sensitivity

Subroute 2.2 crosses 7 SLRUs with low, moderate, and high sensitivity (see figure 3.10-12). High sensitivity areas include major travel corridors along I-10 with views of the subroute in the foreground and middle ground. Tourist attractions and recreation sites along the proposed route with high viewer sensitivity include the Willcox Playa Wildlife Area. There are several rural communities, including San Simon, Bowie, and Cochise. Widely dispersed rural residences and agricultural development occur along the remainder of the subroute. The SLRUs crossed by the proposed route alternative are described in table 3.10-13.

Table 3.10-13. Subroute 2.1 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
I-10 Deming to Lordsburg	High	Travel corridor for local residents and tourism.	E-01, E-02
Animas Valley	High	Scenic area enjoyed by local residents and tourists to the area.	None
I-10 Willcox to New Mexico	High	Major transportation route with scenic areas visible from the highway,	None
Haekel and Fan Roads	Moderate	San Simon Creek area and moderately used access route to Hot Well Dunes Recreation Area. Popular dispersed recreation area with good access to highways.	F-01, F-02
I-10 Willcox to Texas Canyon	High	Major transportation route with scenic areas visible from the highway.	G-01
Sulphur Spring	Low	Low-use and population area with small parcels of BLM among State and private lands. Sulphur Springs contains mostly private and State lands. The small amount of BLM within the unit is located near the community of Pearce and around mining claims in the Swisshelm Mountains.	None
Willcox Playa Wildlife Area	High	A popular birding location for sandhill cranes, and hunting area.	G-02, G-03

Key Observation Points

There are concentrations of residences in the communities of San Simon, Bowie, and Cochise. Dispersed rural residences are located in the analysis area along the remainder of the proposed route. High sensitivity viewing areas within the analysis area for the proposed route include the I-10 travel corridor, Fort Bowie, and the Willcox Playa. The KOPs for subroute 2.2 are summarized in table 3.10-14.

Table 3.10-14. Subroute 2.1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
E-01	Yes	San Simon Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	View is from bypass of Lordsburg Playa.
E-02	No	San Simon Valley	I-10 Deming to Lordsburg	Foreground/ Middleground of the proposed route	View is from town of San Simon, sensitive residential receptors. Major transportation route with scenic areas and provides connection from Las Cruces to Tucson.
F-01	Yes	San Simon Valley	Haekel and Fan Roads	Foreground/ Middleground of the proposed route	This view is located 0.25 mile from alternative route, at the intersection of North Central and East Arizona Street in the town of Bowie. No public comments came from Bowie during scoping. North of the alternative line are agricultural fields and limited homes. Concentrated residential area more than 0.25 mile north of I-10 at Apache Pass Road exit. Surrounded by agricultural lands.
F-02	No	San Simon Valley	Haekel and Fan Roads	Foreground/ Middleground of the proposed route	View is 0.5 mile from the alternative and 2.7 miles from preferred alternative. KOP faces due south. Limited visual sensitivity in this area due to lack of receptors.
G-01	No	Sulphur Springs Valley	I-10 Willcox to Texas Canyon	Foreground/ Middleground of the proposed route	Not on BLM lands. Cascabel Road with views of the Dos Cabezas in the background ot the east and of Segment Ga to the west.
G-02	No	Sulphur Springs Valley	Willcox Playa Wildlife Area	Foreground/ Middleground of the proposed route	North of the Willcox Playa with views of Ga, Gb, and Gc to the west and south.
G-03	Yes	Sulphur Springs Valley	Willcox Playa Wildlife Area	Foreground/ Middleground of the proposed route	View from the Cochise area.

Bureau of Land Management Visual Resource Management

Subroute 2.2 crosses 17.8 miles of VRM Class III, and 4.1 miles of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative LD1

LD1 follows I-10 east-west from the Arizona State border for 18.1 miles, and for 17.3 miles of western Hidalgo County, New Mexico. LD1 follows the I-10 for its entire length and avoids the Lordsburg Playa entirely.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

LD1 crosses the Lordsburg Valley SQRU, which is rated as Class C and is characterized by low flat valley and playas surrounded by mountains (see figure 3.10-11). There are three large playas making up the Lordsburg Playa RNA. LD1 also crosses the Peloncillo Mountains, and San Simon Valley SQRUs, which are rated as Class B, and are characterized by steep, undulating, mountain ridgeline and a large river valley, in which the river is not visible in most views. Development along LD1 is limited and consists mainly of transportation corridors. There are no major transmission lines near LD1. The SQRUs are summarized in table 3.10-15.

Table 3.10-15. Local Alternative LD1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Lordsburg Valley	C	Valley has development.	P5-01/E-01
Peloncillo Mountains	B	A long, complex mountain range running from the Mexican border northwest to the Arizona border. Two lower valleys to the east and west.	None
San Simon Valley	B	Large river valley between mountain ranges on west and east. San Simon River is not evident through most areas in the valley.	E-02

Sensitivity

LD1 crosses the I-10 Deming to Lordsburg, and I-10 Willcox to New Mexico SLRUs, which are both rated as high viewer sensitivity (see figure 3.10-12). The SLRUs are both high sensitivity because they are major travel corridors for local residents and tourism with scenic areas visible from the Interstate.

Key Observation Points

LD1 would pass several small areas of concentrated rural residences, including San Simon, Steins Ghost Town, and Road Forks. The remainder of LD1 is sparsely populated. High concern sensitive viewing areas for the proposed route include the I-10 travel corridor. The KOPs for LD1 are summarized in table 3.10-16.

Table 3.10-16. Local Alternative LD1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
E-01	No	Lordsburg Valley	I-10 Deming to Lordsburg	Foreground/ Middleground	Alkali Flat; view from I-10 across Alkali Flat, toward the Peloncillo Mountains.
E-02	No	San Simon Valley	I-10 Willcox to New Mexico	Foreground/ Middleground	Represents view from within community of San Simon.

Bureau of Land Management Visual Resource Management

LD1 crosses 24.9 miles of VRM Class III BLM-managed lands (see figures 3.10-13 and 3.10-14).

Local Alternative LD2

The LD2 alternative is 9.9 miles long and occurs entirely within Hidalgo County, New Mexico, north of I-10. LD2 is west of the town of the Lordsburg. LD2 passes between two playas and avoids conflicts with the Lordsburg Playa.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The LD2 alternative crosses the Lordsburg Valley SQRU, rated as BLM Class C scenic quality (see figure 3.10-11). The SQRU is characterized by a broad, flat valley and the Lordsburg Playa RNA. There are no major transmission lines near LD2.

Sensitivity

The LD2 alternative crosses the I-10 Deming to Lordsburg, and Lordsburg Valley SLRUs (see figure 3.10-12). The I-10 Deming to Lordsburg SLRU is a major travel corridor with high viewer sensitivity The Lordsburg Valley SLRU has existing development and has low viewer sensitivity. There are no known residences or other occupied areas along LD2. Travel routes along this segment are limited to I-10 in the north, NM 9 in the south, and a sparse unpaved county road network throughout. The Butterfield Trail is near the LD2 for most of its length.

Key Observation Points

No critical KOPs were identified for LD2. The area has no known populations, and representative views of other proposed routes from the I-10 are already available.

Bureau of Land Management Visual Resource Management

The LD2 Alternative crosses 3.1 miles of VRM Class II and 0.6 mile of VRM Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are primarily privately owned.

Local Alternative LD3

The LD3 (LD3a and LD3b) alternative is 30.7 miles and occurs entirely within Hidalgo County, New Mexico. LD3 would begin less than 1 mile east of NM 90, and 6 miles northeast of Lordsburg. LD2 passes between two playas and avoids conflict with the Lordsburg Playa.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The LD3 alternative crosses the Lordsburg Valley SQRU, rated as BLM Class C scenic quality, and the Peloncillo Mountain SQRU, which is rated as BLM Class B scenic quality (see figure 3.10-11). Lordsburg Valley is characterized by a broad, flat valley and the Lordsburg Playa RNA. The Peloncillo Mountains are characterized by large pyramidal and conical peaks, rugged cliffs, and steep, undulating ridgeline. There are no major transmission lines near LD3.

Sensitivity

The LD3 alternative crosses the Lordsburg SLRU (see figure 3.10-12). The Lordsburg Valley SLRU has existing development and has low viewer sensitivity. A small portion of LD3 (1.9 miles) crosses the

I-10 Deming to Lordsburg SLRU. The I-10 Deming to Lordsburg SLRU is a major travel corridor with high viewer sensitivity. The Peloncillo Mountains WSA is visible as a backdrop from I-10.

Key Observation Points

No critical KOPs were identified for LD3. The area has no known populations, and representative views of other proposed routes from I-10 are already available.

Bureau of Land Management Visual Resource Management

The LD3a alternative crosses 0.5 mile of VRM Class II, 7.0 miles of VRM Class III, and 2.5 miles of VRM Class IV BLM-managed lands. The LD3b alternative crosses 1.2 miles of VRM Class IV (see figures 3.10-13 and 3.10-14). These areas of Class II crossed by LD3a and LD3b are associated with the historic Butterfield Trail. Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative LD4

The LD4 alternative is a joint use of a portion of the SunZia project agency preferred alignment and is 52.3 miles long through the San Simon Valley. The LD4 alternative would need to use a combination of connection options in order to connect to the Apache Substation.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The LD4 alternative crosses a diversity of landscapes with scenic quality ratings of Class B and Class C (see figure 3.10-11). The Class C areas are generally characterized by flat desert valleys and playas surrounded by mountains, including the Willcox Playa. The Class B areas are characterized by steep undulating ridgelines, low rounded hills, and eroded rocky peaks. There are also a number of areas along LD4 where existing transmission lines, substations, and other developments do exist. The SQRUs are summarized in table 3.10-17.

Table 3.10-17. Local Alternative LD4 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Lordsburg Valley	C	Lordsburg Valley is characterized by flat valley floors with little variation in topography or color contrast between the sandy soils and low-growing desert vegetation. Buckman Hill, Homestead Hill, and Black Mountain provide isolated topographic variation.	None
Peloncillo Mountains	B	A long, complex mountain range running from the Mexican border northwest to the Arizona border. Two lower valleys to the east and west.	None
San Simon Valley	B	Large river valley between mountain ranges on west and east. San Simon River is not evident through most areas in the valley.	None
Playa De Los Pinos	B	The area is formed by higher mountains surrounding a valley of low, rolling, rounded hills.	None
Sulphur Springs Valley	C	Limited scenic qualities, although Willcox Playa ACEC is an NNL. Most of the playa is a designated bombing range. Fragmented BLM parcels in wide valley with mountain ranges on the east and west sides. Large semi-desert grassland.	None

Sensitivity

The LD 4 alternative crosses 10 SLRUs with low, moderate, and high sensitivity (see figure 3.10-12). Tourist attractions and recreation sites along the proposed route with high viewer sensitivity include hiking opportunities in the Langford Mountains, the Hot Well Dunes OHV area, and Willcox Playa Wildlife Area. Widely dispersed rural residences, agricultural development, and the Bowie Mining District occur along the LD4 alternative. The SLRUs crossed by the LD4 alternative are summarized in table 3.10-18.

Table 3.10-18. Local Alternative LD4 Sensitivity Level Rating Units

SLRU Name	Rating	Description	KOPs
Lordsburg Valley	Low	Valley has development in it.	None
Lordsburg Mesa	Low	Low-usage recreational area with no major population centers. San Simon lies to the east of the Chiricahua Mountains and is at the foothills of the Dos Cabezas Mountains. To the northeast are the Peloncillo Mountains. The ephemeral San Simon River flows northwest though the valley.	None
I-10 Deming to Lordsburg	High	Travel corridor for local residents and tourism.	None
Animas Valley	High	Scenic area enjoyed by local residents and tourists to the area.	None
Dos Cabezas	High	Access to Dos Cabezas Mountain Wilderness.	None
Haekel and Fan Roads	Moderate	San Simon Creek area and moderately used access route to Hot Well Dunes Recreation Area. Popular dispersed recreation area with good access to highways.	None
Hot Well Dunes OHV area	High	2,000-acre Hot Well Dunes OHV area. Popular high-use recreation area near Safford, Clifton, and Duncan.	None
I-10 Willcox to Texas Canyon	High	Major transportation route with scenic areas visible from the highway.	None
Sulphur Spring	Low	Low-use and population area with small parcels of BLM among State and private lands. Sulphur Springs contains mostly private and State lands. The small amount of BLM within the unit is located near the community of Pearce and around mining claims in the Swisshelm Mountains.	None
Willcox Playa Wildlife Area	High	A popular birding location for Sandhill Cranes, and hunting area.	None

Key Observation Points

No critical KOPs were identified for LD4 or its connection options. The area has no known populations, and representative views of other proposed routes from the sensitive areas I-10 are already available.

Bureau of Land Management Visual Resource Management

The LD4 alternative crosses 37.1 miles of Class IV BLM-managed lands (see figures 3.10-13 and 3.10-14). Lands not managed by the BLM are generally State owned or privately owned.

Local Alternative LD 4-Option 4

Segment LD 4-Option 4 is 6.5 miles long and is an alternative to portions of LD4.

Scenic Quality

Segment LD4-Option 4 crosses lands rated as BLM Class C scenic quality.

Sensitivity

Segment LD4-Option 4 crosses with lands with low to high viewer sensitivity. High viewer sensitivity occurs along the I-10 corridor where LD4-Option 4 crosses.

Key Observation Points

No critical KOPs were identified for segment LD4-Option 4. There are representative views from the I-10 corridor described under subroute 2.2.

Bureau of Land Management Visual Resource Management

Segment LD4-Option 4 crosses no BLM managed lands.

Local Alternative LD 4-Option 5

Segment LD 5-Option 4 is 12.2 miles long and is an alternative to portions of LD4.

Scenic Quality

Segment LD4-Option 5 crosses lands rated as BLM Class B and C scenic quality. Class B lands along LD4-Option 5 are characterized by ridgelines, hills, and eroded rocky peaks.

Sensitivity

Segment LD4-Option 5 crosses lands with moderate to high viewer sensitivity. High viewer sensitivity occurs along the I-10 corridor where LD4-Option 5 crosses.

Key Observation Points

No critical KOPs were identified for segment LD4-Option 5.

Bureau of Land Management Visual Resource Management

Segment LD4-Option 5 crosses no BLM-managed lands.

Local Alternative WC1

The WC1 alternative is 15.7 miles long and occurs entirely in Cochise County, Arizona. The WC1 alternative follows I-10 through Willcox, Arizona, ending just north of the Willcox Dry Lake Playa.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

The WC1 alternative crosses the Sulphur Springs Valley SQRU, rated as BLM Class C scenic quality (see figure 3.10-11). The SQRU is characterized by limited scenic qualities, although the Willcox Playa ACEC is an NNL. Most of the playa is a designated bombing range. WC1 follows the I-10 corridor for most of its length.

Sensitivity

The WC1 alternative crosses the I-10 Willcox to New Mexico, I-10 Willcox to Texas Canyon, and Willcox Playa Wildlife Area SLRUs, all of which have high viewer sensitivity (see figure 3.10-12). The I-10 SLRUs are major travel corridors with high viewer sensitivity The Willcox Playa Wildlife Area SLRU is a popular recreation destination for birding and for waterfowl hunting. The WC1 alternative follows the I-10 though the town of Willcox. SLRUs crossed by the WC1 alternative are summarized in table 3.10-19.

Table 3.10-19. Local Alternative WC1 Sensitivity Level Rating Units

SLRU Name	Rating	Description	KOPs
I-10 Willcox to New Mexico	High	Major transportation route with scenic areas visible from the highway	None
I-10 Willcox to Texas Canyon	High	Major transportation route with scenic areas visible from the highway	None
Willcox Playa Wildlife Area	High	A popular birding location for Sandhill Cranes, and hunting area	None

Key Observation Points

No critical KOPs were identified specifically for WC1. KOPs P7-01, P7-02, and P7-03 for the proposed route could be used for WC1.

Bureau of Land Management Visual Resource Management

The WC1 alternative crosses no BLM-managed lands.

Upgrade Section

The proposed Upgrade Section would replace approximately 120 miles of existing 115-kV single-circuit transmission line to a double-circuit 230-kV transmission line. The Upgrade Section is located between the Apache Substation located in Cochise County, Arizona, and the Saguaro Substation located in Pima County, Arizona. The upgrade includes a 2-mile segment of new 230-kV double-circuit segment to connect the existing Western upgrade to the Vail Substation. The Upgrade Section would traverse through portions of Cochise, Pima, and Pinal counties in Arizona, from the Apache Substation to the Saguaro Substation. The Upgrade Section also includes several agency alternatives developed to avoid/minimize impacts to the Tumamoc Hill area, a valued community and cultural feature within Tucson.

ROUTE GROUP 3 – APACHE SUBSTATION TO PANTANO SUBSTATION

The Apache to Pantano route group of the Upgrade Section would start at the Apache Substation in Arizona and traverse westerly to the Pantano Substation located in Pima County. The upgrade line would follow the existing Western 115-kV line, which roughly parallels I-10 in an east-west direction.

The relatively small communities of Dragoon (population 413) and Benson, Arizona (population 5,163) are the population centers located along this portion of the Upgrade Section. Outside of these population centers are scattered rural residences, including ranches, homesteads, and farms.

Recreational areas within this route group include the Little Dragoon and Dragoon Mountains, Texas Canyon, San Pedro River Valley, and recreation within Benson. Recreation in this area is sporadic and typically sparse within the undeveloped desert to the north. However, the lands adjacent to Benson support guest ranches, museums, other tourist attractions, and the Kartchner Caverns, which receive more than 145,000 visitors per year.

The Apache to Pantano route group passes through 0.6 mile of BLM-managed land, all of which is VRM Class IV. The remaining lands are State owned and privately owned.

The landscape in the area of the Apache Substation in Cochise County is largely located within the valley between the Little Dragoon and Dragoon mountains (running south of Texas Canyon) and San Pedro Valley. The segment traverses cropland and rural residences and is characterized by low-density development with a mix of natural landscape, agricultural fields, and rural communities.

Subroute 3.1 – Proponent Preferred

Subroute 3.1, located between Apache and Pantano substations, would follow the existing Western 115-kV power line, which traverses this 41-mile route to provide a connection between the two substations. The developed landscape in this area is generally rural, low-density residential and cropland, surrounded by large swaths of undeveloped open desert. It affords views of several mountain ranges in the background and seldom seen distance zones, including the Dragoon and Little Dragoon mountains, which run south of Texas Canyon and into the San Pedro Valley. As the Proponent Preferred alternative heads east, it crosses the northern corner of the Coronado National Forest for approximately 0.5 mile, then heads just south of the community of Dragoon.

Subroute 3.1 then heads east to cross I-10 as it enters the San Pedro River valley and crosses the San Pedro River, then passes north of Benson, Arizona. Additionally, in this area, the Proponent Preferred alternative closely parallels the Butterfield Trail for approximately 4 miles, diverging at North Pomerene Road just east of the San Pedro River crossing. The town of Benson is the most populated area within the Apache to Pantano segment, and is largely characterized by a small community population concentrated to the south of I-10 and the Proponent Preferred alternative, with rural residences and croplands located outside of the town center. Beyond the town center, the Proponent Preferred alternative passes through rural residential and light industrial development. A portion of the San Pedro Golf Course spans beneath the Proponent Preferred alternative and existing Western 115-kV line; golfers at the San Pedro Golf Course have full middle distance, open views of the line both to the east and west as it crosses perpendicular to the greens.

West of Benson, the Proponent Preferred alternative crosses into Cochise County, Arizona, for approximately 7 miles before connecting with Pantano Substation. The developed landscape is largely rural residential with some cropland just west of Benson, then opens up to undeveloped desert landscape. This segment of the Proponent Preferred alternative is located south of and parallel to I-10 and ranges from 0.5 to 1.5 miles south of the Interstate.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Just west of Apache Substation in the Sulphur Springs Valley, the BLM lands are characterized as scenic quality rating Class C (figure 3.10-15). As the Proponent Preferred alternative heads west beyond the Sulphur Springs Valley, it briefly crosses the Little Dragoon Mountains, which have a Class B scenic quality rating. Scenic quality within the San Pedro Basin, located west of Dragoon, Benson, and Mescal, Arizona, is designated as SQRU Class C (table 3.10-20).

Figure 3.10-15. Scenic Quality Rating Units in the Upgrade Section.

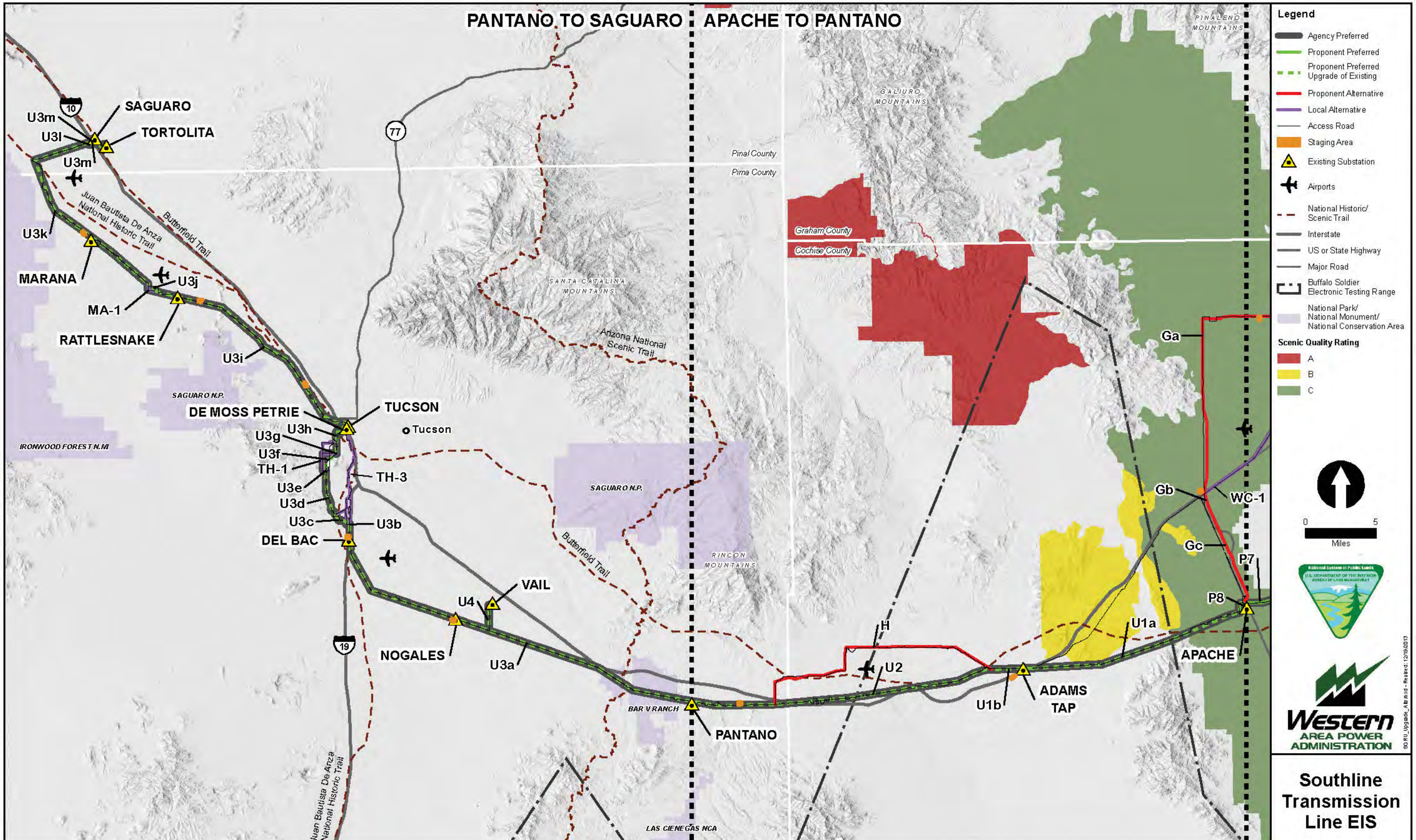


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Table 3.10-20. Subroute 3.1 Scenic Quality Rating Units

SQRU	Rating	Description	KOPs
Willcox Playa	C	(See Hidalgo to Apache route group)	(See Hidalgo to Apache route group)
Dragoon/Little Dragoon Mountains	B	Located on the edge of the Coronado National Forest	U1-01
San Pedro Basin	B	Located on the western edge of residential area between NM 90 and I-10, reveals views within the San Pedro River Basin.	U2-01, U2-04

Sensitivity

The majority of lands along subroute 3.1 are identified as moderate, with some smaller portions of high sensitivity along the Willcox Playa and within the Texas Canyon portion of the Little Dragoon Mountains SLRU (figure 3.10-16). Typically, the lands along subroute 3.1 are infrequently visited, as there are few developed trails and access points. However, the Texas Canyon area is a popular rest stop for travelers on I-10, because it is an appealing landscape replete with long-distance views of large granite boulder-strewn lands. The Willcox Playa (which is mostly located within the Hidalgo to Apache route group) also is designated as a high sensitivity area, because it is widely visited by birders and naturalists seeking views of migrating birds to this area (table 3.10-21).

Table 3.10-21. Subroute 3.1 Sensitivity Level Rating Units

SLRU	Rating	Description	KOPs
Willcox Playa	High	(See Hidalgo to Apache route group)	(See Hidalgo to Apache route group)
Dragoon Mountains	Moderate	Located relatively further from the Proponent Preferred alternative, within landscape with less frequency of viewers.	U1-01
Little Dragoon Mountains	High	Views of large granite boulder-strewn area, unique to the region and sought after views by locals and travelers along I-10.	NA
San Pedro Basin	Moderate	Viewer concern regarding reroute of line because of existing and planned community development.	U2-01, U2-02, U2-03, U2-04

Key Observation Points

KOPs selected along subroute 3.1 are representative of a variety of views along the span between the Apache and Pantano substations, including several SQRUs. The KOPs are largely characterized by low levels of development and natural desert landscape, including desert scrub vegetation, bare rock to low vegetation cover, and a range of topography from low hills to visually dominant rock outcroppings and distant isolated mountain ranges (table 3.10-22).

Table 3.10-22. Subroute 3.1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U1-01	Yes	Dragoon Mountains	Dragoon	Foreground/ Middleground	View from western extent of Coronado National Forest.
U2-01	No	San Pedro Basin	San Pedro Basin	Foreground/ Middleground	View from multiuse recreational park/fields in Benson.

Table 3.10-22. Subroute 3.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U2-02	No	San Pedro Basin	San Pedro Basin	Foreground/ Middleground	View from newly constructed road with unobstructed view from area identified for future development.
U2-03	Yes	San Pedro Basin	San Pedro Basin	Foreground/ Middleground	Represents views from Mescal along rural residential area on North Mescal Road.
U2-04	No	San Pedro Basin	San Pedro Basin	Foreground/ Middleground	Located on Navajo Trail Road and represents low-density residential homesteads with existing views of "H" frames.

Bureau of Land Management Visual Resource Management

Only 0.4 mile of BLM land is designated VRM Class IV (figures 3.10-17 and 3.10-18).

Local Alternative H

Local Alternative H would bypass the town of Benson, and the communities of Pomerene and Mescal, Arizona, to the north, crossing the San Pedro River valley approximately 2 to 3 miles north of the Proponent Alternative. The Proponent Alternative would also follow an existing "H" frame transmission line for the entirety of its length. The alternative would head northwest along the alignment of the existing transmission line, cross the north end of the valley west of Benson, and extend south until it met a railroad line, then would follow the railroad line west along with the existing transmission line until it turned southward and connected with the Proponent Alternative in an area just east of Mescal. This alternative would require the construction of a new transmission line and would not replace the existing "H" frame line.

The local Alternative H route parallels the Butterfield Trail for approximately 1.2 miles before the trail diverges northwesterly. This area is largely unpopulated, with limited recreational opportunities. The primary natural feature is the San Pedro River crossing, which is located approximately 3 miles north of the Proponent Alternative crossing.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Local Alternative H would pass through the same SQRUs (San Pedro River and San Pedro Basin) as the Proponent Preferred alternative, remaining within the scenic quality rating of Class B (table 3.10-23).

Table 3.10-23. Local Alternative H Scenic Quality Rating Unit

SQRU Name	Rating	Description	KOPs
San Pedro Valley	B	Scenic quality is represented by a mix of riparian lands within and adjacent to the river surrounded by desert scrub vegetation, bare rock, and isolated mountains and hills. Vegetation and color variation is most significant adjacent to the San Pedro River which is the primary water feature in the area.	H-01, H-02, H-03

Figure 3.10-16. Sensitivity Level Rating Units in the Upgrade Section.

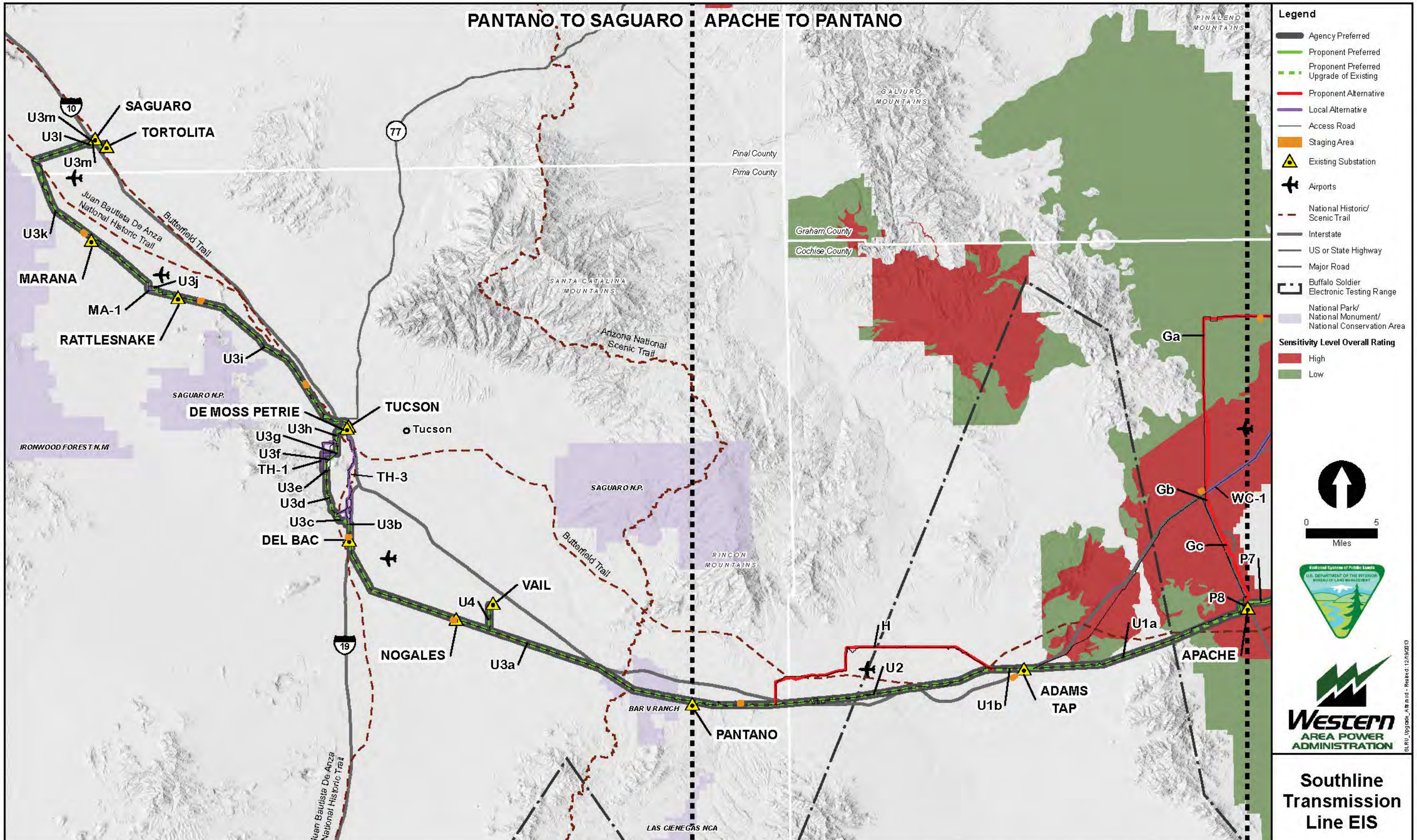
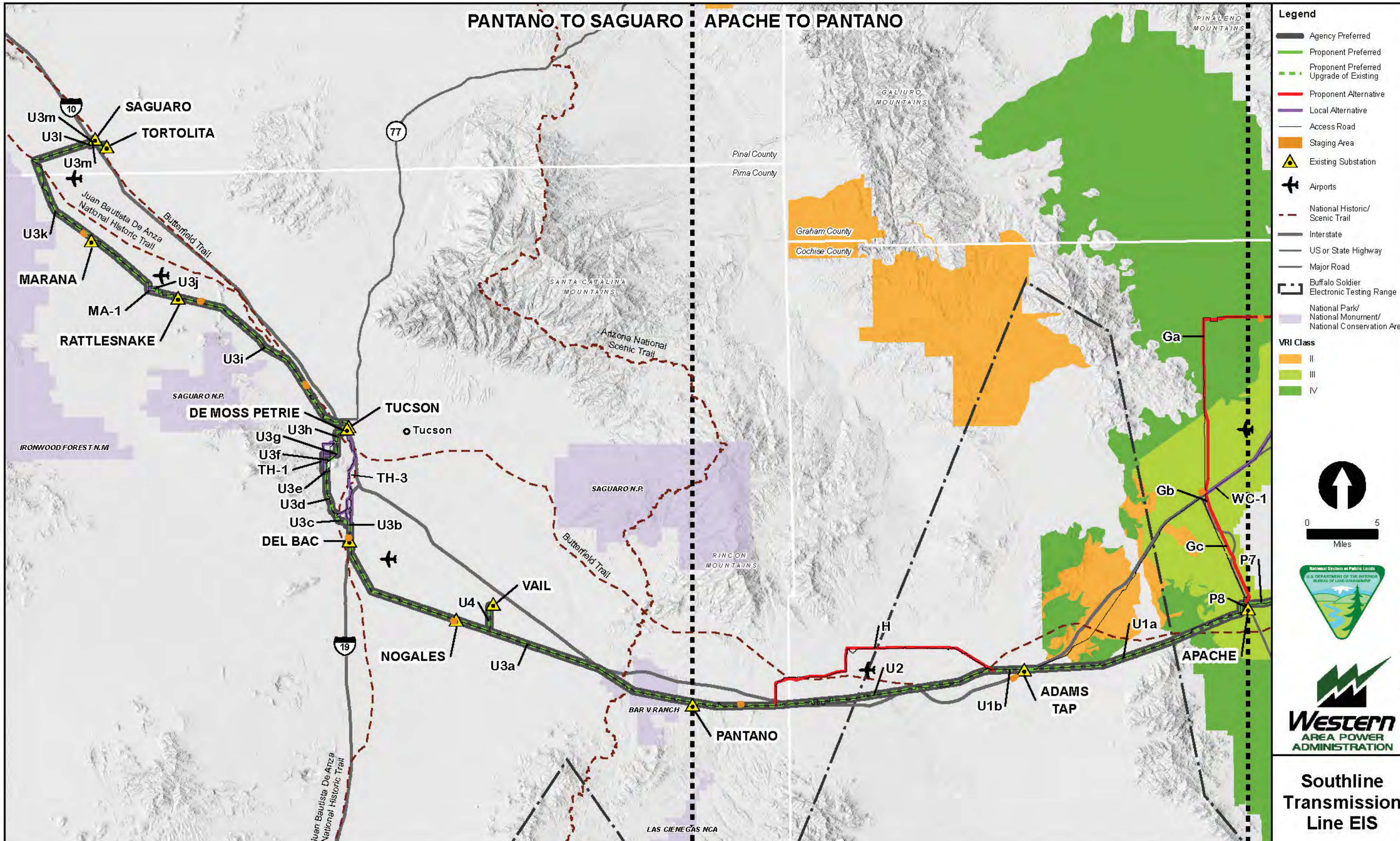
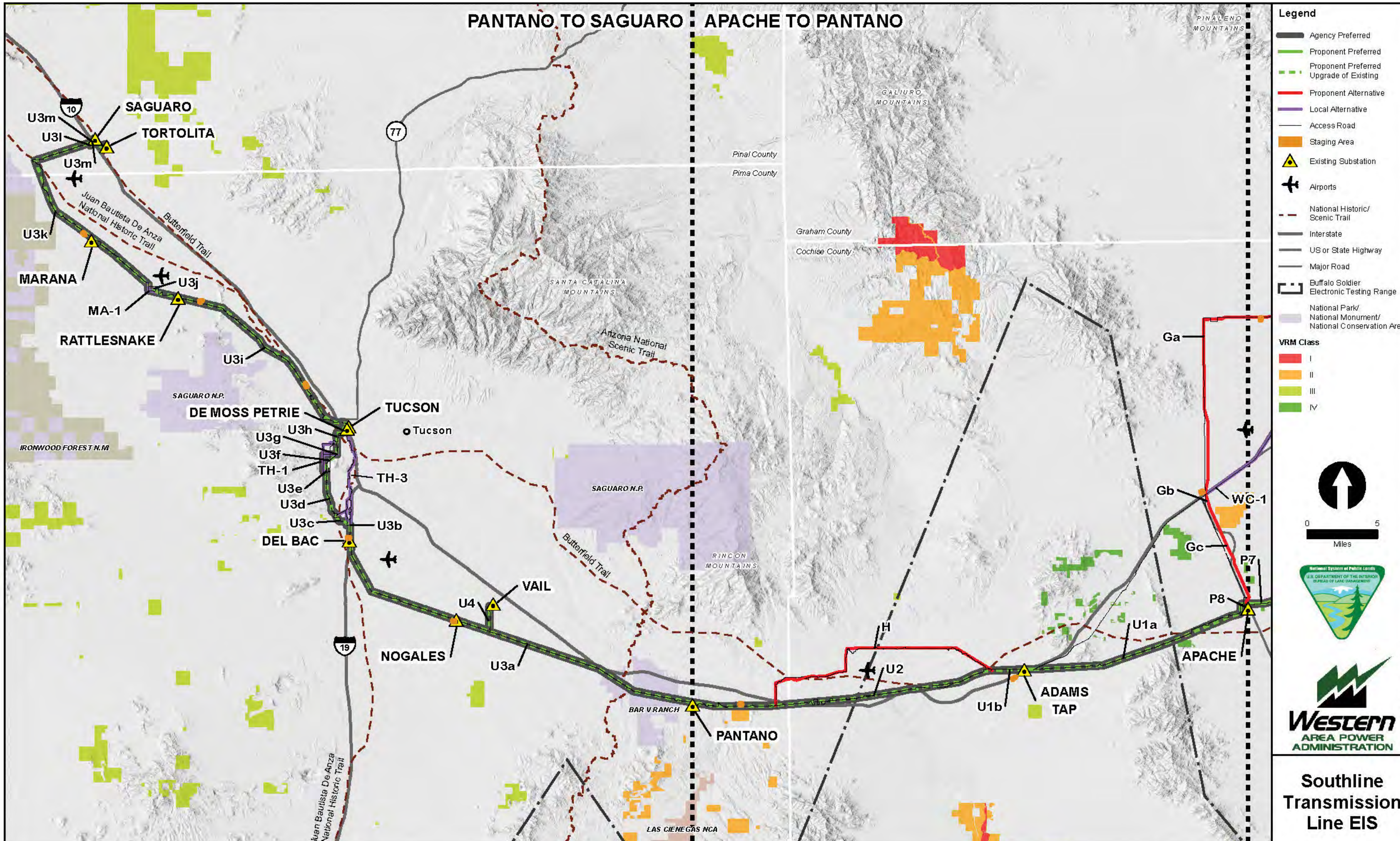


Figure 3.10-17. Visual Resource Inventory classes in the Upgrade Section.



1 **Figure 3.10-18.** Visual Resource Management classes in the Upgrade Section.



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Sensitivity

Local Alternative H would pass through the SLRUs (San Pedro River and San Pedro Basin) as the Proponent Alternative remaining within the sensitivity level rating of moderate (table 3.10-24).

Table 3.10-24. Local Alternative H Sensitivity Level Rating Unit

SQRU Name	Rating	Description	KOPs
San Pedro Valley	Moderate	Low use and low population area, with small concentrations of residential development. The majority of landscape is unpopulated but with well preserved, expansive open desert views.	H-01, H-02, H-03

Key Observation Points

The KOPs selected along the local alternative H route represent dispersed rural residential areas. Given the existence of multiple, similar transmission line structures, the sensitivity level from these residential areas is limited to moderate. However, the large, open expanses of desert views heighten sensitivity from residents, recreators, and travelers (table 3.10-25).

Table 3.10-25. Local Alternative H Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
H-01	Yes	San Pedro River	San Pedro Basin	Foreground/ Middleground	View from Pomerene along North Cascabel Road in a residential area.
H-02	No	San Pedro River	San Pedro Basin	Foreground	View from north Mescal within rural residential area north of Mescal community. This view is in the vicinity of the area where Butterfield Trail parallels the alternative.
H-03	No	San Pedro River	San Pedro Basin	Middleground	View from rural residence/pasture located in Mescal.

Bureau of Land Management Visual Resource Management

There are no BLM lands along local alternative H, and BLM VRM classes do not apply.

ROUTE GROUP 4 – PANTANO SUBSTATION TO SAGUARO SUBSTATION

The Pantano to Saguaro route group is located predominantly outside BLM and federally administered lands. This approximately 73-mile route group passes the towns of Vail and Marana and the highly populated city of Tucson and runs west and northwest to its terminus at the Saguaro Substation.

Subroute 4.1 – Proponent Preferred

Subroute 4.1 traverses a mix of developed and vacant desert as it heads west and north through Vail, Tucson, and Marana, and ends at the Saguaro Substation just north of Marana, Arizona. There is no Proponent Alternative in this area, and subroute 4.1 traverses the entire length of the 73-mile route group. Aside from several swaths of undeveloped open space, the majority of the landscape varies from rural residential development, bedroom communities, and high- to moderate-density urban development in the Tucson area. Tucson is the second largest city in the State of Arizona (population 524,295 (Census Bureau 2013)). Tucson has a major university (University of Arizona), an urban core, and light and heavy industry, and supports a very active tourist and recreationist population as well as seasonal winter residents known as “snowbirds.” The portion of the Proponent Preferred alternative that traverses through the city limits would replace an existing Western 115-kV line and is, in large part, paralleled by other transmission and utility structures in this well-developed area.

To the north and south of the City, the Proponent Preferred alternative continues to parallel the existing Western 115-kV line through small communities, rural residential areas, agricultural land, and open space. None of the lands crossed by the Proponent Preferred alternative in this route group are administered by the BLM.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Scenic quality for the lands crossed by the Proponent Preferred alternative ranges from vacant desert open space to moderate and highly developed urban areas. Scenic quality in urban areas is typically designated as Class D (developed land) (see figure 3.10-15).

Sensitivity

Though much of the Proponent Preferred alternative is located within developed lands, the sensitivity along the route ranges from low to high as the Proponent Preferred alternative traverses areas in which residents and recreationists are located and sensitive to changes in the landscape (see figure 3.10-16). However, due to the existence of other, similar types of utility development (i.e., transmission lines, substations, and ancillary facilities) the viewing sensitivity tends to lessen as the area is characterized by urban congestion, rather than wide open natural views and opportunities for unadulterated desert views.

Key Observation Points

The KOPs identified for the Proponent Preferred alternative follow the entirety of the line from Pantano Substation to the terminus at Saguaro Substation. These KOPs (table 3.10-26) represent a variety of views and viewer types ranging from open, undeveloped desert views to highly urbanized views from or of specific viewing areas of community or natural concern (e.g., Tumamoc Hill, Tucson Mountain Park, and Saguaro National Park West).

Table 3.10-26. Subroute 4.1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U3-03	No	Vail	Vail – SR 83	Foreground	View located along SR 83 in proximity to the community of Vail, Arizona. Scoping comments received regarding visual impacts to the community (and planned community).
U3-04	Yes	Vail	Vail – SR 83	Foreground	View located along SR 83 in proximity to the community of Vail, Arizona. Scoping comments received regarding visual impacts to the community (and planned community).
U3-05	Yes	Vail	Vail – SR 83	Foreground	View is approximately 0.8 mile from Fairgrounds on East Dawn Road, from parking lot and raceway. Lowest sensitivity viewers are represented from this viewpoint.
U3-06	Yes	South Tucson	South Tucson – (I-19 Nogales Highway to Summit)	Foreground	View from small community of Summit, Arizona (adjacent to mobile home park to the south) and vacant disturbed lands to the north.

Table 3.10-26. Subroute 4.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U3-07	No	San Xavier Mission	San Xavier Mission	Background	View from Mission San Xavier del Bac, and San Xavier historic district. View of Proponent Preferred alternative is over 1.5 miles from KOP.
U3-08	No	Santa Cruz River	Anza Trail	Foreground	View is representative of bikeway along the Santa Cruz Bikeway. Commercial development is located on the east bank and the west affords views of the dry/seasonal riverbed. Views to the north and south are largely open and long distance. Anza Trail is identified as an important community and historic feature through Tucson.
U3-09	No	Santa Cruz River	Anza Trail	Foreground	View is located along the Proponent Preferred alternative as it heads west across the Santa Cruz River and into residential development near South Midvale Park Road. Homes are medium-density tract housing with existing views of the “H” frame line.
U3-10	Yes	Tucson West	Tucson West	Foreground	View is from Kennedy Park along 12-kV feeder line and upgrade line.
U3-11	Yes	Tucson West	Tucson West	Foreground	View is 0.11 mile from the upgrade within open space/community space.
U3-12	No	Tumamoc Hill	Sentinel Peak	Foreground/ Middleground	View is from Sentinel Peak oriented toward upgrade line, within the historic and well-used Tumamoc Hill/Sentinel Peak area. This area is considered highly sensitive for a variety of users.
U3-13	Yes	Tumamoc Hill	Tumamoc Hill	Foreground/ Middleground	View shows historic fence approximately 700 feet from upgrade line near sensitive community area.
U3-14	No	Tucson Central	North Silverbell Road to Silvercroft	Foreground	View is from the eastern boundary of Joaquin Murrieta Northwest park, and is adjacent to the upgrade line as it traverses through the urban environment.
U3-15	No	Tucson Central	North Silverbell Road to Silvercroft	Foreground/ Middleground	View shows multiple transmission line congestion, though public sensitivity is low given distance from upgrade line and lack of sensitive receptors. View is from the northern portion of Juhan Park.
TH1-S1	Yes	Tumamoc Hill	Starr Pass and existing line	Foreground	View would be of proposed line rebuilt where the existing H-frame structures are located from the vantage of West Starr Pass Road. From this viewpoint, the proposed structures would be visible against the sky and would also be visible within the vicinity of Tumamoc Hill.
TH1-S9	Yes	Tumamoc Hill	Speedway Boulevard and El Rio	Foreground	View is located near El Rio Golf Course along North El Rio Drive toward TH1c. Existing utility structures are located in this area and views are largely obstructed by development and large vegetation around the golf course.
TH1-S10	Yes	Tumamoc Hill	I-10 to West Grant Road	Foreground	View is from well-traveled intersection of I-10 and West Grant Road, just east of the Santa Cruz River bikeway “the loop.” Upgrade line would cross Grant Road and I-10 to connect with Tucson Substation.
NPS-03	Yes	Anza North	Butterfield Trail	Foreground	View is from bridge crossing where the upgrade line and Butterfield Trail intersect. Area is largely tract housing surrounded by vacant washes and open space.

Table 3.10-26. Subroute 4.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
AN-04		Anza North	Anza Trail	Foreground/ Middleground	View is from bridge crossing where the upgrade line and Anza Trail intersect. Area is largely tract housing surrounded by vacant washes and open space.
U3-16	Yes	Anza North	Rillito and Silverbell Golf Course	Foreground/ Middleground	View from club house of Silverbell Golf Course.
AN-05	Yes	Anza North	Columbus Park	Foreground/ Middleground	View from pavilion at Columbus Park, a well-used local park that has multiple recreational activities, including remote-control stunt plane course, a lake, and picnic areas.
NPS-04	No	Anza North	Columbus Park	Foreground/ Middleground	View from pavilion at Columbus Park, a well-used local park that has multiple recreational activities, including remote-control stunt plane course, a lake, and picnic areas.
AN-06	No	Anza North	Columbus Park	Foreground/ Middleground	View from pavilion at Columbus Park, a well-used local park that has multiple recreational activities, including remote-control stunt plane course, a lake, and picnic areas.
NPS-05	No	Anza North	Columbus Park	Foreground/ Middleground	View from pavilion at Columbus Park, a well-used local park that has multiple recreational activities, including remote-control stunt plane course, a lake, and picnic areas.
NPS-06	No	Anza North	Crossroads Park	Middleground	View from Crossroads at Silverbell District Park is approximately 0.4 mile from the upgrade line to the west. The Anza Trail runs adjacent to the northeast of the park.
AN-07	No	Anza North	Crossroads Park	Middleground	View from Crossroads at Silverbell District Park is approximately 0.4 mile from the upgrade line to the west. The Anza Trail runs adjacent to the northeast of the park.
AN-08	No	Anza North	Anza Trail (north)	Middleground	View is located along the Anza Trail at the eastern border of tract housing; view is 0.5 mile from upgrade line.
SA-01	Yes	Anza North	Saguaro West	Middleground	View is located within the Saguaro National Park (west) from an existing trail oriented toward the proposed upgrade.
NPS-07	No	Anza North	Anza Trail (north)	Background	View is located along the Anza Trail at the eastern border of tract housing; view is 1.5 miles from upgrade line.
AN-09	No	Anza North	Anza Trail (north)	Background	View is located along the Anza Trail at the eastern border of tract housing; view is 1.5 miles from upgrade line.
MA-02	Yes	Marana	Marana/Avra Valley	Foreground	View is from the Marana airport complex, surrounded by agricultural land to the southwest and vacant land to the northeast.
MA-03	Yes	Marana	Marana/Avra Valley	Middleground	View is located along the Anza Trail adjacent to and surrounded by agricultural land and is approximately 0.85 mile from the upgrade line.
AN-12	Yes	Marana	Anza Trail (north)	Middleground	View is located along the Anza Trail to the west of Pinal Airpark and approximately 1 mile from the upgrade line.
U3-17	Yes	Anza North	Silverbell	Foreground	View from west side of upgrade line across from Columbus Park.

Table 3.10-26. Subroute 4.1 Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U3-18	No	Anza North	Silverbell	Foreground	Few/no residences along this road. Located 0.14 mile from Anza Trail outside of sensitive viewing.
U3-19	No	Picture Rocks	Saguaro West to Twin Peaks Road	Background	View is approximately 2 miles from upgrade line and represents views from road accessing Saguaro National Park–West.
U3-20	No	Anza North	Silverbell Road	Foreground	View from residential area along upgrade.
U3-21	No	Anza North	Silverbell Road	Foreground	View from south of West Twin Peaks Road within residential/commercial area.
U3-22	Yes	Picture Rocks	Picture Rocks Road to Saguaro National Park–West	Foreground	View from West Twin Peaks Road slightly northeast of the upgrade line. Road is well traveled by recreators and commuters to the north Tucson/Marana and Saguaro National Park–West area.
U3-23	Yes	Marana	Marana/Avra Valley	Foreground	View located adjacent to upgrade line on West Silverbell Road.
U3-24	Yes	Red Rocks North	I-10 Red Rock to North Tucson	Background	View is located within new residential community at Red Rock, oriented south to the upgrade line and substation.

Bureau of Land Management Visual Resource Management

No BLM VRM exists for this area as the lands are not administered by BLM.

Local Alternative MA1

The MA1 local alternative is approximately 1.1 miles long and is adjacent to the Marana Airport. This alternative was developed to avoid future planned expansion of the Marana Airport in an "L" shape that runs west and north to reconnect with the Proponent Alternative.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

This very short alternative alignment is located adjacent to developed land and is of low scenic quality because of the broad, flat, developed nature of the landscape in this area (table 3.10-27; see figure 3.10-15).

Table 3.10-27. Local Alternative MA1 Scenic Quality Rating Unit

SQRU	Rating	Description	KOPs
Avra Valley	C	Views are characterized largely by the adjacent aviation facility and surrounding agricultural lands, bisected by paved roadways.	MA-02, MA-03

Sensitivity

Local alternative MA1 is located within a low visual sensitivity area due to the adjacent development (i.e., airport and ancillary associated facilities) and adjacent agricultural development within the Avra Valley (table 3.10-28; see figure 3.10-16).

Table 3.10-28. Local Alternative MA1 Sensitivity Level Rating Unit

SQRU	Rating	Description	KOPs
Avra Valley	Low	Viewers include patrons of the Marana Airport, residents of the Avra Valley, or travelers en route to the Saguaro National Park (west), I-10, or other destinations in the Marana outskirts.	MA-02, MA-03

Key Observation Points

KOPs selected for the MA1 local alternative represent views from within the Avra Valley, oriented easterly toward the alignment, and, conversely, from the SkyLine Restaurant, located within the airport complex, oriented westerly toward the alignment (table 3.10-29).

Table 3.10-29. Local Alternative MA1 Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
MA-02	Yes	Marana	Avra Valley	Foreground	View is from the Marana Airport.
MA-03	No	Marana	Anza Trail	Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.

Bureau of Land Management Visual Resource Management

No BLM lands are crossed for local alternative MA1; lands are primarily privately owned.

Local Alternatives – Tumamoc Hill

Several alternatives were developed in the area of Tumamoc Hill (TH1a, TH1b, TH1c, TH1-Option, TH3a, TH3b, TH3-Option A, TH3-Option B, and TH3-Option C). These agency alternatives and options were derived from ongoing agency and public outreach pertaining to the critically sensitive Tumamoc Hill area. Tumamoc Hill is considered an ecological and cultural hub located just west of Tucson's downtown core. It is a protected open space and is considered a "hallowed refuge for people and nature" (University of Arizona, 2013). On Tumamoc Hill is a 2,300-year-old village site that was once home to the Hohokam people. There are hundreds of petroglyphs and prehistoric vestiges including burial sites for the Apache and Hohokam people. Development within the Tumamoc Hill area includes an existing "H" frame 115-kV transmission line, many transmitter towers, a historic lookout structure, recreational trails, and the Steward Observatory. This area is considered a landmark for Tucson and is a popular recreational area with pedestrian and non-motorized trails as well as interpretive signage and public education exhibits.

The Tumamoc Hill is recognized as an NHL and archaeological district and is in the NRHP.

Three primary agency alternatives and options were developed to minimize impact to the Tumamoc Hill area; these agency alternatives are wholly located outside of BLM-administered lands. Scenic quality and sensitivity levels were developed in keeping with BLM methods for visual resource analysis but are not subject to BLM or other Federal agency plan conformance.

Bureau of Land Management Visual Resources Inventory

Scenic Quality

Tumamoc Hill is located within a largely moderate-density residential area; however, the lands within the Tumamoc Hill SQRU (table 3.10-30) are primarily undeveloped with some utility development (e.g., radio towers and transmission lines), recreational facilities, research facilities, and protected Hohokam village sites (see figure 3.10-15). Given the rare combination of open space, archaeological ruins, and recreational opportunity, scenic quality in the Tumamoc Hill area is considered Class A and is considered an important visual and cultural resource.

Table 3.10-30. Local Alternatives Tumamoc Hill Scenic Quality Rating Unit

SQRU	Rating	Description	KOPs
Tumamoc Hill	A	Flanked by residential and utility development, characterized by rolling hills and significant topography. Color contrast is low; vegetation coverage ranges from bare, rocky desert to large-growth desert shrubs. Deer Mountain, Tumamoc Hill, and Tucson Mountain provide isolated topographic variation.	U3-08, U3-09, AN-01, NPS-01, NPS-02, TH3-R4, AN-02, TH1-S2, TH3-R3, TH1-S3, TH1-S4, TH1-S5

Sensitivity

The Tumamoc Hill area is considered highly sensitive because of its visual and cultural significance in the region (see figure 3.10-16). Surrounded by residences and with recreational and educational opportunities throughout the area, Tumamoc Hill is a well-known, popular destination for local residents and visitors to the area (table 3.10-31).

Table 3.10-31. Local Alternatives Tumamoc Hill Sensitivity Level Rating Unit

SQRU Name	Rating	Description	KOPs
Tumamoc Hill	High	High- to moderate-density residential development to the immediate boundary, very high usage area which supports a multitude of recreational, educational, research, and astronomy activities.	U3-08, U3-09, AN-01, NPS-01, NPS-02, TH3-R4, AN-02, TH1-S2, TH3-R3, TH1-S3, TH1-S4, TH1-S5

Key Observation Points

The KOPs (table 3.10-32) identified for the Tumamoc Hill area include a variety of views and represent a variety of sensitive viewers, including residents, recreators, researchers, and travelers viewing from the roadway.

Table 3.10-32. Local Alternatives Tumamoc Hill Key Observation Point Descriptions

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U3-08	No	Santa Cruz River	Anza Trail	Foreground	View is representative of bikeway along the Santa Cruz Bikeway. Commercial development is located on the east bank and the west affords views of the dry/seasonal riverbed. Views to the north and south are largely open and long distance. Anza Trail is identified as an important community and historic feature through Tucson.

1 **Table 3.10-32.** Local Alternatives Tumamoc Hill Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
U3-09	No	Santa Cruz River	Anza Trail	Foreground	View is located along the Proponent Preferred alternative as it heads west across the Santa Cruz River and into residential development near South Midvale Park Road. Homes are medium-density tract housing with existing views of the "H" frame line.
AN-01	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
NPS-01	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
NPS-02	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
TH3-R4	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
AN-02	No	Tumamoc Hill	Sentinel Peak	Foreground/ Middleground	View is from Sentinel Peak oriented toward upgrade line, within the historic and well-used Tumamoc Hill/Sentinel Peak area. This area is considered highly sensitive for a variety of users.
TH1-S2	No	Tumamoc Hill	Starr Pass to Kinder Morgan Pipeline	Foreground/ Middleground	View would be of agency alternative at West Starr Pass Road looking north to the Tumamoc Hill. From this viewpoint, the proposed structures would be visible against the sky and would also be visible within the vicinity of Tumamoc Hill.
TH3-R3	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
TH1-S3	No	Tumamoc Hill	Starr Pass to Deer Mountain	Foreground/ Middleground	View would be from Starr Pass Road in the vicinity of Deer Mountain looking toward agency alternative that runs parallel north on Greasewood Road. This area is a mix of recreation and residential.
TH1-S4	No	Tumamoc Hill	Greasewood to Deer Mountain	Foreground/ Middleground	View is located south of Deer Mountain at the Tolson Elementary School on Greasewood Road and represents views from both the school and recreators at Deer Mountain.
TH1-S5	No	Tumamoc Hill	Greasewood to Calle Tonala	Foreground/ Middleground	View represents residences within the neighborhoods to the west of Greasewood Road An existing 69-kV line runs north and south on Greasewood Road.
TH1-S6	No	Tumamoc Hill	Greasewood to Broadway Blvd.	Foreground/ Middleground	View represents residences within the neighborhoods to the west of Greasewood Road An existing 69-kV line runs north and south on Greasewood Road.
TH3-R2	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
TH1-S7	No	Tumamoc Hill	Greasewood and Speedway	Foreground/ Middleground	View is from intersection of Greasewood Road and Speedway Boulevard, both roads are very well traveled at a posted speed of 45 miles per hour (mph).
TH1-S8	No	Tumamoc Hill	Speedway	Foreground/ Middleground	View is from Speedway Boulevard, road is very well traveled at a posted speed of 45 mph.

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Table 3.10-32. Local Alternatives Tumamoc Hill Key Observation Point Descriptions (Continued)

KOP	Currently Simulated?	SQRU	SLRU	Distance Zone	Description and Rationale
TH3-R1	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.
AN-03	No	Santa Cruz River	Anza Trail	Foreground/ Middleground	View is located along the Loop on the Santa Cruz River Bikeway/Anza Trail.

Bureau of Land Management Visual Resource Management

No BLM lands are crossed. Lands are private, State owned, or county owned.

3.11 LAND USE, INCLUDING FARM AND RANGE RESOURCES AND MILITARY OPERATIONS

This section describes the land uses that currently take place within the analysis area, including farm and range resources and military operations.

3.11.1 Land Use

Land use baseline conditions (the land use "affected environment") includes the discussion of existing land uses in terms of land ownership, management of lands, land use authorizations and ROWs (including lands and realty actions), and future or planned land uses. Land ownership in the New Build Section and Upgrade Section is presented in figures 3.11-1 and 3.11-2. Management of lands indicates the processes and functions a particular land-managing agency (e.g., BLM, State land departments, etc.) implements to accomplish the stated goals and objectives of the land. Management of lands is normally specified in an agency's Land Use Plan. Land use authorizations and ROWs are exceptions granted by the agency for a particular use. Future or planned land uses are trends, anticipated growth/reductions, or set-asides intended to accommodate reasonably foreseeable uses of a particular land area, such as but not limited to future recreation use, future grazing, or future municipal or rural development. The information provided in the subsection is primarily sourced from a report titled "Southline Transmission Project Resource Report 7: Land Use" (CH2M Hill 2013k). The contents of that report are used herein without specific reference.

Analysis Area

The geographic scope for the land use analysis area for the New Build Section is a 2-mile corridor around the action alternatives (1-mile buffer on either side of the centerline). In addition, substations and access roads that are proposed outside the 2-mile corridor are included in the land use analysis area. Some substation expansions and access roads would occur outside the 2-mile corridor and are thus included to capture any potential changes to existing land uses that may result if the proposed project were constructed. The 2-mile corridor is used to identify land uses and land use resources that could be impacted by surface disturbance and where construction materials, equipment, and workers that may be present intermittently along the ROW (i.e., surface disturbance would not occur ROW-wide; much of the ROW will experience minor or no surface disturbance at all). By analyzing a 2-mile corridor analysis area, adjustments to the final design and layout would acknowledge potential incompatible land uses and the adjustment would be captured by the 2-mile analysis area, thus not requiring additional land use analysis. The 2-mile corridor is also used to capture potential changes to the land use resources' visual character (i.e., 2 miles represents a reasonable distance for the human naked eye to "see" potential foreground changes to land uses), and where available, BLM VRM settings. Visual resources are described in section 3.10.

The land use analysis area for the Upgrade Section is a 500-foot corridor (250-foot buffer on either side of the centerline). The Upgrade Section would not change the physical location of the existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines. All substations and access roads would be wholly contained within the existing ROW under the Upgrade Section. Since the Upgrade Section would utilize existing facilities and would not introduce a new visual contrast, the analysis area for the land use resources' visual character is the same 500-foot corridor. Further, there are very limited BLM lands in the Upgrade Section that are subject to existing BLM VRM settings. The temporal scope for the land use analysis area is for the life of the proposed project (50 years).

Laws, Ordinances, Regulations, and Standards

The Federal, State, and local agency jurisdictions that would be traversed by the Project have adopted Land Use Plans and regulations that guide the type, time, and intensity of land use. An inventory of applicable plans was conducted to determine which land use plans may intersect with the Project. The following discussion summarizes the relevant land use laws, regulations, plans, and policies that would apply to the Project (laws, regulations, plans, and policies discussed in chapter 2 or other resource sections are not repeated here).

FEDERAL

Federal Land Policy and Management Act of 1976, as Amended

The FLPMA and the regulations contained in 43 CFR 1600 govern the BLM planning process. The primary legal basis for authorizing a ROW grant on BLM land is Section 501 of the FLPMA. Under the FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew ROWs over, on, or through such land for utilities, roads, trails, highways, railroads, canals, etc. The FLPMA provides the BLM with authority to issue ROW grants for the use, occupancy, and development of public lands.

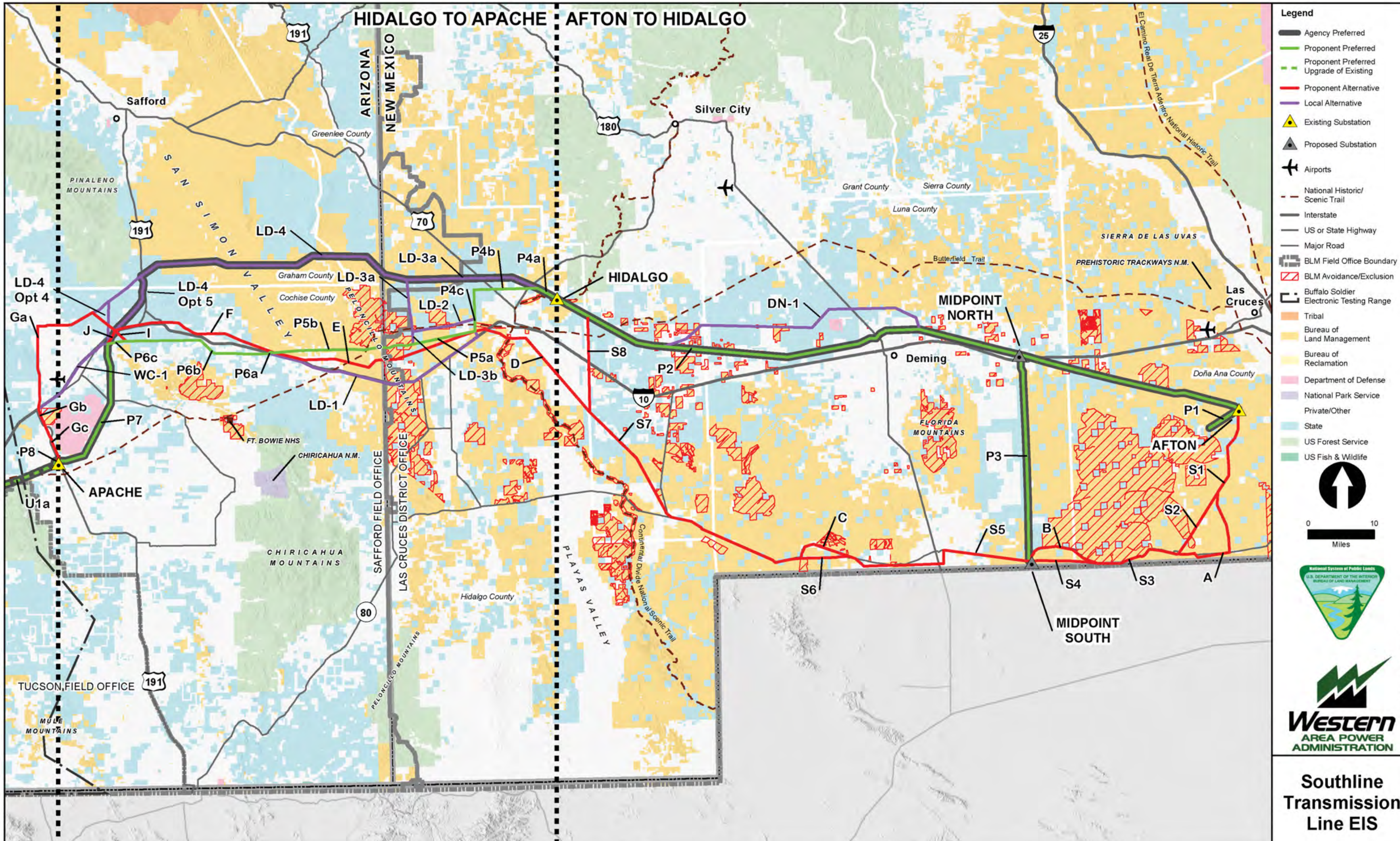
Energy Policy Act of 2005

Section 368 of the EPAct, PL 109-58 (H.R. 6), directs the Secretaries of Agriculture, Commerce, Defense, Energy, and Interior to designate under their respective authorities corridors on Federal land in 11 western states for oil, gas, and hydrogen pipelines, and electricity transmission and distribution facilities (utility corridors). These utility corridors are designated by Federal, State, or county agencies and can be determined through coordination between multiple agencies to help ensure continuity of the corridors between different jurisdictional land ownership. These Section 368 lands can be recognized across multiple agencies as existing utility corridors and identified as the preferred location for new utility lines. Within the land use analysis area, there are existing Section 368 lands. Both the proposed Project and its alternatives follow portions of the existing Section 368 lands within the New Build Section.

U.S. Bureau of Reclamation

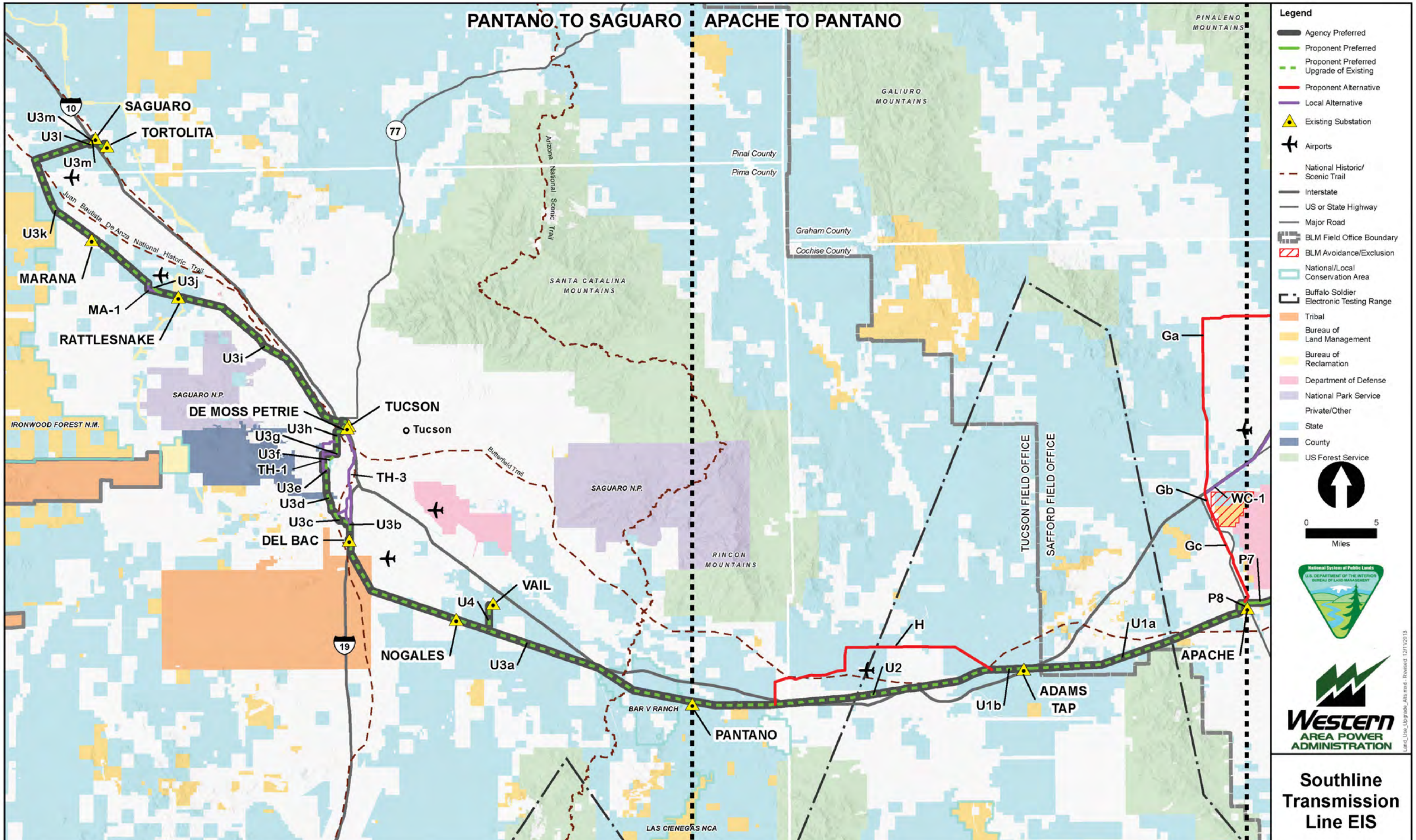
Reclamation manages, develops, and protects water and related resources in the western United States. It is the largest wholesaler of water in the country and functions as a contemporary water management agency (Reclamation 2013). In the Upgrade Section of the proposed Project, the analysis area crosses a small area (less than 1 mile) of Reclamation-managed land (segment U3i). Reclamation issues ROWs under 43 U.S.C. 1761-1771 and 43 CFR 429. The portion of the proposed Project crossing Reclamation lands includes existing transmission facilities and substation areas that already have an existing use authorization.

1 **Figure 3.11-1.** Land ownership in the New Build Section.



2

Figure 3.11-2. Land ownership in the Upgrade Section.



Bureau of Indian Affairs

The DOI provides services directly or through contracts, grants, or compacts to 566 federally recognized tribes with a service population of about 1.9 million American Indian and Alaska Natives (BIA 2012). Natural resources management is among the programs administered through the BIA. The analysis area crosses land managed by the BIA (and the Fort Sills Apache, who are becoming reestablished in their traditional homeland) within the New Build Section; however, the Project would not be located on the Fort Sills Apache lands. The analysis area also crosses land managed by the BIA and the San Xavier District of the Tohono O'odham Nation along the Upgrade Section. Approximately 3 miles of segment U3a would cross the northeast portion of the San Xavier District of the Tohono O'odham Nation. The Tohono O'odham, San Xavier District reservation includes Mission San Xavier del Bac, a Spanish colonial mission open to the public. The San Carlos Indian Reservation is approximately 35 miles from the analysis area in the Upgrade Section of the proposed Project. The BIA operates under the DOI, and any ROW requests are done in coordination with the local tribe's governing authority (e.g., Tohono O'odham Department of Planning and Economic Development).

STATE

New Mexico Public Regulation Commission

The New Mexico Public Regulation Commission control all aspects of transmission line siting within the state. Three permits are required to build a transmission line greater than or equal to 230 kV: (1) Certificate of Public Convenience and Necessity; (2) Location Permit; and (3) Right-of-Way Width Determinations, which establish the requirement for Commission approval on all proposed transmission lines with a ROW width greater than 100 feet, regardless of voltage (New Mexico Public Regulation Commission 2013).

Arizona Corporation Commission

The ACC established a Power Plant and Transmission Line Siting Committee. The Committee provides a single, independent forum responsible for evaluation of applications to build power plants (100 MW or more) or transmission line projects (of 115 kV or more) in the state.

Proposed power plants or transmission lines subject to Committee jurisdiction are required to submit an application to the ACC for a certificate of environmental compatibility (CEC). During open public hearings, the Committee makes a recommendation to the ACC regarding approval of the CEC, and may propose conditions and/or restrictions for inclusion in the CEC. The ACC makes the final determination and may accept, reject, or modify the Committee's recommendation (ACC 2013).

Land Use Plans

Land uses on Federal lands in the analysis area are governed by various Land Use Plans. These plans typically establish goals, objectives, and standards that apply to the land and resources managed under the plan. To ensure the best balance of uses and resource protections for public lands, Federal agencies undertake extensive land use planning through a collaborative approach with local, State, and tribal governments; the general public; and stakeholder groups. The documents provide land use planning and management direction on a broad scale and guide future actions on Federal land. Land Use Plans and the decisions they promulgate are the basis for every on-the-ground action the agency undertakes. As required by FLPMA, NEPA, and Federal land management policy, public lands that are not designated for special management must be managed under the principles of multiple use and sustained yield. Each of the plans listed herein must be compatible with action alternatives, if implemented. This compatibility analysis is presented in Chapter 4, “Environmental Consequences.”

The BLM manages a majority of the Federal lands within the analysis area for the proposed Project. The 1993 Mimbres RMP (BLM 1993) is the primary plan that covers analysis area in New Mexico. The BLM’s Safford and Tucson field office planning areas in Arizona include lands within the analysis area, including the Peloncillo Mountains Wilderness. The Phoenix RMP (BLM 1988a), Safford RMP (BLM 1991) and the Peloncillo Mountains Wilderness Management Plan (BLM 1995) cover portions of the analysis area in Arizona. Plans governing BLM lands are described below.

FEDERAL

Mimbres Resource Management Plan

The Mimbres RMP manages certain lands within the Las Cruces District. The Mimbres RMP, signed in December 1993, was written at a time when the BLM Las Cruces District Office consisted of two Resource Areas, one of which was the Mimbres Resource Area. At this point the administrative unit is referenced as the Las Cruces District Office, with no smaller sub-units, and includes lands in both Sierra and Otero counties. The RMP provides long-term direction for the BLM’s management decisions and applies to BLM lands in Grant, Hidalgo, Luna, and Doña Ana counties. It includes all New Mexico portions of the New Build Section, including the proposed route, alternatives, and the agency alternatives. The Mimbres RMP establishes areas for limited, restricted, or exclusive uses, levels of production, allowable resource uses, resource condition objectives, program uses, program constraints, and general management direction. Additionally, the RMP sets forth the land use decisions, terms, and conditions for guiding and controlling future management actions on public land in the Mimbres RMP planning area. All uses and activities in the resource area must conform with the decisions, terms, and conditions described in the RMP. ROWs are issued on a case-by-case basis. Further, the RMP designates both exclusion and avoidance areas for ROWs. While exclusion areas only allow ROW grants when mandated by law, ROWs may be granted within avoidance areas where no feasible alternative route or designated corridor is available. Special terms and conditions are usually required. The Mimbres RMP designated ACECs and SMAs, and identifies specific management guidance therein. Doña Ana County is currently part of the Mimbres RMP but will eventually be included in a new planning unit (see discussion in the future land use subsection of chapter 4). The 1993 Mimbres Plan includes management prescriptions for the CDNST (BLM 1993) (refer to Appendix F, “National Scenic and Historic Trails Assessment”). All of route group 1 and portions of route group 2 would occur within the Mimbres RMP planning area.

The Mimbres RMP was amended in support of the Solar Energy Development PEIS. The amendments designated approximately 100,000 acres as solar SEZs within the Las Cruces District Mimbres RMP–managed lands. The BLM would prioritize solar energy development in SEZs (as well as development of associated transmission infrastructure) (DOE and BLM 2012).

BLM identifies ROW Avoidance or Exclusion Areas during the RMP planning process. There are avoidance areas within the analysis area that are recognized in the Mimbres RMP; this is discussed below under the “Land Tenure” subsection below.

The TriCounty RMP is currently in draft form; when approved, it will amend a portion of the 1993 Mimbres RMP in Doña Ana County.

Safford Resource Management Plan

The Safford RMP, finalized in December 1991, establishes management direction for lands administered by the BLM Safford District Office, extending from the New Mexico border to west of Benson, Arizona.

At this time, no revisions or plan amendments are proposed, and the 1991 Safford RMP is the guiding plan. This includes both the New Build Section and Upgrade Section of the proposed Project and alternatives. ROWs are issued on a case-by-case basis. The Safford RMP, like the Mimbres RMP, identifies objectives and policies for lands managed by the BLM, and also identifies avoidance and exclusion areas for land actions such as ROWs (BLM 1991). Route group 2 in Arizona, and one segment in route group 3 (U1a) would occur within the Safford RMP planning area. The Safford RMP was not amended in support of the Solar Energy Development PEIS. There are no avoidance areas recognized by the Safford RMP within the analysis area.

Peloncillo Mountains Wilderness Management Plan

The Peloncillo Mountains Wilderness is located northeast of San Simon and is identified as an exclusion area in the Safford RMP. The Wilderness Management Plan (BLM 1995) establishes the objectives, policies, and actions by which the Peloncillo Mountains Wilderness is managed. The analysis area includes a small portion of the Wilderness; however, the proposed project and alternatives would not cross the wilderness (BLM 1995). The Peloncillo Mountains Wilderness Management Plan planning area is located within route group 3; however, the actual project footprint would be outside the Peloncillo Mountains Wilderness Management Plan planning area. The Peloncillo Mountains Wilderness Plan was exempted from amendment in support of the Solar Energy Development PEIS. The Peloncillo Mountains Wilderness Plan recognizes the entire wilderness area as an exclusion area. No project facilities would be constructed in the wilderness area since it expressly prohibited by the enabling legislation of the Wilderness Act, in addition to the Safford RMP and Peloncillo Mountains Wilderness Plan.

Phoenix Resource Management Plan

The BLM Tucson Field Office is managed under the 1988 Phoenix RMP. At this time, no revisions or plan amendments are proposed, and the 1988 Phoenix RMP is the guiding plan. Land use authorizations (ROWs, leases, permits, easements) are issued on a case-by-case basis. The RMP specifies that ROWs would be issued to promote the maximum use of existing ROWs, including joint use whenever possible. Corridors, as identified in the RMP, identify the BLM’s preferred utility systems routing. No avoidance or exclusion areas prescribed by the Phoenix RMP would occur within the analysis area. However, with the exception of those areas identified in the RMP as closed to ROW development, the BLM land is generally open to ROW development on a case-by-case basis (BLM 1988a). Route group 4 would occur within the Phoenix RMP planning area. The Phoenix RMP was not amended in support of the Solar Energy Development PEIS. There are no avoidance areas recognized by the Phoenix RMP within the analysis area.

Continental Divide National Scenic Trail Comprehensive Plan

The 2009 Comprehensive Plan for the CDNST provides management direction to the CDNST Interagency Leadership Council, which includes the U.S. Forest Service, BLM, and NPS. Segments of the trail intersect the analysis area and proposed Project in various locations near Lordsburg in New Mexico. As described in the plan, the nature and purpose of the CDNST is to provide for high-quality, scenic, hiking, and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor. Extending 3,100 miles between Mexico and Canada, the trail traverses landscapes primarily on public lands within 50 miles of the geographic feature known as the Continental Divide. The CDNST was established in 1978 through the authority of the National Trails System Act (PL 90-543) and can be identified with line-of-sight signs except where it follows ranch roads. Equestrian facilities are intermittent and in various stages of development. The CDNST plan specifies that on public lands administered by the BLM, a VRI must be conducted on the basis that the CDNST is a high sensitivity–level travel route, with the inventory performed as if the trail exists even in sections where it is proposed for construction or reconstruction (U.S. Forest Service 2009). The 1993 Mimbres Plan includes management prescriptions for the CDNST (BLM 1993). An ongoing VRI is described in section 3.10. The CDNST is discussed in further in Section 3.12, “Special Designations;” Section 3.14, “Recreation;” and Appendix F, “National Scenic and Historic Trails Assessment.” The CDNST Plan was exempted from amendment in support of the Solar Energy Development PEIS.

Coronado National Forest Plan

The existing Western line (segment U1a) crosses a 0.5-mile stretch of the Dragoon Ecosystem Management Area of the Coronado National Forest, managed by the Douglas Ranger District. The portion of the existing line crossing Coronado National Forest lands includes existing transmission facilities that already have an existing use authorization. The 1986 “Coronado National Forest Land and Resource Management Plan,” amended through 2009, provides management direction for the National Forest System lands in southeastern Arizona and southwestern New Mexico, providing for integrated multiple uses. ROWs are issued on a case-by-case basis (U.S. Forest Service 1986a). A draft updated Coronado National Forest Plan was prepared in 2011 and when finalized, will replace the 1986 plan. Project alternatives for the 2011 draft Coronado National Forest Plan acknowledge the existing Western line that would be included in the analysis area.

Las Cienegas Resource Management Plan

The 2003 Las Cienegas RMP is a plan for managing 49,000 acres of public land, resources, and uses within the Las Cienegas National Conservation Area NCA and Sonoita Valley Acquisition Planning District (SVAPD). The NCA was designated by Congress in order to conserve, protect, and enhance the unique and nationally important aquatic, wildlife, vegetative, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland and riparian resources and values of the public lands within the NCA, while allowing livestock grazing and recreation to continue in appropriate areas (PL 106-538). ROWs are issued on a case-by-case basis. The existing Western line within route group 3 (segment U3a) crosses the NCA and would occur within the SVAPD on non-BLM lands (BLM 2003). The SVAPD is primarily composed of private land. BLM (or other land conservation organizations) pursue land tenure and acquisition options within the SVAPD in order to further protect the NCA, as opportunities are available. The Las Cienegas NCA RMP was exempted from amendment in support of the Solar Energy Development PEIS.

Saguaro National Park Abbreviated Final General Management Plan

The 2008 Final General Management Plan (NPS 2008) defines resource conditions and visitor experiences; and provides a framework for management decisions about how to protect resources, provide for visitor experiences, and manage visitor use; and ensures foundations for decisions are developed in consultation with stakeholders. The analysis area for the existing Western line in subroute 4.1 (segment U3i) is adjacent to NPS lands (Saguaro National Park West Unit). No project activities would occur within the Park and as the existing Western line in this area is located approximately 0.5 mile to the northeast of the Park.

Juan Bautista de Anza National Historic Trail (Anza Trail) Comprehensive Management and Use Plan

The 1996 Anza Trail Comprehensive Management and Use Plan is administered by the NPS. The Anza Trail stretches from Nogales, Arizona, to San Francisco, California. Because only a small portion of the 1,200-mile Anza Trail crosses Federal land available for trail uses, the role of the NPS in the development and management of trail features would primarily be that of trail-wide coordination. The 1996 Anza Trail

Plan does not include management prescriptions for transmission line construction, spanning, or co-location. Portions of subroute 4.1 would occur within the Anza Trail planning area (NPS 1996). Further information about the Anza Trail is presented in Section 3.12, "Special Designations," and Appendix F, "National Scenic and Historic Trails Assessment."

Ironwood Forest National Monument Resource Management Plan

The RMP for the Ironwood Forest National Monument (IFNM) was completed in February 2013. IFNM, which encompasses approximately 189,600 acres of land, was established in 2000 under the authority of the Antiquities Act. ROWs are issued on a case-by-case basis. The IFNM intersects the analysis area for route group 4; however, the proposed Project and alternative footprints would be outside the IFNM (BLM 2013c). The IFNM RMP was exempted from amendment in support of the Solar Energy Development PEIS.

STATE

Willcox Playa Wildlife Area

The Willcox Playa Wildlife Area is a mixed-ownership area of approximately 595 acres, including 120 acres of deeded land, 320 acres of land patented from the BLM, a 115-acre perpetual ROW from the ASLD, and a 40-acre easement from a private landowner. The Wildlife Area is adjacent to the DOD land that comprises the majority of the actual playa, which is more than 27,000 acres. Management emphasis for the Willcox Playa Wildlife Area is to support the best wildlife habitat possible on the wildlife area for present and future generations. This emphasis includes keeping opportunities available for public hunting and other wildlife-oriented recreation (AGFD 2012c). The management emphasis for the Willcox Playa Wildlife Area does not include management prescriptions for transmission line construction. Subroutes 2.1 and 2.2 within route group 2 are adjacent to the Willcox Playa; local alternative WC-1 is another option to avoid the playa.

COUNTY

County of Doña Ana Comprehensive Plan

The 1994 Doña Ana County (New Mexico) Comprehensive Plan is designed to guide future growth and development in the County in a manner consistent with the community's goals for its physical, social, and economic environment. The plan provides a combination of goals, policies, and actions that are used to make responsible development decisions. The plan discourages transmission lines in residential areas. Portions of subroutes 1.1, 1.2. and local alternatives A and B would occur within the Doña Ana County Comprehensive Plan planning area. Chapter 250 of the Doña Ana County Land Use and Zoning Code (a chapter within the 1994 Comprehensive Plan) defines the purpose of the Performance Zone District as allowing flexibility for land use activities (including transmission line development) in the rural areas of the county, while protecting residents and property values. In the Performance Zone District, any use may be approved, provided that all standards for that particular use are met and the use is consistent with the character of the surrounding areas (Doña Ana County 1994). Standards to meet in Performance Zone Districts include using existing ROWs to the maximum extent possible. Portions of Subroute 1.1 would pass through Performance Zone Districts.

Luna County Planning Ordinance

Luna County, New Mexico, includes land use planning ordinances review processes. The purpose of the 1994 Luna County Natural Resource Planning and Review Ordinance is to provide a problem-solving process to eliminate or significantly reduce conflicts or negative impacts on the human environment within Luna County as a result of State or Federal actions. The ordinance does not currently contain any regulations on transmission of electricity (Luna County 1994). No proposed project activities would conflict with other goals and objectives of the plan. Portions of subroutes 1.1and 1.2, and local alternatives B, C, and DN1, as well as the proposed Midpoint Substation, would occur within the Luna County planning area.

Grant County Planning Ordinance

The Grant County, New Mexico, 1978-12-04-01 ordinance establishes the procedure for determining rules and regulations regarding the construction and maintenance of utilities and other facilities within the Grant County road ROW system. The ordinance specifically addresses the height of aboveground transmission lines and establishes the procedure for environmental review (Gutierrez 2011). The proposed Project would be subject to a discretionary review process by the Grant County Board of Commissioners. Portions of subroutes 1.1 and 1.2, and local alternative DN1 would occur within the Grant County planning area.

Hidalgo County Comprehensive Plan

Hidalgo County, New Mexico, does not have designated zoning or any other land use data available that speak to transmission development. Both the Hidalgo County Manager's Office and Assessor's Office confirmed that the county does not have any zoning in place, nor does it contain any future land use data available that would preclude transmission development (Salazar 2011). No proposed Project activities would conflict with other goals and objectives of the plan. Portions of subroutes 1.1 and 2.1, and local alternatives DLD1, LD2, LD3a, andLD3b would occur within the Hidalgo County planning area.

Greenlee County Comprehensive Plan

The 2003 Greenlee County (Arizona) Comprehensive Plan includes the following elements: commercial/infrastructure; economic; land use; recreation/health; residential/natural hazards; and statistics and demographics. Goals and policies are addressed in each element. However, no specific regulations pertaining to electrical transmission are included in the document (Greenlee County 2003). No proposed Project activities would conflict with other goals and objectives of the plan. Local alternative LD4 within route group 2 would occur within the Greenlee County planning area.

Graham County Comprehensive Plan

The 2002 Graham County (Arizona) Comprehensive Plan's purpose is to guide Federal, State and county decisionmakers in protecting, evaluating, and enhancing the county's custom and culture, social stability, economy, tax base, and the overall health of land and resources (Graham County 2002). It specifies land use zones in five broad categories: urban residential, rural residential, agricultural, commercial, and manufacturing. The plan encourages coordination and consultation between Federal and State agencies and Graham County when State or Federal projects have an impact on the county and/or its local resources. The plan does not state specific transmission line objectives. No proposed Project activities would conflict with other goals and objectives of the plan. Local alternative LD4 within route group 2 would occur within the Graham County planning area.

Cochise County Comprehensive Plan

The Cochise County (Arizona) Comprehensive Plan, amended through 2006, sets forth goals, objectives, and policies to control development within the county. The plan includes growth area categories and other plan designations, as well as a land use element plan map. However, the plan contains no specific regulations governing transmission projects (Cochise County 2006). No proposed Project activities would conflict with other goals and objectives of the plan. Portions of subroutes 2.1, 2.2, and 3.1, and local alternatives LD1, LD4-Option 4, LD4-Option 5 within route group 2, and local alternative H within route group 3 would occur within the Cochise County planning area. Cochise County has also developed a Babocomari Area Plan, which covers lands within Cochise County approximately 15 miles south of Benson, Arizona, to assist in managing development at or near the junction of SR 82 and SR 90 and to coordinate development with Fort Huachuca. The Babocomari Area Plan does not occur within the analysis area.

Pima County Comprehensive Plan

The Pima County (Arizona) Comprehensive Plan, updated in 2009, assigns special designations (including parks, open space, and scenic road designations) and lays out policies for uses within those areas. The Pima County Zoning Ordinance designates zoning districts and establishes a land use intensity map. The ordinance, however, does not specifically address transmission of electricity, although electrical transmission requires a Conditional Use Permit under some zoning districts (Pima County 1992, 2011b). The 2009 plan is the current guiding plan. Within the route group 4, portions of subroute 4.1 and local alternative MA1 would occur within the Pima County Comprehensive Plan planning area.

Pima County released a supplement to its Comprehensive Plan regarding environmental planning, the 2012 SDCP. The 2012 SDCP is guiding regional efforts to conserve the best lands and most precious resources for future generations of Pima County residents to enjoy. The SDCP combines short-term actions with long-range land-use decisions in Pima County, to avoid, minimize, and mitigate impacts to species and their habitats. Pima County submitted the SDCP to the FWS for 44 species that may be impacted as a result of the otherwise lawful activities of Pima County and its development community (Pima County 2012).

Pinal County Comprehensive Plan

The 2001 Pinal County Comprehensive Plan, as amended through 2007, guides and manages the County's future growth, quality of life, and sustainability. The 2007 amended plan is the current guiding Plan. Policy 7.6.1.6 and Goal 7.7 of the plan directly address transmission of electricity: "Support the transmission of renewable energy from sources within and outside of Pinal County," and "support the provision of adequate energy for the future while protecting the natural environment and resources." The Pinal County Zoning Ordinance provides rules, regulations, and plans by which the future growth and development in the county may be directed in accordance with the Pinal County Comprehensive Plan and ordinance, as provided in the County Planning and Zoning Act of 1949. Section 2.150.010 states that transmission lines for the distribution of electricity and power substations shall be permitted in any zoning district and not be subject to the minimum lot area requirement (Pinal County 2010a, 2011). The Pinal County Open Space and Trails Master Plan (Pinal County 2007) was developed to identify areas within the County that had high resource values, such as water, geology, biological significance, cultural resources, and other important values. Additionally, parks, open space, and trails from municipalities, Federal land managers, and other entities within Pinal County were collected and inventoried. These areas were included in the 2007 Comprehensive Plan as an addition to the "Open Space and Acquisition and Preservation" element. No portions of the analysis area occur within Pinal County's open space or trails. Segments of subroute 4.1 (U3k, U3l, and U3m) would occur within the Pinal County Comprehensive Plan planning area.

Cienega Creek Natural Preserve Management Plan

The 1994 plan was drafted by the Pima County Regional Flood Control District to manage the 3,979-acre Cienega Creek Natural Preserve, located along Cienega Creek in eastern Pima County. The principal management objectives are to preserve and protect perennial stream flow in Cienega Creek, preserve and protect the existing natural riparian community along the stream corridor, and to provide opportunities for the public use of the preserve (McGann and Associates 1994). The 2-mile corridor analysis area for land use includes a small portion of the preserve; however, the proposed Project and alternatives would occur outside the preserve planning area since the preserve would not be intersected by the proposed Project.

LOCAL

City of Deming Comprehensive Plan

The City of Deming (New Mexico) Comprehensive Plan 2010 Update is a long-range document that works with previous city planning efforts to guide future growth and development in Deming. It is comprehensive in covering the entire geographic planning area within the city of Deming's municipal limits and addressing the major functions of a community (referred to as planning elements), including land use, economic development, transportation, housing, water/wastewater infrastructure, community facilities and recreation, hazard mitigation, and implementation strategies. However, no goals or policies are included in the plan that specifically address transmission of electricity. The City of Deming Zoning Ordinance designates zones and specific uses allowed in each zone. The ordinance contains specific regulations for transmission projects, including setbacks and height limits. Transmission development is allowed in all zones (City of Deming 2006, 2010). A segment of subroute 1.1 (segment P2) would occur within the City of Deming planning area.

City of Lordsburg Comprehensive Plan

The 2011 Comprehensive Plan Update is a policy document that establishes what the residents, property owners, and other stakeholders would like to see in the future for the city. No goals or policies are included in the plan that specifically address transmission of electricity (City of Lordsburg 2011). No proposed Project activities would conflict with other goals and objectives of the Plan. Within the New Build Section, the analysis area for local alternative D within route group 1, and segments of subroute 2.1 and would pass along the northern and southern edges of the city's planning area.

City of Willcox General Plan

The General Plan for the City of Willcox, as updated through 2009, includes the following elements: citizen participation, land use, transportation/circulation, housing, growth, cost of development, environmental planning, open space, and water resources. The overriding goal of the general plan is to protect and preserve the city's heritage and to ensure compatible and managed growth for its citizens (City of Willcox 2009). The plan does not include management prescriptions for transmission line construction. No proposed project activities would conflict with other goals and objectives of the Plan. Within the New Build Section, the analysis area for local alternative WC1 within route group 2 would pass along the western and northern edges of the city's planning area.

City of Benson General Development Plan

The 2002 City of Benson General Development Plan sets goals, policies, and objectives for future development within the city. The plan contains the following elements: land use, circulation, economic development, housing, water resources, cost of development, growth areas, open space, and environmental planning. The plan acknowledges the city's presence along a transmission corridor (City of Benson 2002a, 2002b). The transmission of electricity is allowed in all zoned areas of Benson. Segment U2 within subroute 3.1 would pass through the city limits of Benson.

City of Tucson General Plan

The General Plan, developed in December 2001, presents a series of policies and recommendations for Tucson and, in some cases, all of eastern Pima County. It is in effect only within the corporate limits of the city of Tucson. The policies establish a basic direction and approach to guide the future growth and development of Tucson. The plan does not include management prescriptions for transmission line construction. No proposed Project activities would conflict with other goals and objectives of the plan. The policies also provide guidance for the preparation of more detailed environmental, land use, and transportation proposals; the refinement of community facility and service plans; and the development or amendment of subregional, area, neighborhood, and other specific plans. Within the Upgrade Section, segments U3a in subroute 3.1 and segments within subroute 4.1 (U3b, U3c, U3d, U3e, U3f, U3g, U3h, U3i, TH1 option) and local alternative TH3 would cross within the city limits of Tucson. The City of Tucson Land Use Code was published on July 1, 1995 to protect and promote the general health, safety, and welfare of all present and future residents of Tucson. More specifically, the Land Use Code implements the City's General Plan, guides new growth and redevelopment in the community in accordance with the policies of the City of Tucson Land Use Code, encourages the most efficient use of land through site-sensitive design, reduces potential hazards to individuals and neighborhoods (public) resulting from incompatible land uses or from the development of environmentally hazardous or sensitive lands, protects and enhances the city's natural, cultural, historical, and scenic resources, and promotes the economic stability of the community (City of Tucson 1995, 2001).

Town of Marana General Plan

The 2010 General Plan for the Town of Marana includes the following themes and elements: land management, built environment, people and community, resource management, and natural systems. The General Plan designates a land use map and transportation map as part of the plan. However, the plan does not specifically address transmission of electricity (Town of Marana 2010). No proposed Project activities would conflict with other goals and objectives of the plan. Within the Upgrade Section of the proposed Project, segment U3j of subroute 4.1 and local alternative MA1 would pass through the town of Marana.

Renewable Energy Management Areas

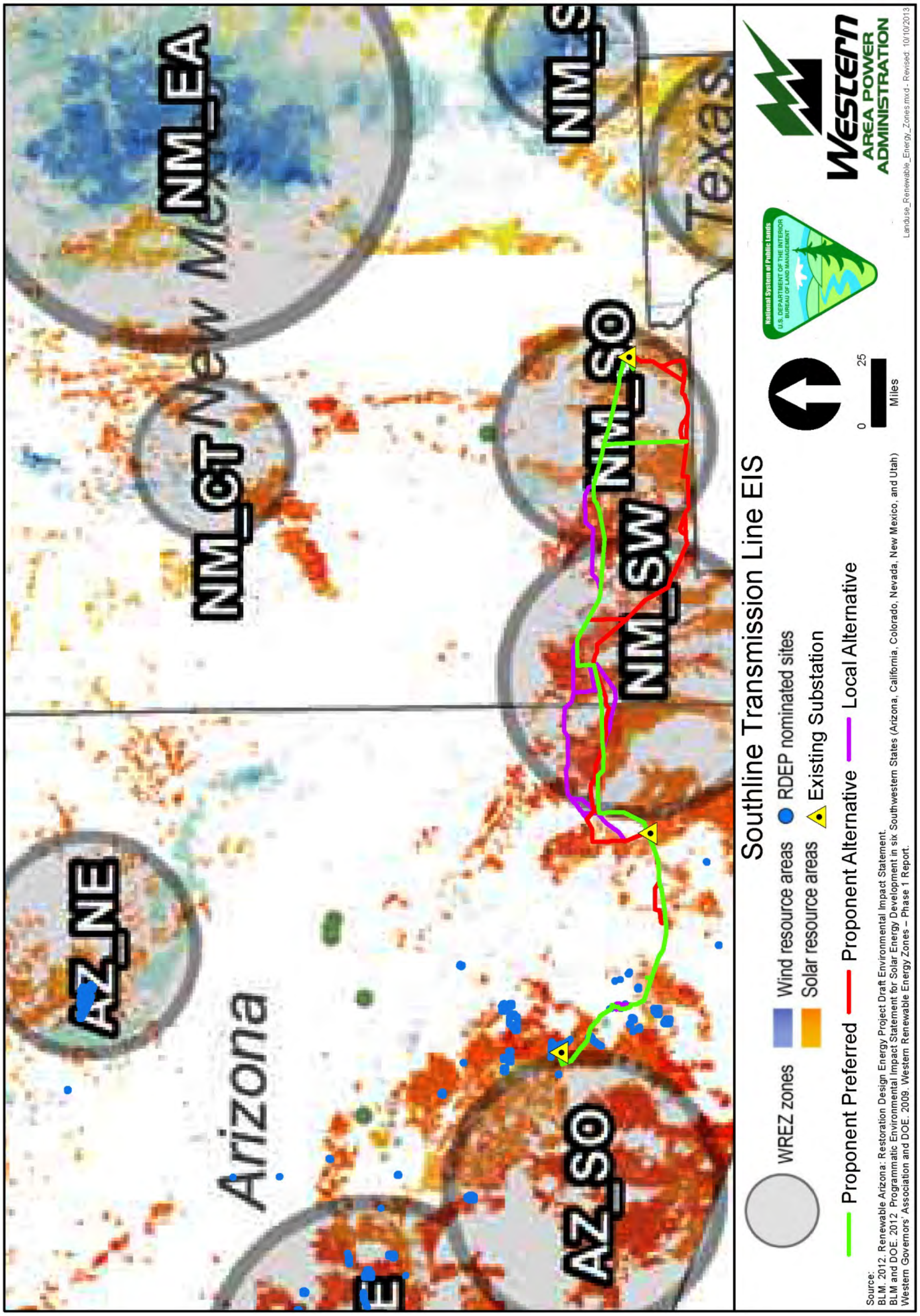
Several renewable energy management areas (REMAs) or initiatives exist in southern Arizona and New Mexico. Figure 3.11-3 depicts the proposed Project in relation to these areas, and additional detail is presented below.

WESTERN RENEWABLE ENERGY ZONE

The Western Governors' Association commissioned interviews with 25 utilities, 11 PUCs, and two provincial energy ministries to learn their views on potential collaboration to develop Western Renewable Energy Zone (WREZ) hubs. These WREZ hubs are identified as those areas in the West with vast renewable resources and the potential to expedite the development and delivery of renewable energy where it is needed through the establishment of an efficient network of interstate transmission lines to deliver the energy to load centers. The renewable resources identified in figure 3.11-3 include the highest-quality solar and wind resources that meet State quality thresholds. The Western Governors' Association Web site[9] provides more information on these zones (Western Governors' Association 2010).

[9] Available at: http://www.westgov.org/index.php?option=com_ content&view=article&id=219&Itemid=81.

Figure 3.11-3. Renewable Energy Management Areas and the analysis area.



SOLAR ENERGY ZONES

In response to increasing interest in the development of renewable energy resources, DOE and DOI conducted analysis in support of a programmatic solar EIS, and 2009 identified SEZs (solar energy zones). An SEZ is defined by the BLM and DOE (2012) as an area with few impediments to utility-scale production of solar energy, where BLM would prioritize solar energy and associated transmission infrastructure development. More information on these areas can be found online[10] (BLM 2013d; BLM and DOE 2012; DOE 2008).

Afton Solar Energy Zone

The proposed Afton SEZ is located in New Mexico on BLM-administered land within the Las Cruces District in Doña Ana County. The area available for development within the SEZ is approximately 29,964 acres and has the resource potential for 3,329 MW of energy production. The Programmatic EIS ROD was signed for the Afton SEZ on October 12, 2012. The Afton SEZ contains existing unimproved roads, transmission structures, and pipeline segments. Part of the SEZ is administered by the BLM for grazing. The analysis area for route group 1 includes lands that have been identified as within the Afton SEZ. More information on the Afton SEZ can be found online[11] (BLM 2012e) and (BLM and DOE 2010).

RESTORATION DESIGN ENERGY PROJECT NOMINATED SITES

The Arizona State Office of the BLM has prepared an EIS to identify previously disturbed lands across Arizona that may be suitable for the development of renewable energy. The EIS would establish a baseline set of environmental protection measures for such projects (BLM 2012a). The DEIS was released on February 17, 2012.The ROD was signed on January 18, 2013.

The RDEP supports the Secretary of Interior’s goals to build America’s new energy future and to protect and restore treasured landscapes. Emphasis is on lands that are previously disturbed or developed, or where the effects on sensitive resources would be minimized. The BLM used the results of the EIS to amend its land use plans across Arizona to identify areas that are considered to be most suitable for renewable energy projects. Although these amendments only applied to BLM-managed lands, the EIS examined all lands in Arizona and serves as a resource to the public, policy makers, and energy planners.

The public was invited to nominate sites for consideration in the EIS during the formal scoping period in early 2010. By the end of the scoping process, 59 sites had been nominated in 11 different counties, including former landfills, brownfields, mines, isolated BLM parcels, and Central Arizona Project canal ROW areas.

SECTION 368 OF THE ENERGY POLICY ACT OF 2005

Section 368 of the EPAct (PL 109-58), enacted August 8, 2005, directs the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior to designate under their respective authorities corridors on Federal land in 11 western states for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (utility corridors). These utility corridors are designated by Federal, State, or County agencies, and can be determined through coordination between multiple agencies to help ensure continuity of the corridors between different jurisdictional land ownership. These Section 368 lands can be recognized across multiple agencies as existing utility corridors and identified as the preferred location for new utility lines.

[10] Available at: http://solareis.anl.gov/.
[11] Available at: http://solareis.anl.gov/sez/afton/index.cfm.

A utility corridor is a linear strip of land identified for the present or future location of utility lines such as electricity, water, and sewer within its boundaries. Utility corridors can provide an opportunity to place new facilities in parallel corridors, which, in turn, helps to minimize impacts. The DOE West-wide Energy Corridors were created by Section 368 of the EPAct of 2005 (West-wide Energy Corridor Programmatic EIS Information Center 2012). A PEIS was published to conduct the requisite environmental analysis for designation of these energy corridors and included the proposed designation of more than 6,000 miles of Section 368 energy corridors among the various agency Land Use Plans. However, there have been recent negotiations challenging the designation of some of the corridors. In June 2012, a landmark settlement was reached between Federal agencies and a coalition of conservation organizations that had challenged West-wide Energy Corridors initially designated under Section 368 of the EPAct. Through the settlement, the designations will be reevaluated and revised to better avoid environmentally sensitive areas, diminish proliferation of dispersed ROWs, and facilitate development of renewable energy projects. Specifically, the settlement states that:

> The BLM, US Forest Service (FS), and Department of Energy (DOE) will enter into a Memorandum of Understanding (MOU) that will guide the agencies' review of corridors and mitigation measures (both for corridors already designated and any new corridors) through an interagency work group that will review corridors and mitigation measures, and their recommendations on needed revisions, deletions and additions (Settlement Agreement Section II.A.1) (Wilderness Society 2012).

Whereas Section 368 corridors can be designated on Federal lands, no such corridors are designated on State or private lands. This results in unconnected corridor segments where land ownership is mixed. Both the proposed Project and its alternatives follow portions of the existing Section 368 lands. The Section 368 corridor within the analysis area is "81-213." Approximately 10 miles of subroute 1.1 (segment P2) occurs within Section 368 corridor 81-213, west of the Luna and Grant County line. In addition, local alternative D and segment P5a and P5b in subroute 2.1 are located within Section 368 corridor 81-213 in the vicinity of Lordsburg, New Mexico.

Issues to Be Analyzed

Based on results of the public scoping process and in consultation with BLM and Western, the following areas of concern were identified with regard to land use:

- Potential conflicts with applicable Land Use Plans, policies, goals, or regulations (incompatible land uses).
- Potential conflicts with existing multiuse or utility ROWs.
- Potential conflicts with existing land uses, specifically where the Project would create a direct long-term impact:
  - Physical conflict with existing residential, commercial, industrial, military, or agricultural uses (i.e., displacement of homes, businesses, center-pivot irrigation agriculture fields)
  - Indirect conflict with residential, commercial, or military uses (refer to the "Military Operations" section below)
- Potential conflicts with planned land uses, specifically residential subdivisions or other sensitive land uses at the final plat approval stage.
- Potential conflicts with State or federally established, designated, or reasonably foreseeable planned land use areas (e.g., lands and realty actions, resource inventory determinations (avoidance areas), recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, wilderness areas, ACECs, etc.).

- The potential for the Project to result in nuisance impacts.

Analysis Area Conditions

The existing conditions for land use are described in an east-to-west sequence, beginning at the Afton Substation in New Mexico and ending at the Saguaro Substation in Arizona. This section describes the environmental setting in terms of the land use resources, such as undeveloped vacant land and urban lands that are encountered within the analysis area. These areas may be affected by implementation of the proposed Project or its alternatives and associated Project components (i.e., substations, representative staging areas, and access roads).

The proposed Project and alternatives cross large tracts of undeveloped land as well as urban and suburban areas. Much of the land in the analysis area is managed by Federal agencies, which generally provide for multiple use management or preservation of natural resources. Special designations of Federal land are discussed in section 3.12. Major portions of the proposed Project parallel existing linear facilities in disturbed corridors, including transmission and distribution lines, roads, and abandoned railroad ROWs. Some of the lands are actively grazed by livestock (see section 3.11.2 below). Additionally, there are residential and commercial lands interspersed in the nearby developed communities. The eastern portion (New Build Section) of the Project would be located in open range-type land uses, crossing mountain ranges (including the Continental Divide) and valley/basins. Farther west (Upgrade Section), the distance between the valley/basins and mountain ranges becomes less, and urban populations surround the Tucson metropolitan area. Specific details regarding land use conditions are described below under "New Build Section" and "Upgrade Section," respectively.

JURISDICTION

The Project would traverse Federal, State, and local agency jurisdictions with existing Land Use Plans and policies (figures 3.11-1 and 3.11-2). Private land would also be traversed by the Project. Various land management agencies in this region have jurisdiction over land development activities. Land use jurisdiction refers to the limits of administrative authority maintained by Federal, State, regional, or local government agencies responsible for land use planning and policies. Jurisdiction does not necessarily imply land ownership; however, in some cases the authority that has jurisdiction may also own the land. Jurisdictions of the New Build and Upgrade sections are provided below, followed by a land ownership discussion.

New Build Section

The New Build Section of the proposed Project is primarily characterized by mostly undeveloped desert landscape with areas of rural residential and commercial development surrounding local municipalities. The analysis area for subroute 1.1 would include approximately 131,000 acres of land. The analysis area for subroute 1.2 includes approximately 175,000 acres. The analysis area for the local alternatives includes approximately 78,000 acres. The proposed substation expansions and new construction would require approximately 424 acres of land. Fourteen staging areas are proposed in route group 1, totaling 280 acres. Table 3.11-1 describes the percentages of jurisdiction within the route group 1. The analysis area for subroute 2.1 would include approximately 131,000 acres of land. The analysis area for subroute 2.2 includes approximately 125,000 acres. The analysis area for the local alternatives would include approximately 123,000 acres of land. The proposed substation expansions and new construction would require approximately 108 acres of land. Thirteen staging areas are proposed in the route group 2, totaling 258 acres. Table 3.11-2 describes the percentages of jurisdiction within the analysis area for route group 2.

Table 3.11-2 lists the local municipalities through which the analysis area for the New Build Section would cross.

Table 3.11-1. New Build Jurisdiction Percentage

	Private Lands		New Mexico State Lands		BLM Lands		BIA Lands		DOD Lands	
	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint
Transmission Lines										
Proponent Preferred	37%	37%	35%	31%	27%	32%	< 1%	–	2%	<1%
Proponent Alternative	24%	23%	19%	19%	57%	58%	–	–	<1%	-
Local Alternatives	28%	31%	11%	12%	61%	57%	–	–	<1%	-
Substations										
Afton Substation, Proposed Midpoint Substation, Alternative Midpoint Substation	–	10%	–	11%	–	79%	–	–	-	-
Staging Areas	–	38%	–	26%	–	38%	–	–	-	-

Note: Percentages are not additive.

Table 3.11-2. Municipal Jurisdictions within the Analysis Area: New Build Section

State	County	Municipality	Proposed Project and Alternative Segments within Municipality
New Mexico	Doña Ana County	Unincorporated community of Doña Ana	Route group 1: Proponent Preferred; Proponent Alternative; interconnection substation (Afton); and staging areas
New Mexico	Luna County	City of Deming	Route group 1: Proponent Preferred; local alternatives; alternative substations (proposed Midpoint and Midpoint South); and staging areas
New Mexico	Luna County	City of Columbus	Route group 1: Proponent Alternative; local alternatives; and staging areas
New Mexico	Grant County	Unincorporated community of Hachita	Route group 1: Proponent Alternative; local alternatives; and staging areas
New Mexico	Hidalgo County	City of Lordsburg	Route group 2: Proponent Alternative; local alternatives; Proponent Alternative; Hidalgo Substation; and staging areas
Arizona	Cochise County	Unincorporated community of San Simon	Route group 2: Proponent Preferred; Proponent Alternative; local alternatives; and staging areas
Arizona	Cochise County	Unincorporated community of Bowie	Route group 2: Proponent Preferred; Proponent Alternative; local alternatives; and staging areas
Arizona	Cochise County	City of Willcox	Route group 2: Proponent Preferred; Proponent Alternative; local alternatives; Apache Substation; and staging areas

Upgrade Section

The analysis area for the Upgrade Section of the proposed Project is similarly characterized by mostly undeveloped desert landscape with areas of rural residential and commercial development surrounding local municipalities. The major difference between the Upgrade Section and the New Build Section is that the Upgrade Section includes the Tucson metropolitan area. The Upgrade Section includes route groups 3 and 4. The route groups of the Upgrade Section are grouped together in this portion of the analysis due to the smaller footprint and the fewer routing options available for analysis. Therefore, the Upgrade Section jurisdiction analysis presented herein includes both route groups.

The analysis area for subroutes 3.1 and 4.1 would include approximately 7,100 acres of land. The analysis area for local alternatives in route groups 3 and 4 includes approximately 2,400 acres. The proposed substation expansions and new construction would require approximately 168 acres of land. Seven staging areas are proposed in the Upgrade Section, totaling 139 acres. Table 3.11-3 describes the percentages of jurisdiction within the Upgrade Section.

Table 3.11-3. Upgrade Section Jurisdiction Percentage

	Private Lands		Arizona State Lands		BLM Lands		BIA Lands		County, FS, Reclamation Lands	
	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint	Analysis Area	Project Footprint
Transmission Lines										
Proponent Preferred	51%	52%	44%	45%	1%	0%	2%	2%	< 1%	< 1%
Local Alternatives	44%	68%	52%	29%	3%	2%	–	–	< 1%	< 1%
Substations										
Pantano, Nogales, and Vail Substations	40%-	-	40%	50%	20%	50%-	-	-	-	-
Del Bac, Tucson, DeMoss Petrie, Rattlesnake, Saguaro, and Tortolita Substations	–	33%	–	58%	–	6%	–	–	–	3%
Staging Areas	–	71%	–	29%	–	–	–	–	–	–

Table 3.11-4 lists the local municipalities through which the analysis area for the Upgrade Section would cross.

Table 3.11-4. Municipal Jurisdictions within the Analysis Area: Upgrade Section

State	County	Municipality	Proposed Project and Alternative Segments occurring within Municipality
Arizona	Cochise County	Unincorporated community of Cochise	Route group 3: Proponent Preferred; Proponent Alternative; local alternatives; Apache Substation; and staging areas
Arizona	Cochise County	Unincorporated community of Pomerene	Route group 3: Proponent Preferred; Proponent Alternative; Adams Tap Substation; and staging areas
Arizona	Cochise County	City of Benson	Route group 3: Proponent Preferred; Proponent Alternative; Adams Tap Substation; and staging areas

Table 3.11-4. Municipal Jurisdictions within the Analysis Area: Upgrade Section (Continued)

State	County	Municipality	Proposed Project and Alternative Segments occurring within Municipality
Arizona	Pima County	City of Tucson	Route group 4: Proponent Preferred; Proponent Alternative; local alternatives; Pantano, Vail, Nogales, Del Bac, and DeMoss Petrie substations; and staging areas
Arizona	Pima County	Town of Marana	Route group 4: Proponent Preferred; Proponent Alternative; local alternatives; Rattlesnake, Marana, and Southline Saguaro substations; and staging areas
Arizona	Pinal County	Census Designated Place of Avra Valley	Route group 4: Proponent Preferred; Saguaro and Tortolita substations; and staging areas

LAND OWNERSHIP

New Build Section

Approximately five agencies or organizations maintain land jurisdiction or ownership in the analysis area (private landowners are consolidated as a single 'organization'). The transmission line acreage that forms the New Build Section for land ownership is provided below in table 3.11-5. See figure 3.11-1 for an illustration of land ownership for the New Build Section.

Table 3.11-5. Surface Management and Land Ownership: New Build Section Analysis Area

Entity	Acres
BLM	323,185
BIA	62
DOD	2,669
Private	156,408
State	244,755
County	0
FS	0
Reclamation	0

Note: Acreages overlap and are not additive.

In addition to the transmission line acreages provided in table 3.11-5 above, approximately 335 acres of BLM lands, 129 acres of private land, and 68 acres of State lands would be used for substation construction and/or expansion. Approximately 120 acres of BLM land, 278 acres of private land, and 140 acres of State land would be used for staging areas.

BLM lands in the New Build Section are managed by the Las Cruces and Gila district offices, out of New Mexico and Arizona, respectively. Within the New Build Section analysis area, the Fort Sills Apache (based out of Oklahoma) are becoming reestablished in their traditional homeland of southeastern New Mexico (route group 1); however, though these lands have not been formally designated, 62 acres are proposed for Tribal lands, subject to the BIA. DOD lands within the New Build Section include the

Willcox Playa. Numerous non-contiguous parcels of privately owned lands would be crossed by the proposed Project, in both New Mexico and Arizona. Similarly, numerous non-contiguous parcels of State lands would be crossed by the New Build Section, in both New Mexico and Arizona.

Upgrade Section

Approximately seven agencies or organizations maintain land jurisdiction or ownership in the analysis area (private landowners are consolidated as a single 'organization') (table 3.11-6; see figure 3.11-2).

Table 3.11-6. Surface Management and Land Ownership: Upgrade Section Analysis Area

Entity	Acres
BLM	879
BIA	229
DOD	0
Private	22,090
State	34,225
County	49
Coronado National Forest	39
Reclamation	36

Note: Acreages overlap and are not additive.

BLM lands in the Upgrade Section are managed by the Gila District Office, under the Safford and Tucson Field Offices. BIA lands include the San Xavier Indian Reservation and a small section of the Tohono O'odham Nation. Numerous, non-contiguous parcels of privately owned lands would be crossed by the Upgrade Section, in both New Mexico and Arizona. Similarly, numerous non-contiguous parcels of State lands would be crossed by the Upgrade Section in Arizona. County lands in the Upgrade Section include the Cienega Creek Nature Preserve. U.S. Forest Service lands include a very small portion of the Coronado National Forest. Reclamation lands near the town of Marana would be crossed by the Upgrade Section (segment U3i). All Upgrade Section activities would be limited to the existing Western line, wholly within the existing ROW (staging areas notwithstanding). All land that is crossed by this existing Western line includes existing ROWs, leases, easements, or landowner permission for its operation and maintenance.

LAND USE

The following uses were considered in determining land uses in the analysis area: agriculture, aviation, communications, development, military, parks and other protected areas, community facilities, recreation, transportation, and utilities.

The following land use discussion is described in general characterization of land use areas, as described by the National Land Cover Database categories (2006). These categories are provided below (including examples) and are consistent across New Mexico and Arizona:

- Agriculture Area – center-pivot irrigation areas, ranching, farming, and dairy operations, with agricultural land uses being primarily ranching and grazing.
- Air Facilities – airports, airparks, landing strips, and airport hazard district for Tucson International Airport.
- Communications Facilities – communication towers and antennae.

- Developed – areas characterized by a high percentage (30 percent or greater) of constructed materials (e.g., asphalt, concrete, buildings, etc.). This information is summarized from the National Land Cover Database 2006 information.
  - Developed, Low-Intensity – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20 to 49 percent of total cover. These areas most commonly include single-family housing units.
  - Developed, Medium-Intensity – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50 to 79 percent of the total cover. These areas most commonly include single-family housing units.
  - Developed, High-Intensity – highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.
- Industrial – includes mining exploration sites, active mines, and related mining facilities (including Mining Districts)
- Military – managed by the DOD and includes bases, missile launch facilities, and firing ranges.
- Parks and Preservation Areas – Federal, State, and local parks, open areas, and areas protected from development, including parks, ACECs, WSAs, wilderness areas, and wildlife refuges.
- Public and Community Facilities – churches, schools, cemeteries, and hospitals.
- Recreation – Federal, State, and local recreational trails and designated OHV areas.
- Transportation – minor roads (county highways, city streets, local roads), major roads (interstates, State highways), railroads, trails, etc.
- Utilities – power plants, substations, transmission lines, pipelines, canals, designated utility corridors, and wind and solar farms.

Detailed descriptions of the designated prime farmland, farmland of statewide importance, and rangeland and grazing allotments are described further below. Detailed descriptions of military operations are also described further below in this section. Detailed descriptions of minerals and mining are discussed in section 3.4. Detailed descriptions of the special land use designations (Federal, State, county, city, and tribal), including ACECs, wilderness areas, WSAs, national monuments, State scenic roads, county parks, and city parks are discussed in section 3.12. Detailed descriptions of the recreational opportunities are discussed in section 3.14.

New Build Section

This section summarizes total land use resources for the transmission line segments, substation expansion areas, and representative staging areas for each portion of the New Build Section. Current land uses in the New Build Section of the analysis area are outlined in table 3.11-7. The analysis area is primarily undeveloped land with pockets of heavy to moderate land uses surrounding the municipal areas and industrial use. The New Build Section can be characterized as open desert with some agriculture and widely dispersed, low-density residential uses on private parcels. The Bowie Mining District (near the town of Bowie, Arizona) is crossed by the New Build Section. As part of the routing process, the analysis area for the proposed Project and alternatives was sited to both follow existing linear facilities to the extent practicable and to minimize potential impacts to sensitive land uses. Although the New Build Section would be new construction, the majority of the New Build Section would parallel existing ROWs and disturbance.

Table 3.11-7. Analysis Area Land Uses: New Build Section

Land Use	Acreage
Agriculture	31,053
Air facilities	18
Developed, low-intensity	3,100
Developed, medium-intensity	285
Developed, high-intensity	51
Military	4,084
Other*	1,324
Parks and preservation areas	14,215
Recreation	1,555
Land Use	**Number of Facilities**
Public and community facilities	8
Communications facilities	3,289
Land Use	**Mileage**
Recreation (trails)	41
Transportation	2,184
Utilities	642

Note: Acreages/mileages may overlap and are not additive.
* Industrial park.

Upgrade Section

The Upgrade Section largely crosses urban and suburban areas, including the Tucson metropolitan area. The Upgrade Section also traverses some areas of desert landscape, rural-residential, and commercial development.

Current land uses in the Upgrade Section of the analysis area are outlined in table 3.11-8. The analysis area is primarily undeveloped land with pockets of heavy to moderate land uses surrounding the municipal areas and industrial use. It can be characterized as open desert with some agriculture and widely dispersed, low-density residential uses on private parcels. As part of the routing process, the analysis area for the proposed Project and alternatives was sited to both follow existing linear facilities to the extent practicable and to minimize potential impacts to sensitive land uses. The Upgrade Section does not include a wholly new ROW for the proposed transmission line construction, but would rather expand the existing transmission lines so that the majority of all upgrades would occur within the existing ROWs and disturbance (refer to Proponent Preferred action sections of chapter 2).

Table 3.11-8. Analysis Area Land Uses: Upgrade Section

Land Use	Acreage
Agriculture	739
Air facilities	11
Developed, low-intensity	684
Developed, medium-intensity	137
Developed, high-intensity	20

Table 3.11-8. Analysis Area Land Uses: Upgrade Section (Continued)

Land Use	Acreage
Military	28,786
Other	0
Parks and preservation areas	765
Recreation	69
Land Use	**Number of Facilities**
Public and community facilities	0
Communications facilities	44
Land Use	**Mileage**
Recreation (trails)	12
Transportation	91
Utilities	43

Note: Acreages/mileages may overlap and are not additive.

The low-intensity development in the Upgrade Section includes the Willcox, Benson, Vail, and Tucson areas. Residents in these areas currently experience the land uses associated with the existing Western line.

BLM LANDS AND REALTY, LAND USE AUTHORIZATIONS AND RIGHTS-OF-WAY, INCLUDING FUTURE OR PLANNED LAND USES

The BLM lands and realty program provides for land use, purchase, exchange, donation and sale; determines the boundaries of Federal land; and maintains historic records for these ownership transactions. Land ownership transfer (tenure) through purchase, exchange, disposal, donation, and sale is a component of the BLM's land management strategy.

BLM identifies ROW Avoidance or Exclusion Areas during the RMP planning process. Section 503 of FLPMA directs BLM to "minimize adverse environmental impacts and proliferation of separate ROWs by using common ROWs to the extent practicable." A designated ROW corridor is a preferred location for the placement of ROWs; however, applicants may propose outside designated corridors, but must follow the prescribed Avoidance or Exclusion Areas as identified by the BLM.

Section 302 of the FLPMA provides the BLM's authority to issue leases and permits for the use, occupancy, and development of the public lands. Leases and permits are issued for purposes such as transmission lines. The regulations establishing procedures for the processing of these leases and permits are found in 43 CFR 2920.

Linear land-use authorizations and ROWs (utility corridors) are established in BLM and Coronado National Forest Land Use Plans, and via the programmatic West-Wide Energy Corridor ROD (2012). There is an existing system of primarily east-west high-voltage (230-kV and above) utility and transportation corridors, including Section 368 energy corridors within the analysis area (see figure 3.11-3).

New Build Section

The Mimbres RMP provides direction for managing numerous land-use authorizations, granting ROWs, leases, and permits to qualified individuals, businesses, and governmental entities for the use of public land. The RMP establishes directions for a balanced use of resources within the planning area; RMPs do not grant ROWs or permit. Rather, RMPs establish areas where certain types of ROWs may or may not be permitted. Future or planned uses for Federal, State, county, and local land use actions are specified in the Mimbres RMP and other long-term planning documents.

A comprehensive listing of BLM land use authorizations (Las Cruces District in New Mexico and the Safford and Tucson Field Offices in Arizona) that occur within the analysis area for the New Build Section are provided in Appendix J, “BLM Land Use Authorizations.”

The Mimbres RMP was approved in 1993, and the BLM Las Cruces District is undergoing a new land-use planning process that will replace part of the Mimbres RMP: the Tri-County RMP. The Tri-County Draft RMP/EIS was issued on April 12, 2013 and will replace the Doña Ana County portion of the Mimbres RMP (BLM 2013e). A proposed RMP/FEIS may be issued in spring 2014. The Tri-County Draft RMP/EIS will analyze and update the BLM’s management of public lands in Sierra, Otero, Luna, and Doña Ana counties in south-central New Mexico. Management of BLM lands in Grant and Hidalgo counties would continue under the Mimbres RMP. Currently, the Tri-County RMP is in the DEIS public-comment period.

The Mimbres RMP specifies that new ROWs are issued within existing ROWs whenever possible to promote joint use. When determining ROW applications, BLM refers to the established ‘exclusion’ and ‘avoidance’ areas to determine appropriateness.

Avoidance areas are areas where future ROWs may be granted only when no feasible alternative route or designated ROW corridor is available. Alternatives were developed that would be routed around avoidance areas. Special terms and conditions may be required.

Exclusion areas are areas where future ROWs may be granted only when mandated by law.

The existing ROW exclusion areas include all wilderness areas, WSAs, ACECs, RNAs, and NNLs. No exclusion areas would be included in the New Build Section.

The existing ROW avoidance areas include the CDNST, Butterfield Trail, bighorn sheep areas, and VRM Class II areas. Specifically, the following special stipulations apply to new facilities that are proposed within avoidance areas:

- Facilities will not be located parallel to the CDNST or Butterfield Trail.
- Facilities will not be located within 0.25 mile of any stage station on the Butterfield Trail.
- Facilities will not be located within riparian areas.
- Access routes will be limited and considered on a case-by-case basis.

The analysis area for the New Build Section includes avoidance areas in the Mimbres RMP, including the CDNST, Butterfield Trail, and VRM Class II areas (see figure 3.11-1).

Suitable/occupied desert bighorn sheep habitat is managed as an avoidance area by the Las Cruces District. Approximately 74 acres of subroute 1.1, roughly 20 acres of the subroute 1.2, 71 acres of local alternative E, 4 acres of local alternative LD3b, and 41 acres of local alternative LD1would occur within suitable/occupied desert bighorn sheep habitat.

Areas identified for disposal are prescribed as avoidance areas under the Mimbres RMP. Approximately 14,704 acres of lands identified as suitable for disposal under the Mimbres RMP would be crossed in the New Build Section.

Upgrade Section

The 1991 Safford RMP provides direction for managing numerous land-use authorizations, granting ROWs, leases, and permits to qualified individuals, businesses, and governmental entities for the use of public land. The RMP establishes directions for a balanced use of resources within the planning area; RMPs do not grant ROWs or permit. Rather, RMPs establish areas where certain types of ROWs may or may not be permitted.

Table 3.11-9 below provides a summary of the land use authorizations for the Upgrade Section. A total of 55 land use authorizations would be intersected by the Upgrade Section. A comprehensive listing of BLM land use authorizations (Las Cruces District in New Mexico and the Safford and Tucson Field Offices in Arizona) that occur within the analysis area are provided in Appendix J, “BLM Land Use Authorizations.”

Table 3.11-9. Land Use Authorizations Summary: Upgrade Section

Land Use Authorization Type	Amount of occurrences in analysis area
Linear ROW – Transmission Line	6
Linear ROW – Transportation Corridor	34
Linear ROW – Natural Gas Pipeline	5
Linear ROW – Communications	5
Linear ROW – Water Pipeline/Canal	3
Communication Site	1
Other	1

Sources: BLM (2013f, 2013g, 2013h).

Future or planned uses for Federal, State, county, and local land use actions are specified in the Safford RMP. No formal utility corridors have been established within the analysis area under the Safford RMP. BLM indicates that there has been some discussion about the upcoming San Pedro RMP that may include an area expansion in a future revision. The San Pedro RMP planning area is unknown, but is unlikely to include the Project footprint.

No avoidance areas are identified by the Safford RMP (refer to Figure 3.11-2).

The Phoenix RMP designated the 1-mile-wide Silver Bell utility corridor within route group 4’s analysis area near Marana; however, the IFNM ROD abolished this corridor (BLM 2013c). The proposed Project footprint would not occur within this corridor.

No lands identified for disposal are included in the Upgrade Section analysis area.

3.11.2 Farmlands and Rangelands

The information provided in the following subsections is taken from a report titled "Southline Transmission Project Resource Report 3: Farmlands and Rangeland" (CH2M Hill 2013l). The content of that report are used herein without specific reference.

Analysis Area

The analysis includes the area for farmlands and rangeland that would be impacted by disturbance associated with construction of the Project. The analysis area for the New Build Section is 1 mile on each side of the centerline. The analysis area for the Upgrade Section is 500 feet, represented by 200 feet on either side of the existing 100-foot corridor.

Information was gathered on farmlands, rangeland, and grazing within the analysis area of the proposed Project and alternatives for the BLM, NMSLO, and ASLD. Each agency was contacted to acquire grazing data and determine whether any existing plans, regulations, or policies would apply to the proposed Project and alternatives. GIS grazing allotment data were provided by BLM in 2012 (BLM 2012f, 2012g). Online databases were accessed in 2012 for ASLD and NMSLO grazing data. Farmlands information and GIS data were obtained from the NRCS online database (NRCS 2012a).

Relevant management plans were reviewed to identify potential conflicts between the existing resource management objectives and the proposed Project and alternatives. Contact with the three agencies resulted in little information regarding range improvement projects. Both the NMSLO and the ASLD indicated that additional information might be available by researching hard-copy office files or conducting field trips to confirm the status of range improvement projects. These efforts have not been undertaken. Data on animal unit months (AUMs) were obtained from the BLM for their grazing leases, but stocking rates for some Arizona leases were not available.

GIS data were used to develop a comprehensive set of maps showing the farmlands, rangeland, and grazing areas in the analysis area and calculate acreages for BLM and State lands.

Laws, Ordinances, Regulations, and Standards

FEDERAL LAWS AND MANAGEMENT PLANS

The Farmland Protection Policy Act is a set of Federal programs and policies to protect farmland from urban sprawl and the waste of energy and resources associated with such development. Farmlands are classified into prime, unique, or those having statewide or local importance.

The Taylor Grazing Act of 1934 (PL 73-482) is a Federal law developed to control livestock grazing on public land by creating grazing allotments and providing parameters on the number and type of livestock, and the season of use. The law was intended to prevent overgrazing and soil erosion/loss (BLM 2012h).

To establish grazing fees and a rangeland monitoring program, the Public Rangeland Improvement Act (PL 95-514) was passed in 1978. Under this act, the U.S. Forest Service and BLM must consult, coordinate, and cooperate with grazing permittees and State agencies to develop Range Management Plans (U.S. Forest Service 2012).

Most of the public land within the analysis area is managed by the BLM from the Las Cruces Field Office (New Mexico) and the Safford Field Office (Arizona). The agency is guided by 43 CFR 4100 to administer livestock grazing on their lands to promote coordination with other Federal and State grazing authorities and ensure that the goals of the previous two acts are met (BLM 2009c). Under the authority of Sections 3 and 15 of the Taylor Grazing Act of 1934 (BLM 2012h), BLM issues grazing permits, generally covering a 10-year period, which include terms and conditions such as the stocking rates in AUMs (the amount of forage needed to sustain one cow for a month), and season of use. The BLM uses rangeland health assessments to monitor proper grazing management on their leases as dictated by the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997).

BLM grazing lands in New Mexico are covered by the 1993 Mimbres RMP (BLM 1993). The Safford RMP (BLM 1991) and the Peloncillo Mountains Wilderness Management Plan (BLM 2012i) cover the Arizona portions of the analysis area; however, the former relies on the Upper Gila-San Simon EIS (BLM 1978) and the Eastern Arizona Grazing EIS (BLM 1986b) for guidance on grazing management. The Proposed Statewide RMP Amendment/FEIS, "New Mexico Standards for Public Land Health and Guidelines for Livestock Grazing Management" (BLM 2000b), also provides direction for management of grazing leases and RMPs covering public land in New Mexico. The Proposed Statewide RMP Amendment/FEIS, "Arizona Standards for Rangeland Health and Guidelines for Grazing Administration" (BLM 1997), also provides direction for management of grazing leases and RMPs covering public land in Arizona.

STATE GUIDELINES AND MANAGEMENT PLANS

To ensure healthy rangelands, the NMSLO administers grazing leases on State Trust lands following guidelines established in the NMAC 2012, Title 19, "Natural Resources and Wildlife," Chapter 2, Part 8.

The ASLD issues grazing leases to ranchers following protocol issued in the "Arizona Standards for Rangeland Health and Guidelines for Grazing Administration" (University of Arizona 2012). The intent is to provide standards to ensure healthy rangelands, with management coordinated between the State and Federal agencies.

Issues to Be Analyzed

The EIS evaluates whether the construction related to the proposed Project and alternatives would result in significant impacts to farm and range lands. Specifically, the analysis estimates the amount of acreage that would be lost as a result of land clearing and disturbance related to the proposed Project, and determines whether changes to stocking rates, grazing allotments, or other range improvement projects (i.e., fencing, water) would be required. For farmlands, the analysis assesses loss of crop production on prime or unique farmland or farmland of statewide importance and considers whether the Project would cause interference with existing automated irrigation and fertilization programs. In accordance with Section 1508.27 of CEQ regulations, the analysis considers temporal scale (time), spatial extent (area), and intensity to compare the Project and alternatives.

Analysis Area Conditions

NEW BUILD SECTION

The Proponent Preferred alternative would cross land that is primarily characterized by undeveloped desert landscape with interspersed areas of rural residential and commercial development. The proposed Project footprint for all action alternatives also parallels disturbed areas, including existing transmission lines, roads, and abandoned railroad ROWs. More details can be found above in "Land Use."

Farmlands

Management and planning support for Federal and private farmlands is administered by the NRCS through the Farm and Ranchlands Protection Program. The Farmland Protection Policy Act (NRCS 2012b) defines lands as follows:

Prime—land that has physical and chemical properties that best support the production of food, feed, forage, fiber, and oilseed crops with minimal input of fuel, fertilizer and pesticides. Cropland, pastureland, rangeland, or forestland qualifies, but not land that is committed to urban development or water storage.

Unique—land other than prime farmland used for producing specific high-value food or fiber crops. These lands have the special combination of soil quality, location, growing season, and moisture supply needed to produce economically sustainable high quality and high yields when acceptable farming methods are implemented. Citrus and tree nuts are good examples of crops that qualify.

Farmland of Statewide Importance—land that is of statewide importance for the production of food or other crops. These lands must be designated by the State government and require concurrence by the NRCS State Conservationist.

Farmland of Local Importance—local land considered important for production of food and other crops. The lands are designated by a local agency and require concurrence from the NRCS State Conservationist. There are no farmlands that have been designated as locally important within proximity to the Project footprint or representative ROWs.

Despite the arid climate, farmlands do exist, aided by irrigation where more permanent water sources are present either from river flows or groundwater pumping. Some farmlands can become prime if adequate irrigation is provided, or in the example of playas, if sufficient flooding occurs during the growing season. Table 3.11-10 shows the acreages of farmland classifications within the two route groups in the New Build Section. It is important to note that the NRCS classifies farmlands based on the physical, chemical, climatological, and sociological characteristics of the soil and land. It does not imply that areas classified as prime or unique farmlands or farmlands of statewide or local importance are currently being actively farmed or have ever been actively farmed. Therefore, it can be assumed that the calculations of acres of NRCS farmland classifications are larger than the acreages of actual existing farmland.

Table 3.11-10. Summary of Farmlands in the New Build Section Analysis Area

Route Group	Farmland of Statewide Importance (acres)	Farmland of Unique Importance (acres)	Prime Farmland if Irrigated (acres)	Prime Farmland if Meeting Other Conditions (acres)
Route group 1 – Afton Substation to Hidalgo Substation	55,858	0	0	0
Route group 2 – Hidalgo Substation to Apache Substation	47,556	9,562	43,950	20,521

Rangelands

Rangeland areas that are actively grazed comprise the majority land use in the project footprint. The BLM, the ASLD, and the NMSLO have the responsibility for management and oversight of public land grazing allotments and leases in proximity to the proposed Project and alternatives. Leases and allotments may contain a mosaic of private, State, and Federal lands, each managed according to a different set of requirements and administrators. The Farmland Protection Policy Act (NRCS 2012b) also recognizes prime rangeland where soil, climate, topography, vegetation, and location have enhanced the quality or value of natural vegetation for the kinds of herbivores common to the area.

Almost all of the land in each segment of the proposed route and alternatives is designated as grazing land, with the exception of active farmland and other urban and developed areas. This is also true of those areas to be developed for substations and staging areas. Within route group 1, the majority of the grazing allotments in the proposed route, alternatives, substations, and staging areas are managed by the BLM, with some overlap in jurisdiction with the State of New Mexico (table 3.11-11). The management responsibility for grazing management in the route group 2, alternatives, substations, and staging areas is distributed among both the BLM and State agencies, with the majority of the grazing allotments being administered by the New Mexico BLM and the State of Arizona (see table 3.11-11).

Table 3.11-11. Summary of Grazing Lands in the New Build Section Analysis Area

Route Group	Arizona BLM Grazing Lands (acres)	New Mexico BLM Grazing Lands (acres)	Arizona State Grazing Lands (acres)	New Mexico State Grazing Lands (acres)	Total Acres
Route group 1 – Afton Substation to Hidalgo Substation	0	189,164	0	113,014	**302,178**
Route group 2 –Hidalgo Substation to Apache Substation	96,496	56,491	177,293	43,300	**373,580**

UPGRADE SECTION

Farmlands

The Upgrade Section generally crosses urban and suburban areas, including the city of Tucson, and minimal farmland. Most of the farmlands consist of playas that would require seasonal flooding to be agriculturally productive (table 3.11-12).

Table 3.11-12. Summary of Farmlands in the Upgrade Section Analysis Area

Proposed and Alternative Routing Options Segment	Farmland of Statewide Importance (acres)	Farmland of Unique Importance (acres)	Prime Farmland if Irrigated (acres)	Prime Farmland if Meeting Other Conditions (acres)
Route group 3 – Apache Substation to Pantano Substation	0	0	166	130
Route group 4 – Pantano Substation to Saguaro Substation	0	146	993	1,365

Rangelands

The majority of the rangeland within the proposed Upgrade Section consists of grazing lands managed by the State of Arizona (table 3.11-13).

Table 3.11-13. Summary of Grazing Lands in the Upgrade Section Analysis Area

Proposed and Alternative Routing Options Segment	Arizona BLM Grazing Lands (acres)	New Mexico BLM Grazing Lands (acres)	Arizona State Grazing Lands (acres)	New Mexico State Grazing Lands (acres)	Total Acres
Route group 3 - Apache Substation to Pantano Substation	464	0	2,414	0	**2,878**
Route group 4 – Pantano Substation to Saguaro Substation	854	0	1,935	0	**2,789**

ELECTROMAGNETIC FIELDS

One issue raised during the EIS scoping process was the potential for electromagnetic fields (EMF) created by the flow of electricity associated with the proposed Project to interfere with radio signals used in automated irrigation or fertilization systems. This effect is classified as broadband interference since it occurs over a wide range of electromagnetic spectrum and may be difficult to void. Electric fields from electric power transmission lines can interfere with radio signals, although the effect may only be experienced for systems located beneath or in close proximity to the power line, with the interference dissipating rapidly as distance from the line increases.

Little information is available to assess this impact. To date, the only guidelines established for EMF exposure by the Federal Communications Commission (FCC), the IEEE, and the American Conference of Governmental Industrial Hygienists (ACGIH) are related to human health. No EMF regulations have been established by the Federal Government or by the New Mexico and Arizona State governments related to exposure and human health. Nor have any guidelines been established or evaluations completed of the impact of EMF on interference with radio signals of the type that might be employed by local farmers. One technique used to prevent interference is to enclose the electric operating unit in a conductor envelope also called a Faraday cage, which shields the instrumentation from the electric field.

3.11.3 Military Operations

Military baseline conditions (the military “affected environment”) include the discussion of existing military land uses in terms of military operations, military training routes (MTRs), and military installations. The information provided in the subsection is taken from a report titled “Southline Transmission Project Resource Report 19: Military Operations” (CH2M Hill 2013m). The contents of that report are used herein without specific reference.

Analysis Area

The analysis area military operations for the both the New Build Section and Upgrade Section includes any military operation, MTRs, and military installation that may intersect with the footprint for the action alternatives. This includes a 1-mile buffer around the BSETR. The analysis area includes the proposed Project footprint total acreage (approximately 0 to 2,000 acres, depending upon alternative) as well as the intersection of the proposed Project with the 1.6 million-acre BSETR. This analysis area is at the request of military staff from BSETR, who requested a 1-km buffer, which is captured in the 1-mile buffer. This analysis area is used to identify military operations, MTRs, and military installations that could be directly, indirectly, or cumulatively impacted by surface disturbance, above-surface facilities (i.e., towers, spans) and where construction materials, equipment, and workers may be present (figures 3.11-4 and 3.11-5 below).

Laws, Ordinances, Regulations, and Standards

Proposed BLM actions must consider military regulations during the application review process and resource analysis. The following discussion summarizes the relevant military laws, regulations, plans, and policies that would apply to the Project (laws, regulations, plans, and policies discussed in chapter 2 or other resource sections of this EIS are not repeated here).

FEDERAL

National Telecommunications and Information Administration Regulations and Procedures

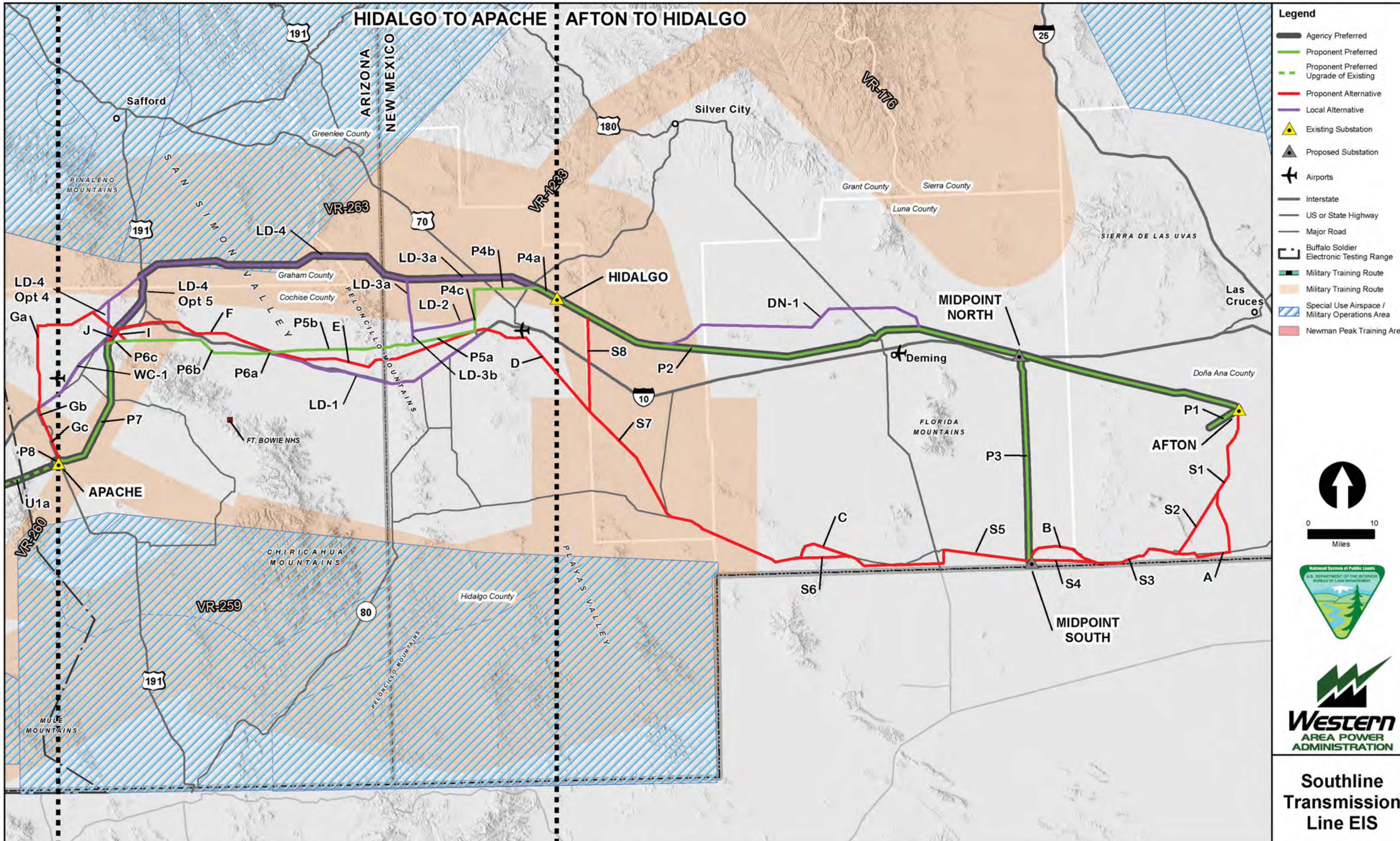
There are two managed areas in the vicinity of Fort Huachuca within which radio frequencies could affect the U.S. Army EPG. The “Coordination Zone” and “Noise Minimize Zone” are established in the “Manual of Regulations and Procedures for Federal Radio Frequency Management” published by the National Telecommunications and Information Administration of the DOC (2013). Each Federal agency having radio operations within the Coordination Zone must notify the Area Frequency Coordinator, Fort Huachuca, or the Army Interdepartment Radio Advisory Committee representative, of the frequency, power, location, and type emission of the radio operations. The Coordination Zone is the area bounded by connecting lines along Arizona SR 80 from Tucson to Bisbee, due south from Bisbee to the international border, west along the border to a point due south of Dateland, due north to Dateland, along SR 80 from Dateland to Gila Bend, and along SR 84 from Gila Bend to Tucson. The Noise Minimize Zone is the area extending 15 miles from Fort Huachuca within which transmissions of mobile stations need to be minimized to the extent feasible. Signal levels within the Noise Minimize Zone should not exceed the following limits:

- 10–540 kilohertz (kHz) 20 millivolts (mV) per meter
- 540–1,600 kHz 50 mV per meter
- 1.6–20 megahertz (MHz) 20 mV per meter
- 20–54 MHz 50 mV per meter
- 54–148 MHz 20 mV per meter
- above 148 MHz 50 mV per meter

U.S. Department of Defense and Federal Aviation Administration

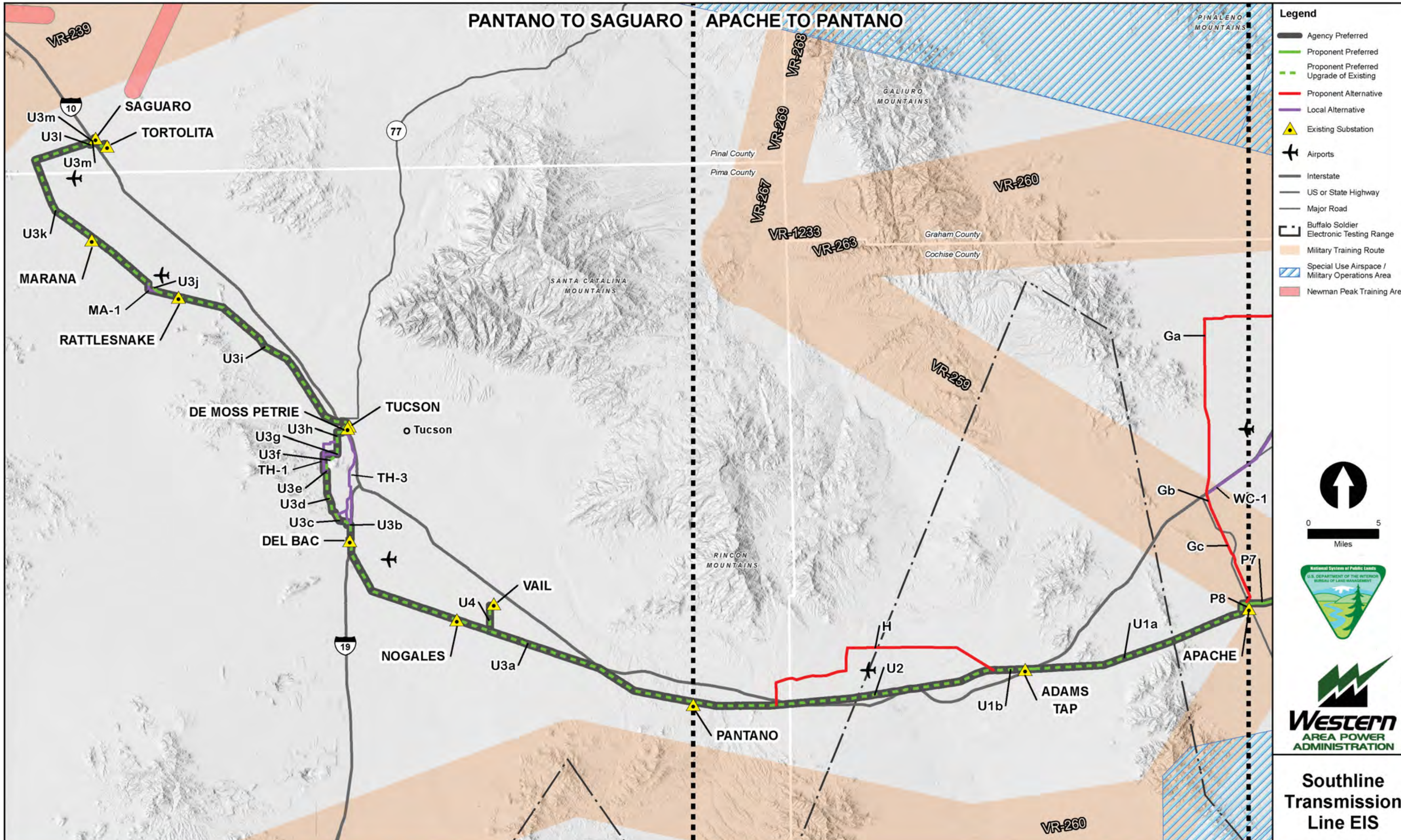
The DOD implemented the Air Installation Compatible Use Zone (AICUZ) Program in 1973 to promote compatible land use development around military airfields. The AICUZ Program creates standard land-use guidelines for areas that may be affected by noise exposure and accident potential, and provides information that can be used by local government jurisdictions to regulate land use and development. The AICUZ Program identifies noise zones and accident potential zones (APZs), while providing guidance regarding the compatibility of various land uses.

1 **Figure 3.11-4.** Military training routes and airspace restrictions in the New Build Section.



2

1 **Figure 3.11-5.** Military training routes and airspace restrictions in the Upgrade Section.



2

NOISEMAP and the Integrated Noise Model are the two EPA-approved computer models used to determine potential noise impacts from aircraft operations. The FAA uses the Integrated Noise Model for civilian airport modeling, whereas the U.S. Air Force uses the NOISEMAP model to describe noise impacts created by aircraft operations.

The AICUZ Program identifies APZs for military airfields to limit noise exposure and safety hazards. An area of high accident potential is known as a Clear Zone (CZ), followed by Accident Potential Zone I (APZ-I), and Accident Potential Zone II (APZ-II). Due to high incidence rate of accident potential within CZ areas, acceptable land uses within these areas are highly limited. Nationwide, the U.S. Air Force has funded the acquisition of real property interests within CZs at military bases. Land uses also are limited within APZs due to the potential for accidents to occur. The AICUZ Program guidelines apply to Libby Army Airfield associated with Fort Huachuca, as does State law (primarily ARS 28-8481 and 28-8482) concerning military airports. No APZs are included in the analysis area.

Issues to Be Analyzed

Public scoping of the Project generated eight comments regarding military concerns. These comments generally recommended analysis of the potential impacts to military installations and airspace from the Project:

- directly or indirectly impacting DOD-owned land, leased land, or withdrawn Federal land; military bases, bombing ranges, gunnery ranges (including EPGs), airports, and airspace; parachute drop zones; and MTRs;
- directly or indirectly impacting access to military owned, leased, or withdrawn (including EPGs) lands as a result of fencing or other physical or legal barriers necessary for completion and operation/maintenance of the proposed Project and its alternatives; or
- conflicting with, or putting limitations on, existing and/or future military activities and/or missions.

Analysis Area Conditions

The existing conditions for military operations are described in an east-to-west sequence, beginning at the Afton Substation in New Mexico and ending at the Saguaro Substation in Arizona. Military operations are illustrated in figures 3.11-4 and 3.11-5, New Build and Upgrade sections, respectively.

New Build Section

DEPARTMENT OF DEFENSE LAND

Lands managed by DOD form less than 1 percent of the analysis area (refer to Section 3.11.1, “Land Use”). The DOD lands crossed by the Upgrade Section are located in Willcox Playa, in route group 2 (segment P7 of subroute 2.1). Willcox Playa was formerly used as a bombing range around World War II, but is no longer used as an active bombing range. Remnant unexploded ordinance may exist on the Willcox Playa. The Willcox Playa is under a perpetual lease to the Fort Huachuca’s EPG operations by DOD and is currently used for aerial training by the EPG. The playa falls outside the BSETR, but is still a key location for Fort Huachuca’s overall electronic testing mission in Arizona.

MILITARY TRAINING ROUTES

The MTR program is a joint venture by the FAA and the DOD to develop routes for the purpose of conducting low-altitude, high-speed training. MTRs may refer to types of special use airspace, other than restricted airspace or prohibited airspace, where military operations justify limitations on aircraft not participating in those operations. The DOD (e.g., U.S. Army, U.S. Air Force) trains in a wide range of airborne tactics, one of which is low-level combat. MTRs are aerial corridors in which military aircraft generally operate below 10,000 feet at speeds in excess of 250 knots.

The FAA and DOD define Special Use Airspace areas used for military flight activities as follows:

- Prohibited Areas—airspace that may contain a high volume of pilot training activity or an unusual type of aerial activity, neither of which is hazardous to aircraft. They are depicted on aeronautical charts for information to non-participating pilots.
- Restricted Area—airspace designated for hazardous military activities including live firing of weapons. Restrictions are placed on all non-participating air traffic.
- Warning Areas—international airspace designated for military activities. Although activities may be hazardous, international agreements do not provide for prohibition of flight in international airspace.
- Military Operations Areas (MOAs)—airspace designated for non-hazardous military activity such as acrobatics, air combat tactics, and formation training. The designation informs and segregates non-participating instrument flight rules aircraft from the activity. Visual flight rules aircraft are not restricted from operating in MOAs. Examples of activities conducted in MOAs include, but are not limited to, air combat tactics, air intercepts, aerobatics, formation training, and low-altitude tactics.
- Alert Areas—alert areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. Pilots should be particularly alert when flying in these areas.
- Controlled Firing Areas—airspace where live ammunition is used to simulate combat scenarios. Controlled firing areas contain activities which, if not conducted in a controlled environment, could be hazardous to nonparticipating aircraft. The distinguishing feature of the Controlled Firing Area, compared with other Special Use Airspace, is that its activities are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate an aircraft might be approaching the area.

The FAA and DOD define Other Airspace Areas used for military flight activities as follows:

- MTRs—for military flight training at airspeeds in excess of 250 knots. There are two types of MTRs:
  - Instrument Flight Rules: for low-altitude navigation and tactical training below 10,000 feet and at airspeeds in excess of 250 knots at night and in foul weather.
  - Visual Flight Rules: for low-altitude navigation and tactical training below 10,000 feet at airspeeds in excess of 250 knots under visual flight rules (FAA 2013).

Each training route is identified by two letters, followed by either four digits for routes below 1,500 feet above ground level (AGL), or three digits for routes extending for at least one leg above 1,500 feet AGL. Each segment of an MTR is allocated a floor and ceiling altitude and lateral boundaries. The floor may be at the earth's surface or at any altitude above the surface. Lateral boundaries are described by nautical miles left and right of the route. MTRs are subdivided into Instrument MTRs, Visual MTRs, and Slow-

Speed, Low-Altitude MTRs. Instrument MTRs are flown under Air Traffic Control, while Visual MTRs are not.

U.S. Air Force military aircraft operating on the MTRs with night-vision goggles under “HI illumination” conditions are restricted to a 1,000 feet AGL minimum. Those operating with night-vision goggles under “LO illumination” or without night-vision goggles are restricted to a Minimum Safe Altitude computed for each leg of the route. This leg Minimum Safe Altitude is typically always higher than 1,000 feet AGL minimum, due to terrain and human-made obstructions. Army, Navy, and Marine aircraft might have lower-altitude restrictions depending on the type of equipment (e.g., Army helicopters).

There are multiple MTRs throughout southern New Mexico and Arizona within the New Build Section military analysis area. MTRs and airspace restriction areas were reviewed specific to the proposed and alternative project routes. Specific military training flight paths that intersect or occur adjacent to the New Build Section are shown in table 3.11-14 and on figures 3.11-4 and 3.11-5. Although airspace restrictions are present in the vicinity of the proposed Project and alternatives, the military analysis area does not overlap with these areas. Transmission line structures built along training routes would need to be limited in height to less than 200 feet, and consultation with military authorities is advised. Building to the floor of the airspace would require separate operational clearance requirements for safety because the MTR AGL minimum applies to not just the terrain, but also human-made obstructions.

Tucson International Airport is home to the U.S. Air Force 162nd Fighter Wing (FW), which trains pilots in the F-16 Falcon fighter aircraft. The 162nd FW uses MTRs in New Mexico and Arizona. Low-altitude tactical maneuvering is an important part not only for their training syllabi, but also for other units who use their MTRs for their own training requirements. The 162nd FW uses the MTRs to fly extremely high-task-loaded missions called Low Altitude Step Down Training. These missions are flown dual (with an instructor pilot in the rear cockpit) at 500 feet AGL and 500 to 575 miles per hour (mph) (450 to 500 knots). The student pilot maneuvers the aircraft three-dimensionally (e.g., vertical pull to specific attitude/altitude, then inverted pull down back to 500 feet AGL). Although the 162nd FW’s F-16 aircraft are currently limited to a 500 feet AGL minimum training altitude, many other military units using the MTRs do currently train to lower minimum altitudes. Recent examples include local and deployed units flying Air Force A-10 Thunderbolts and C-130 Hercules, Marine MV-22 Ospreys and AV-8 Harriers, Navy F-18 Hornets, and Royal Air Force GR-4 Tornados. These aircraft often fly these prime low-level training down to their operational minimum altitudes (100 to 300 feet AGL) or the MTR minimum, whichever is higher.

Specific military airspace operations categories that intersect the analysis area include Low Altitude Step Down Training, Low-Altitude Navigation, Low-Altitude Tactical Formation, and Low-Altitude Awareness Training.

Table 3.11-14. Military Training Routes that Cross the Analysis Area– New Build Section

Route Segment/Expansion Area/Staging Area	Visual MTR	Height AGL at Point of Route Crossing (feet)	Length of Analysis Area Crossed by MTR (miles)
Route Group 1 – Afton Substation to Hidalgo Substation			
P2- subroute 1.1	VR-176	100	0
	VR-263	100	0.05
P4a - subroute 1.1	VR-263	100	0
P4b - subroute 1.1	VR-263	100	0
	VR-1233	300	0

Table 3.11-14. Military Training Routes that Cross the Analysis Area– New Build Section (Continued)

Route Segment/Expansion Area/Staging Area	Visual MTR	Height AGL at Point of Route Crossing (feet)	Length of Analysis Area Crossed by MTR (miles)
P6b - subroute 1.1	VR-260	300	0.04
P7 - subroute 1.1	VR-259	700	0.05
	VR-260	300	0.47
P8 - subroute 1.1	VR-259	700	0
Local Alternative DN1	VR-263	100	0.05
Local Alternative D	VR-263	100	0
S7 - subroute 1.2	VR-263	100	0.08
S8 - subroute 1.2	VR-263	100	0
Route Group 2 – Hidalgo Substation to Apache Substation			
F – subroute 2.2	VR-260	300	0.04
Local Alternative LD3a	VR-263	100	0
	VR-1233	300	0.09
Local Alternative LD4	VR-260	300	0.04
	VR-1233	300	0.06
	VR-1233	300	0.05
Local Alternative WC1	VR-259	700	0
Substations			
Hidalgo Substation Expansion	VR-263	100	0
Southline Apache Substation Expansion	VR-259	700	0
SWTC Apache Substation Expansion	VR-259	700	0
Staging Areas			
Staging Area 5	VR-263	100	0
Staging Area S6	VR-263	100	0
Staging Area S7	VR-263	100	0
Staging Area S8	VR-263	100	0
Staging Area Gb	VR-259	700	0
Staging Area LD3	VR-263	100	0
	VR-1233	300	0

MILITARY OPERATIONS AREA (IAW FAA ORDER JO 7400.2.J, CHAPTER 25, MILITARY OPERATIONS AREA)

An MOA is "airspace established outside Class A airspace to separate or segregate certain nonhazardous military activities from instrument flight rules (IFR) Traffic and to identify for visual flight rules (VFR) Traffic where these activities are conducted" (14 CFR Part 1-2). Class A airspace is defined by the FAA as "generally, that airspace from 18,000 feet mean sea-level (MSL) up to and including flight-level (FL) 600, including the airspace overlying the waters within 12 nautical miles (NM) of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under instrument flight rules (IFR)."

MOAs are designated to contain nonhazardous, military flight activities, including, but not limited to, air combat maneuvers, air intercepts, low-altitude tactics, etc. (FAA JO 7400.2J, 25-1-2) (FAA 2012).

The 162nd FW conducts daily operations in the Tombstone MOA, Outlaw MOA, Jackal Low/Jackal MOAs, Reserve/Morenci MOA, Ruby/Fuzzy MOA, and Sells MOA. The MOAs are not active 24 hours a day; they are activated and deactivated by the Albuquerque Air Route Traffic Control Center, as required. The analysis area for the proposed New Build Section would only intersect one MOA: the Morenci MOA; the Jackal Low and Tombstone MOAs are located in general proximity to the proposed New Build Section, as shown in table 3.11-15.

Table 3.11-15. Military Operations Areas in the Vicinity of the New Build Section

Facility	Distance to Nearest Route (Segment Name)	Analysis Area Crossed (miles)
Jackal Low MOA	8.4 miles (Ga)	0
Morenci MOA	0 miles (LD4)	19.2
Tombstone MOAs (A, B, and C)	7.5 miles (U1)	0

JACKAL LOW MILITARY OPERATIONS AREA

The Jackal Low MOA overlies Graham County in southwestern Arizona. The lowest altitude of operation is 100 feet AGL. The Army National Guard trains helicopter pilots near the Tortolita Substation. Military training flights occur between 1,000 and 10,999 feet amsl. The Jackal Low MOA is active Monday through Friday from 7 a.m. to 10 p.m., and intermittently on weekends indicated by Notice to Airmen (NOTAM).

MORENCI MILITARY OPERATIONS AREA

The Morenci MOA occurs at an altitude between 1,500 feet AGL and 17,999 feet amsl. Greenlee County Airport is located within the boundaries of the Morenci MOA. The MOA is active Monday through Friday from 6 a.m. to 9 p.m., and other times by NOTAM.

TOMBSTONE MILITARY OPERATIONS AREAS

The Tombstone MOAs (A, B, and C) are managed by the 355th FW at Davis-Monthan AFB and occasionally utilized by the 162nd FW. A cooperative scheduling agreement is in place among the 56th FW at Luke AFB, 355th FW at Davis-Monthan AFB, and 162nd FW at Tucson to ensure all three units have sufficient access to the airspace to accomplish their training goals. Tombstone MOAs A and B occur at an altitude between 500 feet AGL and 14,500 feet amsl; Tombstone MOA C occurs at an altitude between 14,500 feet amsl and 17,999 feet amsl. The Tombstone MOAs all are active Monday through Friday from 6 a.m. to 9 p.m., and other times by NOTAM.

MILITARY INSTALLATIONS

There are no military installations within the analysis area for the New Build Section.

Upgrade Section

DEPARTMENT OF DEFENSE LAND

Lands managed by DOD form less than 1 percent of the analysis area (refer to Section 3.11.1, "Land Use"). No DOD lands would be crossed by the New Build Section.

MILITARY TRAINING ROUTES

There are multiple MTRs throughout southern Arizona. MTRs within the Upgrade Section analysis area share the same descriptions and users as those described under the New Build Section above. MTRs and airspace restriction areas were reviewed specific to the proposed and alternative Project routes. Specific military training flight paths that intersect or occur adjacent to the Project footprint for Upgrade Section are shown in table 3.11-16 and in figures 3.11-4 and 3.11-5.

Table 3.11-16. Military Training Routes that Cross the Analysis Area– Upgrade Section

Route Segment/Expansion Area/Staging Area	Visual MTR	Height AGL at Point of Route Crossing (feet)	Length of Analysis Area Crossed by MTR (miles)
Route Group 3 - Apache Substation to Pantano Substation			
Ga	VR-259	700	0
Gb	VR-259	700	0
Gc	VR-259	700	0.07
	VR-1233	300	0.09
	VR-1233	300	0.06
	VR-1233	300	0.05
Staging Areas			
Staging Area 5	VR-263	100	0
Staging Area S6	VR-263	100	0
Staging Area S7	VR-263	100	0
Staging Area S8	VR-263	100	0
Staging Area 6	VR-263	100	0
Staging Area 9	VR-260	300	0
	VR-1233	300	0

MILITARY OPERATIONS AREA

No MOAs are located within the Upgrade Section analysis area. However, the analysis area would be located within 10 miles of one MOA, as shown in table 3.11-17 and in figures 3.11-4 and 3.11-5. This MOA has the same description as described above under the New Build Section.

Table 3.11-17. Military Operations Areas in the Vicinity of the Upgrade Section

Facility	Distance to Nearest Route (Segment Name)	Analysis Area Crossed (miles)
Tombstone MOA (C)	7.5 miles (U1a)	0

MILITARY INSTALLATIONS

Several military installations are located in the vicinity of the Upgrade Section; however, the military analysis area only intersects Fort Huachuca's BSETR and Willcox Dry Lake, where military test operation activities are possible. The vast majority of the intersection would occur in the Upgrade Section; however, there are areas of the BSETR that would occur in the New Build Section. Other military installations that are located nearby that may use the MTRs or MOAs described above are included. The military installations in the vicinity of the proposed analysis area (within 5 miles) are presented in table 3.11-18.

Table 3.11-18. Military Installations

Facility	Distance to Nearest Route (Segment Name)	Analysis Area Crossed (acres)
Fort Huachuca BSETR Willcox Dry Lake	0 miles (U1a, U1b, U2, H) 0 miles (P7)	825 5
Davis-Monthan Air Force Base	3.7 miles (U3a)	0
Tucson International Airport – Arizona Air National Guard – 162nd FW	2.1 miles (U3a)	0
Arizona Army National Guard - Silver Bell Army Heliport - Western Army Aviation Training Site (WAATS) - 1/285th ARB - Peace Vanguard – Pinal Airpark	1 mile (U3k)	0
DOD Parachute Training and Testing Facility - Drop Zone (West Drop Zone-VFR-Supplement U.S. Page 208) – Pinal Airpark	Less than 1 mile (U3k)	0

Fort Huachuca

The primary Fort Huachuca facility near the city of Sierra Vista is located on approximately 70,000 acres in the foothills of the Huachuca Mountains near the U.S.–Mexico border, approximately 60 miles southeast of Tucson. The primary mission of Fort Huachuca is to support the Army's military intelligence training for the 111th and 112th Military Intelligence Brigades. Fort Huachuca also supports numerous tenants including the Army's Signal Command, EPG, and the 11th Signal Brigade. Arizona Senate Bill 1387 was signed into law in 2007 by Governor Jan Brewer, which requires that Fort Huachuca be notified and consulted with for projects with potential impacts to the Fort or BSETR. Senate Bill 1387 was enacted to protect the unique electromagnetic conditions of the BSETR. BLM and Western have coordinated closely with the military through the DOD clearinghouse, and directly with the EPG to address impacts to the BSETR.

The EPG is a facility headquartered at Fort Huachuca where tests of electronic combat and electronic warfare equipment are conducted. One area of the EPG where such tests are conducted extends northward from Fort Huachuca and crosses the existing Western power line corridor (included in the analysis area) west of the Apache power plant (segment U2 of subroute 3.1 and alternative H of route group 3 local alternatives). Existing facilities, such as power lines, cell phone structures, radio stations, and other radio frequency emitters, have been measured and taken into account to form a "zero point" for electronics and communications testing purposes within the EPG.

The EPG conducted a power line study in July 2012 (Valentine et al. 2012) and measured emissions from 500-kV lines at different locations in Arizona. Broadband noise was detectable above the ambient noise floor out to distances of approximately 0.6 mile. The study used existing lines that used a radio communications carrier on the conductors. This could present more EMI than a line using fiber optics for communications, or microwave communications, as the radio signal is carried on the transmission line itself. Additional studies, to be coordinated between the EPG and Southline, would be conducted to further categorize possible interference by transmission lines to military C4 systems under various operational configurations and environments.

The electromagnetic environment that surrounds Fort Huachuca is an unparalleled asset for the testing and training operations carried out under a wide variety of missions. The receiving and transmitting points involved in operations in the "Electronic Range" extend well beyond the boundaries of the Fort; while most points are located within 30 miles of the Fort, some operations extend to the Tucson area and beyond.

Fort Huachuca's Electronic Range Complex is unique in several aspects:

- Much of the land surrounding the Fort is either undeveloped or occupied by low-density uses that generate relatively little electromagnetic activity and therefore relatively little EMI.
- Its location in the San Pedro River valley, surrounded by mountains, further reduces EMI. This area is referred to locally as "the bowl:"
- It is the only U.S. location where aggressive, offensive electronic warfare/jamming can be conducted.
- It is the only test range with a frequency coordination zone protected by Federal mandate.
- It is expandable to adjacent Federal, State and local lands to emulate division-size tests.
- The Restricted Airspace controlled by Libby Army Air Field is coterminous with much of the Electronic Range providing controlled airspace for unmanned aerial vehicle testing.

The topography of the San Pedro River valley forms a natural high-altitude "bowl" that largely defines the BSETR for purposes of this DEIS. The National Telecommunications and Information Administration "Noise Minimize Zone" is located within the boundaries of the BSETR. Although the actual Electronic Range extends outside the BSETR boundary analyzed in this DEIS and extends as far as Tucson, the primary operations most critical to the electronic testing and training missions are carried out within the BSETR area delineated. As these missions change and new information about EMI becomes available, the boundary of the BSETR may require revision. For example, the Fort is conducting research to delineate mountain peaks above a certain elevation to determine whether peaks that contain facilities that may transmit electromagnetic energy (i.e., telecommunications signal facilities) could create EMI interference issues. It is likely that in the future some of these mountain peak areas may be included in the BSETR.

The National Telecommunications and Information Administration has adopted regulations to limit electronic interference in the vicinity of Fort Huachuca. The nature and status of the existing land use compatibility guidance (including Federal, State and local guidelines and regulations) are addressed below.

Cochise County Comprehensive Plan

The County's Comprehensive Plan, adopted in 1984 and amended through 2006, has as a major focus the designation of growth areas around existing communities (unless otherwise approved through a master development plan process). Thus, growth areas are defined around the cities of Sierra Vista, Huachuca City, Benson, Willcox, the Whetstone area, and Tombstone.

An Area Plan has also been adopted for the Babocomari Area, located southeast of the Whetstone Area and north of the Fort's East Range. The Comprehensive Plan and Babocomari Area Plan may be found online.[12]

Babocomari Area Plan

Among the issues addressed in the Babocomari Area Plan, adopted in September 2005, were to determine the appropriate types and density of land uses in the high priority encroachment area associated with the Hubbard Assault Strip in Fort Huachuca's East Range. To address this issue, the plan includes the following policies:

Policy 1.1 New land uses should be compatible with adjacent existing uses, particularly with historic ranching, mining, rural-residential, and military activities and should incorporate setbacks, vegetative and visual screening, and noise attenuation measures into project design to mitigate potential impacts associated with proximity to these historic land uses.

Policy 1.3 The use of conservation tools, such as fee-simple acquisition, conservation easements, and conservation subdivision options, are encouraged and supported by this plan to protect washes, open space, wildlife corridors, and the hydrologic functions of the Babocomari River.

Policy 1.4 Developers of property should provide disclosure to future buyers of military activities in the air space over the Plan Area, as required by ARS 33-422, and all new subdivision plats should include a note about military as well as private airfield activities in the area.

The plan also identifies specific policies for the Hubbard Assault Strip Encroachment Area, including:

- Gross residential densities in the southern half of the Hubbard Assault Strip Encroachment Area should not exceed 1 residence per 3 acres.
- Sellers will provide disclosure of the Hubbard Field Encroachment Area and military activities to potential buyers of lots, as well as provide a disclosure notice on subdivision plats.
- No special uses will be approved that have the ability to impact the military missions of the East Range.
- Additional light pollution control measures may be considered in the future.

City of Sierra Vista General Plan

The City of Sierra Vista General Plan, "Vista 2020," was adopted in 2003 and contains goals and strategies for the city's development. Among the goals are Goal 2-6, "Minimize conflicts between land uses using appropriate performance standards and design guidelines" and Goal 5-1, "Target growth to identified growth areas." Strategies for achieving both of these goals include coordinating with the Fort on development plans and growth areas. The economic development element of the plan also recognizes that the city's economy is largely dependent on the Fort. The growth areas identified in the General Plan are located generally to the south and west of the existing developed portions of the city, away from the major operational areas of the Fort.

Because the success of Fort Huachuca in achieving its mission is highly dependent on the proper operation of sophisticated communication systems, EMI is an important consideration. An environment free of EMI is essential to carry out its training and testing mission using a wide range of electronic equipment and systems.

[12] Available at: www.cochisecounty.com/P&Z/Comprehensive.htm.

Electromagnetic interference (or radio frequency interference) occurs when an electromagnetic field interferes with the normal operation of an electronic device. Any device that transmits, distributes or processes any form of electrical energy can be a source of EMI. Such interference typically is generated on a small scale due to the operation of everyday items such as cell phones or fluorescent lights, but because the reach of the field from such devices is small, it does not result in problems. However, larger sources of interference, such as telecommunication signal facilities, or other transmitters can create significant problems for other devices using the radio frequencies. With the growth of the telecommunications industry, the increase in dependence on electronic control and guidance systems for aircraft, and the generally increased use of the radio frequency spectrum by an expanded number of users, the potential for adverse effects will likely increase in the future.

Transmitters are designed to emit electromagnetic energy to convey radio frequency signals to receiving devices; interference occurs when the emitted energy is picked up by a receiver that is not the intended recipient of the emissions. Typically, the operating frequency of the transmitter and receiver of the unwanted emissions are in the same frequency bandwidth; the potential for interference decreases as the frequency separation between a transmitter and receiver increases. Interference can also occur when unintended leakage occurs from a device that is not intended to emit energy. For example, properly maintained television cable carrier systems do not radiate much electromagnetic energy. However, malfunctioning of the system may result in significant leakage and consequent interference.

EMI from surrounding land uses can adversely affect military operations in numerous ways. Among these are interference with aircraft guidance systems (including those on the ground as well as in the aircraft itself); interference with the proper functioning of computer hardware; disruption of communications between units during training exercises; and interference with testing of electronic systems and devices. Military operations that transmit electromagnetic energy can also potentially interfere with civilian activities around the installation, such as television and radio reception and operation of computers and medical devices.

An important consideration for avoiding electromagnetic interference is that electronic fields operate according to the inverse square law of physics, which states that a quantity of something such as electromagnetic energy is inversely proportional to the square of the distance from a source point. For example, at twice the distance, 1/4 of the emissions would be received, while at 10 times the distance, only 1/100 would be received. For this reason, distance is one of the best methods to avoid EMI, as the effects decrease more rapidly than the distance increases.

Compatibility problems due to obstruction or interference can be avoided by following principles concerning obstructions and sources of interference, and by submitting proposals for these kinds of uses to the installation for review.

1. The height of structures and other objects (such as trees) in critical airspace should be restricted in accordance with relevant FAA and DOD guidance to avoid obstructions. (See above for a discussion of guidance concerning airspace obstructions.)
2. Uses that transmit electromagnetic energy should be located at sufficient distance from any receivers on the installation to avoid interference with the operation of the receivers. Such uses may include:
    - Telecommunications signal facilities,
    - Television and radio transmitting towers, and
    - High-voltage electric transmission lines.

All sources of light around the installation should be shielded to avoid adverse effects of light pollution (such as light trespass, glare or sky-glow) on installation operations.

The analysis area is approximately 20–21 miles north of Fort Huachuca, but passes through the BSETR at about the midway point. The most northern tip of the BSETR is 48 miles north of Fort Huachuca.

The BSETR is located near Sierra Vista in southeastern Arizona. It is the principal Army Test Center for testing of command, control, communications, computer, and intelligence equipment and systems in real, virtual, and constructive environments. The BSETR is within the analysis area near Benson in Arizona. The BSETR also manages the 26,000-acre Willcox Dry Lake, where test operations are possible. A segment of the proposed route (P7) would pass through the eastern edge of Willcox Dry Lake.

The BSETR is the Army's C4I (Command, Control, Communications, Computers, Intelligence) Developmental Tester, and is a test center of the U.S. Army Developmental Test Command, which in turn is part of the U.S. Army Test and Evaluation Command. The mission of BSETR is to plan, conduct, and analyze the results of Technical Tests for C4I systems, Signal Intelligence, and Electronic Combat/Electronic Warfare equipment. In addition to conducting developmental tests, BSETR supports the Army operational test community in the conduct of operational tests, user tests, and experiments, and also supports customers in the joint and training communities. BSETR provides quality services to developers through the acquisition development cycle. Early in the acquisition development cycle, BSETR, through the use of modeling and simulation can address questions concerning frequency assignment, potential electromagnetic compatibility, and the effects of electronic warfare while the equipment is in the early design stage. Later in the development cycle, extensive measurement capabilities are available to satisfy the developer's data collection needs. BSETR conducts bench tests, lab tests, field tests, and tests of large-scale, geographically distributed systems employing a mix of live and simulated instrumentation and assets.

- The Electromagnetic Environmental Test Facility makes extensive use of modeling and simulation for determining electromagnetic effects on test items. It includes the Virtual Battlefield Environment facility, a hardware-in-the-loop simulator that provides scenario-driven communications and radar environments.
- The Instrumented Test Range provides time-space-position information and target signals for open-air testing. An extensive network of precision tracking instrumentation and surveillance radars measure data on airborne and ground-based vehicles. The Instrumented Test Range can collect both airborne and ground telemetry from systems as far west as the Yuma Proving Grounds.
- The Antenna Test Facility provides large scale testing of antennas mounted on platforms, and can determine radiation patterns in the high-frequency to microwave frequencies.
- The Environmental Test Facility can perform a full range of static and dynamic environmental testing on components and systems, particularly electromagnetic compatibility and interference testing, the need for which is becoming more prevalent with the increased number of electronic systems on the battlefield.
- The Electromagnetic Interference/Electromagnetic Compatibility/TEMPEST Test Facility offers testing both at its Fort Huachuca chambers and in the field with portable test equipment.

BSETR's area of operation includes more than 9,000 square miles of public and private lands in and around the Fort Huachuca military reservation. Operations are routinely possible on 70,000 acres at Fort Huachuca, 23,000 acres on Wilcox Dry Lake, more than 100,000 acres at Gila Bend, and with prior coordination, on approximately 62 million acres of Federal and State-owned land.

Davis-Monthan Air Force Base and Pinal Airpark

Davis-Monthan Air Force Base (AFB) and Pinal Airpark are located in the Tucson metropolitan area. Davis-Monthan AFB is home to the 355th FW, which trains pilots to fly the A-10 Thunderbolt II aircraft. Pinal Air Park is home to the Silver Bell Army Heliport, a U.S. Army helicopter training facility. Airspace north of the city (including MOAs within the analysis area) is used by the Army National Guard to conduct flight training operations.

Tucson International Airport – Arizona Air National Guard – 162nd Fighter Wing

The 162nd FW of the Arizona Army National Guard is located at the Tucson International Airport in Tucson. The 162nd FW is the largest Army National Guard wing in the United States, with three fighter squadrons and the Army National Guard/Air Force Reserve Test Center. The mission of the 162nd FW of the Arizona Army National Guard is to provide fighter training programs. The 162nd FW provides F-16 training for pilots through academic, simulator, and flight training. The 162nd FW has scheduling and operational control of the Special Use Airspace for five MOAs, including the Outlaw and Jackal Low/Jackal MOAs located north of Tucson, the Morenci and Reserve MOAs located east of Tucson, and the Ruby/Fuzzy MOA located south of Tucson, as well as one low-level MTR and one Air-to-Air Refueling Anchor. The 162nd FW also regularly uses the Goldwater Range Complex and the Sells MOA.

Arizona Army National Guard – Silver Bell Army Heliport – Pinal Airpark

The Arizona Army National Guard, Silver Bell Army Heliport, is located about 30 miles northwest of Tucson in Marana, Arizona, in the Pinal Airpark Area. The Silver Bell Army Heliport is the home of Western Army Aviation Training Site, Army Aviation Support Facility #2, 1-285th Attack Recon Battalion, Singapore Air Force Peace Vanguard and other Army Aviation Supporting Units. Western Army Aviation Training Site is a premier training site for-Army Aviation Rotor-Wing advance airframe qualifications courses for aviators, advance aviation enlisted training courses and foreign military training for the Army National Guard which is directed by the National Guard Bureau–Training and Doctrine Command, and Joint Force Headquarters – Arizona. Army Aviation Support Facility #2 provides airfield operations support for Silver Bell Army Heliport, aircraft maintenance support and training support for 1-285th Attack Recon Battalion and other aviation supporting units, and Peace Vanguard, which is directed by Arizona Army National Guard, Joint Force Headquarters – Arizona. The Army National Guard trains helicopter pilots near the Saguaro and Tortolita substations. Segments U3i, U3k, U3l, U3m, and MA-1 might conflict with their training.

Pinal Airpark- DOD Parachute Training and Testing Facility

Pinal Airpark is located about 30 miles northwest of Tucson in Marana, Arizona. Pinal Airpark is the home to DOD Parachute Training and Testing Facility at the West Drop Zone of Pinal Airpark. West Drop Zone of Pinal Airpark is near the Segments U3i, U3k, U3l, U3m, and MA1 might conflict with their training and testing. Pinal Airpark (MZJ) is currently updating the Master Airport Plan.

U.S. Border Patrol

During the preliminary studies conducted by Southline, contact was made with CBP, and no areas of concern or flight paths in the analysis area were identified by the CBP representative. However, if U.S. Border Patrol flight paths do cross the analysis area, then potential exists for U.S. Border Patrol activities to be affected by the proposed Project and alternatives.

3.12 SPECIAL DESIGNATIONS

Special designations baseline conditions (the special designations "affected environment") includes the discussion of existing special designations in terms designated wilderness areas, wilderness study areas, lands managed to maintain wilderness characteristics, national trails, ACECs, national monuments, county and city special designations, and REMAs. Lands that are managed to or that may possess wilderness characteristics are addressed in Section 3.13, "Wilderness Characteristics." The information provided in the subsection is primarily sourced from a report titled "Southline Transmission Project Resource Report 13: Special Designations" (CH2M Hill 2013n). The contents of that report are used herein without specific reference.

The BLM, through previous inventory and ongoing land planning efforts, has identified areas of public land for special designation throughout New Mexico and Arizona (as well as nationwide) as part of the National Conservation Lands, also known as the National Landscape Conservation System (NLCS). BLM does not designate wilderness areas or national trails. Those designations are established by Congress or Presidential proclamation (i.e., wilderness areas, National Historic and Scenic Trails, national monuments) and are included in the NLCS. The BLM established the NLCS in 2000 to increase public awareness of the scientific, cultural, educational, ecological, and other values present within certain special designations (BLM 2013i). The NLCS was signed into law by Congress in 2009.

In addition to lands designated by Congress or the President, the BLM may also create special designations through administrative resource inventories or during the planning process, such as cooperative management areas and protection areas, outstanding natural areas, forest reserves, wilderness study areas, ACECs, RNAs, Special Recreation Management Areas (SRMAs), SMAs, backcountry byways, and energy zones. Energy zones are areas with few impediments to utility-scale production of energy (namely solar) where BLM would prioritize renewable energy production and associated transmission infrastructure development.

3.12.1 Analysis Area

The special designation analysis area for the New Build Section is a 2-mile corridor around the proposed Project (1-mile buffer on either side of the centerline). In addition, proposed and alternative substations and access roads that are proposed outside the 2-mile corridor are included in the special designations analysis area. The 2-mile corridor is used to identify special designations that could be directly impacted by surface disturbance and where construction materials, equipment, and workers may be present.

The special designations analysis area for the Upgrade Section is a 500-foot corridor (250-foot buffer on either side of the centerline of the existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines).

References to the "Project" indicate the actual transmission line facilities (i.e., a 200-foot-wide transmission line corridor for the New Build Section and a 150-foot-wide corridor for the Upgrade Section, substation, or access road) that would remain during operation and maintenance of the proposed Project.

3.12.2 Issues to Be Analyzed

Effects on special designations would occur if construction and operation/maintenance of the proposed Project conflicts with the objectives of the special designation. The proposed Project could have potential effects on natural qualities, outstanding opportunities for solitude and primitive recreation, and values such as visual resources and visibility from special designations.

Indicator:

- Whether the proposed Project would conflict with the goals, objectives, and resources a particular special designation is intended to protect.

3.12.3 Analysis Area Conditions

The existing conditions for special designations are described in an east to west sequence, beginning at the Afton Substation in New Mexico and ending at the Saguaro Substation in Arizona. This section begins by describing the special designations that occur within the analysis area, followed by a more detailed description of specific special designations as they would occur in the proposed New Build and Upgrade sections, respectively. These areas may be affected by implementation of the proposed Project or its alternatives and associated proposed Project components (i.e., substations, representative staging areas, and access roads).

The analysis area and proposed Project cross linear and spatial special designations. There are multiple agencies that manage special designations within the analysis area; these are illustrated below in figures 3.12-1 and 3.12-2.

3.12.4 Designated Wilderness, Including Wilderness Study Areas

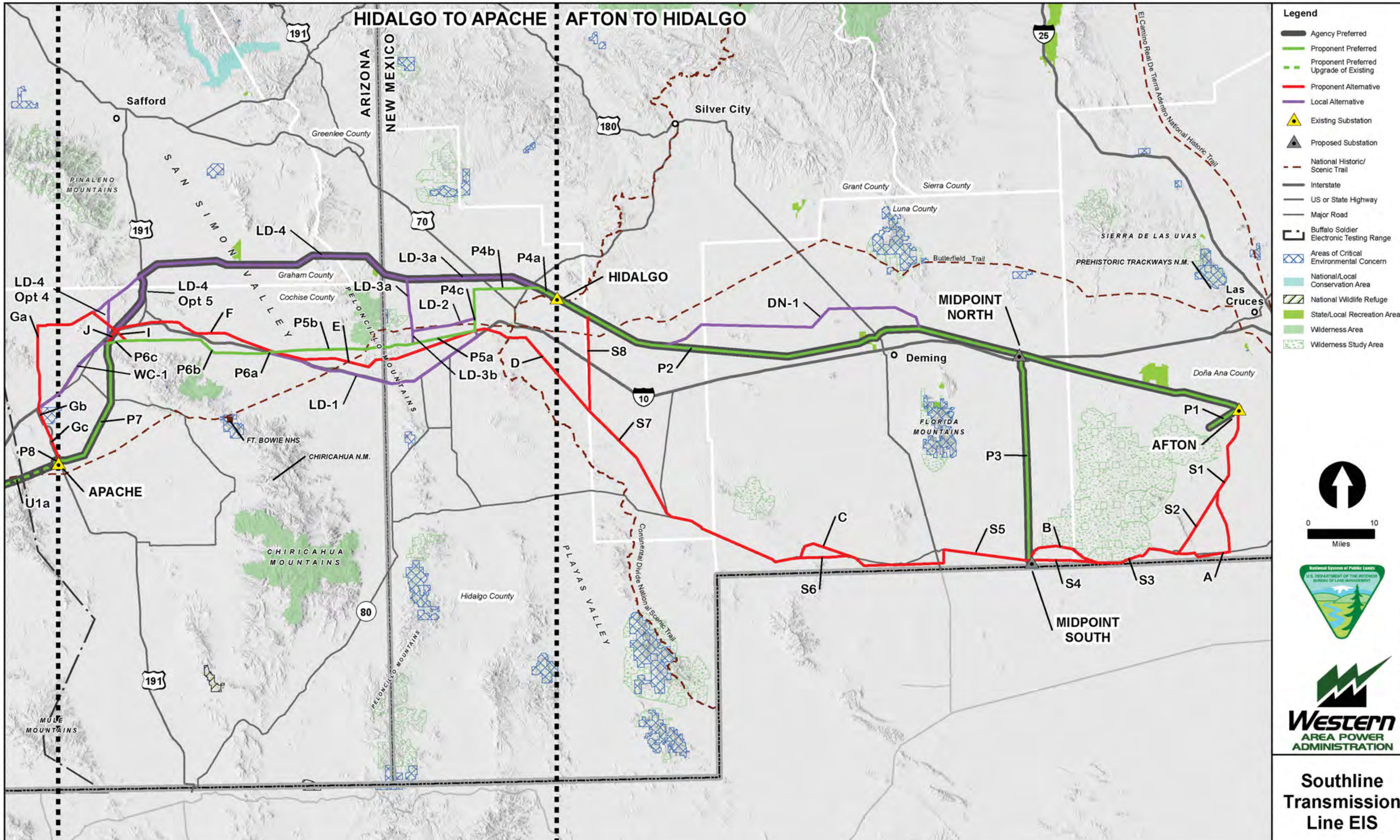
The Wilderness Act of 1964 (PL 88-577)

The Wilderness Act of 1964 was passed to “establish a National Wilderness Preservation System.” The act defines wilderness as

> an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

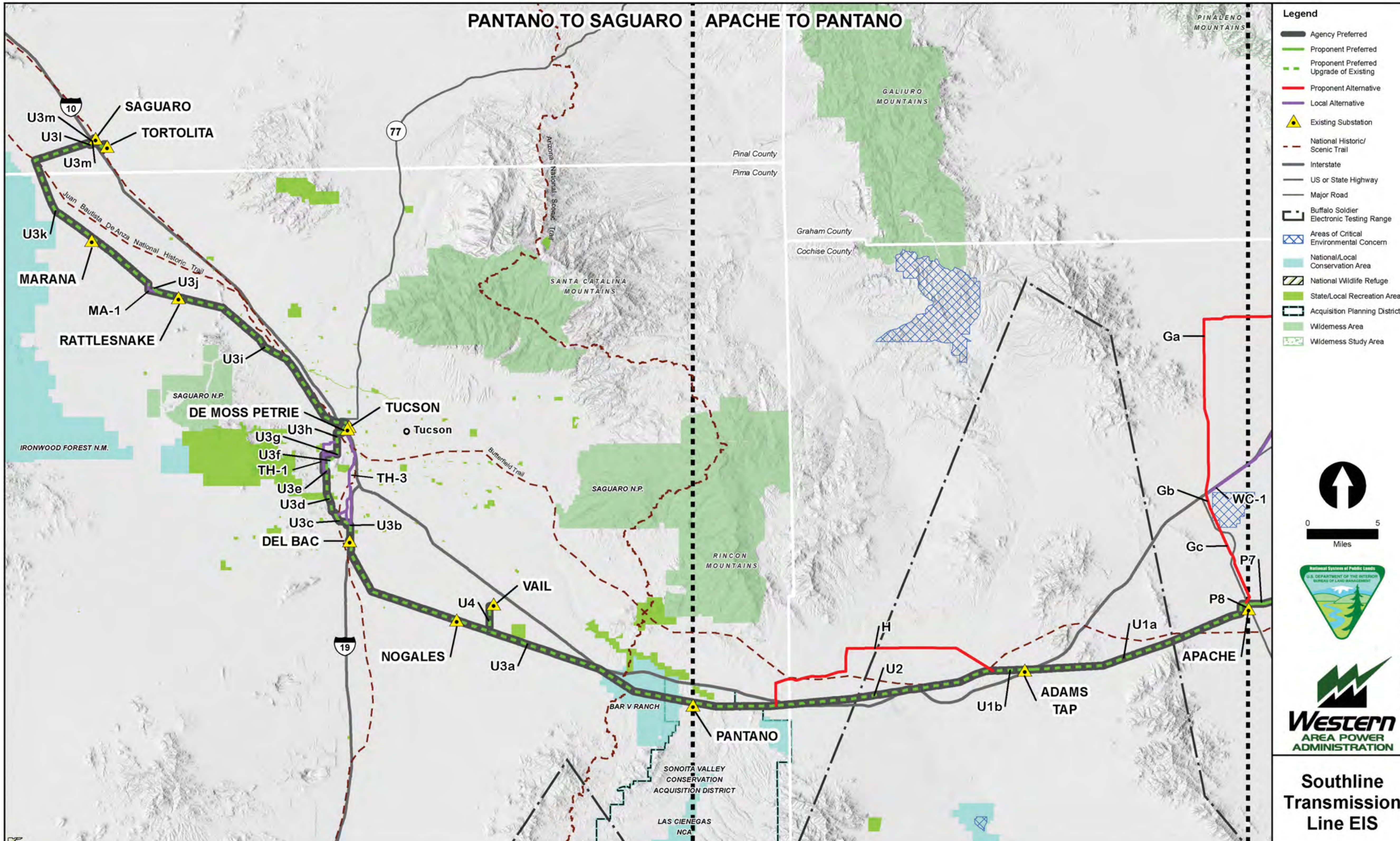
Designated by Congress for inclusion in the National Wilderness Preservation System, wilderness areas are managed either independently or cooperatively by the BLM, NPS, FWS, and U.S. Forest Service. Wilderness areas protect the habitat, serve as a sanctuary from modern-day conflicts for diverse species of plants and animals, and provide a source of clean water for numerous plant and wildlife species. They are also used for science and education by providing sites for field trips and study areas for student research. Wilderness areas may also provide recreational opportunities such as hiking and camping in a primitive setting. There is one wilderness area within the analysis area.

1 **Figure 3.12-1.** Special designation areas in the New Build Section.



2

Figure 3.12-2. Special designation areas in the Upgrade Section.



PELONCILLO MOUNTAINS WILDERNESS

The Peloncillo Mountains Wilderness is located northeast of San Simon and is identified as an exclusion area in the Safford RMP. Portions of the analysis area for segment Pb5 include areas of the Wilderness; none of the proposed Project would occur within the Wilderness. The Peloncillo Mountains Wilderness Management Plan establishes the objectives, policies, and actions by which the Peloncillo Mountains Wilderness is managed. The Peloncillo Mountains Wilderness Area totals nearly 20,000 acres within the Peloncillo Range, which extends from the Gila River into Mexico, near the border between Arizona and New Mexico. This remote and primitive area shows little signs of human activity and affords opportunities for primitive recreation, including hiking, backpacking, rock scrambling, hunting, and sightseeing. The higher country offers long-distance views, and excellent scenery enhances wilderness values in the rugged mountains and canyons (BLM 1995). Access to the southern section of the wilderness area is north of San Simon.

Wilderness Study Areas

BLM WSAs are identified through FLPMA, which directed the BLM to inventory and study its roadless areas for wilderness characteristics. Until Congress makes a final determination on a WSA, the area is managed so as not to impair its suitability for preservation as wilderness. WSAs often have special qualities, such as ecological, geological, educational, historical, scientific, and scenic values, and must possess the following characteristics:

- Size – Roadless areas of at least 5,000 contiguous acres of public land or of manageable size.
- Naturalness – Generally appear to have been affected primarily by the forces of nature (unaffected by manmade influences).
- Solitude – Provide outstanding opportunities for solitude or primitive and unconfined types of recreation.

Though BLM continued to designate WSAs through the RMP process, after the original FLPMA inventory and subsequent report to Congress, no WSAs have been designated since 1998, due to a court settlement. Therefore, the BLM no longer designates WSAs in the land use planning process. There are four WSAs within the analysis area in New Mexico.

The Mount Riley and West Potrillo Mountains WSAs, managed by the BLM Las Cruces District, consist of two adjacent WSAs comprising mountains that are a series of 48 volcanic cinder cones interspersed with small sand dunes, playas, and lava fields. These WSAs total approximately 151,082 acres. The vegetation consists of desert grasses and shrubs. Indian Basin, a natural depression at the southwest end of the West Potrillo Mountains, fills with water during the rainy season, providing a temporary pond for ducks. Wintering raptors are found in high numbers due to a high small-mammal prey base. These WSAs are accessed via dirt road in various conditions, which limits usage levels for recreation purposes.

The Aden Lava Flow WSA, also managed by the BLM Las Cruces District, is characterized by basalt flows, volcanic craters, and coppice sand dunes. The Aden Lava Flow WSA is approximately 22,213 acres. The lava flow includes pressure ridges, lava tubes, and steep-walled depressions of up to 100 feet in width. Grass and shrubs grow on the flow with many cacti and yucca. Vegetation consists of grasslands and desert shrubs, such as mesquite and creosote. Vent tubes and the many crevices found in the lava provide cover and den sites for wildlife. Bats are numerous and the rock pocket mouse (*Chaetodipus intermedius*) and black-tailed rattlesnake (*Crotalus colossus*) are found on the black lava flows. The WSA is accessed via dirt road in various conditions, which limits usage levels for recreation purposes.

The Peloncillo Mountains WSA is approximately 3,109 acres. This WSA is adjacent to the designated Peloncillo Mountain Wilderness Area in Arizona, as well as the Northern Peloncillo Mountains ACEC in New Mexico. The WSA is accessed via dirt roads in various conditions, which limits usage levels for recreation purposes.

There are no WSAs within the analysis area in Arizona.

In addition to these federally designated wilderness and WSAs, members of the NGO New Mexico Wilderness Alliance provided information during public outreach efforts for the proposed Project on other sensitive areas near the proposed Project. The NGO has suggested to the BLM that these areas be nominated for official designation as wilderness areas or WSAs. Since the BLM does not have authority to designate either, they are not shown on the maps presented in this DEIS. Review of those nominated areas is being addressed through the inventory updates that BLM is conducting for lands with wilderness characteristics (refer to section 3.13).

3.12.5 National Trails

National Trails System Act of 1968 (PL 90-543, as amended through PL 111-11)

The National Trails System Act authorizes the designation of a network of scenic, historic, and recreation trails. These trails provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of outdoor areas and historic resources; and encourage public access and citizen involvement. The National Trails System includes national historic, scenic, and recreation trails for public use. BLM is one of several Federal agencies that manage trails within the National Trails System. A national scenic and historic trails assessment is provided in appendix F of this DEIS.

National trails are designated under the National Trails System Act of 1968. According to the NPS, this system comprises national recreation trails that provide a variety of outdoor recreation uses in or accessible to urban areas. The National Trails System is designated to allow outdoor recreation opportunities, protect nationally significant scenic, historic, natural, or cultural qualities of areas, and represent desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as landforms that are characteristic of a region. National Historic Trails must follow as closely as possible and practicable to the original trails or routes of national historic significance. There are three national trails and one trail under study by Congress within the analysis area. The CDNST, Arizona Trail, Anza Trail, and the Butterfield Trail (also known as the Butterfield Overland Trail National Historic Trail) would be crossed by the Project.

Continental Divide National Scenic Trail

The 2009 Comprehensive Plan for the CDNST provides management direction to the CDNST Interagency Leadership Council, which consists of the U.S. Forest Service, BLM, and NPS. The Mimbres RMP was amended in 2009 to include prescriptions for management of the CDNST on BLM lands. Segments of the trail intersect the New Build Section of the proposed Project in various locations near Lordsburg in New Mexico. As described in the plan, the nature and purposes of the CDNST is to provide for high-quality, scenic hiking, and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor. Extending 3,100 miles between Mexico and Canada, the trail traverses landscapes primarily on public lands within 50 miles of the continental divide. The authority to establish national scenic trails is the 1978 National Trails System Act (PL 90-543). The CDNST is identified with line-of-sight signs except where it follows ranch roads. Equestrian facilities are intermittent and in various stages of development. The CDNST plan specifies that on public lands administered by the BLM, a visual resource inventory must be conducted on the basis that the CDNST is a high-sensitivity-level travel route, with the inventory performed as if the trail exists even in sections where it is proposed for construction or reconstruction (U.S. Forest Service 2009). The CDNST would be crossed by the proposed Project.

Arizona National Scenic Trail

The Arizona Trail is an 820-mile non-motorized trail that traverses Arizona from the Mexico border to Utah. The Arizona Trail is intended to be a primitive, long-distance trail that highlights Arizona's topographic, biologic, historic, and cultural diversity. The trail's primary users are hikers, equestrians, and mountain bicyclists (outside of wilderness or other specially managed areas). Opportunities also exist for cross-country skiers, snowshoers, joggers, and pack stock users. The Arizona Trail is a managed and maintained by multiple partners, including State and Federal agencies, non-profits, and private landowners. Segments of the Arizona Trail intersect the Upgrade Section of the proposed Project near Vail, Arizona; these segments are managed by the Arizona Trail Association, a non-profit organization that supports development of the Arizona Trail. The BLM does not manage any portions of the trail that would be intersected by the Project. The Arizona Trail is 100 percent complete; however, a Comprehensive Management Plan has not been completed.

Juan Bautista de Anza National Historic Trail

The Anza Trail follows the path of the 1775 Juan Bautista de Anza expedition that began in Mexico and ended in San Francisco, California. A comprehensive plan was published by the National Park Service in 1996. The Anza Trail is managed by the NPS and extends 1,200 miles through 20 counties in Arizona and California (NPS 1996). Today's visitors may follow in the tracks of the 1775–1776 expedition members on Auto Route, Historic Route, or Recreation Trail segments. The portion of the trail within the area of analysis is an Auto Route, primarily within suburban Tucson and nearby rural communities. The Anza Trail stretches from Nogales, Arizona, to San Francisco, California.

Butterfield Overland Mail and State Route

The Butterfield Trail is currently under study by the Secretary of the Interior for consideration for NHT designation (Section 7209 of PL 111-11). Though the Butterfield Trail is not designated an NHT, the Mimbres RMP manages for preservation of the Butterfield Trail on BLM lands. Segments of the Butterfield Trail intersect both the New Build and Upgrade sections of the proposed Project in various locations.

3.12.6 National Monuments

Antiquities Act of 1906 (16 U.S.C. 431-33)

National monuments are designated under the Antiquities Act of 1906, and are managed chiefly by the NPS; some, however, are managed by the BLM, FWS, and other Federal, State, and local agencies. The Antiquities Act authorizes the President to protect landmarks, structures, and objects of natural, historic, or scientific interest by designating them as national monuments. The Act also requires Federal agencies that manage national monuments to preserve for present and future generations the natural, historic, scientific, commemorative, and cultural values of these lands. National monuments can also be designated by Congress in standalone legislation that is unrelated to the Antiquities Act, such as the

Omnibus Lands Act of 2009.There is one national monument adjacent to the analysis area, the IFNM in Pima and Pinal counties, Arizona.

IRONWOOD FOREST NATIONAL MONUMENT

The IFNM was designated under the authority of the Antiquities Act in June 2000. IFNM is northwest of Marana in Pima County, Arizona. This 129,000-acre monument showcases ironwood trees, rugged mountain peaks, and desert valleys. The analysis area is adjacent to the northeast corner of the IFNM; therefore, the proposed Project would be located outside the monument. The IFNM RMP was completed in February 2013 (BLM 2013c).

PROPOSED ORGAN MOUNTAINS – DESERT PEAKS NATIONAL MONUMENT

On May 1, 2012, citizens proposed the Organ Mountains – Desert Peaks National Monument, which would encompass approximately 600,000 acres in three separate units. Refer to Section 4.20 “Cumulative Impacts”, for additional detail on the proposed national monument.

3.12.7 Areas of Critical Environmental Concern and Research Natural Areas

Federal Land Policy and Management Act of 1976 (PL 94-579)

FLPMA requires BLM to consider special designations during the land use planning process. ACECs are designated in RMPs. The language at 43 CFR 1610.7-2 provides the specifications for the designation of ACECs:

> Areas having potential for Areas of Critical Environmental Concern (ACEC) designation and protection management shall be identified and considered throughout the resource management planning process
>
> (a) The inventory data shall be analyzed to determine whether there are areas containing resources, values, systems or processes or hazards eligible for further consideration for designation as an ACEC. In order to be a potential ACEC, both of the following criteria shall be met:
>
>> (1) *Relevance.* There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.
>>
>> (2) *Importance.* The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

ACECs are special management areas designated by BLM, per 43 CFR 1510.7-2. ACECs are designated during the land use planning process under the guidance provided in BLM Manual 1613 – “Areas of Critical Environmental Concern”(BLM 1988b). ACECs are designated to protect significant historic, cultural, or scenic values; fish and wildlife resources; natural process or systems; and/or natural hazards that:

- have more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource;

- have qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change;
- has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLMPA;
- has qualities which warrant highlighting in order to satisfy public or management concerns about safety and public welfare; and/or
- poses a significant threat to human life and safety or to property.

There is one ACEC within the analysis area, the Willcox Playa, located in Cochise County, Arizona.

WILLCOX PLAYA NATIONAL NATURAL LANDMARK AND AREA OF CRITICAL ENVIRONMENTAL CONCERN

The Willcox Playa is recognized primarily for its geological values, that being a remnant Pleistocene lake and a typical example of playa lakes in the Southwest. The playa is managed by the BLM under the Safford RMP (BLM 1991). The playa also contains unique vegetation that has adapted to the playa conditions and is a resource for wildlife, including the endangered whooping crane. The Willcox Playa Wildlife Area covers about 595 acres, including 120 acres of deeded land, 320 acres of land patented from the BLM, a 115-acre perpetual ROW from the ASLD, and a 40-acre donation from a private landowner (AGFD 2012c). Management of the Willcox Playa Wildlife Area emphasizes supporting the best wildlife habitat possible in the wildlife area for present and future generations. This emphasis includes sustaining opportunities available for public hunting and other wildlife-oriented recreation. Existing uses include bird watching, photography, and hunting. The analysis area would cross a portion of the playa. However, none of the proposed Project would occur within the ACEC.

Research natural areas are also designated in RMPs. RNAs are areas that are part of a national network of reserved areas under various ownership which contain important ecological and scientific values and are managed for minimum human disturbance. In RNAs, natural processes are allowed to predominate without human intervention. Activities such as hiking, bird watching, hunting, fishing, wildlife observation, and photography are permissible but not mandated in RNAs. There are two RNAs within the analysis area, Aden Lava Flow RNA and Lordsburg Playa RNA.

ADEN LAVA FLOW RESEARCH NATURAL AREA

The Aden Lava Flow RNA is located in central Doña Ana County, approximately 20 miles southwest of Las Cruces, New Mexico. The existing RNA is approximately 3,930 acres. Rich vegetation, diverse wildlife, and geologically unique lava flows comprise the Aden Lava Flow RNA. The lava flow is a nearly flat landform, with steep-walled depressions that vary in size and shape, containing crevices, pressure ridges, and lava tubes. Aden Crater is located in the northwestern portion of the RNA (BLM 1993).

LORDSBURG PLAYA RESEARCH NATURAL AREA

Lordsburg Playa RNA is located 10 miles west of Lordsburg, New Mexico, in west-central Hidalgo County. The RNA is approximately 3,833 acres. The playa is a flat, dry lake bed that is devoid of vegetation except around the outer edges. The playa is a relatively pristine and undisturbed relict of the large Pleistocene lakes that covered many of the intermountain basins of the southwestern United States during the last glacial period. The playa provides an important stop-off or wintering site for migrating shorebirds and waterfowls when conditions permit (e.g., wet years) (BLM 1993).

3.12.8 Bureau of Land Management Resource Management Plans and other Administrative Designations

In addition to special designations that have been mandated by law, BLM also manages special designations via management prescriptions that are defined in the field office's RMP or other long-term planning document. Though not mandated by a law or legislation, many administrative designations promulgated in RMP process carry the weight of law and may effectuate a special designation.

BLM lands that include national trails are required to undergo analysis in accordance with BLM Manual 6250 – "National Scenic and Historic Trails Administration (Public)" and BLM Manual 6280 – "Management of National Scenic and Historic Trials and Trails Under Study or Recommended as Suitable for Congressional Designation (Public) (BLM 2012c and 2012d)." An assessment of the national trails occurring on BLM lands is included in appendix F.

In addition to ACECs and RNAs, BLM special designations may also include OHV areas, National Natural Landmarks, and NCAs. There is one OHV area, two NNLs, and one NCA in the analysis area: the Aden Hills OHV area, Kilbourne Hole NNL, Willcox Playa NNL, and the Las Cienegas NCA.

The Aden Hills OHV Area was established as an "open" area for OHV use under the Mimbres RMP. The OHV Area is managed as a special designation due to the special management required to accommodate the heavy use by the public. The area experiences about 10,000 visitor days of use annually. Attributes such as access, challenging terrain, and availability of trails are most important to users of the Aden Hills OHV area.

Kilbourne Hole NNL is a volcanic feature in southwestern Doña Ana County, totaling approximately 5,480 acres. The Kilbourne Hole is a crater that formed when a volcanic bubble burst on the surface of the earth. The NNL is designated by the BLM and NPS because it is the best known example of a "maar" in the Chihuahuan desert region (BLM 1993).

Willcox Playa NNL is a large, approximately 2-million-acre playa located in western Cochise County, Arizona. The playa is a relatively pristine and undisturbed relict of the large Pleistocene lakes that covered many of the intermountain basins of the southwestern United States during the last glacial period. The playa provides an important stop-off or wintering site for migrating shorebirds and waterfowls when conditions permit (e.g., wet years), and is mostly closed to the public since the area is also used by the DOD for military training exercises.

The 2003 Las Cienegas NCA RMP (BLM 2003), though outside the analysis area, is adjacent to the SVAPD, which covers the lands from the NCA north to I-10. The SVAPD is managed in the same fashion as the NCA. Utility corridors are established in the SVAPD, and the existing Western 115-kV transmission line along which the Proponent Preferred alternative would follow occurs within the SVAPD. Specific RMP objectives state: "BLM will continue to consider other new land use authorizations including non-major lineal utilities on a case-by-case basis with stipulations attached to any permits or leases to ensure consistency with the plans goals and objectives." Thus, the Las Cienegas NCA SVAPD is included in the analysis area.

RMP-level and resource-inventory actions may also include vegetation restoration, wildlife, and/or wildlife habitat designations. These designations may be treated as special designations since resource management may require special stipulations/regulations. Refer to Section 3.11, "Land Use," for a discussion on vegetation and/or wildlife avoidance areas.

There are no designated Wild and Scenic Rivers, Scenic Byways, or other special designations within the analysis area.

State

State special designations within the analysis area include the Willcox Playa Wildlife Area. The Wildlife Area is adjacent to the Willcox Playa NNL ACEC, and is managed by the AGFD as part of Game Management Unit (GMU) 30A. As part of the management strategy to provide for migratory bird populations, portions of the Wildlife Area are closed to public entry October 15 through March 15 annually.

The 2003 Corridor Management Plan for the Patagonia – Sonoita Scenic Road, produced by ADOT, sets goals and objectives related to protection, development, safety, and partnerships in managing this scenic route, which includes Arizona SR 83 (ADOT 2003). The northern terminus of the road corridor is the intersection of SR 83 and I-10, west of Benson, which is within the analysis area.

3.12.9 County and City

County and City special designations may not be the same as BLM special designations and in most cases are not managed by the BLM since county and city special designations generally do not occur upon BLM-managed lands. Nonetheless, the proposed Southline Project includes analysis for county and city special designations in order to establish comprehensive baseline recreation resource conditions. There are two County special designations within the analysis area: Cienega Creek Natural Preserve and Pima county CLS designations, both administered by Pima County in Arizona. There are approximately 12 city special designations (City of Benson and City of Tucson) that are located within the analysis area.

Cienega Creek Natural Preserve

The 1994 Cienega Creek Natural Preserve Management Plan identifies objectives, articulates policies, and lists specific actions related to the management of the Cienega Creek Natural Preserve. The 3,979-acre preserve is owned by the Pima County Flood Control District, and is located adjacent to the analysis area in the Upgrade Section just east of Vail, Arizona, in Pima County (McGann and Associates 1994).

Pima County Comprehensive Plan Update

The Pima County Comprehensive Plan, updated in 2009, assigns special designations (including parks, open space, and scenic road designations) and lays out policies for uses within those areas (Pima County 1992, amended in 2009).

Tumamoc Hill is managed by both the University of Arizona College of Science and Pima County. Since 1906, Tumamoc Hill has been an ecological preserve and study area. Its 860-acre ecological reservation is both an NHL and Archaeological District. Tumamoc Hill also is a heavily used hiking trail along the paved road; however, public hiking access is prohibited between 7:30 a.m. and 5:30 p.m.

Tucson Mountain Park was established in 1929. Totaling approximately 20,000 acres, the park is one of the largest natural resource areas owned and managed by a local government in the United States. The park has approximately 62 miles of non-motorized shared-use trails open to hikers, equestrians, and mountain bikers. The Gates Pass overlook includes interpretive displays and historic structures. Picnicking and wildlife viewing opportunities are located throughout the park.

In the Upgrade Section, the proposed Project would be located within Pima County–managed lands, and portions of these route segments would pass through areas designated as conservation lands in the Pima County CLS.

The Pima County Conservation Lands (Regional Plan Policy 6 Environmental Element 2005) in proximity to the analysis area are described below:

A. Agriculture In-Holdings within the CLS:

1) This designation denotes those lands utilized for agricultural purposes and lands where agricultural uses have been abandoned. Agricultural land uses, in general, are more conducive to the movement of native fauna and functional pollination processes than other lands supporting higher intensity uses. Intensifying the land use of these areas could compromise landscape integrity, promote the spread of exotic species, and otherwise compromise the biodiversity of adjacent or nearby CLS lands (Regional Plan Policy 6 Environmental Element 2005).

2) Conservation Guidelines: Intensifying land uses of these areas will emphasize the use of native flora, facilitate the movement of native fauna and pollination of native flora across and through the landscape, and conserve on-site conservation values when they are present. Development within these areas will be configured in a manner that does not compromise the conservation values of adjacent and nearby CLS lands (Regional Plan Policy 6 Environmental Element 2005).

B. Biological Core Management Areas:

1) This category identifies lands that fulfill the five tenets used to construct the CLS and which provide greater biological diversity than Multiple Use Management Areas. These areas are primarily distinguished from other lands within the CLS by their potential to support high-value habitat for five or more priority vulnerable species as identified by the SDCP (Regional Plan Policy 6 Environmental Element 2005).

2) Conservation Guidelines – At least 80 percent of the total acreage of lands within this designation shall be conserved as undisturbed natural open space. As such, land use changes will result in 4:1 land conservation (i.e., 4 acres conserved for every 1 acre developed) and may occur through a combination of onsite and/ or offsite conservation inside the Biological Core Management Area or Habitat Protection Priority Areas. For purposes of this policy, Habitat Protection Priority Areas are those areas referenced and mapped as part of the 2004 Conservation Bond Program. The 4:1 mitigation ratio will be calculated according to the extent of impacts to the total surface area of that portion of any parcel designated as Biological Core Management Areas. Development shall be configured in the least sensitive portion(s) of the property. Area(s) of undisturbed natural open space will be configured to include onsite conservation values and preserve the movement of native fauna and pollination of native flora across and through the landscape. Land use and management within these areas shall focus on the preservation, restoration, and enhancement of native biological communities. Land uses appropriate for these areas must retain and improve conditions for onsite conservation values, preserve the movement of native fauna and pollination of native flora across and through the landscape, and preserve landscape integrity. A transfer of development rights may be used in order to secure mitigation lands (Regional Plan Policy 6 Environmental Element 2005).

C. Important Riparian Areas:

1) These areas are characterized by hydro-riparian, meso-riparian, and xero-riparian biological communities. Hydro-riparian communities generally exist in areas where vegetation is supported by perennial watercourses or springs. Mesoriparian communities generally exist in areas where vegetation is supported by perennial or intermittent watercourses, or shallow groundwater.

Xero-riparian communities generally exist in areas where vegetation is supported by an ephemeral watercourse (Regional Plan Policy 6 Environmental Element 2005).

Important riparian areas are valued for their higher water availability, vegetation density, and biological productivity. In addition to the inherent high biological value of these water-related communities, important riparian areas including their associated upland areas provide a framework for linkages and landscape connections. Important riparian areas are essential elements in the CLS (Regional Plan Policy 6 Environmental Element 2005).

2) Conservation Guidelines - At least 95 percent of the total acreage of lands within this designation shall be conserved in a natural or undisturbed condition. Every effort should be made to protect, restore, and enhance the structure and functions of Important Riparian Areas, including their hydrological, geomorphological, and biological functions. Areas within an Important Riparian Area that have been previously degraded or otherwise compromised may be restored and/or enhanced. Such restored and/or enhanced areas may contribute to achieving the 95 percent conservation guideline for Important Riparian Areas (Regional Plan Policy 6 Environmental Element 2005).

D. Multiple Use Management Areas:

1) This category identifies those lands that fulfill the five tenets used to construct the CLS, but which are not as biologically rich as those lands designated as Biological Core Management Areas. These areas are primarily distinguished from other lands within the CLS by their potential to support high-value habitat for three or more priority vulnerable species as identified by the SDCP (Regional Plan Policy 6 Environmental Element 2005).

2) Conservation Guidelines – At least 66 percent of the total acreage of lands within this designation shall be conserved as undisturbed natural open space. As such, land use changes will result in a 2:1 land conservation (i.e., 2 acres conserved for every 1 acre developed) and may occur through a combination of onsite and offsite conservation inside the Multiple Use Management Area or any more protective category of the CLS, including Habitat Protection Priority Areas.
For purposes of this policy, Habitat Protection Priority Areas are those areas referenced and mapped as part of the 2004 Conservation Bond Program. The 2:1 mitigation ratio will be calculated according to the extent of impacts to the total surface area of that portion of any parcel designated as Multiple Use Management Areas. Development shall be configured in the least sensitive portion(s) of the property. Area(s) of undisturbed natural open space will include onsite conservation values and facilitate the movement of native fauna and pollination of native flora across and through the landscape. Land use and management goals within these areas shall focus on balancing land uses with conservation, restoration, and enhancement of native biological communities. Land uses appropriate for these areas must facilitate the movement of native fauna and pollination of native flora across and through the landscape, maximize retention of onsite conservation values, and promote landscape integrity. Additional conservation exceeding 66 percent will be encouraged through the use of development-related incentives and may utilize undisturbed natural open space on individual lots. Transfer of development rights may be used in order to secure lands utilized for mitigation, restoration, and/or enhancement purposes (Regional Plan Policy 6 Environmental Element 2005).

Parks designated and managed by individual municipalities encompass a variety of recreational purposes such as hiking, fishing, camping, etc., and include athletic facilities such as golf courses, ballparks, and swimming pools.

City parks within the analysis area include: San Pedro Golf Course, Christopher Columbus Park, Garden of Gethsemane, Greasewood Park, El Rio Trini Alvarez Municipal Golf Course, Joaquin Murrieta Park, John F. Kennedy Park, Santa Cruz River Park, Sentinel Peak Park, Silverbell Municipal Golf Course, Tucson Mountain Park, and Tumamoc Hill (refer to Section 3.14, “Recreation,” for a description of these City parks). City parks are included within the analysis area for the Upgrade Section, discussed below.

3.12.10 New Build Section

This section describes all specially designated areas within the analysis area for the New Build Section (see figure 3.12-1).

The analysis area for the proposed Project transmission lines would include the following specially designated areas in the New Build Section:

- BLM Special Designations (New Mexico) (approximately 13,374 acres in the analysis area):
  - Peloncillo Mountains Wilderness (approximately 1,162 acres in the analysis area)
  - Mount Riley/West Potrillo Mountains WSAs (approximately 5,008 acres in analysis area)
  - Lordsburg Playa RNA (2,168 acres in analysis area)
  - Aden Lava Flow WSA/RNA (0 acres in analysis area)
  - Kilbourne Hole NNL (0 acres in analysis area)
- BLM Special Designations (Arizona) (approximately 2,574 acres in the analysis area):
  - Willcox Playa NNL (approximately 2,574 acres in the analysis area)
- Butterfield Trail (approximately 31 miles in the analysis area)
- CDNST (approximately 9 miles in the analysis area)
- Willcox Playa Wildlife Area (approximately 548 acres in the analysis area)

The proposed Project substation expansions (Hidalgo Substation Expansion, Southline Apache Substation Expansion, and SWTC Apache Substation Expansion) would not occur within any specially designated areas in the New Build Section. The alternative substation expansion (Alternative Midpoint Substation) would not occur within any specially designated areas in the New Build Section.

The analysis area for the proposed Project staging areas would not include specially designated areas in the New Build Section.

3.12.11 Upgrade Section

This section describes all specially designated areas within the analysis area for the Upgrade Section (see figure 3.12-2). As specified in Section 3.11, “Land Use,” the Upgrade Section includes far less public lands than the New Build Section; therefore, the Upgrade Section contains commensurately fewer BLM special designations.

The analysis area for the proposed Project transmission lines would include the following BLM specially designated areas in the Upgrade Section (note: all proposed Project activities for the Upgrade Section would only apply in the state of Arizona):

- Arizona Trail (approximately 0.16 mile in the analysis area)
- Butterfield Trail (approximately 11 miles in the analysis area)
- Cienega Creek NCA (0 acres in the analysis area)
- IFNM (0 acres in the analysis area)
- Anza Trail (approximately 2 miles in the analysis area)

The analysis area for the proposed Project transmission lines would also include the following city or county specially designated areas in the Upgrade Section (note: all proposed Project activities for the Upgrade Section would only apply in the state of Arizona):

- Christopher Columbus Park (approximately 70 acres in the analysis area)
- Cienega Creek Natural Preserve (0 acres in the analysis area)
- Garden of Gethsemane (approximately 0.67 acre in the analysis area)
- Greasewood Park (approximately 11 acres in the analysis area)
- Joaquin Murrieta Park (approximately 13 acres in the analysis area)
- Kennedy Park (approximately 25 acres in the analysis area)
- Pima County Conservation Lands – Ag Inholdings (approximately 91 acres in the analysis area)
- Pima County Conservation Lands – Biological Core Management Areas (approximately 4,109 acres in the analysis area)
- Pima County Conservation Lands – Important Riparian Areas (approximately 705 acres in the analysis area)
- Pima County Conservation Lands – Multiple Use Management Areas (approximately 1,227 acres in the analysis area)
- Santa Cruz River Park (approximately 145 acres in the analysis area)
- Sentinel Peak Park (approximately 0.27 acre in the analysis area)
- Tucson Mountain Park (approximately 4 acres in the analysis area)
- Tumamoc Hill (approximately 142 acres in the analysis area)

The analysis area for the proposed Upgrade Section substations (Adams Tap Substation Expansion, Pantano Substation Expansion, Vail Substation Expansion, Nogales Substation Expansion, Del Bac Substation Expansion, Tucson Substation Expansion, DeMoss Petrie Substation Expansion, Rattlesnake Substation Expansion, Marana Substation Expansion, Southline Saguaro Substation Expansion, APS Saguaro Substation Expansion, and Tortolita Substation Expansion) would include the following city or county specially designated areas in the Upgrade Section:

- Pima County Conservation Lands – Biological Core Management Areas: approximately 25 acres near the Pantano Substation Expansion area.
- Pima County Conservation Lands – Important Riparian Areas: approximately 0.47 acre near the Pantano Substation Expansion area.
- Pima County Conservation Lands – Multiple Use Management Areas: approximately 15 acres near the Marana Substation Expansion area.

The analysis area for the Upgrade Section proposed staging areas would include the following BLM and county and city specially designated areas:

- Anza Trail (approximately 0.01 mile near staging area 13)
- Pima County Conservation Lands – Biological Core Management Areas (approximately 20 acres near staging areas 11 and 13)
- Pima County Conservation Lands – Important Riparian Areas (approximately 20 acres near staging area 13)

- Pima County Conservation Lands – Multiple Use Management Areas (approximately 19 acres near staging area 13a)

3.13 WILDERNESS CHARACTERISTICS

Federal lands that possess the tangible qualities of a wilderness (refer to Section 3.12, "Special Designations") but that have not been designated a wilderness by an act of Congress are sometimes managed to maintain certain wilderness characteristics.

Wilderness characteristics baseline conditions (the wilderness characteristics "affected environment") includes the discussion of existing lands managed to maintain wilderness characteristics. The information provided in this subsection is primarily sourced from existing BLM inventories, and new inventories conducted in support of this Project.

The BLM is directed to maintain an inventory of lands that may contain wilderness characteristics under Section 201 of FLPMA and in accordance with BLM Manual 6310 – "Conducting Wilderness Characteristic Inventory on BLM Lands (Public)" (BLM 2012j). BLM is required to maintain wilderness resource inventories on a regular and continuing basis for public lands under its jurisdiction. BLM Manual 6310 and Section 201 of FLPMA direct the BLM to protect wilderness characteristics through land use planning and project-level decisions unless the BLM determines, in accordance with BLM Manual 6310, that projects within lands managed to maintain wilderness characteristics are appropriate and consistent with other applicable requirements of law and other resource management considerations.

Through previous inventory, ongoing land planning efforts, and a wilderness characteristics inventory currently in progress for this DEIS, the BLM has updated their inventory of lands that may contain wilderness characteristics for BLM lands that would be intersected by the action alternatives. These inventories are referred to as WIUs. Only BLM lands were inventoried for lands with wilderness characteristics. The BLM lands inventoried for wilderness characteristics are composed of two District Offices: the Las Cruces District in New Mexico, and the Safford District in Arizona.

The wilderness characteristics inventory process is guided by BLM Manual 6310. A wilderness characteristics inventory is the process of determining the presence or absence of wilderness characteristics. These "characteristics" are derived from Section 2(c) of the Wilderness Act of 1964:

1. Size: the area must be at least 5,000 acres of contiguous, roadless BLM land. If less than 5,000 acres, the area must be adjacent to an area known to possess wilderness characteristics.
2. Naturalness: the area must appear to be in natural ecological conditions, where human developments within the area are unnoticeable enough that it appears the area was affected primarily by the forces of nature.
3. Outstanding opportunities for solitude or primitive, unconfined recreation: the area must provide outstanding opportunities for solitude or primitive, unconfined recreation opportunities.
4. Other supplemental values: the area may contain ecological, geological, or other features of scientific, education, scenic, or historic value. Supplemental values are not required to be present in order for an area to be identified as lands with wilderness characteristics.

Size – The size of an area with wilderness characteristics is determined by roads, ROWs, or land ownership, but can also be determined by areas of unnaturalness. Impacts to the size requirement would be any types of development or construction that directly affects the roadless or naturalness characteristics of the area. For this Project, the types of development or construction that affect naturalness include transmission line construction, construction or improvement of access roads, construction of substations, placement of structures on the landscape, or any other ground disturbance (e.g., clearing of vegetation, digging, or grading of soil) from Project actions. If actions from the proposed Project reduce a land unit identified as having wilderness characteristics to less than 5,000 acres, the Project would affect the size characteristics and the entire unit would not have wilderness characteristics. However, if Project actions bisect a unit but remaining portions of the unit are greater than 5,000 acres in size, the remaining portions may still have wilderness characteristics.

Naturalness – Lands with wilderness characteristics must primarily be influenced by the forces of nature with evidence of humankind substantially unnoticeable. Evidence of humankind on the landscape affects the natural character of the area by introducing unnatural actions or objects. This can cause direct impacts to vegetation, wildlife, soils, landforms, water, and riparian areas. The types of unnatural objects and actions that affect naturalness include transmission lines and access roads, substations, ancillary facilities, or any other ground disturbance (e.g., clearing of vegetation, digging, or grading of soil).

Opportunities for solitude and/or primitive recreation – Opportunities for solitude and/or primitive recreation can be affected by Project actions by determining whether a visitor can hear or see the Project action. To provide an accurate and extensive estimate of the effects on opportunities for solitude and/or primitive recreation, this analysis references the noise analysis presented in section 3.3.

Other Supplemental Values – Special features (or supplemental values) are those features identified as unique to the specific land area. Most special features identified for areas with wilderness characteristics are items such as unique plants, wildlife, or geologic features, and are often analyzed in other sections of the EIS. The analysis in this section identifies any special features for areas with wilderness characteristics affected by Project actions. Such impacts are disclosed in the appropriate section of the EIS for that special feature (see Sections 3.4, "Geology and Mineral Resources;" 3.6, "Paleontological Resources;" 3.8.1, "Vegetation;" and 3.8.2, "Wildlife").

If characteristics 1–3 are present, then the area is identified as possessing wilderness characteristics. Finding the presence or absence of wilderness characteristics is not a decision-level finding and thus is not subject to appeal. Acreages herein have been derived from the best available GIS data unless otherwise stated. As a result, there may be some variation from acreages in previous documents. At this time, only a screening of size has been conducted; an assessment of naturalness, outstanding opportunities for solitude or primitive, unconfined recreation, and other supplemental values is ongoing and will be completed for the FEIS.

3.13.1 Analysis Area

The wilderness characteristics analysis area for the New Build Section is a 2-mile corridor around the action alternatives (1-mile buffer on either side of the centerline). In addition, the action alternative substations and access roads that are proposed outside the 2-mile corridor are included in the wilderness characteristics analysis area. The 2-mile corridor is used to identify lands that may possess wilderness characteristics that could be directly impacted by surface disturbance and where construction materials, equipment, and workers that may be present would potentially conflict with one or more of the four criteria that form the area's potential wilderness characteristics.

The wilderness characteristics analysis area for the Upgrade Section is also 2-mile corridor around the action alternatives (1-mile buffer on either side of the centerline of the existing Saguaro–Tucson and Tucson–Apache 115-kV transmission lines).

References to the "Project" indicate the actual transmission line facilities (i.e., a 200-foot-wide transmission line corridor for the New Build Section and a 150-foot-wide corridor for the Upgrade Section, substation, or access road) that would remain during operation and maintenance of the proposed Project.

3.13.2 Issues to Be Analyzed

The indicators used to characterize the potential impacts to wilderness characteristics are the qualities for which the wilderness is designated (see below). Effects on wilderness characteristics would occur if construction and operation/maintenance of the Project conflicts with one or more of these four tangible qualities of a wilderness.

Indicators:

- Whether the proposed Project would decrease the lands with wilderness characteristics to less than 5,000 acres;
- Whether the proposed Project would affect the degree of naturalness;
- Whether the proposed Project would affect outstanding opportunities for solitude and outstanding opportunity for primitive and unconfined recreation; and
- Whether the proposed Project would affect the wilderness characteristics' supplemental values.

3.13.3 Analysis Area Conditions

The DEIS describes WIUs based on the first characteristic (size criteria) only. The initial set of WIUs is those units of BLM land that are 5,000 acres or greater, not intersected by roads that are constructed, maintained, regularly used, and not intersected by developed ROWs. The initial set of WIUs has been identified using a GIS desktop analysis. WIUs based on the size criteria will be further refined following a comprehensive road inventory of each unit. An assessment of naturalness, outstanding opportunities for solitude or primitive, unconfined recreation, and other supplemental values is ongoing and will be completed for the FEIS.

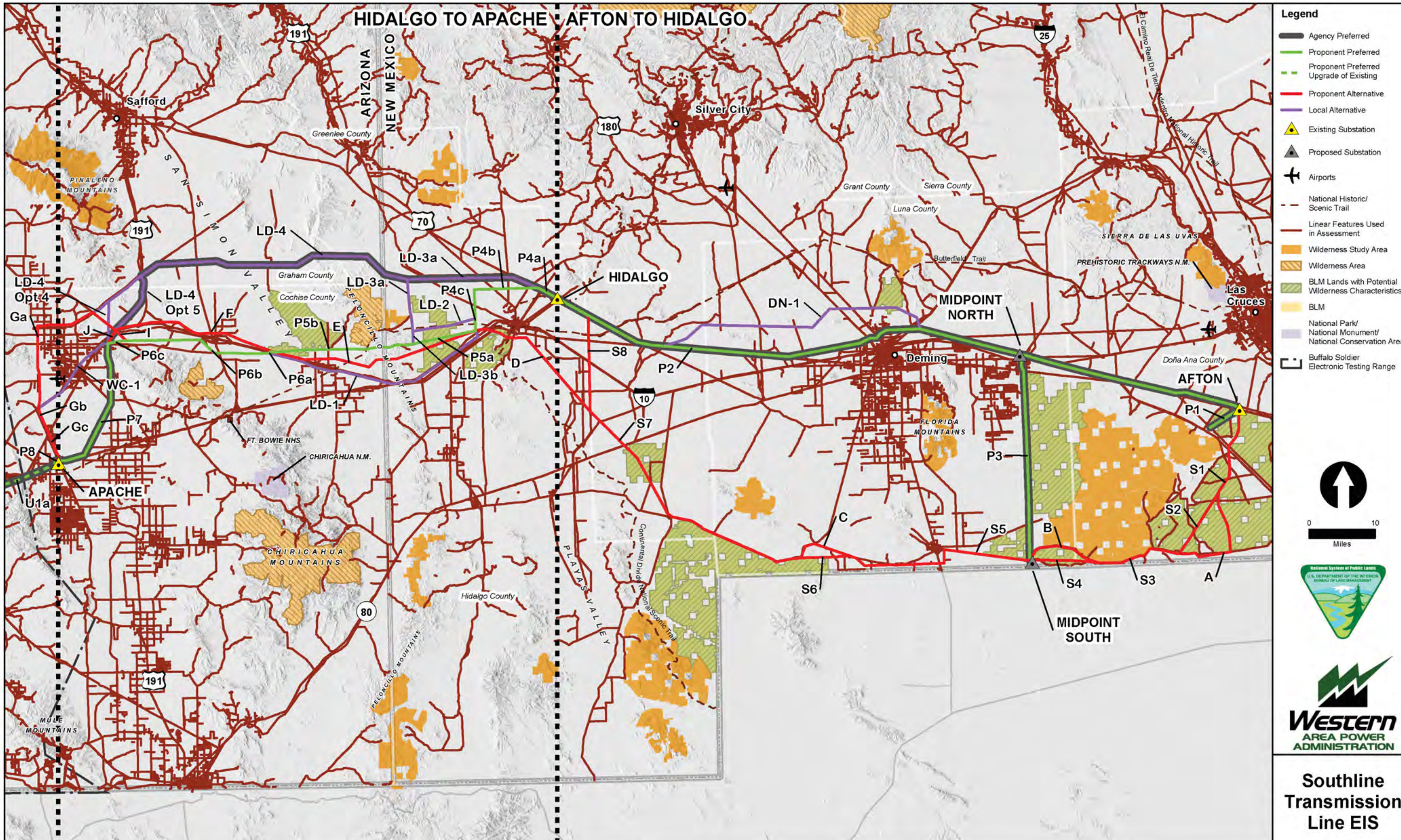
All potential roads and developed ROWs will be identified using current aerial imagery, and will be evaluated by local BLM field office staff to determine if additional field verification is needed.

The FEIS will describe WIUs based on the second, third, and fourth characteristics (naturalness, outstanding opportunities for solitude or primitive, unconfined recreation, and supplemental values criteria) of determining wilderness characteristics. This evaluation will be conducted by the local BLM Field Office staff for incorporation into the FEIS and will begin once the final set of units based on the size criteria, and any prior wilderness characteristics inventory data, are determined.

New Build Section

This section describes all inventoried WIUs that occur within the New Build Section analysis area (i.e., within 1 mile of the Project's centerline) (figure 3.13-1).

Figure 3.13-1. Wilderness characteristics in the New Build Section.



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ROUTE GROUP 1 – AFTON SUBSTATION TO HIDALGO SUBSTATION

Previous inventories for wilderness characteristics have been conducted by the BLM's Las Cruces District Office in 1979 and 1980, in 1993 (in support of the Mimbres RMP [BLM 1993]), and most recently for the SunZia and Southline transmission line projects. The 1979, 1980, 1993, and SunZia project inventories were reviewed for the Southline Project inventory in cooperation with the BLM Las Cruces District Office and New Mexico State Office to ensure previous conclusions remain valid. Citizen proposed wilderness include portions of NM-LC-006 and NM-LC-011; no designations have been made regarding these proposed wildernesses.

As shown on figure 3.13-1, approximately 13 WIUs occur within route group 1, as identified during the first step of the Southline Project wilderness characteristics inventory process—the size criteria only (greater than 5,000 acres). These 13 WIUs total approximately 402,792 acres. Table 3.13-1 provides the initial WIUs for route group 1.

Table 3.13-1. WIUs Located within the Analysis Area for Route Group 1

WIU No.	WIU Name	WIU Size (acres)
NM-LC-001	Black Mountain -Grant	18,948
NM-LC-002	China Draw	9,813
NM-LC-003	Camel Mountain	11,414
NM-LC-004	Coyote Hill	11,972
NM-LC-005	South Doña Ana	55,790
NM-LC-006	East Potrillo Mountains	25,158
NM-LC-007	Rutter South 2	6,680
NM-LC-008	Rutter South 3	6,196
NM-LC-009	Rutter South 1	6,017
NM-LC-010	Black Mountain – Doña Ana	39,993
NM-LC-011	Afton East	6,287
NM-LC-016	Eagle Nest	87,136
NM-LC-015	Apache Hills-Hatchita Valley	117,388
Total	**13**	**402,792**

ROUTE GROUP 2 – HIDALGO SUBSTATION TO APACHE SUBSTATION

Previous inventories for wilderness characteristics have been conducted by the BLM's Las Cruces District Office and Safford Field Office in 1979 and 1980, in 1991 and 1993 (in support of the Safford and Mimbres RMPs (BLM 1991 and 1993, respectively)), and mostly recently for the SunZia and Southline transmission line projects. The 1979, 1980, 1991, 1993, and SunZia project inventories were reviewed for the Southline Project inventory in cooperation with the BLM Las Cruces District Office and New Mexico State Office and the BLM Safford Field Office, Tucson Field Office, and Arizona State Office to ensure previous conclusions remain valid.

As shown on figure 3.13-1, approximately four WIUs occur within route group 2, as identified during the first step of the Southline Project wilderness characteristics inventory process—the size criteria only (greater than 5,000 acres). These four WIUs total approximately 74,000 acres. Table 3.13-2 provides the initial WIUs for route group 2.

Table 3.13-2. WIUs Located within the Analysis Area for Route Group 2

WIU No.	WIU Name	WIU Size (acres)
NM-LC-013	Aberdeen Peak	17,529
NM-LC-014	Lordsburg Playa North	11,846
NM-LC-012	Lordsburg Playa South	10,784
AZ-SF-001	Peloncillo Mountains South	34,153
Total	**4**	**74,312**

Upgrade Section

No inventoried WIUs were identified within the Upgrade Section analysis area (i.e., within 1 mile of either side of the Project's centerline) (figure 3.13-2).

ROUTE GROUP 3 – APACHE SUBSTATION TO PANTANO SUBSTATION AND ROUTE GROUP 4 – PANTANO SUBSTATION TO SAGUARO SUBSTATION

Previous inventories for wilderness characteristics have been conducted by the BLM's Tucson and Safford Field Offices in 1979 and 1980, and mostly recently for the SunZia and Southline transmission line projects. The 1979, 1980, and SunZia project inventories were reviewed for the Southline Project inventory in cooperation with the BLM Safford and Tucson Field Offices and Arizona State Office to ensure previous conclusions remain valid. All the previous inventories that include route groups 3 and 4 would not intersect the Project.

Due to the majority of land included in route groups 3 and 4 being non-BLM lands, WIUs were not present within the analysis area, and non-BLM lands are not considered for their wilderness characteristics.

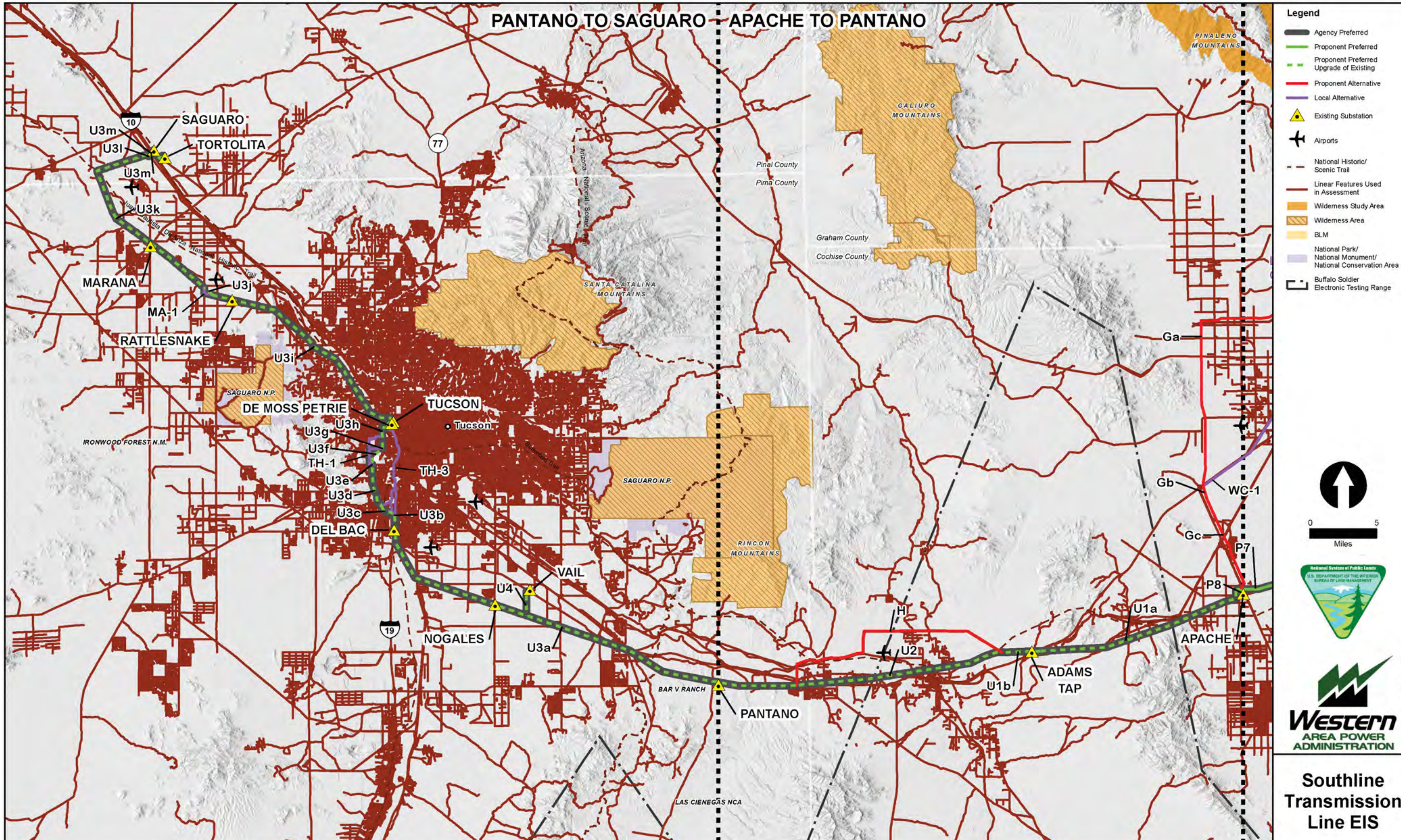
3.14 RECREATION

Recreation baseline conditions (the recreation resources "affected environment") includes the discussion of existing recreation in terms of recreation opportunities and activities, recreation settings, desired recreation experiences, and adjacent recreation areas. The information provided here is primarily sourced from a report titled "Southline Transmission Project Resource Report 10: Recreation" (CH2M Hill 2013). The contents of that report are used herein without specific reference.

Recreation activities occurring throughout southern New Mexico and Arizona involve a broad spectrum of pursuits, ranging from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation in the region includes, but may not be limited to: OHV driving, scenic driving, hunting, hiking, wildlife viewing, horseback riding, camping, backpacking, mountain biking, geocaching, rock-hounding, picnicking, night-sky viewing, viewing cultural/historical sites, soaring/paragliding, and photography. The region is known for its large-scale undeveloped areas and remoteness, which provide a wide variety of recreational opportunities for users who wish to experience undeveloped recreation, as well as those seeking more organized or packaged recreation experiences.

The affected environment is based on defining the existing conditions of recreation resources using the management guidelines from the BLM Mimbres RMP, Safford RMP, Phoenix RMP, and other existing conditions described in applicable long-term planning documents (refer to Section 3.11, "Land Use, Including Farm and Range Resources and Military Operations").

1 **Figure 3.13-2.** Wilderness characteristics in the Upgrade Section.



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3.14.1 Analysis Area

New Build Section

The New Build Section analysis area for recreation resources includes the proposed Project footprint and alternatives. The analysis area for recreation resources does not include a continuous, equidistant buffer (as with other resources), since large areas of land are not likely to have similar existing recreation conditions and settings as the Project footprint. Because the proposed Project could affect adjacent areas where recreation conditions and use may intensify and vary widely, some adjacent recreation areas are included in the Project footprint. Therefore, in addition to the proposed Project footprint, adjacent recreation areas that could be directly or indirectly affected by the proposed Project are also included in the analysis area. Figure 3.14-1 shows the recreation resources for the New Build Section.

Upgrade Section

The analysis area for the Upgrade Section is the same as for the New Build Section. Figure 3.14-2 shows the recreation resources for the Upgrade Section.

3.14.2 Laws, Ordinances, Regulations, and Standards

Federal

NATIONAL TRAILS SYSTEM ACT OF 1968 (PL 90-543, AS AMENDED THROUGH PL 111-11)

The National Trails System Act authorizes the designation of a network of scenic, historic, and recreational trails. These trails provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of outdoor areas and historic resources; and encourage public access and citizen involvement (NPS 2010a). The National Trails System includes National Historic, Scenic, and Recreation Trails for public use. BLM is one of several Federal agencies that manage trails within the National Trails System.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (PL 94-579)

The FLPMA requires BLM to consider recreation during the land-use planning process. Recreation management prescriptions are designated in RMPs. The Project would traverse Federal, State, and local agency jurisdictions with authority to manage recreation resources. Private land would also be traversed by the Project, and many restrictions on recreation activities that would be applicable to other lands may not apply to private land. The Federal, State, and local agency jurisdictions that would be traversed by the Project may or may not have in place regulations that guide the type, time, and intensity of recreation activity.

Recreational opportunities and activities on BLM lands are managed in accordance with the prescribed settings specified in the RMP. Integral to both prior and current recreation planning processes is the use of a tool called the recreation opportunity spectrum (ROS). This is a system used to inventory and classify public lands according to physical and social settings, which combine to offer specific types of recreational opportunities. As the name implies, such settings range across a spectrum of opportunities from primitive, where motorized use does not occur and facilities are non-existent or minor in extent, to urban, where opportunities are vehicle-dependent and facilities may be extensive. The Mimbres RMP, Safford RMP, Phoenix RMP, and Coronado National Forest Plan use the ROS settings to manage recreation resources.

The BLM also uses benefits-based management, which integrates perceptions of visitor demand with ROS to produce market-based strategies that provide recreational opportunities and visitor services; commonly known as recreation management zones (RMZs). The result is that public lands are allocated to SRMAs in which structured recreational opportunities are offered, or to extensive recreation management areas (ERMAs) in which management is of a custodial nature. The major way this approach differs from one using ROS is that SRMAs now are targeted to demonstrated recreation-tourism (destinations); locales dependent on public land for recreation (communities); or to dispersed, frontier-like opportunities dependent upon the natural characteristics of the landscape (undeveloped). Many BLM RMPs (Mimbres, Safford, and Phoenix RMPs included) have yet to update their recreation management prescriptions to RMZ-management. Future RMPs will use the benefits-based management/RMZ approach for recreation resources. For example, the IFNM RMP (released in February 2013) utilizes the benefits-based management/RMZs for recreation resources. The Tri-County Draft RMP (released in April 2013; ROD expected in 2014) will use benefits-based management/RMZ for recreation prescriptions.

BLM Manual 6280 – "Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation," identifies the requirements for the management of National Trails (BLM 2012d). BLM Manual 8320 – "Planning for Recreation and Visitor Services, identifies the requirements for the management of recreation and visitor services (BLM 2011).

State

State land within the analysis area is open to recreational use as long as the user possesses an active individual permit (e.g., a valid New Mexico or Arizona hunting license), unless otherwise specified.

Hunting on all lands in the analysis area, regardless of ownership, is managed by the NMDGF and AGFD under NMAC Title 19, Chapter 31 and AAC Title 12, Chapter 4, respectively (NMDGF 2013).

3.14.3 Issues to Be Analyzed

Based on results of the public scoping process and in consultation with the BLM, the following areas of concern were identified with regards to recreation resources, and are the subject of the analysis in chapter 4:

- Recreation Opportunities/Activities
    - Assess whether a change in (loss and creation of) recreational activities would result with development of the proposed Project and improvement of access roads.
    - Specifically, assess whether the change would increase or decrease the qualities of the hunting experience
- Recreation Settings
    - Assess changes in the recreation setting (e.g., undeveloped or rural settings) of the analysis area as a result of the proposed transmission line and access roads. Specifically, assess whether changes in the settings that support existing OHV, hiking, camping, target shooting, or hunting opportunities would increase or decrease within the proposed analysis area.

- Desired Recreation Experiences
  - Assess the potential for diminished or loss of recreational values and quality (e.g., remoteness, quiet, or solitude) in analysis area/region.
  - Identify the hunting in area game management units (GMUs).
- Assess potential changes in recreation (opportunities/activities, settings, and experiences) on lands adjacent to the Project, if present.

3.14.4 Analysis Area Conditions

The existing conditions for recreation are described in an east-to-west sequence, beginning at the Afton Substation in New Mexico. This section describes the environmental setting in terms of the recreation resources, such as designated recreation sites or access points to recreation areas that are encountered within the analysis area. Dispersed and non-designated recreation activities are also present within the analysis area. Because the analysis area offers access to landscapes and features unique to the region, recreation is a popular activity in southern New Mexico and Arizona.

The proposed Project and alternatives would cross both large tracts of undeveloped land as well as urban and suburban areas. Much of the land in the analysis area is managed by Federal agencies, which generally provide for multiple-use management, in which recreation is included. Additionally, there are residential and commercial lands interspersed in the nearby developed communities. The region is known for its large-scale undeveloped areas and remoteness, which provide a wide variety of recreational opportunities.

The eastern portion (New Build Section) of the Project would be located in open range-type settings, crossing mountain ranges (including the Continental Divide) and valley/basins. Farther west (Upgrade Section), the distance between the valley/basins and mountain ranges becomes less, and urban populations surround the Tucson metropolitan area. Many recreation activities vary in intensity, depending upon the distance to urban populations.

New Build Section

The New Build Section would involve the construction of approximately 240 miles of new transmission facilities as well as proposed substation expansion areas and staging areas during construction, and require ROWs across public and private lands. The New Build Section is characterized by primarily undeveloped desert landscape with pockets of rural residential and commercial development. The undeveloped and rural areas offer limited formal recreational opportunities, except in the vicinity of populated areas and designated recreation sites. The majority of the undeveloped areas provide dispersed recreation opportunities, such as hiking, biking, horseback riding, hunting, fishing, and bird watching. Formal recreation opportunities, such as parks, ball fields, golf courses, rodeo arenas, and fairgrounds, are located within cities and towns.

As shown on figure 3.14-1, the analysis area includes several recreation areas along the New Build Section:

- Federal land open to recreation, including ACECs, wilderness areas, WSAs, and national trails; and
- State, County, and city recreation areas, including OHV areas, State land open to hunting, wildlife areas, natural areas, county parks, and city parks.

RECREATION OPPORTUNITIES/ACTIVITIES

The availability for recreation opportunity and activity in the analysis area is largely dependent upon the amount of public lands in a given area. Private land recreation opportunities and activities are limited to the landowner and invited guests only. Therefore, areas that include larger amounts of public land experience higher use by the public.

Aden Lava Flow Wilderness Study Area

The Aden Lava Flow WSA is 25,287 acres in size and is located within the Potrillo volcanic field, 20 miles southwest of Las Cruces, New Mexico. The Aden Crater lies at the western side of the lava flow. The WSA is characterized by basalt flows, volcanic craters, and coppice sand dunes. The lava flow includes pressure ridges, lava tubes, and steep-walled depressions of up to 100 feet wide. Grass and shrubs grow on the flow with many cacti and yucca. Vegetation consists of grasslands and desert shrubs such as mesquite and creosote. Vent tubes, and the many crevices found in the lava, provide cover and den sites for wildlife. Bats are numerous and the rock pocket mouse (*Chaetodipus intermedius*) and blacktail rattlesnake (*Crotalus lepidus*) are found on the black lava flows. The WSA can be accessed from I-10 via a dirt road, which, depending on the condition, may limit usage levels for recreation purposes. Although less than a 1-hour drive from either Las Cruces, New Mexico, or El Paso, Texas, most of the area receives little visitor use. The area does not have any maintained trails, making cross-country travel for horseback riders, hikers, and backpackers a very primitive experience. The WSA offers primitive and dispersed recreation opportunities and activities (BLM 2013j). Approximately 9 acres of the WSA lies within the analysis area.

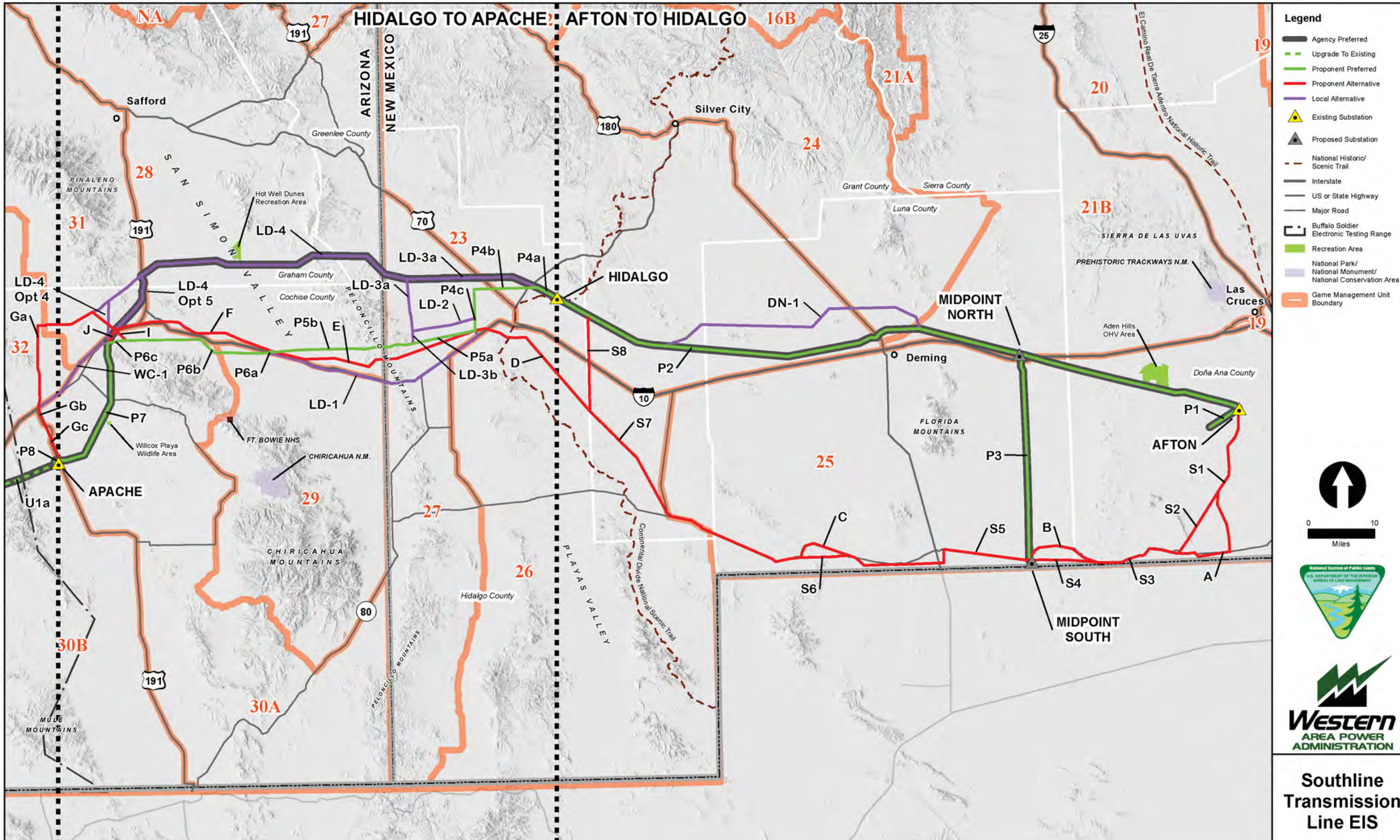
West Potrillo Mountains and Mount Riley Wilderness Study Area

The West Potrillo Mountains and Mount Riley WSA is 148,697 acres in size and is located approximately 30 miles southwest of Las Cruces, New Mexico, just north of the Mexico border. It consists of mountains comprising a series of 48 volcanic cinder cones, with small sand dunes, playas, and lava fields in between. The vegetation consists of desert grasses and shrubs. Indian Basin, a natural depression at the southwest end of the West Potrillo Mountains, fills with water during the rainy season, providing a temporary pond for ducks. Wintering raptors are found in high numbers due to a large small-mammal prey base. County Road A3-B provides general access from the south, and County Road A17-B4 allows access from the northeast. The condition of the dirt access roads may limit usage levels for recreational purposes. The WSA offers hang-gliding, parasailing, primitive and dispersed recreation opportunities and activities (BLM 2013k). Approximately 10,163 acres of the WSA lie within the analysis area. The adjacent East Potrillo Mountains and Cox Peak areas provide opportunities for paragliding/parasailing.

Peloncillo Mountains Wilderness Study Area

The Peloncillo Mountains WSA is 4,061 acres located along the Arizona–New Mexico border, adjacent to the eastern border of the Peloncillo Mountains Wilderness. The landform comprises low mountains, cliffs, and numerous canyons, with gentle hills covered in desert grasses and shrubs. Desert bighorn sheep inhabit the Peloncillo Mountains, as well as Gila monsters and pincushion cacti. There are no marked trails within the WSA, and four-wheel drive is required to access the WSA. The WSA offers primitive and dispersed recreation opportunities and activities (BLM 2013l). Approximately 600 acres of the WSA lie within the analysis area.

1 **Figure 3.14-1.** Recreation areas in the New Build Section.



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Aden Hills Off-Highway Vehicle Area

The Aden Hills OHV Area is designated by the Mimbres RMP as an "open" area for OHV use. The area receives about 10,000 visitor-days of use annually. Use of an OHV open area is not generally dependent upon scenic quality; rather, attributes such as access, challenging terrain, and availability of trails are most important. Approximately 1,555 acres of the Aden Hills OHV Area lies within the analysis area (BLM 1993).

Proposed Butterfield Overland Trail National Historic Trail

The proposed Butterfield Trail commemorates the routes pioneered by John Butterfield and his Butterfield Overland Stage Company as its stages traveled over the "oxbow route" between the eastern termini of St. Louis and Memphis and the western terminus of San Francisco. Stages traveled over this route between 1858 and 1861. The entire trail can be hiked and has access to the ruins of Fort Bowie, near Willcox, Arizona. The Butterfield Trail offers primitive, developed, and dispersed recreation opportunities and activities (NPS 2013). The trail is currently under study by the NPS to determine whether the trail should be designated under the National Trails System Act of 1968 as historic. Approximately 7.27 miles of the Butterfield Trail occur within the analysis area in the New Build Section.

Continental Divide National Scenic Trail

The CDNST part of the National Trail System is a 50-mile-wide corridor on either side of the Continental Divide. The CDNST provides for scenic, primitive hiking and horseback-riding recreational experiences, while conserving natural, historic, and cultural resources along the Continental Divide. Extending 3,100 miles between Mexico and Canada, the CDNST traverses landscapes primarily on public lands. This National Scenic Trail was established in 1978 through the authority of the National Trails System Act (PL 90-543) and is one of the outstanding resources of the BLM's National Landscape Conservation System. Where the CDNST crosses BLM lands in New Mexico, the route does not ordinarily have a tread. The trail is identified with line-of-sight signs except where it follows ranch roads. Equestrian facilities are intermittent and in various stages of development. Although the CDNST is open year-round, spring is the best season for northbound travelers, while early fall is best for those entering from the north and heading south. The CDNST offers primitive and dispersed recreation opportunities and activities (FS 2009). Approximately 7.09 miles of the CDNST would occur within the analysis area in the New Build Section.

Peloncillo Mountains Wilderness Area

The 19,440-acre Peloncillo Mountains Wilderness is located 9 miles northeast of San Simon, Arizona, in Graham, Greenlee, and Cochise Counties, Arizona. The wilderness lies within the rugged Peloncillo Range, which stretches from Mexico to the Gila River. This remote and primitive area along the New Mexico State line shows little signs of human activity. The higher country offers long-distance views, and excellent scenery enhances wilderness values in the rugged mountains and canyons. High-clearance or four-wheel drive vehicles are recommended for access to the wilderness boundary. The Peloncillo Mountain Wilderness offers opportunities and activities for primitive recreation, including hiking, backpacking, rock scrambling, hunting, and sightseeing (BLM 2012i). Approximately 405 acres of the Peloncillo Mountains Wilderness lie within the analysis area.

Hunting

Table 3.14-1 presents the GMUs crossed by the New Build Section of the proposed Project and alternatives and the hunter days and hunting success data associated with those GMUs. Hunter days and hunt success for the Arizona GMUs were derived from deer, pronghorn, turkey, and javelina hunts (AGFD 2012d).

RECREATION SETTINGS

Critical to producing recreation opportunities is the condition of recreation settings on which those opportunities depend. As specified in section 3.14.2, ROS uses settings that correspond to allowable uses. The ROS stratifies and defines classes of outdoor recreation environments. The spectrum may be applied to all lands, regardless of ownership or jurisdiction. The ROS divides recreation settings into six broad categories: urban, rural, roaded natural, semi-primitive motorized, semi-primitive non-motorized, and primitive (U.S. Forest Service 1986a).

The physical setting describes variations in components such as remoteness, naturalness, and facilities. The social setting reflects the variations in components such as group size, number and types of contact with other users, encounters between individuals or groups, and the evidence of use by others. The administrative setting reflects the variations in the kind and extent of components such as visitor services, management controls, user fees, and mechanized use.

The recreation settings along the New Build Section of the analysis area vary widely. The settings for special designations such as Wilderness, WSA, National Monument, and National Trail offer more restrictive recreation settings such as primitive and dispersed recreational settings, where the users are less likely to anticipate encounters with other users. The settings for lands that have not been specially designated offer less restrictive settings such as motorized and developed recreational settings, where the users are more likely to anticipate encountering other users.

Both developed (e.g., city parks) and undeveloped (e.g., primitive camping) recreational uses are located within the analysis area.

ROS data were largely not available within the analysis area. The Mimbres, Safford, and Phoenix RMPs specify that all BLM lands, unless otherwise designated and subject to travel management rules, are open to recreational use (BLM 1993, 1988, 1991).

Although BLM lands within the analysis area do not contain ROS designations, the overall recreation setting of the New Build Section analysis area can be characterized as mostly roaded natural, with areas of semi-primitive motorized in site-specific areas. The only non-motorized areas in the New Build Section analysis area occur in specially designated areas such as designated Wilderness areas and DOD managed lands.

The 2009 Comprehensive Plan for the CDNST (U.S. Forest Service 2009) uses the ROS in delineating and integrating recreation opportunities in managing the CDNST. This ROS system consists of the following classifications: (a) primitive; (b) semi-private non-motorized; (c) semi-primitive motorized; (d) roaded natural; (e) rural and urban; and (f) private lands ROWs or easements. The analysis area intersects with the CDNST approximately 7 miles northeast of Lordsburg in route group 1. The 2009 Comprehensive Plan does not classify lands along the trail. However, because of the physical and visual proximity to urbanized and/or developed areas, the location where the trail would intersect the analysis area would be classified as primitive or semi-primitive. Both the roaded natural and rural and urban classifications assume that the natural setting may have strong modifications, including those that are strongly dominant. The rural and urban class specifically anticipates the presence of utility corridors (U.S. Forest Service 2009).

Table 3.14-1.GMU and Hunting Data Associated with the Proposed New Build Section

GMU	GMU Crossed by Analysis Area (acres)	GMU Game Species and Hunting Month(s)	GMU Permits	GMU Hunter Days*, †	GMU Hunting Success*, ‡
21B (New Mexico)	23,510	Turkey: April 15–May 10, September 1–30 (archery only), November 1–30 Deer (all Unit 21): Select dates in November and December Elk: Select dates October–December Pronghorn antelope (all Unit 21): October 5–7, 26–28 Bear: Select dates in August– November Cougar: Annual	Turkey: Between 2–100 (2013–2014) Deer: 1,100 (21 as a whole; 2013–2014) Elk: 110 (2013–2014) Pronghorn antelope: 7 (2013–2014) Bear: 109 (for all units 12, 13, 15–18, 20–24, 26, 27; yr 2013–2014) Cougar: 89 (for all units 15, 16, 21, 25; yr 2013–2014)	NA	Deer: 25% (2010–2011) Elk: 44% (2011)
23 (New Mexico)	76,054	Turkey: April 15–May 10, September 1–30 (archery only), November 1–30 Deer: Select dates in November and December Elk: October 5–9, 19–23 Pronghorn antelope: Select dates in August and October Javelina: Select dates in January–February Bear: Select dates in August–November	Turkey: Between 2–100 (2013–2014) Deer: 1,375 (2013–2014) Elk: 100 (2013–2014) Pronghorn antelope: 33 (2013–2014) Javelina: 1,300 (total for units 19, 23–28; 2013–2014) Bear: 109 (for all units 12, 13, 15–18, 20–24, 26, 27)	NA	Deer: 28% (2010–2011) Elk: 19% (2011)
24 (New Mexico)	7,165	Turkey: April 15–May 10, September 1–30 (archery only), November 1–30 Deer: Select dates in September through December Elk: October 5–9, 19–23 Pronghorn antelope: October 5–7, 26–28 Javelina: Select dates in January–February Bear: Select dates in August–November Cougar: Annual	Turkey: Between 2–100 (2013–2014) Deer: 1,050 (2013–2014) Elk: 20 (2013–2014) Pronghorn antelope: 6 (2013–2014) Javelina: 1,300 (total for Units 19, 23–28; yr 2013–2014) Bear: 109 (for all units 12, 13, 15–18, 20–24, 26, 27; yr 2013–2014) Cougar: 66 (for all units 22–24; yr 2013–2014)	NA	Deer: 33.3% (2010–2011) Elk: 25% (2011)
25 (New Mexico)	89,230	Deer: November 2–6, 9–13 Pronghorn antelope: October 5–7, 26–28 Ibex (*Capra aegagrus*): Select days October–January, depending on sporting arm Javelina: Select dates in January–February Cougar: Annual	Deer: 200 (2013–2014) Pronghorn antelope: 6 (2013–2014) Ibex: 165 (2013–2014) Javelina: 1,300 (total for units 19, 23–28; yr 2013–2014) Cougar: 89 (for all units 15, 16, 21, 25; yr 2013–2014)	NA	Deer: 24.9% (2010–2011)
26 (New Mexico)	610	Deer: November 2–6, 9–13 Pronghorn antelope: October 5–7, 26–28 Javelina: Select dates in January–February Bear: Select dates in August–November Cougar: Annual	Deer: 200 (2013–2014) Pronghorn antelope: 11 (2013–2014) Javelina: 1,300 (total for units 19, 23–28; yr 2013–2014) Bear: 109 (for all units 12, 13, 15–18, 20–24, 26, 27; yr 2013–2014) Cougar: 19 (for both units 26–27; yr 2013–2014)	NA	Deer: 43.2% (2010–2011)

Table 3.14-1.GMU and Hunting Data Associated with the Proposed New Build Section (Continued)

GMU	GMU Crossed by Analysis Area (acres)	GMU Game Species and Hunting Month(s)	GMU Permits	GMU Hunter Days*,†	GMU Hunting Success*,‡
T27 (New Mexico)	29,455	Deer: Select dates in November and December Desert bighorn sheep: November 1–30 Javelina: Select dates in January–February Bear: Select dates in August–November Cougar: Annual	Deer: 200 (2013–2014) Desert bighorn sheep: 2 (2013–2014) Javelina: 1,300 (total for units 19, 23–28; yr 2013–2014) Bear: 109 (for all units 12, 13, 15–18, 20–24, 26, 27) Cougar: 19 (for units 26–27; yr 2013–2014)	NA	Deer: 38.5% (2010–2011)
28 (Arizona)	23,765	Mule deer: October/November Javelina: January/February Bighorn sheep: Dec Quail: Oct–February Dove: Sept	*Average no. of permits in past 5 years:* Mule deer: 1,200 Javelina: 450 Bighorn sheep–desert: 2 Bighorn sheep–Rocky Mountain: 3	6,101	31%
29 (Arizona)	9,880	White-tailed deer: October–December Mule deer: October/November Javelina: February–March Quail: October–February	*Average no. of permits in past 5 years:* White-tailed deer: 900 Mule deer: 500 Javelina: 300	4,550	26%
30A (Arizona)	49,468	White-tailed deer: October–December Mule deer: October/November Javelina: January/February Quail: October–February Antelope: September	*Average no. of permits in past 5 years:* White-tailed deer: 1,463 Mule deer: 1,300 Javelina: 650 Antelope: 7	7,376	32%
30B (Arizona)	751	White-tailed deer: October–December Mule deer: October/November Javelina: January–March Quail: October–February Mountain lion: Year-round	*Average no. of permits in past 5 years:* White-tailed deer: 200 Mule deer: 1,480 Javelina: 430, 200 handgun, archery and muzzleloader (HAM), 600 archery	9,134	28%
31 (Arizona)	112	White-tailed deer: November/December Mule deer: October/November Javelina: January/February Black bear: March, September Bighorn sheep: December	*Average no. of permits in past 5 years:* White-tailed deer: 600 Mule deer: 800 Javelina: 650	5,409	20%

Note: NA: Not available.

*****Arizona hunter days and hunt success were derived from deer, pronghorn, turkey, and javelina hunts.

†NMDGF does not calculate or report GMU hunter days.

‡NMDGF only has success data for elk and deer because they are the only species with mandatory harvest reporting.

DESIRED RECREATION EXPERIENCES

The Mimbres RMP includes objectives for managing recreation resources. Namely, the objective of the recreation program is to ensure the continued availability of quality outdoor recreation opportunities and experiences that are not readily available from other sources. Recreation use is managed in order to protect the health and safety of visitors; to protect natural, cultural, and other resource values; to stimulate public enjoyment of public land, and to resolve user conflicts (BLM 1993).

The Safford and Phoenix RMP do not prescribe specific, future desired recreation experiences goals and objectives; management prescriptions required to manage SRMAs would be developed between the BLM and cooperating agencies. Management prescriptions that would be addressed include OHV travel, signing requirements, recreation facilities, fee collection, and visitor use allocations (BLM 1988a, 1991).

The future Tri County RMP provides goals and objectives for BLM lands in Doña Ana County, New Mexico (BLM 2013e):

- Provide the public with appropriate information to plan, prepare, and choose safe, enjoyable, and appropriate recreational uses of public land;
- Provide and maintain legal access to public land in SRMAs and ERMAs; and
- Increase understanding, tolerance, and respect for other recreation user types. Improve recreation participant's awareness and sense of stewardship for natural and cultural resource values.

ADJACENT RECREATION AREAS

The Hot Well Dunes Recreation SRMA is adjacent to the analysis area in the New Build Section. Hot Dune Wells is approximately 1,708 acres and is located approximately 0.5 mile north of the proposed Project in route group 2. The primary recreation activities are camping and OHV driving, because the Hot Well Dunes area is designated as “open” to vehicles (BLM 2013m). The BLM Safford Field Office manages the Hot Well Dunes Recreation Area.

Upgrade Section

The Upgrade Section would involve the upgrade and integration of approximately 120 miles of existing transmission facilities, as well as proposed substation expansion areas and staging areas during construction. The Upgrade Section is characterized by primarily undeveloped desert landscape with pockets of rural residential and commercial development. Similar to the New Build Section, the Upgrade Section's undeveloped and rural areas offer limited formal recreation opportunities, except in the vicinity of populated areas.

As shown on figure 3.14-2, the analysis area would include several recreation areas along the Upgrade Section, including:

- Federal lands open to recreation, including national trails and national monuments; and
- State, County, and city recreation areas, including State land open to hunting, natural areas, State scenic roads, county parks, county Important Riparian Areas, and city parks.

RECREATION OPPORTUNITIES/ACTIVITIES

Arizona National Scenic Trail

The Arizona Trail, part of the National Trail System, is an 820-mile non-motorized trail that traverses the State from Mexico to Utah. The Arizona Trail is intended to be a primitive, long-distance trail that highlights Arizona's topographic, biologic, historic, and cultural diversity. The Trail's primary users are hikers, equestrians, and mountain bicyclists (outside of wilderness or other specially managed areas). Opportunities also exist for cross-country skiers, snowshoers, joggers, and pack-stock users. The Arizona Trail is a complex partnership of State and Federal agencies, non-profits, and private landowners, and is co-managed, constructed, and stewarded by the Arizona Trail Association in cooperation with agencies. This trail has many different segments. The segment in Pima County does not have a formal visitor recording process, but an estimated 500 visitors per year use the portion of the trail that crosses Bar V Ranch (Arizona Trail Association 2010). The analysis area crosses 0.16 mile of the Arizona Trail.

Willcox Playa Wildlife Area

The Willcox Playa Wildlife Area totals approximately 595 acres, including 120 acres of deeded land, 320 acres of land patented from the BLM, a 115-acre perpetual ROW from the ASLD, and a 40-acre donation from a private landowner. Management emphasis for the Willcox Playa Wildlife Area is to support the best wildlife habitat possible in the area for present and future generations. This emphasis includes keeping opportunities available for public hunting and other wildlife-oriented recreation. Existing uses include bird watching, photography, and hunting. Willcox Playa was placed on the NPS NNL list in 1966 (NPS 2012). The area is a roosting area for 4,000 to 8,000 sandhill cranes and contains the greatest diversity of tiger beetles (*Cicindela sperata*) in the United States (AGFD 2012c). The entire Willcox Playa Wildlife Area lies within the analysis area (refer to Figure 3.14-1).

Juan Bautista De Anza National Historic Trail

The Anza Trail extends 1,200 miles through 20 counties across Arizona and California, and is managed by the NPS. Today's visitors may follow in the tracks of the 1775–1776 expedition members on a historic route, auto route, or recreation trail segments. The portion of the trail within the analysis area is an auto route, primarily within suburban Tucson and nearby rural communities (NPS 1996). Approximately 0.98 mile of the trail occurs within the analysis area for the Upgrade Section.

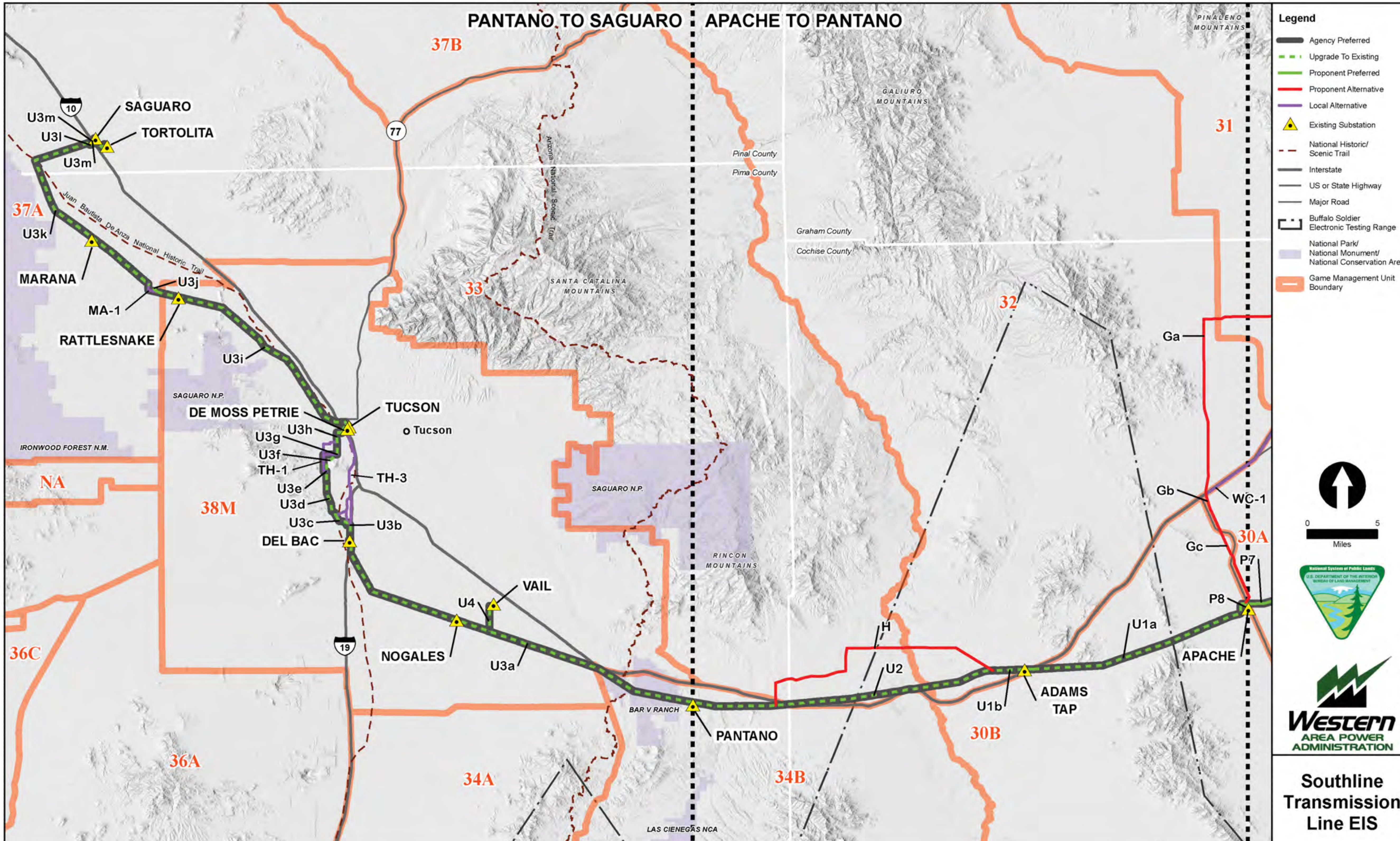
Coronado National Forest

The Coronado National Forest includes 1,780,000 acres of land of southeastern Arizona and southwestern New Mexico. Within the forest, 12 scattered mountain ranges or "sky islands" rise from the desert floor, supporting biologically diverse plant communities. The sky islands offer year-round recreation opportunities, including hiking, camping, mountain biking, birding, horseback riding, picnicking, sightseeing, and visiting historic areas. Fishing and boating are available but limited. The Coronado National Forest offers primitive and dispersed recreation opportunities and activities within the analysis area (U.S. Forest Service 1986a). The analysis area within the Upgrade Section crosses approximately 30 acres of semi-primitive motorized lands within the Coronado National Forest's Dragoon Management Unit.

Proposed Butterfield Overland Trail National Historic Trail

Approximately 2.11 miles of the Butterfield Trail lies within the analysis area in the Upgrade Section.

Figure 3.14-2. Recreation areas in the Upgrade Section.



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Hunting

Table 3.14-2 presents GMUs crossed by the Upgrade Section of the proposed Project and alternatives, and the hunter days and hunting success data associated with those GMUs. Hunter days and hunt success for the Arizona GMUs were derived from deer, pronghorn, turkey, and javelina hunts. GMU 38M data are for archery deer only; archery javelina hunters also hunt this unit but no data are available.

Patagonia–Sonoita (State Route 83) Scenic Road

Approximately 53 miles of SR 83 south from I-10 is an Arizona State-designated Scenic Road. Traversing the riparian basin of the Santa Cruz River, this scenic road weaves its way between the Santa Rita and Patagonia Mountains and through the grasslands and rolling hills of southern Arizona, an area rich in geographic diversity with more than 300 bird species, luring birdwatchers from around the world (U.S. Department of Transportation (USDOT) 1985). Approximately 2 miles of SR 83 lie within the analysis area.

Bar V Ranch

Pima County acquired the Bar V Ranch in February 2005, with 2004 bond funds. The ranch includes 14,400 acres of fee and grazing lease lands located between the Rincon and Santa Rita Mountains, adjacent to Pima County's Cienega Creek Natural Preserve (described below). The Bar V Ranch contributes to the conservation of an important wildlife movement corridors in the Cienega Valley. The ranch includes a significant portion of Davison Canyon, an important tributary and water source to Cienega Creek and the Tucson Basin. Acquisition of the Bar V Ranch preserves a large intact piece of the overall region (known as the Empire-Cienega landscape) and protects important riparian habitat crucial for several vulnerable species.

The ranch is maintained and continues to operate as a working ranch. Limited grazing is conducted on parts of the ranch and waters have been developed and are maintained year-round for livestock and wildlife. The lands are monitored annually, and activity on the ranch is managed to protect and sustain ecological values. Most of the Davidson Canyon stretch of the perennial and intermittent flow owned by Pima County has been fenced to restrict livestock access and reduce unregulated recreational use impacts.

Trails and roads along Davidson Canyon are used by hikers, ATV riders, and equestrian users. The Arizona Trail crosses Bar V Ranch along the Davidson Canyon drainage. Because the ranch is a mix of State Trust Lands and County-owned parcels, diverse recreational opportunities exist on the ranch. Recreational users are subject to County Park rules when on the County lands, and ASLD regulations for the State Trust Lands. Regulatory signage is posted for recreational users. It is estimated the ranch receives approximately 1,500 visitors per year (Pima County 2012b). Approximately 357 acres of the Bar V Ranch are within the analysis area.

Cienega Creek Natural Preserve

The Cienega Creek Natural Preserve is managed by the Pima County Parks and Recreation Department, and is located approximately 25 miles southeast of downtown Tucson. Hiking and bird-watching are the primary recreational activities. The principal management objectives are to preserve and protect perennial stream flow in Cienega Creek, preserve and protect the existing natural riparian community along the stream corridor, and to provide opportunities for the public use of the Preserve (McGann and Associates 1994). The analysis area includes a small portion (less than 1 acre) of the Preserve.

Table 3.14-2. GMU and Hunting Data Associated with the Proposed Upgrade Section

GMU	GMU Crossed by Analysis area (acres)	GMU Hunting Season(s)	GMU Permits	GMU Hunter Days*	GMU Hunting Success*
30B (Arizona)	982	White-tailed deer: October–December Mule deer: October/November Javelina: January–March Quail: October–February Mountain lion: Year-round	*Average no. of permits in past 5 years:* White-tailed deer: 200 Mule deer: 1,480 Javelina: 430, 200 HAM, 600 archery	9,134	28%
32 (Arizona)	444	White-tailed deer: October–December Mule deer: October/November Javelina: January/February Antelope: August/September Quail: October–February	*Average no. of permits in past 5 years:* White-tailed deer: 1,500 Mule deer: 1,000 Javelina: 800 Antelope: 20	12,814	24%
33 (Arizona)	628	White-tailed deer: October–December Mule Deer: October/November Javelina: January/February	*Average no. of permits in past 5 years:* White-tailed deer: 1,700 Mule deer: 700 Javelina: 1,500	15,387	16%
34B (Arizona)	871	Antelope: August/September Mule deer: August–January White-tailed deer: August–January Javelina: January–March	*Average no. of permits in past 5 years:* Antelope: 6 Mule deer: 81 White-tailed deer: 530 Javelina: 600	5,273	15%
37A (Arizona)	1,199	Mule deer: November Javelina: February/March Bighorn sheep: December Dove: September, November–January Quail: October–February	*Average no. of permits in past 5 years:* Mule deer: 200 Javelina: 800 Bighorn sheep: 1	10,880	19%
38M (Arizona)	3,038	Javelina: January (archery only) Mule deer: late December/January (archery only) Mountain lion: August–May (archery only) Eurasian collared dove: year-round Mourning dove, white-wing dove: September 1–15 Mourning dove (only): late November–early January Quail: early October–early February Coyote: year-round Other fur-bearers (bobcat, raccoon): August 1–March 3	*Average no. of hunters in past 5 years:*[†] Deer (archery only): 276	2,192	6% (limited data, archery only for deer)

*Arizona hunter days and hunt success were derived from deer, pronghorn, turkey, and javelina hunts.
[†] AGFD does not authorize a specific number of permits for archery deer hunting in Unit 38M. The majority of archery deer hunts are offered as permits sold over-the-counter; hunters can then choose to hunt in any of the open units for that season; Unit 38M is one of the open units. Value presented is the average number of hunters that elected to hunt unit 38M. Javelina hunter data are not available.

Las Cienegas National Conservation Area

The 2003 Las Cienegas NCA includes 49,000 acres of public land, resources, and uses within Las Cienegas NCA and SVAPD. NCAs were designated by Congress in order to conserve, protect, and enhance the unique and nationally important aquatic, wildlife, vegetative, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland, and riparian resources and values of the public lands within the NCAs, while allowing livestock grazing and recreation to continue in appropriate areas (BLM 2003). Approximately 5 miles of the analysis area crosses the Las Cienegas NCA along existing transmission line corridors within the SVAPD.

Additional recreation opportunities/activities within the Tucson metropolitan area are described below in table 3-14.3.

RECREATION SETTINGS

The recreation settings for the Upgrade Section would be similar to the settings described for the New Build Section.

The proximity of the Upgrade Section to the Tucson metropolitan area provides greater potential for access to recreational settings of varying degrees to a larger population. Despite the potential for increased use resultant from the increased population, recreation settings that provide remoteness, such as semi-primitive motorized, can be readily accessed by the Tucson population.

DESIRED RECREATION EXPERIENCES

The desired recreation experiences of the Safford RMP and Phoenix RMP lands within the Upgrade Section would be the same as described above under the New Build Section.

ADJACENT RECREATION AREAS

The recreation areas adjacent to the Upgrade Section include Saguaro National Park, east of the Upgrade Section and west of downtown Tucson. Saguaro National Park is composed of two distinct districts: The Rincon Mountain District and the Tucson Mountain District. The Tucson Mountain District (West Unit) lies on the west side of Tucson, and the Rincon Mountain District (East Unit) lies on the east side of Tucson. Both districts were formed to protect and exhibit forests of their namesake plant: the saguaro cactus. The Tucson Mountain District of Saguaro National Park ranges from an elevation of 2,180 to 4,687 feet and contains two biotic communities—desert scrub and desert grassland. Average annual precipitation is approximately 10.27 inches. Common wildlife include coyote, Gambel’s quail, and desert tortoise. Access to hiking trails is concentrated in the western and southern reaches of the West Unit (NPS 2008). The analysis area is located approximately 1 mile from the northeastern reaches of the Park’s West Unit.

The IFNM is northwest of Marana in Pima County, Arizona. This 129,000-acre Monument showcases ironwood trees, rugged mountain peaks, and desert valleys. The analysis area includes portions of the northeast corner of the IFNM. The IFNM RMP was completed in February 2013 BLM 2013c).

Table 3.14-3. City of Tucson Parks and Recreation Areas Associated with the Proposed Upgrade Section

Name	Acres within Analysis Area*	Description
San Pedro Golf Course*	48	The San Pedro Golf Course, owned and operated by the City of Benson, is an 18-hole championship course located 30 miles southeast of Tucson. The facility has five sets of tee boxes that allow for play from over 7,300 yards down to 5,200 yards. The front nine meanders through mesquite groves along the San Pedro River, while the back nine plays through natural canyons with significant elevation changes (San Pedro Golf Course 2012).
Christopher Columbus Park	70	Christopher Columbus Park is a large, regional-size park located on the northwest side of Tucson at Silverbell Road and Camino del Cero. Features of the park include ramadas, picnic sites, comfort stations, a playground, and two baseball fields. The park has a recreational and urban fishing lake where native waterfowl can be seen. The park also contains a model airplane area, a model boat lake, and an off-leash dog park with a ramada, an entry area for dogs to be introduced to each other, and equipment for dog skill activities. Columbus Park is located along the Anza Trail. Adjacent to the trail is a horse trailer pullout to unload horses, along with a ramada, water for the horses, and drinking fountain. A Comcast camping site with a fire pit, ramada with shade cover, and outdoor sitting area for small groups can be used as a meeting place or for outdoor classroom activities (City of Tucson 2012).
Garden of Gethsemane	Less than 1	The Garden of Gethsemane is located next to the Santa Cruz River on West Congress Street. The garden and small park contain the religious sculptures (registered historic art) of artist Felix Lucero. The garden is often used for weddings, quinceañeras, and small parties. Though open to the public, reservations, fees, and access keys are required (City of Tucson 2012).
Greasewood Park	11	Greasewood Park is located on Greasewood Road in an urban setting. This 160-acre natural desert park is dedicated to nature-oriented recreation and preserving the natural desert vegetation in the Tucson area. Its orienteering course consists of 39 permanent checkpoints located at significant landforms. Picnic areas also are available (City of Tucson 2012).
El Rio Trini Alvarez Municipal Golf Course	Less than 0.5	El Rio Trini Alvarez Municipal Golf Course was built in 1934 and is one of the oldest courses in Tucson. The course was developed with the traditional design of narrow fairways and small greens. The course receives approximately 35,000 visitors per year (Golf Nation 2012).
Joaquin Murrieta Park	13	Located in Tucson on Silverbell Road north of Speedway Boulevard, the 38-acre Joaquin Murrieta Park is considered the home of the Western Little League organization. It is an often-used site for the Old Timers, a group of senior baseball players, and is frequently used for family picnics, public festivals, and youth sports tournaments, including Western and Baja Little League. Features of the park include ramadas, picnic areas, soccer fields, Little League fields, softball fields, and a pool (City of Tucson 2012).
John F. Kennedy Park	25	Features of the John F. Kennedy regional park in Tucson include ramadas, restrooms, grills, sports fields, lighted tennis and basketball courts, playgrounds, and a pool. Its urban fishing lake is stocked regularly (City of Tucson 2012).
Santa Cruz River Park	6	The Santa Cruz River Park is a linear park located in Tucson along the Santa Cruz River north of Speedway Boulevard. The park is home to a disc-golf course in a desert setting. The park also offers picnic benches under mesquite trees, two ramadas, a softball field, a sand volleyball court, and a playground (at Bonita and Commerce Park Loop). The park is frequently used by walkers and bicyclists along the Santa Cruz River (City of Tucson 2012).
Sentinel Peak Park	Less than 1	Sentinel Peak or “A Mountain” in Tucson is a popular lookout point and annually hosts the City’s July 4 fireworks show. A gazebo is located on the west side of the mountains, and picnic areas are available. For special events and/or use of the gazebo, a letter of request is required (City of Tucson 2012).
Silverbell Municipal Golf Course	21	The 18-hole Silverbell Municipal Golf Course in Tucson is a public course that opened in 1979. There are nine lakes on the course with water coming into play on only a few holes (Golfnow 2012; Silverbell Municipal Golf Course 2012).

Table 3.14-3. City of Tucson Parks and Recreation Areas Associated with the Proposed Upgrade Section (Continued)

Name	Acres within Analysis Area*	Description
Tucson Mountain Park	27	Tucson Mountain Park is approximately 20,000 acres in size and one of the largest natural resource areas owned and managed by a local government in the United States. The park has approximately 62 miles of non-motorized shared-use trails open to hikers, equestrians, and mountain bikers. Gates Pass overlook includes interpretive displays and historic structures. Picnicking and wildlife viewing opportunities are located throughout the park. Hunting in Tucson Mountain Park is not permitted within 0.25 mile of any developed picnic area, developed campground, shooting range, occupied building, boat ramp, or golf course. An estimated 2.5 million people visit or drive through Tucson Mountain Park annually. Of this total, approximately 1.4 million people enter the park to visit or use park facilities. The approximate number of visitors traveling to various park destinations is as follows (City of Tucson 2012; Pima County 2008): - Arizona-Sonora Desert Museum: 445,000 per year - Old Tucson Studios: 230,000 per year - Other Pima County–operated facilities and trails: 725,000 per year
Tumamoc Hill	49	Tumamoc Hill is managed by both the University of Arizona College of Science and Pima County. Since 1906, Tumamoc Hill has been an ecological preserve and study area. Its 860-acre ecological reservation is both an NHL and Archaeological District. Tumamoc Hill also is a heavily used hiking trail along the paved road; public hiking access, however, is prohibited between 7:30 a.m. and 5:30 p.m. (City of Tucson 2012).

* Includes proposed Project and alternatives.

3.15 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The following analysis includes a summary of current social and economic data relevant to the proposed Project, including population, demographics, employment, income, and taxes in the analysis area. State, county, municipal, and census tract data are also included to provide a comparative discussion for the analysis area.

Some information in this section was obtained from a report titled "Southline Transmission Project Resource Report 11: Socioeconomics and Environmental Justice" (CH2M Hill 2013p). The contents of that report are used herein without specific reference.

3.15.1 Analysis Area

The analysis area for socioeconomics is based on the counties the proposed Project alternatives traverse and where proposed Project impacts are most likely to occur; these counties include Doña Ana County, Grant County, Hidalgo County, and Luna County in New Mexico, and Cochise County, Pima County, Pinal County, Graham County, and Greenlee County in Arizona. The New Build Section of the proposed Project would generally be located within the four counties in New Mexico and in Cochise County, Arizona. Under one New Build alternative, the line would also cross Graham County and Greenlee County in Arizona. The Upgrade Section of the proposed Project would be located in Cochise County, Pima County, and Pinal County in Arizona. The analysis area for environmental justice includes census tracts that fall within a 2-mile buffer of the proposed Project alternatives within the New Build Section of the proposed Project, and a 500-foot buffer within the Upgrade Section of the proposed Project. All of the census tracts within the analysis area for environmental justice were analyzed for low-income and minority populations.

3.15.2 Laws, Ordinances, Regulations, and Standards

The BLM (2005b) Land Use Planning Handbook (H-1601-1) specifies that the social and economic environment must be considered for all BLM land use planning decisions. Additionally, in accordance with this handbook, by statute, regulation, and EO, the BLM must use social science in the preparation of informed, sustainable land use planning decisions. Further, as noted in the BLM (2008d) NEPA Handbook (H-1790-1), socioeconomic issues typically occur within communities located outside BLM-managed lands. Nevertheless, the BLM must analyze the impacts of a given decision or project on the social and economic resources of a community or region.

Section 202(c)(2) of the FLPMA requires BLM to integrate physical, biological, economic, and other sciences in developing land use plans (43 U.S.C. 1712(c)(2)). FLPMA regulations 43 CFR 1610.4-3 and 1610.4-6 also require BLM to analyze social, economic, and institutional information. Section 102(2)(A) of NEPA requires Federal agencies to "insure the integrated use of the natural and social science in planning and decision making" (42 U.S.C. 4332(2)(A)). Federal agencies are also required to "identify and address" disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States, in accordance with EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations."

EO 12898 was signed by President Clinton in 1994. The EO requires agencies to advance environmental justice by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from Federal programs, policies, decisions, or operations. Meaningful involvement means Federal officials actively promote opportunities for public participation, and Federal decisions can be materially affected by participating groups and individuals.

The proposed Project alternatives cross eight BLM planning areas, managed by their respective management plans. These plans are: Mimbres RMP, TriCounty RMPs (still in draft), Safford District RMP, Dos Cabezas Mountains Wilderness Management Plan, Peloncillo Mountains Wilderness Management Plan, Las Cienegas RMP, Phoenix RMP, and IFNM Management Plan. These plans provide information on and analyze the social and economic conditions of their respective planning areas. BLM management decisions have the potential to affect the social and economic conditions of communities and individuals within these planning areas.

As noted above, the analysis area crosses several county and local jurisdictions. These counties, cities, and towns have goals, objectives, and policies outlined in comprehensive plans that are related to socioeconomics. A discussion of the regional and local guidelines and associated plans can be found in the land use discussion in section 3.11.

3.15.3 Issues to Be Analyzed

The following discussion describes the current social and economic conditions of the analysis area, and when appropriate, compares these with statewide conditions in New Mexico and Arizona. This description of current socioeconomic conditions is provided as the context used for analyses of issues identified during public and internal scoping for the proposed Project. Topics in this section were selected from issues noted by the public during scoping and include population, employment, housing, and economic trends in the analysis area. Current property values, tourism, and potential environmental justice communities are also discussed.

3.15.4 Analysis Area Conditions

Regional Overview

The proposed New Build Section of the proposed Project extends roughly from Las Cruces, New Mexico, to Willcox, Arizona. In New Mexico it traverses Hidalgo County, Grant County, Luna County, and Doña Ana County, and in Arizona it traverses Cochise County, Graham County, and Greenlee County. The Upgrade Section of the proposed Project would begin at the western end of the New Build Section and then continue farther west to the Saguaro Substation, approximately 30 miles northwest of Tucson.

Proposed routes for both the New Build and the Upgrade sections generally follow a 330-mile stretch of I-10. I-10 stretches 2,460 miles from Jacksonville, Florida, to Santa Monica, California, and is the southernmost transcontinental Interstate highway. The two largest cities along this portion of I-10 are Las Cruces, New Mexico, and Tucson, Arizona. In Las Cruces, the largest employers include New Mexico State University, the Memorial Medical Center, and Wal-Mart Stores Inc. (New Mexico Workforce Connection 2013). The largest private employers in Tucson are Raytheon Missile Systems, Wal-Mart Stores Inc., and University of Arizona Healthcare (Tucson Regional Economic Opportunities 2013).

However, in contrast to these regional population centers, the majority of the Project’s analysis area is rural. In particular, the eastern portion of the New Build Section is near the Mesilla Valley, which is part of the Rio Grande’s agriculturally productive floodplain. Doña Ana County is the country’s largest producer of pecans and the third largest producer of chilies. Other regional agricultural products include milk, corn, and onions (Mesilla Valley Economic Development Alliance 2013).

In both the urban and rural areas of the analysis area, the histories, cultures, and economies are heavily influenced by the proximity to the international border between the United States and Mexico. The New Build Section's Afton interconnection substation would be approximately 30 miles north of the border, and alternative segments of the New Build Section run within 5 miles of the border. This territory was purchased from Mexico in 1854 as part of the Gadsden Purchase during the term of President Franklin Pierce. The Gadsden Purchase was the last major acquisition of land in the contiguous United States and included 29,670 square miles from southern Las Cruces, New Mexico, to Yuma, Arizona (U.S. Department of State: Office of the Historian 2013). Today, a large proportion of the populations in these counties are Hispanic. The Arizona counties impacted by the proposed Project are roughly 30 percent Hispanic, and the New Mexico counties are between 47 to 67 percent Hispanic. In addition to the international cultural ties, this region has a distinct border economy which is heavily dependent on the transfer of goods, services, and people between the two countries. The transportation and logistics industry is a major sector of the border economy, because of the close proximity to over 300 maquilas in Juarez, Mexico (Mesilla Valley Economic Development Alliance 2013).

Population and Demographics

Population estimates and projections for the analysis area were collected from the Census Bureau and are summarized below for both the New Build and Upgrade sections.

NEW BUILD SECTION

The New Build Section is within both the state of New Mexico and the state of Arizona. With a Census 2010 total population of 2,059,179, New Mexico is ranked 36th in terms of population size (Census Bureau 2010a). Arizona, with a Census 2010 total population of 6,392,017, is the 16th largest state in terms of population (Census Bureau 2010b). Population centers in the New Build Section analysis area include Las Cruces, Deming, and Lordsburg, New Mexico, and Willcox, Arizona.

Of the counties forming the analysis area for the New Build Section, Doña Ana County has the largest population and economy, and Hidalgo County has the smallest. With a Census 2010 total population of 209,233, Doña Ana County is the second largest county in New Mexico and is part of the Las Cruces Metropolitan Statistical Area. Las Cruces is the second largest city in New Mexico and the county seat of Doña Ana County. Hidalgo County, with a Census 2010 population of 4,894, is the southernmost county in New Mexico. Grant County, with a 2010 Census population of 29,514, is the 16th most populous county in New Mexico, while Luna County, with a population of 25,095, is the state's 19th most populous.

Doña Ana County and Cochise County are the only counties in the New Build Section analysis area with greater than 10 percent population increases between 2000 and 2010—at 19.8 percent and 11.5 percent, respectively. Comparatively, populations in Grant County and Hidalgo County, New Mexico and Greenlee County, Arizona decreased during the same period. Luna County's population remained relatively constant. Within the New Build Section analysis area, Las Cruces is the largest city and has experienced the most rapid growth in the past decade (28.2 percent). By contrast, Lordsburg, in Hidalgo County, experienced a 10.1 percent decrease in population for the same period (table 3.15-1). Overall, the New Build Section analysis area experienced a 12.3 percent increase in population between 2000 and 2010.

Population projections for 2020 show continued growth in Doña Ana County, Luna County, Cochise County, and Graham County, of between 8 and 16 percent. Hidalgo County's population is expected to continue to decline during this time period. Grant County's population is expected to stabilize rather than continue decreasing (see table 3.15-1). Overall, population in the New Build Section analysis area is expected to increase by 11.8 percent between 2010 and 2020.

Table 3.15-1. Population: Historical, Current, and Projected (New Build Section Analysis Area)

Location	2000*	2010†	Percent Change 2000–2010	2020‡, §	Percent Change 2010–2010
County					
Doña Ana County, New Mexico	174,682	209,233	19.8	243,164	16.2
Grant County, New Mexico	31,002	29,514	−4.8	29,547	0.1
Hidalgo County, New Mexico	5,932	4,894	−17.5	4,818	−1.6
Luna County, New Mexico	25,016	25,095	0.3	28,024	11.7
Cochise County, Arizona	117,755	131,346	11.5	142,400	8.4
Graham County, Arizona	33,489	36,720	9.6	41,200	12.2
Greenlee County, Arizona	8,547	8,472	−0.1	8,500	0.3
Total New Build Section	*396,423*	*445,274*	*12.3*	*497,653*	*11.8*
City/Town					
Las Cruces (Doña Ana County)	74,267	95,233	28.2	NA	NA
Deming (Luna County)	14,116	14,901	5.6	NA	NA
Lordsburg (Hidalgo County)	3,379	3,039	−10.1	NA	NA
Willcox (Cochise County)	3,733	3,776	1.2	NA	NA
State					
State of Arizona	5,130,632	6,392,017	24.6	7,485,000	17.1
State of New Mexico	1,819,046	2,059,017	13.2	2,351,724	14.2

Note: NA = not applicable.
* Census Bureau (2000).
† Census Bureau (2010a).
‡ University of New Mexico (2013).
§ ADOA (2013).

UPGRADE SECTION

The Upgrade Section is entirely within the State of Arizona. Population centers in the Upgrade Section analysis area include Benson, Vail, Tucson, and Marana. Of the counties forming the analysis area for the Upgrade Section, Pima County has both the largest population and economy, and Cochise County has the smallest. Pima County is the second largest county in Arizona, and the majority of its Census 2010 population of 980,263 resides in Tucson.

Counties in the analysis area for the Upgrade Section have all experienced population growth in the past decade (table 3.15-2). Pinal County in particular had substantial population growth between 2000 and 2010, more than doubling its population.

Table 3.15-2. Population: Historical, Current, and Projected (Upgrade Section Analysis Area)

Location	2000*	2010†	Percent Change 2000–2010	2020‡	Percent Change 2010–2020
County					
Cochise County, Arizona	117,755	131,346	11.5	142,400	8.4
Pima County, Arizona	843,746	980,263	16.2	1,100,000	12.2
Pinal County, Arizona	179,727	375,770	109.1	493,200	31.3
Total Upgrade Section	*1,141,228*	*1,487,379*	*15.6*	*1,735,600*	*56.1*

Table 3.15-2. Population: Historical, Current, and Projected (Upgrade Section Analysis Area), Continued

Location	2000*	2010†	Percent Change 2000–2010	2020‡	Percent Change 2010–2020
City/Town					
Benson (Cochise County)	4,711	5,092	8.1	NA	NA
Vail (Pima County)	2,484	9,468	282.1	NA	NA
Tucson (Pima County)	486,699	520,981	7.0	NA	NA
Marana (Pima County)	13,556	32,993	143.4	NA	NA
State					
State of Arizona	5,130,632	6,392,017	24.6	7,485,000	17.1

Note: NA = not applicable.
* Census Bureau (2000).
† Census Bureau (2010a).
‡ ADOA (2013).

Population estimates for 2020 show continued substantial growth in the Upgrade Section analysis area (56.1 percent) over the next decade. Pima County is projected to continue to grow at a rate generally consistent with the state, while Pinal County growth is expected to be more rapid (31.3 percent), though slower than during the past decade (109.1 percent). Cochise County is projected to experience moderate growth (8.4 percent) over the next decade (see table 3.15-2).

3.15.5 Housing

New Build Section

Consistent with the population figures discussed above, Doña Ana County has the highest number of existing housing units within the New Build Section analysis area, and has experienced the largest expansion in housing capacity (25 percent) within the past decade (table 3.15-3). The average household size is slightly higher for the owner-occupied units in Cochise County, Doña Ana County, and Luna County than for either Grant County or Hidalgo County (see table 3.15-3).

In 2010, homeowner vacancy rates ranged from 1.8 to 3.7 percent across Counties in the New Build Section analysis area, which is generally consistent with the overall homeowner vacancy rate for the states of Arizona and New Mexico. Homeowner vacancy rates were highest in Graham County. In the same year, rental vacancy rates ranged from 7 to 11.2 percent across counties in the New Build Section analysis area, which again is consistent with the statewide rental vacancy rates. Rental vacancy rates were highest in Hidalgo County.

Vacant rental housing potentially available for this proposed Project exists in all counties across the New Build Section analysis area. In the New Mexico portions of the New Build Section, Doña Ana County has the highest number of available rental units and Hidalgo County has the fewest (4,829 and 416 units, respectively). In the Arizona portions of the New Build Section, the counties with the highest total number of units also have the highest number of potentially available rental units. Cochise County has 6,746 available units, whereas Greenlee County only has 1,043. These estimates include vacant general rental properties as well as properties identified in the 2010 Census as being for seasonal, recreational, or migratory labor needs.

Table 3.15-3. Housing Statistics, 2010 Census, New Build Section

Housing Segment	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Total housing units (2000)*	65,210	14,066	2,848	11,291	51,126	11,430	3,744	2,189,189	780,579
Total housing units (2010)†	81,492	14,693	2,393	10,999	59,041	12,980	4,372	2,844,526	901,388
Percent change	25.0	4.5	−16.0	−2.6	15.5	13.6	16.8	29.9	15.5
Total owner-occupied	48,514	9,019	1,306	6,706	34,711	8,089	1,593	1,571,990	542,122
Total renter-occupied	27,018	3,567	630	2,887	16,154	3,031	1,595	809,303	249,273
Homeowner vacancy rate (2010)†	1.8%	2.1%	2.1%	2.9%	3.2%	3.7%	2.2%	3.9%	2.0%
Rental vacancy rate (2010)†	7.0%	8.9%	11.2%	9.1%	10.6%	2.9%	10.7%	12.9%	8.1%
Potentially available rental units‡	2,054	351	80	293	1,917	502	466	120,490	22,150

* Census Bureau (2000).
† Census Bureau (2010a).
‡ Census Bureau (2010b).

Upgrade Section

Although Pima County has the highest number of housing units within the Upgrade Section analysis area, Pinal County experienced the largest percentage increase in housing units during the last decade, with housing units there nearly doubling between 2000 and 2010 (table 3.15-4). However, while the number of housing units grew 96.2 percent, population in Pinal County increased 109.1 percent. In Cochise County, housing growth (15.5 percent) was larger than population growth (11.5 percent). The same is true for Pima County (see table 3.15-4).

In 2010, homeowner vacancy rates ranged from 2.9 to 5.5 percent in the Upgrade Section analysis area. In the same year, rental vacancy rates ranged from 10.6 to 13.9 percent across counties in the Upgrade Section analysis area. For both owned homes and rentals, vacancy rates were the highest in Pinal County in 2010.

Across the Upgrade Section analysis area there is a considerably larger potentially available rental housing stock than in the counties of the New Build Section analysis area (see tables 3.15-3 and 3.15-4). All of these counties also have large total housing units and high rental vacancy rates. There are nearly 18,000 potential available units in Pima County alone and an additional 4,887 in Pinal County (see table 3.15-4).

Table 3.15-4. Housing Statistics, 2010 Census, Upgrade Section

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Total housing units (2000)*	51,126	366,737	81,154	2,189,189
Total housing units (2010)†	59,041	440,909	159,222	2,844,526
Percent change	15.5	20.2	96.2	29.9

Table 3.15-4. Housing Statistics, 2010 Census, Upgrade Section (Continued)

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Total owner-occupied	34,711	248,970	95,629	1,571,687
Total renter-occupied	16,154	169,690	29,961	809,303
Homeowner vacancy rate (2010)†	3.2%	2.9%	5.5%	3.9%
Rental vacancy rate (2010)†	10.6%	11.2%	13.9%	12.9%
Potentially available rental units‡	1,917	17,708	4,887	120,490

* Census Bureau (2000).
† Census Bureau (2010a).
‡ Census Bureau (2010b).

Other Short-term Accommodations: New Build and Upgrade Sections

Apart from rental housing, motels and recreational vehicle (RV) parks in the analysis area provide other potential accommodations for short-term residents. The western and eastern ends of the analysis area are particularly well served, in this regard, by the larger communities of Tucson and Las Cruces. The Tucson area has about 15,000 motel/hotel rooms and 46 mobile home and RV parks. The Las Cruces area includes about 21 hotels and motels with an estimated 1,000 to 2,000 rooms and 12 mobile home and RV parks (Dean Runyan 2012; CH2M Hill 2013p).

There are fewer short-term accommodations in the central portion of the analysis area, more than 90 miles east of Tucson and more than 90 miles west of Las Cruces. The city of Lordsburg, New Mexico, in Hidalgo County, has approximately 11 hotels and motels offering approximately 400 to 500 rooms and one RV park (CH2M Hill 2013p). To the west, there are numerous hotels and motels in Cochise County, Arizona, but virtually all of them are located a considerable distance south of the potential transmission line routes near I-10 in the cities of Sierra Vista, Tombstone, and Bisbee. There are, however, about 25 mobile home and RV parks in the northeastern portions of Cochise County, proximate to the potential transmission line routes. These RV parks are primarily located in or near the communities of Benson, Willcox, and St. David (CH2M Hill 2013p).

3.15.6 Property Values

With the exception of population centers like Las Cruces and Tucson, the proposed Project and alternatives would traverse generally rural landscapes that are largely undeveloped. Neither the New Build Section nor the Upgrade Section analysis areas have been impervious to the national increases in distressed and foreclosed properties, though the housing markets in New Mexico and Arizona do appear to be recovering slowly. As with any new development, transmission lines have the potential, either real or perceived, to impact residential property values.

New Build Section

Between 2000 and 2010, median home values in New Mexico increased 46.5 percent from $108,100 to $158,400 (table 3.15-5). In Arizona, median home values increased 77.2 percent for the same time period, from $121,300 to $215,000. All counties in the New Build Section analysis area saw an increase in home values between 2000 and 2010. In 2010, median home values in the New Build Section analysis area range from $73,200 in Greenlee County to $154,900 in Cochise County (see table 3.15-5). These figures represent nominal price increases; actual growth in housing values after accounting for inflation was smaller.

Table 3.15-5. Housing Statistics, 2010 Census, New Build Section

Housing Segment	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Median Home Value (2000)*	$90,900	$87,900	$53,900	$66,000	$88,200	$80,900	$62,700	$121,300	$108,100
Median Home Value (2010)†	$137,200	$125,000	$90,800	$91,700	$154,900	$121,100	$73,200	$215,000	$158,400
Percent change	50.9	42.2	68.5	38.9	75.6	49.7	16.7	77.2	46.5

* Census Bureau (2000).
† Census Bureau (2010c).

Upgrade Section

Median home values in the Upgrade Section analysis area range from $154,900 in Cochise County to $198,300 in Pima County (table 3.15-6). Like the New Build Section analysis area, all counties experienced an increase in home values between 2000 and 2010. Median home values in Pima County were slightly lower than the median state value; median home values in Cochise County and Pinal County were farther below the state average (see table 3.15-6).

Table 3.15-6. Housing Statistics, 2010 Census, Upgrade Section

Housing Segment	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Median Home Value (2000)*	$88,200	$114,600	$93,900	$121,300
Median Home Value (2010)†	$154,900	$198,300	$164,400	$215,000
Percent Change	75.6	73.0	75.1	77.2

* Census Bureau (2000).
† Census Bureau (2010c).

3.15.7 Employment and Income

New Build Section

EMPLOYMENT

Two estimates of employment are typically used to describe employment in an area: civilian labor force and employment by industry. The Census Bureau defines the civilian labor force on the basis of individuals in the population who are "16 years and over." Employment-by-industry data, on the other hand, reflects jobs by "place of work" and includes both part-time and full-time jobs. Individuals with more than one job are counted only once in civilian labor force data and counted in each job in the employment-by-industry data. The 2010 employment statistics summarized in table 3.15-7 are from the U.S. Census 2006–2010 American Community Survey (Census Bureau 2011), whereas the 2000 statistics are from the U.S. Census 2000 (Census Bureau 2000).

Table 3.15-7. Employment Statistics for the New Build Section

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Labor force (2000)*	74,546	12,408	2,347	8,633	45,702	12,094	3,694	2,366,372	823,440
Labor force (2010)†	92,899	13,447	2,430	9,966	53,041	13,643	3,951	2,975,166	957,903
Labor force, average annual growth rate (2000–2010)	2.2	0.8	0.3	1.4	1.5	1.2	0.7	2.3	1.5
Employed (2010)†	84,880	12,387	2,182	8,601	48,973	12,306	3,490	2,747,475	888,761
Unemployment rate (2010)†	8.6	7.9	10.2	13.7	7.7	9.8	11.7	7.7	7.2

* Census Bureau (2000)
† Census Bureau (2010c)

There has been an overall increase in the civilian labor force within all of the counties in the New Build Section analysis area. The average annual growth rate in the civilian labor force between 2000 and 2010 was highest in Doña Ana County (2.2 percent) and lowest in Hidalgo County (0.3 percent). The average annual growth rate in Doña Ana County was higher than for the State of New Mexico as a whole (1.6 percent), while the average annual growth rate in Cochise County, Graham County, and Greenlee County was lower than that for the State of Arizona as a whole (2.4 percent). Unemployment rates ranged from 7.7 percent in Cochise County to 14.2 percent in Greenlee County.

In terms of employment by industry, the Federal Bureau of Economic Analysis (BEA) reports these data by major industrial classification at the state and county level (BEA 2012b). The most recent data available are from 2009 (table 3.15-8). The services and government sectors were the major employers in the New Build Section analysis area and together accounted for roughly two out of three jobs in the analysis area. The “services” sector includes personal (educational, health care and social assistance, arts, entertainment, and recreation, and accommodation and food) and business (finance and insurance, real estate, professional, scientific, and technical services, and management of companies and enterprises) services. Employment in the construction sector accounted for 4 to 8 percent of the total employment by industry in each of the counties (except Hidalgo County) in 2001, and 4 to 7 percent in 2009. In every county the two largest sectors by employment are government and services (see table 3.15-8).

INCOME

Per capita income in 2009 in the New Build Section analysis area ranged from $23,509 in Graham County to $34,243 in Cochise County, which is below the average per capita income for both states (table 3.15-9). According to the American Community Survey (ACS), Greenlee County had the highest median household income ($49,390) among the counties in the New Build Section analysis area. During the same period, New Mexico’s median household income was $43,820 while Arizona’s median household income was $50,448 (Census Bureau 2010c).

The ACS data also include an estimate of the number of people living below the poverty level as well as the percentage of population living below the poverty level. Based on the poverty statistics, the percentage of people living below the poverty level was highest in Luna County (26.2 percent) (see table 3.15-9).

Table 3.15-8. Employment by Industry, New Build Section

	Doña Ana County, New Mexico		Grant County, New Mexico		Hidalgo County, New Mexico		Luna County, New Mexico		Cochise County, Arizona		Graham County, Arizona		Greenlee County, Arizona		State of New Mexico		State of Arizona	
Industry	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**	**2001**	**2009**
Agricultural, Forestry, Fisheries, etc.	3,210	4,074	443	434	285*	208*	400*	368*	1,997	2,294	364	D	D	D	40,332	41,680	29,518	29,680
Mining	D	221	D	790	L	D	D	D	77	261	13	D	D	D	12,852	16,514	19,612	24,488
Manufacturing	3,352	3,216	D	109	D	D	1,042	1,030	1,156	896	287	277	D	18	210,741	165,372	45,621	36,355
Transportation, Warehousing, and Utilities	2,112	2,598	D	234	D	75*	D	261*	1,346	1,435	D	D	52	D	92,283	103,971	28,226	29,123
Wholesale Trade	1,377	1,523	236	106	L	D	163	D	615	659	126	127	D	18	104,906	113,085	27,801	26,652
Retail Trade	7,656	8,279	1,642	1,608	324	317	1,172	1,421	6,077	6,539	1,578	1,611	274	199	323,264	364,491	110,010	114,066
Information	1,032	1,020	191	166	22	24	37	32	622	798	D	129	D	D	62,224	49,015	19,438	17,309
Finance, Insurance, and Real Estate	3,565	5,141	640	725	D	D	139	185	D	4,114	333	458	D	D	272,679	393,717	60,211	76,175
Services	27,728	35,704	3,744*	4,240	184*	27*	1,444*	1,841*	17,077	22,000	D	D	D	D	1,093,246	1,352,796	360,041	433,760
Construction	4,532	5,565	872	823	D	D	334	413	2,982	2,718	393	446	451	200	213,716	213,716	63,293	67,211
Government	19,599	22,273	3,571	3,791	540	719	1,776	2,345	16,739	17,409	2,403	2,738	548	554	397,209	452,631	205,158	216,118
Total Employment	**75,712**	**89,614**	**14,423**	**13,026**	**2,276**	**2,307**	**8,350**	**9,780**	**51,397**	**59,123**	**9,594**	**11,099**	**4,727**	**4,220**	**2,823,452**	**3,235,139**	**968,929**	**1,070,937**

Source: BEA (2012a).
Notes: D = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
L = Less than 10 jobs, but the estimates for this item are included in the totals.
* Includes non-disclosure estimates.

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The sources of personal income vary by county but tend to follow the same general patterns (table 3.15-10). In every county in the New Build Section analysis area, earnings by place of work accounts for the largest percent of income, while dividends, interest, and rent is the smallest. Greenlee County, Arizona, has the largest percent coming from earnings and the lowest from both net transfer payments and dividends. Graham County has the largest proportion of income from net transfer payments and the lowest from earnings (see table 3.15-10).

Compensation by industry also varies by county (table 3.15-11). With the exception of Greenlee County, the construction compensation per job in the New Build Section analysis area is dramatically lower than the state average. Utilities is the highest paid industry in every county; however, the lowest paid industry varies by county.

Table 3.15-9. Income Statistics for the New Build Section

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Per capita income (2009)*	$28,165	$29,713	$28,772	$24,275	$34,243	$23,509	$29,244	$35,754	$35,131
Median household income (2010)†	$36,657	$36,591	$36,733	$27,997	$44,876	$43,083	$49,390	$50,448	$43,820
Percentage of population living below poverty level†	20.1%	11.7%	20.6%	26.2%	11.8%	21.6%	17.2%	15.3%	18.4%

* BEA (2012c).
† Census Bureau (2010c).

Table 3.15-10. Sources of Personal Income for the New Build Section

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Earnings by place of work	62%	51%	61%	55%	61%	49%	75%	66%	65%
Net transfer payments	25%	33%	29%	33%	26%	38%	20%	20%	21%
Dividends, interest, and rent	13%	16%	11%	12%	14%	12%	6%	15%	14%

Source: BEA (2013b).

Table 3.15-11. Earnings per Job by Industry for the New Build Section (2011)

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Farming, Forestry, Fisheries, etc.	$21,004	$3,116	$16,394	$21,984	$23,062	$28,819	$64,96	$20,594	$11,270
Mining	$12,217	$80,894	D	D	$23,517	D	D	$52,296	$57,707
Manufacturing	$50,077	$29,427	D	$34,557	D	$28,847	D	$80,431	$59,137
Transportation and Warehousing	$27,031	$19,993	$29,283	D	$31,127	D	D	$48,443	$45,762

Table 3.15-11. Earnings per Job by Industry for the New Build Section (2011), Continued

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	State of Arizona	State of New Mexico
Utilities	$92,695	$85,259	$68,294	$83,346	$107,520	D	$86,575	$128,435	$99,878
Wholesale Trade	$43,296	$43,211	$12,084	$32,932	$36,998	$38,446	D	$70,429	$48,214
Retail Trade	$23,436	$20,864	$18,484	$22,090	$21,259	$24,146	$22,823	$30,846	$26,357
Information	$41,384	$43,929	$28,733	D	$64,605	$16,466	D	$57,341	$47,734
Businesses	$31,982	$14,072	$20,052	$15,637	$46,286	$48,296	D	$38,588	$42,285
Services	$27,529	$20,198	$23,249	$12,785	$24,499	$32,017	$41,315	$33,797	$28,830
Construction	$29,590	$26,046	D	$27,264	$25,491	D	$47,067	$40,931	$38,390
Government	$63,295	$49,698	$79,490	$70,405	$92,014	$58,959	$44,920	$65,251	$64,192

Source: BEA (2012a, 2013a).

Notes: Compensation per job was calculated by dividing total county compensation per industry by total county employment per industry. Total employment includes both full and part-time jobs.

D = Not shown in order to avoid disclosure of confidential information.

Upgrade Section

EMPLOYMENT

Between 2000 and 2010, there was an overall increase in the labor force in the counties in the Upgrade Section analysis area (table 3.15-12). Pinal County experienced the biggest increase in labor force (7.4 percent) while Cochise County's growth was the lowest (1.5 percent). Within the Upgrade Section analysis area, Pima County, at 8 percent, had the highest unemployment rate. Cochise County and Pinal County had the same unemployment rate as that of the state (7.7 percent).

Table 3.15-12. Employment Statistics for the Upgrade Section

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Labor force (2000)*	45,702	391,673	66,695	2,366,372
Labor force (2010)†	53,041	460,138	136,067	2,975,166
Labor force, average annual growth rate (2000–2010)	1.5%	1.6%	7.4%	2.3%
Employed (2010)†	48,973	423,298	125,577	2,747,475
Unemployment rate (2010)†	7.7%	8.0%	7.7%	7.7%

* Census Bureau (2000).

† Census Bureau (2010c).

The retail trade, services, and government sectors are the major employers in all three counties and the state (table 3.15-13). Employment in the construction sector accounted for 5 to 8 percent of the total employment by industry in each of the counties in the Upgrade Section analysis area as well as the state in 2001. By 2009, the contribution of the construction sector to the three counties and the state had declined slightly to between 4 and 7 percent. As seen in the New Build Section, the largest industries in each county by employment are services and government.

Table 3.15-13. Employment by Industry for the Upgrade Section

Industry	Cochise 2001	Cochise 2009	Pima 2001	Pima 2009	Pinal 2001	Pinal 2009	State of Arizona 2001	State of Arizona 2009
Agricultural, Forestry, Fisheries, etc.	1,997	2,294	1,602	1,500	3,030	2,840	40,332	41,680
Mining	77	261	2,484	3,406	1,330	1,512	12,852	16,514
Manufacturing	1,156	896	34,793	27,030	3,038	3,645	210,741	165,372
Transportation, Warehousing, and Utilities	1,346	1,435	10,403	11,385	957	1,585	92,283	103,971
Wholesale Trade	615	659	8,610	10,309	1,202	1,014	104,906	113,085
Retail Trade	6,077	6,539	48,079	51,663	5,572	7,638	323,264	364,491
Information	622	798	9,249	6,635	370	495	62,224	49,015
Businesses	D	4,114	33,450	55,356	2,463	4,832	272,679	393,717
Services	17,077	22,000	181,474	217,617	13,323*	21,371	1,093,246	1,352,796
Construction	2,982	2,718	28,870	24,245	2,393	2,645	213,716	213,716
Government	16,739	17,409	80,781	86,523	16,418	21,019	397,209	452,631
Total Employment	**51,397**	**59,123**	**439,795**	**495,669**	**51,477**	**68,596**	**2,823,452**	**3,235,139**

Source: BEA (2012b).
Note: D = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
* Includes non-disclosure estimates.

INCOME

Among the three counties in the Upgrade Section analysis area, Cochise County had the highest per capita income ($34,243) in 2009 (BEA 2012c) (table 3.15-14). However, Cochise County's per capita income was still lower than the $35,754 average per capita income for the State of Arizona as a whole. Based on the ACS 5-year estimates data set, Pinal County had the highest median household income ($51,310). During the same period, Arizona's median household income was $50,448 (Census Bureau 2010c).

The ACS estimates the number of people living below the poverty level as well as the percentage of the population living below the poverty level. As shown in table 3.15-14, based on the poverty statistics, the percentage of people living below the poverty level was highest within the analysis area in Cochise County (11.8 percent); however, this was lower than the statewide average (15.3 percent).

Table 3.15-14. Income Statistics for the Upgrade Section

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Per Capita Income (2009)*	$34,243	$33,833	$24,225	$35,754
Median Household Income†	$44,876	$45,521	$51,310	$50,448
Percentage of Population Living Below Poverty Level†	11.8%	11.2%	10.1%	15.3%

* BEA (2012b).
† Census Bureau (2010c).

In all three Arizona counties in the Upgrade Section analysis area, the largest income source is earnings by place of work (table 3.15-15). However, in the analysis area this income source accounts for 47 to 61 percent of total personal income, which is a smaller proportion than the statewide average (66 percent). Net transfer payments make up a larger percentage of income compared to the state for both Cochise

County and Pima County. Dividends, interest, and rent account for a larger proportion of income when in Pima County and Pinal County than in Arizona as a whole (see table 3.15-15).

Table 3.15-15. Sources of Income for the Upgrade Section

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Earnings by place of work	61%	60%	47%	66%
Net transfer payments	26%	22%	16%	20%
Dividends, interest, and rent	14%	18%	37%	15%

Source: BEA (2013b).

Compensation per wage follows the same trends in the Upgrade Section analysis area as it does in the New Build Section analysis area (table 3.15-16). Construction compensation in these three counties is less than the statewide value ($40,931), and is lowest in Pinal County ($23,697). Compensation per job is the highest in the utilities industry, though this is still lower in the analysis area than it is statewide (see table 3.15-16).

Table 3.15-16. Earnings per Job by Industry for the Upgrade Section (2011)

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	State of Arizona
Farming, Forestry, Fisheries, etc.	$23,062	$18,684	$27,181	$20,594
Mining	$23,517	$47,010	$73,832	$52,296
Manufacturing	D	$89,996	$52,898	$80,431
Transportation and Warehousing	$31,127	$41,517	$24,618	$48,443
Utilities	$107,520	$111,453	$71,556	$128,435
Wholesale Trade	$36,998	$53,036	$55,497	$70,429
Retail Trade	$21,259	$26,058	$27,146	$30,846
Information	$64,605	$52,241	$24,596	$57,341
Businesses	$46,286	$32,370	$14,438	$38,588
Services	$24,499	$30,312	$27,293	$33,797
Construction	$25,491	$34,182	$23,697	$40,931
Government	$92,014	$67,224	$60,774	$65,251

Source: BEA (2012a, 2013a).

Notes: Compensation per job was calculated by dividing total county compensation per industry by total county employment per industry. Total employment includes both full and part-time jobs.

D = Not shown to avoid disclosure of confidential information.

3.15.8 Fiscal Conditions and Public Services

States and counties generate revenue to operate through federal funding for programs like education, transportation, etc., as well as by collecting taxes, licensing fees, permit fees, penalties, and other revenues. Tax revenues are generated by the collection of sales, income, corporate, lodging, and property taxes, and used to fund public services. Authorization of the proposed Project has the potential to impact local government agencies such as police and fire departments, but also to generate property and sales and use tax revenues for local agencies. The largest sources of tax revenues for local governments, and the revenue sources most likely to be affected by the proposed Project, are property taxes and sales taxes (termed gross receipts taxes in New Mexico and transaction privilege taxes in Arizona).

New Build Section

TAX REVENUES

In 2012, city and county governments in the New Build Section analysis area received nearly $280 million in property taxes, and almost $160 million in sales tax revenues. Doña Ana County, New Mexico, had the largest tax revenues, and Hidalgo County had the smallest tax revenues in the New Build Section analysis area. Table 3.15-17 summarizes combined municipal and county property and sales taxes, by county, in the New Build Section.

Table 3.15-17. New Build Section Analysis Area Local Government Property and Sales Tax Revenues (2012)

	Doña Ana County, New Mexico	Grant County, New Mexico	Hidalgo County, New Mexico	Luna County, New Mexico	Cochise County, Arizona	Graham County, Arizona	Greenlee County, Arizona	Total New Build Section
Property Taxes	$104,183,082	$12,854,645	$2,962,311	$10,609,406	$110,322,051	$21,331,861	$12,741,917	**$275,005,273**
Sales Taxes	$105,272,193	$13,876,758	$1,889,325	$10,317,668	$17,132,163	$4,938,515	$4,689,937	**$158,116,559**

Source: Arizona Department of Revenue (2012), New Mexico Department of Finance & Administration (2013), and New Mexico Taxation & Revenue Department (2013).
Note: Revenues include property and sales tax revenues received at both the county and municipal levels.

Changes in demand for local agencies are induced by changes in population, workforce, and unemployment; these impacts are analyzed in chapter 4. In general, the eastern portion of the New Build Section analysis area receives public services from county and municipal agencies in Doña Ana County and the City of Las Cruces, which are scaled to serve a relatively large population. The western portion of the New Build Segment, however, is serviced by county and municipal agencies in Hidalgo County, which are much smaller in scale. Table 3.15-18 summarizes police, fire, and medical services in Hidalgo County.

Table 3.15-18. Public Services of Hidalgo County, New Mexico

Public Services	Location
Police Services	
Hidalgo County Sheriff	Lordsburg
Lordsburg Police Department	Lordsburg
New Mexico State Police	Lordsburg
Fire Services	**Location**
Animas Volunteer Fire and Rescue Department	Animas
Cotton City Volunteer Fire Department	Animas
Hidalgo County Fire Department: District 1	Lordsburg
Lordsburg Fire Department	Lordsburg
Playas Fire Department	Playas
Medical Services	**Location**
None	None

Upgrade Section

TAX REVENUES

In 2012, county and municipal governments in the Upgrade Section analysis area received more than $1.5 billion in property taxes and about $200 million in sales tax. Cochise County local governments had the lowest amount of both forms of tax revenues within the Upgrade Section analysis area (table 3.15-19).

Table 3.15-19. Upgrade Section Analysis Area Local Government Property and Sales Tax Revenues (2012)

	Cochise County, Arizona	Pima County, Arizona	Pinal County, Arizona	Total Upgrade Section
Property Taxes	$110,322,051	$1,100,070,338	$298,995,538	$1,509,387,927
Sales Tax	$17,132,163	$141,717,822	$41,298,194	$200,148,179

Source: Arizona Department of Revenue (2012).
Note: Revenues includes property and sales tax revenues received at both the county and municipal levels.

PUBLIC SERVICES

In general, the western portion of the Upgrade Section receives public services from county and municipal agencies in Pima County and the city of Tucson, which are scaled to serve a large population. The eastern portion of the Upgrade Section, however, is serviced by county and municipal agencies in Cochise County, which are smaller in scale. As shown in table 3.15-20, many of these services are also based in the southern portion of the county (including Sierra Vista, Bisbee, and Tombstone), which is relatively far from the proposed transmission line alignments.

Table 3.15-20. Public Services of Cochise County, Arizona

Public Services	Location
Police Services	
Benson Police Department	Benson
Cochise County Sheriff	Benson
Cochise County Sheriff's Department	Bisbee
Cochise County Government: Division #1	Sierra Vista
Public Safety Department	Sierra Vista
Sierra Vista Police Department	Sierra Vista
Cochise County Sheriff's Office	Willcox
Fire Services	
Huachuca City Fire Department	Huachuca City
Tombstone Fire Department	Tombstone
Tombstone Volunteer Fire Department	Tombstone
Willcox Fire Department	Willcox
Willcox Rural Fire Department	Willcox

Table 3.15-20. Public Services of Cochise County, Arizona (Continued)

Public Services	Location
Medical Services	
Benson Hospital	Benson
Copper Queen Community Hospital	Bisbee
Southeast Arizona Medical Center	Douglas
Holy Cross Hospital	Nogales
Sierra Vista Regional Health Center	Nogales
Southeast Arizona Medical Center	Sierra Vista
Northern Cochise Community Hospital	Willcox

3.15.9 Tourism and Recreation

Common social trends in the western United States include rapidly growing urban populations, increased concern over loss of open space, increasingly transformed landscapes, continued and increasing loss of biodiversity, and increased pressures for uses of all types (in particular, strong trends in recreational uses). Public land resources continue to be perceived as linked to local economic well-being. The scenic and natural resources, climate, and outdoor opportunities in the region attract visitors and therefore local spending.

Recreation and tourism are important contributors to the economic stability of a community; economic benefits are derived from direct spending on food, gas, lodging, etc., but also from sales tax generated from visitor spending. Local and sales tax revenue is extremely important in rural (or non-urban) areas. This is because tourism often forms a larger proportion of the economic activity in these areas and also because special excise taxes on tourists and visitors (i.e., from food, lodging, auto rentals, etc.) are more heavily paid by visitors, rather than residents (Dean Runyan 2012). OHV use and camping (both dispersed and developed), along with hunting and fishing, stimulate the economy through direct local expenditures on motorized vehicles, trailers, equipment and accessories, and insurance and maintenance costs (Arizona State Parks 2003). Local spending on food, gas, lodging, and souvenirs also indirectly benefits the region by supporting wages and income in the local economy, as well as contributing local and state tax dollar revenue.

Population growth in Arizona and New Mexico is partially attributed to the states' appeal as year-round recreational destinations offering diverse opportunities for outdoor recreational activities such as wildlife watching, birding, nature photography, hiking, biking, camping, OHV use, equestrian activities, and hunting. A number of federal, state, county, and local recreation areas are located along the New Build Section and Upgrade Section analysis areas. These include wilderness areas, trails, national forests, OHV areas, a wildlife area, golf courses, and parks (see Section 3.14, "Recreation"). As above, visitors spend money in the communities they visit through lodging, meals, gas, etc.

3.15.10 Environmental Justice

The following discussion of baseline conditions within the Upgrade Section and New Build Section analysis areas uses data at the census-tract level to determine if there is an environmental justice community with a meaningfully higher percentage of minority or low-income individuals than the state. Census tracts typically include 2,500 to 8,000 people and range in size and geography; however, they do not cross county or state lines.

This section identifies and describes the potential for environmental justice impacts as a result of the construction, operation, and maintenance of the proposed Project. Environmental justice includes the fair treatment and meaningful involvement of all people—regardless of race, ethnicity, or income level—in Federal environmental decision-making. Environmental justice programs promote the protection of human health and the environment, empowerment by means of public participation, and the dissemination of relevant information to inform and educate affected communities. Consideration of environmental justice issues is mandated by EO 12898, which was published on February 11, 1994. This EO requires that all Federal agencies incorporate environmental justice into their mission by “identifying and addressing . . . disproportionately high and adverse human health or environmental effects of [their] programs, policies and activities on minority and low-income populations in the United States” (EPA 1994).

The EPA defines a community with potential environmental justice populations as one that has a greater percentage of minority or low-income populations than does an identified reference community. Minority populations are those populations having (1) 50 percent minority population in the affected area, or (2) a significantly greater minority population than the reference area (EPA 1994). The EPA has not specified what percentage of the population can be characterized as “significant” in order to define environmental justice populations. Therefore, for the purposes of this analysis, a conservative approach is used to identify potential environmental justice populations; it is assumed that if the affected area minority and/or poverty status populations are considerably higher than those of the reference area, there is likely an environmental justice population of concern. Low-income populations were defined as those individuals who are considered living below poverty levels. The Census Bureau defines poverty-level thresholds for individuals and a family of four as income levels below $11,170 and $23,050, respectively (Census Bureau 2012).

The methodology for this analysis included assessing the presence and percentage of minority and low-income populations in the analysis areas (i.e., existing conditions) and determining whether those communities would experience disproportionately high and adverse impacts as a result of the proposed Project. The Census Bureau data for 2010 at the state, county, municipal, and census-tract level were used to determine the presence of minority and low-income populations. By establishing a reference population from definable communities and determining whether higher concentrations of environmental justice populations exist within the area of analysis, any disproportionately high or adverse impacts are identified, analyzed, and disclosed herein.

For determining the presence of low-income communities as environmental justice populations, census tracts in each analysis area were evaluated against a reference population. The reference population for low-income communities is the state in which the tract is located. Thus, all census tracts with an equal or greater percentage of the population below the poverty level as the reference population, or greater than 50 percent minority (not white alone), are considered environmental justice populations.

Minority population data for the states, counties, and census tracts within each analysis area were obtained from the Census Bureau (2011). For this analysis, a population is considered a “minority” based on all races and ethnicities that are not “white alone.”

Low-income populations in an affected area are populations below the annual statistical poverty thresholds published by the Census Bureau’s current population reports on income and poverty. Families and persons are classified by the Census Bureau as below poverty level if their total family income or unrelated individual income is less than the poverty threshold specified for the applicable family size, age, and number of related children under 18 years of age. Poverty status is determined for all families (and, by implication, all family members). For persons not in families, poverty status is determined by their income in relation to the appropriate poverty threshold. Thus, two unrelated individuals living together may not have the same poverty status.

New Build Section

Within the New Build Section analysis area, there are 16 census tracts; 9 tracts in New Mexico and 7 tracts in Arizona. Of the 16 census tracts, 9 tracts scattered across the analysis area include a minority population greater than 50 percent, and 2 additional tracts include a proportion of minority residents higher than the state average (table 3.15-21). In terms of low-income populations, there are 12 tracts where the percentage of individuals or families living below the poverty level is greater than that of the state where the tract is located (see table 3.15-21). In combination, each of the tracts in the Upgrade Section analysis area can be classified as an environmental justice community, because the population within the census tract is either low-income or minority or both.

Upgrade Section

Within the Upgrade Section analysis area, there are 38 census tracts, all located within Arizona. Of the 38 census tracts, 18 tracts within the Upgrade Section analysis area include a minority population greater than 50 percent, and 1 other tract has a proportion of minority residents greater than the state average (table 3.15-22). In terms of low-income populations, there are 21 tracts where the percentage of individuals or families living below the poverty level is greater than the state where the tract is located (see table 3.15-22). There are 26 census tracts (about 68 percent) in the Upgrade Section analysis area that can be classified as environmental justice communities, because the population within each census tract is either low-income or minority or both.

3.16 PUBLIC HEALTH AND SAFETY

This section describes the existing environmental conditions that may affect human health and safety, including electrocution risks; severe weather hazards, including wind and earthquakes; fire hazards; and exposure to electromagnetic fields. These conditions may be affected by implementation of the proposed Project or its alternatives and associated Project components (i.e., substations, representative staging areas, and access roads). For identification and analysis of hazardous materials, transportation conflicts, noise hazards, and potential sabotage hazards, see the “Hazardous Materials and Hazardous and Solid Waste,” “Transportation,” “Noise and Vibration,” and “Intentional Acts of Destruction” sections of this chapter, respectively.

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 6: Human Health and Safety” (CH2M Hill 2013q). The contents of that report are used herein without specific reference.

3.16.1 Analysis Area

New Build Section

The analysis area for public health and safety within the proposed New Build Section is a 2-mile-wide corridor that is 1 mile on either side of the centerline of the alternatives carried forward. The analysis area is used to identify natural and man-made hazards that could be directly impacted by construction, operations, and maintenance of the proposed Project.

Table 3.15-21. Minority and Low-Income Percentages for the New Build Analysis Area

			Minority Population							
2010 Census Tract	**Total Population**	**% White Alone (non-Hispanic)**	**% Hispanic or Latino**	**% African American**	**% Native American**	**% Asian**	**% Native Hawaiian or Pacific Islander**	**% Total Minority**	**% Individuals Below Poverty Level**	**% Families Below Poverty Level**
Arizona	6,392,017	57.8%	29.6%	4.1%	4.6%	2.8%	0.2%	41.3%	16.2%	11.7%
Cochise	131,346	58.5%	32.4%	3.8%	0.8%	1.8%	0.3%	39.0%	16.2%	11.6%
100	1,971	71.5%	24.3%	0.5%	1.0%	0.6%	0.1%	26.4%	22.9%	17.3%
2.01	3,747	54.6%	43.2%	0.3%	0.6%	0.2%	0.2%	44.4%	6.0%	3.1%
2.02	3,982	47.6%	49.0%	0.7%	0.5%	0.6%	0.2%	51.0%	27.3%	23.7%
2.03	2,740	84.5%	11.6%	0.5%	0.8%	0.6%	0.4%	13.8%	16.9%	15.2%
Graham	37,220	52.3%	30.4%	1.7%	13.6%	0.5%	0.1%	46.4%	21.6%	16.2%
9615	4,449	62.5%	34.7%	0.3%	0.9%	0.2%	0.0%	36.2%	22.0%	15.3%
9616	3,161	41.5%	42.4%	8.0%	5.0%	1.3%	0.7%	57.3%	35.5%	31.0%
Greenlee	8,437	48.1%	47.9%	0.9%	1.7%	0.5%	0.1%	51.1%	17.2%	12.9%
9603	2,588	68.4%	29.4%	0.4%	0.5%	0.3%	0.0%	30.6%	22.2%	17.6%
New Mexico	2,059,179	40.5%	46.3%	1.7%	8.5%	1.3%	0.1%	57.9%	19.0%	14.4%
Doña Ana	209,233	30.1%	65.7%	1.4%	0.7%	1.0%	0.1%	68.8%	25.6%	20.6%
15	6,119	56.6%	38.5%	1.5%	1.4%	0.7%	0.0%	42.2%	11.5%	9.7%
16	2,910	16.1%	82.4%	0.0%	0.1%	0.0%	0.0%	82.6%	25.4%	22.5%
17.01	5,842	22.7%	75.4%	0.8%	0.2%	0.3%	0.1%	76.8%	20.5%	16.8%
17.02	1,692	18.8%	80.5%	0.1%	0.2%	0.1%	0.0%	80.9%	29.6%	21.8%
Grant	29,514	48.6%	48.3%	0.6%	0.7%	0.4%	0.1%	50.1%	16.6%	12.5%
9648	1,764	45.0%	53.5%	0.6%	0.2%	0.1%	0.0%	54.4%	12.1%	7.1%
Hidalgo	4,894	41.4%	56.6%	0.3%	0.3%	0.5%	0.0%	57.8%	23.7%	20.6%
9700	2,195	66.6%	31.2%	0.0%	0.3%	0.4%	0.1%	32.0%	28.1%	21.0%
9702	2,699	20.9%	77.3%	0.6%	0.3%	0.6%	0.0%	78.7%	20.2%	20.2%
Luna	25,095	35.9%	61.5%	0.8%	0.6%	0.4%	0.0%	63.2%	30.8%	23.6%
4	5,936	42.1%	55.2%	0.5%	0.7%	0.2%	0.0%	56.7%	29.7%	21.5%
5	4,338	43.2%	53.7%	0.7%	1.0%	0.2%	0.0%	55.7%	30.1%	20.6%

Source: Census Bureau (2011).

Note: Shaded cells indicate census tracts that meet the criteria for an environmental justice population.

Table 3.15-22. Minority and Low-Income Percentages for the Upgrade Analysis Area

2010 Census Tract	Total Population	% White Alone (non- Hispanic)	% Hispanic or Latino	% African American	% Native American	% Asian	% Native Hawaiian or Pacific Islander	% Total Minority	% Individuals Below Poverty Level	% Families Below Poverty Level
Arizona	6,392,017	57.8%	29.6%	4.1%	4.6%	2.8%	0.2%	41.3%	16.2%	11.7%
Cochise	131,346	58.5%	32.4%	3.8%	0.8%	1.8%	0.3%	39.0%	16.2%	11.6%
2.01	3,747	54.6%	43.2%	0.3%	0.6%	0.2%	0.2%	44.4%	6.0%	3.1%
2.03	2,740	84.5%	11.6%	0.5%	0.8%	0.6%	0.4%	13.8%	16.9%	15.2%
3.01	4,212	72.3%	24.4%	0.5%	0.6%	0.4%	0.1%	26.0%	22.9%	13.3%
3.02	4,851	86.0%	10.3%	0.7%	0.9%	0.5%	0.1%	12.5%	8.1%	6.3%
3.03	3,457	83.9%	12.4%	0.4%	0.8%	0.6%	0.2%	14.3%	8.1%	6.6%
4	2,206	80.5%	16.4%	0.4%	0.9%	0.5%	0.0%	18.2%	23.4%	18.3%
Pinal	375,770	58.7%	28.5%	4.3%	4.6%	1.6%	0.4%	39.4%	14.3%	10.5%
8.02	4,154	74.8%	20.7%	1.1%	1.2%	0.6%	0.0%	23.6%	8.7%	10.3%
21.03	5,143	59.8%	33.1%	2.6%	1.9%	0.6%	0.1%	38.4%	9.7%	8.0%
Pima	980,263	55.3%	34.6%	3.2%	2.4%	2.5%	0.1%	42.8%	17.4%	12.0%
2	4,409	22.2%	69.3%	2.4%	3.1%	1.8%	0.1%	76.7%	25.4%	19.2%
1	514	65.4%	25.3%	3.5%	0.8%	1.9%	0.0%	31.5%	42.5%	29.8%
11	2,900	8.1%	86.8%	0.7%	3.0%	0.6%	0.1%	91.0%	26.7%	22.5%
12	3,791	12.1%	67.7%	7.4%	10.5%	0.8%	0.0%	86.4%	32.4%	25.9%
25.01	6,213	19.1%	72.4%	3.9%	3.2%	0.6%	0.1%	80.2%	15.7%	12.9%
25.03	4,153	22.4%	72.9%	1.0%	2.2%	0.5%	0.0%	76.6%	31.2%	26.7%
25.04	5,825	20.4%	75.6%	1.2%	1.5%	0.7%	0.0%	79.0%	29.3%	25.4%
25.05	6,534	13.5%	77.8%	2.9%	3.5%	1.1%	0.1%	85.3%	27.8%	30.0%
39.01	2,095	5.3%	89.3%	0.7%	3.7%	0.2%	0.0%	93.9%	37.8%	30.3%
39.02	2,701	8.7%	88.2%	0.7%	1.8%	0.1%	0.0%	90.8%	25.5%	20.1%
39.03	3,232	8.0%	88.1%	0.9%	1.8%	0.2%	0.1%	91.1%	9.1%	9.7%
40.61	4,821	79.4%	13.8%	2.0%	0.5%	1.7%	0.0%	17.9%	4.5%	1.9%
41.09	5,304	75.9%	19.3%	1.1%	0.9%	0.7%	0.1%	22.1%	10.4%	6.7%
41.14	5,424	17.2%	79.8%	0.6%	0.5%	0.5%	0.0%	81.5%	30.9%	27.4%

Table 3.15-22. Minority and Low-Income Percentages for the Upgrade Analysis Area (Continued)

2010 Census Tract	Total Population	% White Alone (non- Hispanic)	% Hispanic or Latino	% African American	% Native American	% Asian	% Native Hawaiian or Pacific Islander	% Total Minority	% Individuals Below Poverty Level	% Families Below Poverty Level
43.1	2,084	30.1%	63.8%	1.7%	1.5%	1.2%	0.0%	68.3%	15.8%	13.3%
44.11	7,085	51.6%	37.5%	4.3%	1.6%	3.4%	0.1%	46.8%	32.4%	13.8%
44.14	3,194	31.6%	55.2%	3.5%	2.8%	4.9%	0.1%	66.5%	10.7%	6.2%
44.15	1,622	37.3%	56.8%	1.8%	1.4%	1.2%	0.0%	61.3%	33.5%	31.9%
44.18	3,348	74.5%	19.2%	1.2%	0.3%	3.1%	0.1%	23.9%	6.6%	3.9%
44.19	6,287	71.6%	23.2%	1.7%	1.3%	0.3%	0.1%	26.6%	16.2%	14.4%
44.22	5,312	44.0%	48.5%	3.2%	1.5%	1.5%	0.3%	55.0%	9.7%	2.9%
44.23	4,324	81.5%	13.8%	0.7%	0.8%	0.5%	0.0%	15.8%	9.4%	7.7%
44.25	6,166	76.8%	18.6%	0.7%	1.6%	0.4%	0.1%	21.5%	13.1%	10.9%
44.27	8,138	74.0%	18.1%	2.1%	0.6%	3.1%	0.1%	24.0%	3.6%	4.5%
44.29	7,398	65.0%	23.1%	2.3%	0.4%	6.6%	0.2%	32.6%	0.9%	0.0%
44.3	2,454	54.2%	35.9%	3.5%	3.8%	1.0%	0.1%	44.3%	26.2%	24.1%
44.31	3,903	64.4%	27.9%	3.2%	0.4%	1.8%	0.1%	33.4%	16.7%	8.6%
45.04	7,131	40.7%	51.3%	2.3%	1.2%	2.9%	0.1%	57.9%	38.2%	37.2%
4105.02	6,243	36.7%	44.3%	10.1%	1.6%	4.2%	0.5%	60.7%	9.3%	6.5%
9409	1,885	12.3%	24.9%	0.4%	61.5%	0.3%	0.1%	87.2%	41.5%	32.1%

Source: Census Bureau (2011).

Note: Shaded cells indicate census tracts that meet the criteria for an environmental justice population.

Upgrade Section

The analysis area for the Upgrade Section is a 500-foot corridor (200 feet on either side of the existing 100-foot corridor).

3.16.2 Laws, Ordinances, Regulations, and Standards

Regulations specific to noise, air, recreation, transportation, and hazardous materials are detailed in those respective sections. The following laws and regulations are specific to public health and safety.

Federal

NATIONAL ELECTRIC SAFETY CODE

The NESC is a national standard that dictates the minimum distance between the phase conductors of the transmission line themselves and the minimum distance between the energized conductors and the ground or to a building or structure. The NESC is used to determine the width of the transmission line ROW, to ensure that the energized line will not come into contact with structures built outside of the ROW. The NESC is also used to specify a minimum distance to the ground, to prevent vehicles that drive beneath the line from coming into contact with the conductors.

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

The NERC develops and maintains the reliability standards available in its “Standard Processes Manual” for planning and operating the North American bulk power system. The NERC requirements are results-based and guided by three principles: measurable performance, risk mitigation strategies, and entity capabilities. High-voltage transmission projects must comply with NERC reliability standards (NERC 2006).

NERC works through regional transmission planning organizations, in this case the WECC, to ensure that the electric system in the western United States will operate reliably and will have adequate transmission capacity to serve the electric load of the western states, even if some transmission lines are out of service. NERC is able to levy fines on utilities for not complying with reliability requirements.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OSHA’s mission is to ensure the safety and health of America’s workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. OSHA establishes and enforces protective standards, and reaches out to employers and employees through technical assistance and consultation programs. OSHA standards are listed in 29 CFR 1910 (OSHA 2012).

NEW MEXICO

Within the NMED, the Occupational Health and Safety Bureau enforces OSHA regulations in New Mexico. As applicable to the Project, New Mexico has adopted Federal OSHA regulations.

ARIZONA

Arizona adopted Federal OSHA regulations through the Arizona State Plan, approved in 1985. The Arizona State Plan is administered by the Industrial Commission of Arizona, and within that commission, the Arizona Division of Occupational Safety and Health operates an occupational safety and health program that enforces OSHA regulations.

OTHER

Neither the Arizona and New Mexico governments nor the United States government has regulations limiting EMF exposure from power transmission lines. However, several organizations have developed nonbinding guidelines for EMF exposure, including individual States, the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the IEEE, and the ACGIH.

International Commission on Non-Ionizing Radiation Protection

The ICNIRP electric field guideline for occupational exposure is 8.3 kilovolts per meter (kV/m), and for members of the public, 4.2 kV/m. The ICNIRP guideline for magnetic fields is 4,200 milliGauss (mG), and the guideline for exposure to members of the public is 833 mG (ICNIRP 1998).

Institute of Electrical and Electronics Engineers

The IEEE electric field guideline for occupational exposure is 20 kV/m, and for members of the public, 5 kV/m. The IEEE guideline for magnetic fields is 27,100 mG, and the guideline for exposure to members of the public is 9,040 mG (IEEE 2002).

American Conference of Governmental Industrial Hygienists

The ACGIH electric field guideline for occupational exposure is 25 kV/m. The ACGIH guideline for the exposure of workers to magnetic fields is 10,000 mG (ACGIH 2001).

3.16.3 Issues to Be Analyzed

- Electrocution or Other Construction and Operation Injuries: Electrocution poses a potential hazard to those who come in close contact with overhead transmission lines during energization and commissioning, or maintenance activities, especially those doing construction using mobile equipment. There could also be severe injuries or death to workers during both the construction and operational phases of the proposed Project from falls or other occupational injuries.

- Wind, Earthquake, and Other Severe Weather Hazards: Severe weather events during construction and operational phases could cause the transmission line to fail from wind or other severe weather events; downed lines could electrocute humans. During operation, there is a risk of wildland fire from lightning strikes.

- Fire Hazards: During construction or maintenance activities, activities such as workers smoking, refueling, welding, blasting, and sparks from vehicles and other equipment could cause fires. During operation and maintenance, fires could be started from accidents related to weapons, or airborne debris, branches, or aircraft coming into contact with conductors, poles, and towers.

- Electromagnetic Fields: EMF associated with the operation and maintenance of the transmission line could create electronic interference, induced electrical current and nuisance shock hazards, stray voltage hazards, and other adverse health effects (e.g., cancer, heart disease, reproductive effects).

3.16.4 Analysis Area Conditions

For existing conditions regarding hazardous materials, transportation, noise, and sabotage, see the "Hazardous Materials and Hazardous and Solid Waste," "Transportation," "Noise and Vibration," and "Intentional Acts of Destruction" sections of this chapter, respectively.

Existing Risk of Construction, Operation, and Maintenance Injuries

Work-related fatalities, injuries, and illnesses associated with utility and construction workers can occur in and around utility construction sites. According to OSHA, "Over the past three decades, occupational injuries and illnesses in the U.S. have declined by 42 percent, even though employment has more than doubled" (OSHA 2012).

The U.S. Department of Labor, Bureau of Labor Statistics (BLS) and the BLS Injuries, Illnesses and Fatalities Program monitor and track statistics on these injury rates. According to the BLS, "an injury or illness is considered to be work-related if an event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing condition" (BLS 2012a). Table 3.16-1 provides information on the number of fatalities, and rate of injury and illness cases (per 100 full-time workers) from 2008 to 2011 in the United States (BLS Injuries, Illnesses and Fatalities Program 2012b).

Table 3.16-1. Work-related Fatalities, Injuries, and Illnesses in Construction Field

Data Series	2008	2009	2010	2011
Fatalities				
Number of fatalities	1,016	879	802	(P) 759
Rate of injury and illness cases per 100 full-time workers				
Total recordable cases	4.7	4.3	4.0	3.9
Cases involving days away from work, job restriction, or transfer	2.5	2.3	2.1	2.1
Cases involving days away from work	1.7	1.6	1.5	1.5
Cases involving days of job transfer or restriction	0.7	0.7	0.6	0.7

Sources: BLS (2012a); BLS Injuries, Illnesses and Fatalities Program (2012b).
Note: (P) Preliminary.

The BLS released a report in October 2012 with estimates from the Survey of Occupational Injuries and Illnesses that found that "nearly 3.0 million nonfatal workplace injuries and illnesses were reported by private industry employers in 2011, resulting in an incidence rate of 3.5 cases per 100 equivalent full-time workers" (BLS 2012a). The BLS also reported that "more than half of the 3.0 million private industry injury and illness cases reported nationally in 2011 were of a more serious nature that involved days away from work, job transfer, or restriction [and] these cases occurred at a rate of 1.8 cases per 100 full-time workers, unchanged from 2010" (BLS 2012a).

With respect to the New Build Section of the proposed Project in New Mexico, the report did find that the New Mexico rate (at 4.2 incidents per 100 full-time workers) was higher overall than the national statistic for construction-related injuries and illnesses. However, as it pertains to both the New Build and Upgrade Sections of the proposed Project in Arizona, the state rate was lower overall than the national statistic (at 3.2 incidents per 100 full-time workers) (BLS 2012a). Statistics for injuries and illnesses incurred during operations and maintenance activities for the existing transmission lines is not available.

Existing Risk of Severe Weather Hazards and Fire

When a power outage impacts more than 50,000 customers or the delivery of more than 300 MW of power is interrupted, the NERC requires electric utilities to file a report on the event. As is characteristic of the desert Southwest, the most common severe weather events in the analysis area are extreme heat in the summer, extreme cold in the winter, strong winds, and lightning strikes. Earthquakes, tornadoes, and hurricanes/tropical storms are historically uncommon events within the analysis area.

The most recent severe weather event to occur within the analysis area that met the NERC reporting criteria was a cold weather–related outage in February 2011. This event caused a severe loss of generation across West Texas, New Mexico, and Arizona, for a total of several thousand MW of generation loss and impacts for more than 4 million customers (FERC 2011). Severe heat can also cause power outages in the summer due to increased demand for electricity to power air conditioners and other climate control devices. Although common in the analysis area, a severe heat event has not triggered an outage that meets the NERC reporting criteria.

High winds frequently occur in southern New Mexico and southern Arizona. On occasion, sustained high winds over dry terrain can cause large dust storms. The largest of these dust storms, called a haboob, can cover very large areas with dust and dirt and damage transmission lines. Several large haboobs have occurred and/or originated from southern Arizona in recent summers.

Lightning strikes can cause fires and transmission outages. Lightning often strikes tall objects because it provides the easiest path for the lightning to take. In a rural desert region, transmission towers are often the tallest objects available. According to data presented by the Fire Danger Subcommittee of the Fire Environment Committee, BLM Safford Field Office, Gila District Fire Management Program, natural fires in the region typically occur in July due to lightning strikes that are concurrent with the onset of monsoon season (National Wildfire Coordinating Group 2007).

Existing Electromagnetic Fields

EMFs are phenomena that occur both naturally and as a result of human activity. Naturally occurring EMFs are caused by the weather and Earth's geomagnetic field. In the case of a transmission line, magnetic fields are created when current flows through power lines. The strength of the fields is determined mainly by line current, line height, and distance. The EMF from the line will occur mainly within the ROW and for a short distance beyond. EMFs occur within the analysis area from existing transmission lines for both the New Build and Upgrade sections. In the New Build Section, transmission lines of various voltages are located within the analysis area, and the Proponent Preferred alternative in the Upgrade Section is the upgrade of an existing transmission line. Figure 3.16-1 shows the electric field contours, and figure 3.16-2 shows the magnetic field contours for a 115-kV H-frame transmission line, as exists within the Upgrade Section.

Figure 3.16-1. Electric field contours for a 115-kV H-frame transmission line.

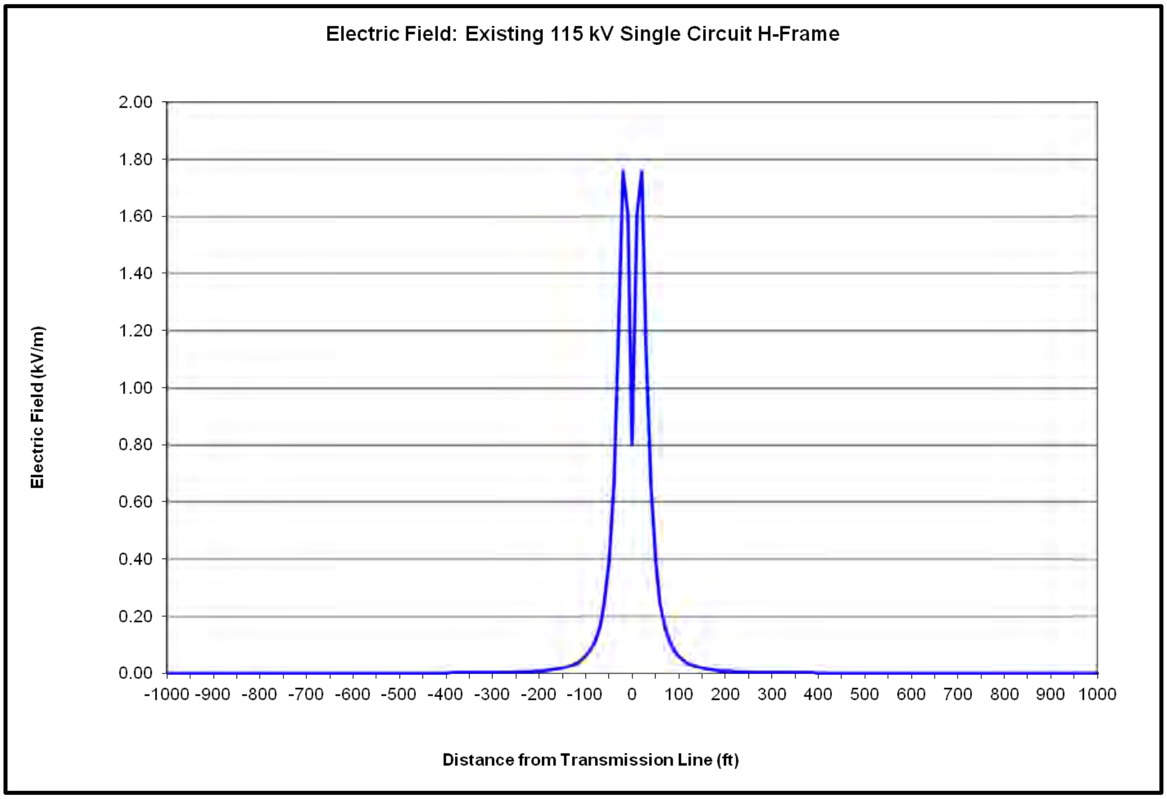
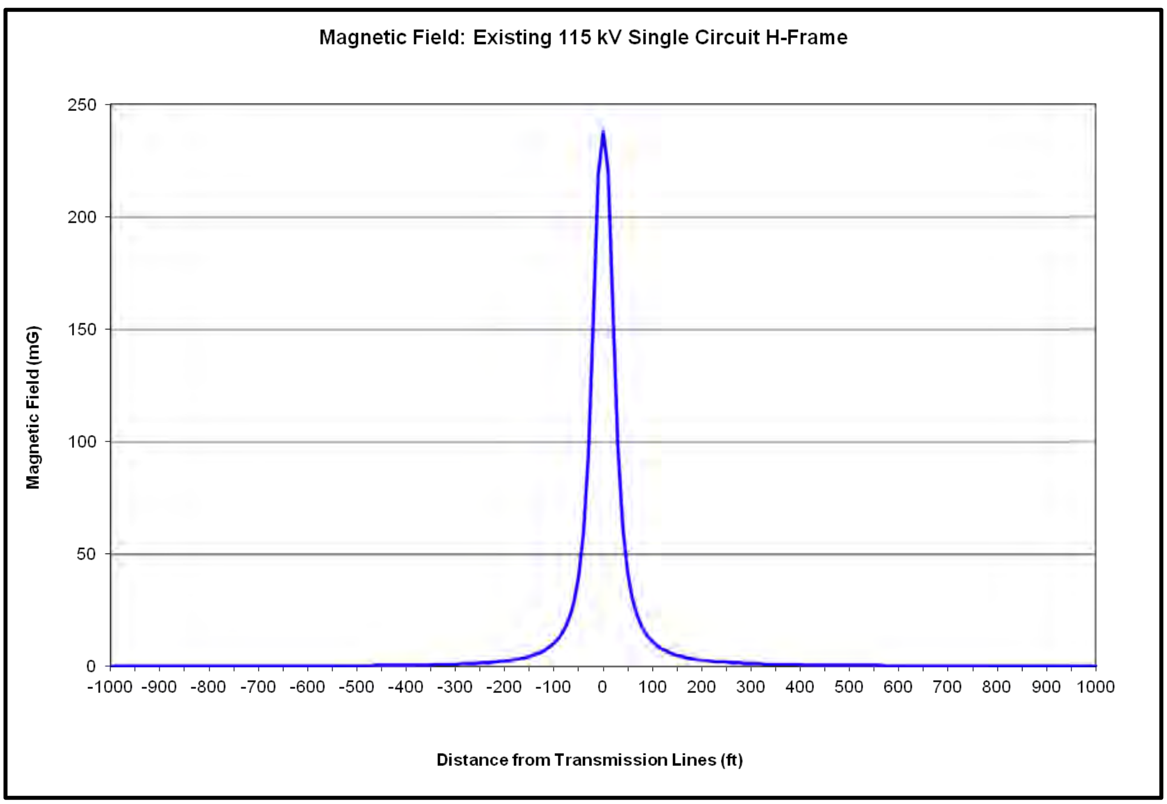


Figure 3.16-2. Magnetic field contours for a 115-kV H-frame transmission line.



3.17 HAZARDOUS MATERIALS AND HAZARDOUS AND SOLID WASTE

The information provided in the following subsections is taken from a report titled “Southline Transmission Project Resource Report 5: Hazardous Materials and Waste” (CH2M Hill 2013r). The contents of that report are used herein without specific reference.

3.17.1 Analysis Area

The analysis area for hazardous materials and solid waste for the New Build Section is a 2-mile corridor, 1 mile on either side of the centerline of alternatives carried forward, and any substations or access roads outside that corridor. This satisfies the search distances specified in American Society for Testing and Materials (ASTM) Standard E 1527-05 (ASTM 2005). The ASTM has determined that these search distances are appropriate distances in which to search for potential sources of contamination that could affect the analysis area (table 3.17-1). The analysis area for the Upgrade Section of the Project is a 500-foot corridor, which is 200 feet on either side of the centerline of the existing 100-foot corridor. The analysis area described here is sufficient to identify hazardous materials sites that could impact, or be directly impacted by, construction or operation and maintenance of the Project.

Table 3.17-1. Hazardous Materials Analysis Area

Environmental Record Source	Approximate Minimum Analysis Area (mile)
Federal NPL	1.0
Federal Delisted NPL	0.5
Federal CERCLIS	0.5
Federal CERCLIS No Further Remedial Action Planned	0.5
Federal RCRA Corrective Action Sites	1.0
Federal RCRA Non-Corrective Action Sites Treatment, Storage, and Disposal	0.5
Federal RCRA Generators	ROW and adjacent properties
Federal Institutional Controls/Engineering Controls	ROW
Federal Emergency Response Notification System	ROW
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5
State and Tribal Landfill and/or Solid Waste Disposal Sites	0.5
State and Tribal LUST	0.5
State and Tribal Registered UST	ROW and adjacent properties
State and Tribal Institutional Controls/Engineering Controls	ROW
State and Tribal Voluntary Cleanup Sites	0.5
State and Tribal Brownfields Sites	0.5

Source: ASTM (2005).

Note: CERCLIS = Comprehensive Environmental Response, Compensation, and Liability Information System; LUST = leaking underground storage tank; NPL = National Priorities List; RCRA = Resource Conservation and Recovery Act of 1976; UST = underground storage tank

3.17.2 Laws, Ordinances, Regulations, and Standards

Federal

U.S. ENVIRONMENTAL PROTECTION AGENCY

The Federal Toxic Substances Control Act (1976) and the Resource Conservation and Recovery Act of 1976 (RCRA) established a program administered by the EPA for the regulation of the generation, transportation, treatment, storage, and disposal of toxic substances and hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle-to-grave" system of regulating hazardous wastes.

The CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980 and amended by the Superfund Amendments and Reauthorization Act on October 17, 1986. This law (U.S.C. Title 42, Chapter 103) provides broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites; provides for liability of persons responsible for releases of hazardous waste at these sites; and establishes a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enables the revision of the National Contingency Plan (NCP). The NCP (40 CFR 300) provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The NCP also established the National Priorities List (NPL).

EPA oversees and enforces the Oil Pollution Prevention regulation (40 CFR 112) as part of the CWA. This is often referred to as the "SPCC rule" because the regulations describe the requirements for facilities to prepare, amend, and implement spill prevention, control, and countermeasure plans. A facility is subject to SPCC regulations if the total aboveground oil storage capacity exceeds 1,320 gallons, or the underground oil storage capacity exceeds 42,000 gallons, and if, due to its location, the facility could reasonably be expected to discharge oil into or upon navigable WUS.

Other Federal regulations overseen by the EPA relevant to hazardous materials and environmental contamination include 40 CFR Chapter I, Subchapter D – Water Programs, and Subchapter I – Solid Wastes. Subchapter D, Parts 116 and 117 of 40 CFR Chapter I designate hazardous substances under the Federal Water Pollution Control Act and set forth a determination of the reportable quantity for each substance that is designated as hazardous in 40 CFR 116. Additionally, 40 CFR 117 applies to quantities of designated substances equal to or greater than the reportable quantities that may be discharged into WUS.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OSHA's mission is to ensure the safety and health of the nation's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. OSHA staff establishes protective standards, enforces those standards, and reaches out to employers and employees through technical assistance and consultation programs. OSHA worker safety standards are listed in 29 CFR 1910 (workplace) and 1926 (construction).

BUREAU OF LAND MANAGEMENT

The BLM's Hazard Management and Resource Restoration Program objectives include maintaining compliance with all applicable environmental laws, regulations, and directives. Under the BLM 1703 –

Hazard Management and Resource Restoration Manual (BLM 2009d), the following policies have been set:

- To protect public health and the environment by minimizing risks from hazards on public lands and from hazards at BLM-owned or -operated facilities. Hazards are defined as any hazard not covered under hazardous substances and includes all physical, geologic, and biologic hazards.
- To maintain public land condition by remediating contaminated sites and restoring natural resources impacted by releases of hazardous substances and petroleum products.
- To reduce costs and liabilities by:
  - pursuing potentially responsible parties for contamination of public lands;
  - conducting efficient and effective assessment, investigation, and remediation actions;
  - identifying environmental concerns associated with acquisition and disposal of real property;
  - ensuring that BLM-owned or -operated facilities are in compliance with environmental laws; and
  - establishing partnerships with States, counties, communities, other Federal agencies, and the private sector.
- To prevent pollution by integrating effective environmental management into all BLM activities, authorized actions, and business processes.

WESTERN AREA POWER ADMINISTRATION

The primary goal of Western’s pollution prevention program is to reduce or eliminate the generation of waste and associated adverse environmental impacts from its actions (Western 2012b). Western Order 450.1A, “Environmental Considerations in the Planning, Design, Construction, and Maintenance of Power Facilities and Activities” (Western 2008) establishes policy, assigns responsibilities, and delegates authority to ensure that agency activities comply with environmental requirements. Western’s environmental managers are charged with ensuring environmental management system requirements are established, implemented, and maintained in accordance with recognized standards (Western 2004). Western uses the following approaches to meet its pollution prevention goals:

- Waste minimization, product substitution, and life-cycle analysis;
- Recovered material content purchasing;
- Bio-based products purchasing;
- Sustainable design; and
- Green Power Purchases (hydroelectric, solar, and wind).

U.S. DEPARTMENT OF TRANSPORTATION—PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is responsible for regulating and ensuring the safe and secure movement of hazardous materials to industry and consumers by all modes of transportation. To minimize threats to the public, property, or the environment due to hazardous materials related incidents, PHMSA’s Office of Hazardous Materials Safety develops regulations and standards for the classifying, handling, and packaging of shipments of hazardous materials within the United States (PHMSA 2012).

Title 49, Subtitle B, Chapter I of the CFR (49 CFR 100-185) outlines regulations and standards under PHMSA. 49 CFR 177, "Carriage by Public Highway," contains the following regulations pertaining to the transport of hazardous substances on any U.S. public highway:

- Sections 49 CFR 177.800–177.823—general information and regulations relating to driver training, recordkeeping and inspections, and shipping papers
- Subpart B, 49 CFR 177.834–177.843—regulations and standards for the loading and unloading of hazardous substances
- Subpart C, D, and E of Title 49 part 177—regulations regarding segregation and separation of hazardous materials, vehicles, and shipments in transit and accidents, and hazardous material on motor vehicles carrying passengers for hire
- Title 49 Part 172—regulations for hazardous materials communications, including the labeling and placarding of all shipments that contain hazardous substances.

State

NEW MEXICO

Within the NMED, the Occupational Health and Safety Bureau is responsible for enforcing occupational health and safety regulations within the State. Relevant to this project, New Mexico has adopted Federal OSHA regulations.

NMED's Hazardous Waste Bureau is charged with providing regulatory oversight and technical guidance to New Mexico hazardous waste generators and treatment, storage, and disposal facilities, as required by the New Mexico Hazardous Waste Act (NMSA 1978, Chapter 74, Article 4) and regulations promulgated under the act. All underground storage tanks (USTs) that contain petroleum or other hazardous substances are required to be registered with the State under the New Mexico Hazardous Waste Act. In addition, the Hazardous Waste Bureau monitors hazardous waste and Superfund sites, the latter of which it coordinates with the EPA (NMED 2013).

New Mexico statute 65-3-13, "Transportation of Hazardous Materials," states, "The director shall adopt regulations not inconsistent with or more stringent than applicable Federal safety standards concerning the safe transportation of hazardous materials, including hazardous substances and waste."

ARIZONA

Under the Federal RCRA and State statutes and codes modeled on the Federal law, ADEQ has the authority to monitor and direct businesses that may generate, transport, or dispose of hazardous waste in Arizona.

ADEQ's Waste Programs Division implements standards for the safe generation, management, treatment, storage, and disposal of hazardous waste. Responsibilities include such things as: conducting compliance and complaint inspections; investigating complaints and violations of soil and groundwater remediation, solid and hazardous waste, aboveground storage tanks, and underground storage tanks (USTs); and permitting of disposal facilities.

The ADOT is responsible, pursuant to ARS 28-5204, for rules governing safety operations of motor carriers, shippers, and vehicles transporting hazardous materials, hazardous substances, or hazardous waste. ADOT also may audit records and inspect these vehicles (as prescribed in Title 49 of the CFR), pursuant to ARS 28-5204. ARS 28-7045 gives ADOT complete and exclusive operational control and jurisdiction over the use of State highways and routes, and for rules regarding the use of these highways and routes (ADOT 2010).

In March of 2010, ADOT released a study that states transportation of hazardous materials should be limited to designated routes in order to protect public health and safety. These routes should be chosen with consideration given to the sources and destination of hazardous materials, as well as the different modes of transportation used (ADOT 2010).

3.17.3 Issues to Be Analyzed

- Whether the Project would cause environmental contamination (hazardous materials) or expose workers or the public to contamination;
- What the effects of certain chemicals and materials (characterized as hazardous materials) that would be used during the construction or operation and maintenance of the Project would be;
- What the effects of certain hazardous and nonhazardous solid waste streams would be during transmission line construction and operation/maintenance activities.

3.17.4 Analysis Area Conditions

Publicly available databases were searched to gather information regarding known sites of environmental concern within the analysis area. Sites of potential environmental concern include, but are not limited to, Superfund sites, USTs, and permitted facilities. EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) contains data on potentially hazardous waste sites that have been reported to EPA, as well as sites listed on the NPL. EPA, NMED, and ADEQ were queried to identify sites of potential environmental concern in relation to the analysis area.

Sites of potential environmental concern exist within the analysis area. Sites of existing potential concern include CERCLIS/Superfund sites, permitted facilities, and UST/leaking underground storage tank (LUST) facilities.

As presented below, there are a total of five CERCLIS/Superfund sites, seven EPA-permitted facilities, and four priority LUST sites associated with the New Build Section analysis area. In the Upgrade Section, there is one CERCLIS/Superfund site, four EPA-permitted facilities, and two priority LUST sites within the analysis area.

New Build Section

CERCLIS/SUPERFUND SITES

A search of the publicly available data identified five sites in the New Build Section within New Mexico and no sites in the New Build Section within Arizona, as shown in table 3.17-2. None of the identified sites is on the NPL.

Table 3.17-2. CERCLIS Sites within the New Build Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name	EPA ID #	Status
1	Afton-Hidalgo	Deming, NM	P2	Peru Hill Mill	NMD097119986	Fully remediated
1	Afton-Hidalgo	Deming, NM	P2	American Smelting & Refining Deming Mill and Tailings*	NMD980749220	Archived
1	Afton-Hidalgo	Hachita, NM	S7	Hachita Landfill	Unknown ‡	–

Table 3.17-2. CERCLIS Sites within the New Build Section Analysis Area (Continued)

Route Group No.	Route Group	City	Segment	Facility Name	EPA ID #	Status
2	Hidalgo-Apache	Mogollon, NM	P4	Fannie Hill Mine and Mill*, †	NMD981147192	Archived
2	Hidalgo-Apache	Lordsburg, NM	D	Shakespeare Mining District*	NMD986684256	Archived

* Archived Superfund site.

† Latitude and longitude coordinates for this facility appear to be incorrect. Available information suggests this site is not located within the New Build analysis area.

‡ Data obtained from NMED included this site. This site did not appear in the EPA CERCLIS database.

PERMITTED FACILITIES

A search of publicly available data identified seven EPA-permitted facilities within the New Build Section analysis area (table 3.17-3).

Table 3.17-3. EPA Permitted Facilities Located within the New Build Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name/Type
1	Afton-Hidalgo	Deming, NM	P2	Luna Energy Facility / Power Gen.
1	Afton-Hidalgo	Deming, NM	P2	Deming Compressor Station / NG Compression
1	Afton-Hidalgo	Deming, NM	P3	Florida Compressor Station / NG Compression
1	Afton-Hidalgo	Berino, NM	P2	Afton Compressor Station / NG Compression
1	Afton-Hidalgo	La Mesa, NM	P2	Afton Generating Station / Power Gen.
2	Hidalgo-Apache	Bowie, AZ	P6	El Paso NG Co. Bowie Compressor Station / NG Compression
2	Hidalgo-Apache	Willcox, AZ	G	Arizona Electric Power Cooperative / Power Gen.

Note: NG = natural gas.

UNDERGROUND STORAGE TANKS

A search of publicly available NMED data identified five USTs within the analysis area in New Mexico, including one tank reported as leaking. According to ADEQ, 30 UST sites are within the New Build Section in Arizona, 12 of which are LUST sites with a total of 25 leaking tanks. Table 3.17-4 lists LUST facilities identified within the New Build Section analysis area.

Table 3.17-4. Leaking Underground Storage Tank Sites Located within the New Build Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name	Total USTs	Leaking USTs	Priority LUSTs
2	Hidalgo-Apache	San Simon, AZ	E	Vacant Lot	4	1	1
2	Hidalgo-Apache	Bowie, AZ	F	Dixie’s Texaco	4	1	0
2	Hidalgo-Apache	Bowie, AZ	F	PJ’s Family Travel Center	3	3	3
2	Hidalgo-Apache	Bowie, AZ	P6	Concho Petroleum, Inc.	5	5	0

Table 3.17-4. Leaking Underground Storage Tank Sites Located within the New Build Section Analysis Area (Continued)

Route Group No.	Route Group	City	Segment	Facility Name	Total USTs	Leaking USTs	Priority LUSTs
2	Hidalgo-Apache	Bowie, AZ	F	Bowie Depot	7	1	0
2	Hidalgo-Apache	Willcox, AZ	WC1a, LD4	Billy's Freeway Texaco	5	1	1
2	Hidalgo-Apache	Willcox, AZ	WC1a	Freeway Texaco	7	5	0
2	Hidalgo-Apache	Willcox, AZ	WC1a	Circle K #1431	3	2	0
2	Hidalgo-Apache	Willcox, AZ	WC1a	Dunlap Oil Co. Inc.	6	2	0
2	Hidalgo-Apache	Willcox, AZ	WC1a	Willcox Unified School District	2	1	0
2	Hidalgo-Apache	Willcox, AZ	WC1a	Chevron #9-0044	1	1	0
2	Hidalgo-Apache	Willcox, AZ	LD4	Willcox Truck Plaza	6	2	0

Upgrade Section

CERCLIS/SUPERFUND SITES

A search of publicly available data identified one site in the Upgrade Section within Arizona and no sites in New Mexico (table 3.17-5). The one CERCLIS/Superfund site is in route group 4.The identified site is not on the NPL.

Table 3.17-5. CERCLIS Sites within the Upgrade Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name	EPA ID #
4	Pantano-Saguaro	Tucson, AZ	U3i	Jail Annex Landfill*	AZD980813695

* Archived Superfund site.

PERMITTED FACILITIES

A search of publicly available data identified four EPA-permitted facilities within the Upgrade Section analysis area (table 3.17-6).

Table 3.17-6. EPA Permitted Facilities Located within the Upgrade Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name/Type
3	Apache-Pantano	Benson, AZ	U2	City of Benson Water Treatment Plant
4	Pantano-Saguaro	Tucson, AZ	U3a	United Metro Materials, Valencia 221 / Ready Mix Concrete
4	Pantano-Saguaro	Tucson, AZ	U3a	Pima Community College D V / Semiconductors
4	Pantano-Saguaro	Tucson, AZ	U3i	Hart & Cooley, Inc. / Fabricated Metalworks

UNDERGROUND STORAGE TANKS

A search of publicly available ADEQ data identified 22 UST sites that are within the Upgrade Section analysis area. Thirteen are LUST sites (table 3.17-7) with a total of 27 leaking tanks, and 1 facility (Texaco Service) is on the ADEQ priority list.

Table 3.17-7. Leaking Underground Storage Tank Sites Located within the Upgrade Section Analysis Area

Route Group No.	Route Group	City	Segment	Facility Name	Total USTs	Leaking USTs	Priority LUSTs
4	Pantano-Saguaro	Tucson, AZ	U3a	Maust Chevron	4	1	0
4	Pantano-Saguaro	Tucson, AZ	U3g	Circle K #2708772	3	1	0
4	Pantano-Saguaro	Tucson, AZ	U3h	Ryder Truck Rental and Leasing #0489	6	4	0
4	Pantano-Saguaro	Tucson, AZ	U3h	Central Freight	2	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	Circle K #1583	6	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	ADOT – Tucson Shop	6	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	Century Link	5	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	W.W. Williams Southwest, Inc.	3	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	Mobile Mini Storage Systems	2	0	0
4	Pantano-Saguaro	Tucson, AZ	U3i	City of Tucson – Silverbell Golf Course	2	1	0
4	Pantano-Saguaro	Tucson, AZ	U3i	Exxon #7-3504	8	8	0
4	Pantano-Saguaro	Tucson, AZ	TH3b	Texaco Service	5	2	2
4	Pantano-Saguaro	Benson, AZ	Staging Area 10	Stuckey's Old West	5	2	0

EXISTING WESTERN TRANSMISSION LINE

The existing transmission line in route groups 3 and 4 that is proposed to be upgraded connects to several existing electrical substations along its corridor. Existing electrical substations along the proposed Project each contain many transformers. Electrical transformers are filled with insulating mineral oil. Polychlorinated biphenyls (PCBs) are no longer used in transformers.

Sulfur hexafluoride (SF_6) is a nonflammable, odorless, nontoxic, and colorless gas used in the electrical industry for high-voltage circuit breakers, switchgear, and other electrical equipment, often replacing oil-filled circuit breakers that historically contained harmful PCBs. SF_6 under pressure is used as an insulator in gas-insulated switches at electrical substations. Though it is nontoxic and largely inert, it is considered to be an extremely potent GHG. This gas is also present in the existing electrical substations of the Upgrade Section.

3.18 TRANSPORTATION

This section describes the environmental setting in terms of transportation infrastructure resources, including airports, railroads, roads, and BLM roads within the analysis area. These resources may be affected by implementation of the proposed Project or its alternatives and associated Project components (i.e., substations, representative staging areas, and access roads).

The information provided in the following subsections is taken from a report titled "Southline Transmission Project Resource Report 14: Transportation" (CH2M Hill 2013s). The contents of that report are used herein without specific reference.

3.18.1 Analysis Area

New Build Section

The analysis area for transportation infrastructure resources within the proposed New Build Section is a 10-mile-wide corridor that is 5 miles on either side of the centerline of the alternatives carried forward. The analysis area is used to identify existing and proposed transportation infrastructure that could be directly impacted by ground disturbance during construction, delivery of construction equipment, construction worker access, maintenance access, and potential conflicts with flight paths at airports.

Upgrade Section

The analysis area for transportation infrastructure within the proposed Upgrade Section is the same as identified above for the New Build Section.

3.18.2 Laws, Ordinances, Regulations, and Standards

Laws, ordinances, regulations, and standards that apply to the management of transportation resources occur at the Federal, State, and local levels of government, as well as from the private management of railroads and airports.

Federal

FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration (FHWA) regulations state that the FHWA will allow, under controlled circumstances, the placement of longitudinal utility facilities within the access control limits of the Interstate system or other fully access-controlled freeways. These regulations do not apply to utility lines for servicing facilities required for the operation of the freeway.

FEDERAL AVIATION ADMINISTRATION

The mission of the FAA is to provide the safest, most efficient aerospace system in the world. To accomplish this, the FAA developed an obstruction evaluation and airport airspace analysis (OE/AAA) tool to be used for all public and private development that is planned within the vicinity of an airport and has the potential to impact aviation activities. As described in 14 CFR 77.9, Southline would file a notice of construction activities with the FAA to determine potential obstruction impacts to aviation activities according to FAA standards. A proposal must be submitted to the FAA for an OE/AAA for projects that fall within the thresholds. The FAA also issues standards for marking and lighting built components such as transmission line structures.

BUREAU OF LAND MANAGEMENT

On Federal lands managed by the BLM, motorized routes are designated for public use through the managing agency's land use plan or motorized transportation plan. Although the BLM manages its own transportation system, the agency often partners with the FHWA and State and county transportation agencies to provide access to BLM lands. Many BLM roads are unmaintained informal facilities with light use. Applying standard transportation management and regulatory practices can be difficult. Motorized routes may be designated by the BLM for other authorized use. The BLM requires a Right-of-Way Authorization Permit to use public land when certain projects such as transmission lines or roads are planned that are in the public interest. The ROW regulations are authorized by Title V of the FLPMA, as amended (43 U.S.C. 1761–1771).

Bureau of Land Management Right-of-Way Grant

A ROW grant would be required to construct the transmission line, substations, representative staging areas, and roads on BLM land. A ROW grant is an authorization to use a specific piece of public land for transmission lines. The grant authorizes rights and privileges for a specific use of the land for a specific period of time that is appropriate for the life of the project. The grant details the project requirements so the BLM can ensure the proposed transmission line will be constructed, operated, maintained and terminated in a safe and environmentally sound manner. The BLM would monitor the construction, operation, maintenance, and termination of the proposed Project to include protection and rehabilitation of the public lands involved. The ROW grant program is detailed in 43 CFR 2800 and 2880.

Bureau of Land Management Manual 9100 – Facilities Planning, Design, Construction and Maintenance (Public)

BLM Manual 9100, "Facilities Planning, Design, Construction and Maintenance (Public)" (BLM 2008e), is the BLM's manual for facilities, planning design, construction, and maintenance policy; it provides the current standards and codes for BLM-managed lands. New road construction and roads improved on BLM lands for the proposed project use would use this for guidance for minimum standards of width, alignment, grade, surface, and other requirements found in this BLM manual.

Mimbres Resource Management Plan

This RMP is the current plan for Doña Ana, Luna, Hidalgo, and Grant counties in the BLM Las Cruces District Office management area in New Mexico. Note that the Mimbres RMP is currently under partial revision for the Doña Ana County portion of that plan. The TriCounty RMP Amendment is currently in draft and the final RMP Amendment is unlikely to be finalized before the end of 2014.The RMP describes the access program used to enhance access to and across public land. All roads within the Mimbres resource area will be constructed or maintained in accordance with BLM policy.

Safford Resource Management Plan

This RMP is the current plan for all of Graham and Cochise counties and portions of Pima and Pinal counties in southeastern Arizona. This includes both the New Build Section and Upgrade Section of the proposed Project and alternatives. The RMP describes the access program used to enhance access to and across public land. All roads within the Safford resource area will be constructed or maintained in accordance with BLM policy.

Phoenix Resource Management Plan

The BLM Tucson Field Office is managed under the 1988 Phoenix RMP. At this time, no revisions or plan amendments are proposed and the 1988 Phoenix RMP is the guiding plan. The RMP specifies ROWs would be issued to promote the maximum utilization of existing ROWs, including joint use whenever possible. Corridors, as identified in the RMP, identify the BLM's preferred utility systems routing. The RMP describes the access program used to enhance access to and across public land. All roads within the Phoenix resource area will be constructed or maintained in accordance with BLM policy.

State

NEW MEXICO

The proposed Project and alternatives would likely encroach on highways and highway ROWs that are under the jurisdiction of the New Mexico Department of Transportation (NMDOT). Regulations that describe permit requirements and policies are provided below.

New Mexico Department of Transportation Highway Encroachment/Right-of-Way Permits

Title 17, Chapter 4, Part 2 of the NMAC describes the conditions under which utilities can be co-located within public ROWs. In general, longitudinal aerial utilities may not run parallel to public roadways within the roadway ROW. Aerial utilities may cross the roadway ROW if a utility permit has been issued. Issuance of this permit is dependent upon receipt of environmental clearance from the NMDOT headquarters office. A ROW permit must be obtained from the NMDOT prior to placing any structures on NMDOT ROW.

New Mexico Department of Transportation Highway Utility Construction Requirements

An NMDOT utility permit is required for all utility crossings of State highways and Interstates. Construction requirements of the utility permit are defined in Title 17, Chapter 4, Part 2 of the NMAC.

New Mexico Department of Transportation Route Restrictions

The NMDOT publishes maps that show bridges with load limitations and non-Interstate roads with vertical clearance restrictions. NM 26 in Luna County has a load-restricted bridge in the vicinity of segment P2 of the Proponent Preferred alternative in the New Build Section. Oversized or overweight loads are not permitted on NM 113 (Hidalgo County) and NM 146 (Grant County). Three locations on I-10 (one west of Las Cruces and two in the vicinity of Lordsburg) have vertical clearance restrictions. For non-interstate roads, three locations in the Deming area and one location on U.S. 70 north of Lordsburg have vertical clearance restrictions.

Airports

The Aviation Division of NMDOT provides planning and technical support in developing and maintaining the State's airports and other elements of the aviation system throughout New Mexico. The Division plans development of a system of public use airports within the state that includes development and continuous enhancement of the state's airport system. NMDOT develops a Five-Year Airport Capital Improvement Program (ACIP) to parallel the FAA's ACIP.

ARIZONA

The proposed Project and alternatives would likely encroach on highways and highway ROWs that are under the jurisdiction of the ADOT. Utilities may not run parallel to interstate roadways within ADOT ROW, but they may cross Interstate ROW. Utilities may run parallel to state highways within ADOT ROW. An encroachment permit must be obtained prior to installing aerial or subsurface utilities running over, under or parallel to ADOT ROW. Regulations that describe permit requirements and policies are provided below.

Arizona Department of Transportation Highway Encroachment/Right-of-Way Permits

AAC Title 17, Article 5 describes the conditions under which utilities can be co-located within public ROWs. An encroachment permit, pursuant to ARS 28-363 and Administrative Rule R17-3-502, is a written approval granted by the ADOT for construction of fixed or temporary improvements within a State highway ROW, or any activity requiring the temporary use of a State highway ROW. For more information, consult the ADOT document “Encroachment Permits, Policies, Guidelines, and Procedures Manual” (ADOT 2008).

Arizona Department of Transportation Highway Policies for Utilities Crossing Highways

The ADOT document “Policy for Accommodating Utilities on Highway Rights of Way” (ADOT 2009) identifies the policies for utilities crossing highways. Permission to perform work in ADOT ROW requires submission of a Highway Encroachment Permit Application. A permit must be issued prior to installation of utilities. Specific information on closing Interstate and State highways, as well as permission for closing, could be obtained from the Tucson ADOT District Office during the pre-permitting phase of the permitting process.

Arizona Department of Transportation Oversize Vehicle Restrictions

Electronic special permit application and issuance for oversize or overweight vehicles is not available for routes that include several structures along I-10 and I-17 in the Tucson metropolitan area; they must be applied for in person. Escorts are required for oversize or overweight vehicles in the metropolitan area. Oversize loads cannot be transported in Tucson on weekdays between 7 a.m. and 9 a.m., or between 4 p.m. and 6 p.m. on I-10, I-19, SR 77, and SR 86. Transport on these routes is also restricted from 3 a.m. to 12 p.m. on Saturdays and on major holidays. Permits for local roads must be obtained from the local authority.

Airports

In conjunction with Arizona’s public airports and the FAA, ADOT develops a Five-Year ACIP to parallel the FAA’s ACIP. The current document, “2013–2017 Five-Year Transportation Facilities Construction Program,” (ADOT 2012) has two main objectives: to maximize use of State dollars for airport development, and to maximize FAA funding for Arizona airports.

Regional, Local, and Other Guidelines

NEW MEXICO

Southwest New Mexico Council of Governments Transportation Plan

This 2007 long-range transportation plan (Southwest New Mexico Council of Governments 2007) provides regional guidance in the development of transportation projects and enhances safety, economic development, freight movement, and growth. The plan contains no specific regulations governing transmission projects.

County Department of Transportation Highway Encroachment/Right-of-Way Permits

The following lists applicable information for one of the New Mexico counties that is part of the study area. An extensive Internet search did not yield relevant information for the other three counties in the analysis area.

Doña Ana County (New Mexico) Code Chapter 274 Section 4:

- Wire utilities shall be placed no farther than 5 feet from the edge of the ROW on the east and/or north side of the centerline of the ROW.

ARIZONA

South East Arizona Governmental Organization Arizona–Sonora Border Master Plan

Overall goals of the 2013 Master Plan (South East Arizona Governmental Organization 2013) are to improve the capacity and operational efficiency for the land point of entries, and to support transportation infrastructure essential to relieving traffic congestion, reducing delays, enhancing safety and security, promoting international trade, and improving the quality of life for residents in the border region. The plan contains no specific regulations governing transmission projects.

Pima Association of Governments 2040 Regional Transportation Plan

The 2040 Regional Transportation Plan (Pima Association of Governments 2012) represents the work of the regional community and focuses on cross-jurisdictional planning issues. The plan contains no specific regulations governing transmission projects; however, the Pima Association of Governments' Greater Tucson Strategic Energy Plan Working Group is working with the DOE to reduce overall energy demand and increase the use of renewable sources of energy, which may include new infrastructure (transmission lines).

County Department of Transportation Highway Encroachment/Right-of-Way Permits

The following lists (verbatim) applicable information for two of the Arizona counties that are in the analysis area. An extensive Internet search did not yield relevant information for the other two Counties in the analysis area.

Cochise County (Arizona) Road Design & Construction Standards & Specifications for Public Improvements Section C Part 4:

- "All new overhead utility lines, utility poles, and other above ground utility structures shall be constructed outside the clear zone of the roadway. Utility poles and any other above ground streetscape shall be located within five feet of the right-of-way line or ten feet from the travel lane, whichever is most restrictive."

Pima County (Arizona) Code, Section 1, Title 10:

- "Conformance with County Regulations. The location or relocation of a user's facilities in the public right-of-way shall conform to county policies, standards, and regulations applicable to the use of the public right-of-way."

Pima County will evaluate requests to install utilities within public ROW if appropriate conditions are met in the ROW application. An approved application will have certain conditions associated with the approval, such as the preservation and protection of natural and cultural resources, prevention and reduction of air pollution, and ensuring of safe public transportation facilities.

Union Pacific Railroad

If it is necessary to enter the UPRR property for nonintrusive civil engineering survey work, a permit is required as described under the Procedures for Encroachments on the UPRR Website (UPRR 2012). For encroachments of permanent structures in UPRR property, the "Wireline/Pipeline Encroachment Planning Guide & Construction Procedures" (UPRR 2012) provide guidance in preparation of construction drawings to expedite approval by the railroad.

3.18.3 Issues to Be Analyzed

- Increase in traffic that exceeds the volume to capacity ratio for primary roadways.
- Traffic delays on a primary transportation corridor.
- Creation of severe road damage at levels that create hazardous situations for motorists and pedestrians.
- Impacts to BLM roadway system, including improved access into remote or designated roadless or wilderness areas.
- Consistency with Federal, State, and local transportation plans.
- Change in air traffic patterns as a result of new utility towers and lines near airports, including military training facilities away from airports.

3.18.4 Analysis Area Conditions

Transportation infrastructure within the analysis area includes airports, railroads, roads, and highways. This section identifies the existing transportation infrastructure, the existing conditions of the transportation infrastructure, and the existing or future transportation plans within the analysis area.

Existing Traffic on Primary Roadways

Primary roadways for this analysis are defined as interstates, U.S. highways, and state highways. The primary roadways within the analysis area are identified in table 3.18-1. Figures 3.18-1 and 3.18-2 show the primary roads that are within the area of analysis for the proposed Project. Traffic conditions on the primary roadways for this analysis are identified by using the volume-to-capacity (v/c) ratio. Segments of roadways that experience high v/c ratios at peak hours suggest that the segment is experiencing a low level of service. For example, a higher v/c ratio on a particular segment of a primary roadway suggests higher levels of traffic demand on the segment and a lower level of service. Levels of service ratings run from a rating of A, for the highest or best level of service, to F, the lowest or worst level of service. A v/c ratio above 0.90 indicates the demand nearly equals the design capacity of the roadway, and a level of service of E or F can be assumed. Roadway segments that experience a v/c ratio between .80 and .90 (level of service equivalent C or D) and above .90 only occur on primary roadways in the vicinity of Tucson. The v/c ratios for all other primary roadways within the analysis area indicate that the existing traffic volumes are within the roadways' design capacities, and the roadways are therefore operating at acceptable levels of service, as typically occurs in rural areas with low populations.

Table 3.18-1. Primary Roadways within the Analysis Area

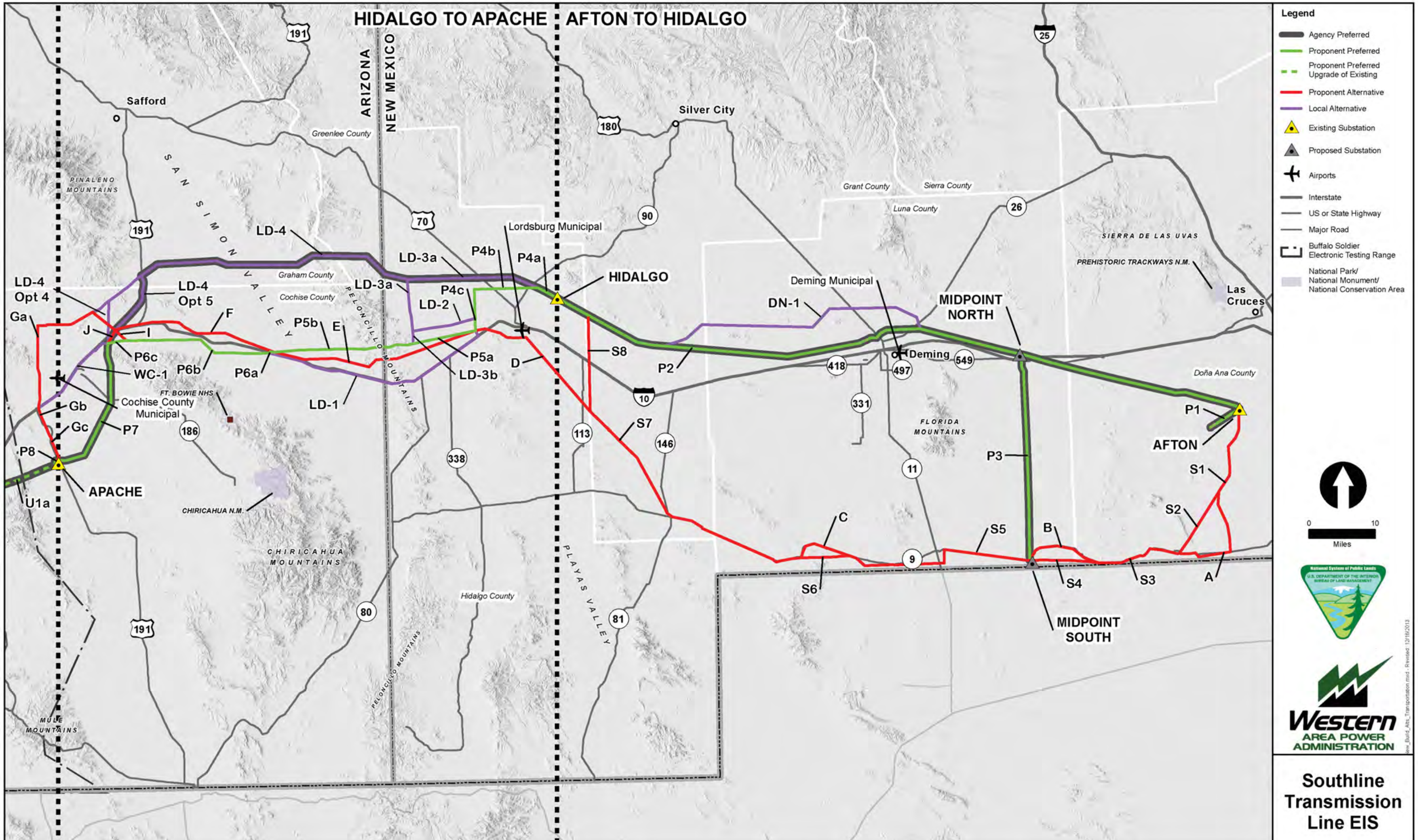
New Build Section				Upgrade Section			
Interstate	U.S. Route	New Mexico State Route	Arizona State Route	Interstate	U.S. Route	New Mexico State Route	Arizona State Route
10	70	9	80	10	191	NA	77
	180	11	90	19			80
	191	26	186				83
		81					86
		113					90
		146					210
		331					
		338					
		418					
		497					
		549					

Note: NA = not applicable.

New Build Section

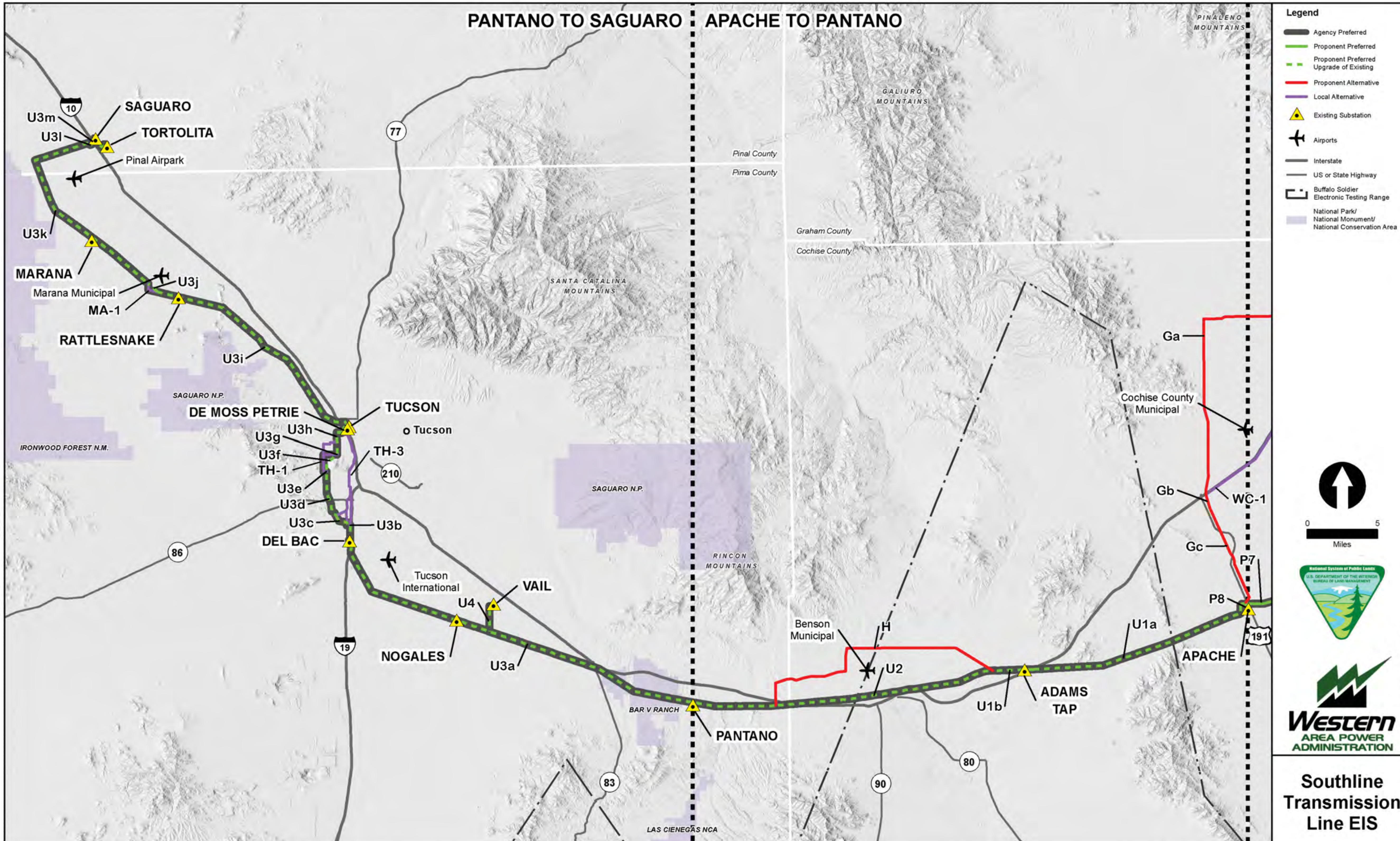
Traffic volumes vary greatly on primary roads within the analysis areas of each New Build segment. The traffic volumes along I-10 range from 11,000 to 27,000 vehicles per day, with the highest volumes recorded in the vicinity of Deming, New Mexico. The state highways in the vicinity of the alternative routes carry a considerably lower daily traffic volume than those in the Tucson area, ranging from 100 to 7,800 vehicles per day. The Interstate and highway segments along the proposed route and alternative routes currently operate with low v/c ratios, which result in uncongested traffic operating conditions and desirable levels of service during peak hours.

1 **Figure 3.18-1.** Roadways in the New Build Section.



2

Figure 3.18-2. Roadways in the Upgrade Section.



Upgrade Section

Traffic volumes are much higher on primary roadways within the analysis area of the Upgrade Section as a result of being located near or within large urban areas. I-10 within Tucson generally carries over 100,000 vehicles per day and congested conditions result during peak hours, with several segments operating at an estimated v/c greater than 1.0. The highways in the Upgrade Section carry between 4,000 and 42,000 vehicles per day. The segment of SR 77 that carries 42,000 vehicles per day (between I-10 and Oracle Road) has an estimated peak-hour v/c ratio of 1.20 and experiences congested peak-hour conditions. The section of SR 86 between I-10 and Mission Road, in the vicinity of the proposed transmission line crossing, also experiences congested peak-hour conditions (36,000 vehicles per day travel this segment and the estimated peak-hour v/c ratio is 1.01). Altogether, segments of three primary roadways within the Upgrade Section currently experience congested operating conditions during peak hours.

Existing Bureau of Land Management Roadway System Roads within the Analysis Area

There are approximately 970 documented BLM routes in the vicinity of the analysis area. They are primarily secondary, or tertiary routes that are unpaved and have a natural gravel surface. Automobiles, trucks, motorcycles, and OHVs have been observed using these roads and routes. Approximately 70 percent of the routes are documented as lightly used or not used. Most of the BLM lands are in the New Build Section of the proposed Project rather than in the Upgrade Section. GIS roadway data indicate that there is an extensive network of existing rural roads and trails (that may or may not be on BLM land) throughout the New Build Section. Every route segment appears to have roads or trails through it; therefore, no large expanses of land are currently inaccessible.

Existing Air Traffic Patterns

A total of 22 public and private airports exists within the analysis area. Only 15 of the 22 airports are currently open and operating. Seven of the operating airports are publicly owned and the remaining eight are privately owned. Figures 3.18-1 and 3.18-2 show the publicly owned airports. Table 3.18-2 provides an inventory of general aviation facilities, excluding military airports in the Upgrade and New Build sections, and summarizes the characteristics of each airport. The inventory includes information relative to owner/operator, capacity, activity, and proximity to transmission line segments and substations. Pinal Airpark is discussed below and in Section 3.11.3 (“Military Operations”) because the Silver Bell Army Heliport is based at this public airport facility. Information regarding other military airports is discussed in Section 3.11, “Land Use, Including Farm and Range Resources and Military Operations.”

Table 3.18-2. Summary of Existing Airports Currently Operating in the Transportation Analysis Area

Airport	Owner	Operator	Capacity (Aircraft)	Average Number of Flights	Adjacent Alternative Segments
New Build Section – Afton Substation to east of Lordsburg					
Columbus Stockyard	Luna County	Private	2	NA	S5
Deming Municipal*	City of Deming	City of Deming	22	78/day	P2
First Aero Squadron Airpark	Estate of M. Ann Cobb-Gambel	Private	7	NA	S5

Table 3.18-2. Summary of Existing Airports Currently Operating in the Transportation Analysis Area (Continued)

Airport	Owner	Operator	Capacity (Aircraft)	Average Number of Flights	Adjacent Alternative Segments
Hacienda Sur Luna	Estate of M. Ann Cobb-Gambel	Private	4	NA	S5
Lordsburg Municipal*	City of Lordsburg	City of Lordsburg	4	92/week	D
Solo Ranch	Dennis and Shirley F. Johnson	Private	1	NA	P2 and P3
New Build Section – East of Lordsburg to Apache Substation					
Cochise County*	Cochise County	Cochise County	23	23/day	Ga and WC1a
Inde Motorsports Ranch	Motor Sports Ranch	Private	1	NA	Ga and BE2b/c
Leroy	Joanny Liliane Leroy	Private	13	NA	P7
Upgrade Section – Apache Substation to Saguaro Substation					
Ammon	Peter J. Ammon	Private	1	NA	U1a
Benson	Ben A. Taylor	Private	NA	58/month	U2 and H
Benson Municipal*	City of Benson	Southwestern Aviation	44	98/week	U2 and H
Marana Regional*	Town of Marana	Pima Aviation	221	307/day	U3j
Pinal Airpark*	Pinal County	Pinal County	3	> 30,000/year	U3k
Tucson International	Tucson Airport Authority	Tucson Airport Authority	302	421/day	U3a

Note: NA = Not applicable.
* Public airport.

Existing Transportation Plans

NEW MEXICO

Roads

The current Statewide Transportation Improvement Plan (STIP) for New Mexico indicates that three improvements are planned for portions of analysis area roadways through 2015. The planned improvements within the 10-mile analysis area for the New Build Section are:

- Replace railroad bridge on NM 549 near Deming (2013; Segment P2);
- Resurface and relocate utilities along U.S. 180 from Deming to Bayard (2012; Segment P2); and
- Restore and rehabilitate various 1-mile sections of I-10 between Lordsburg and the state line with Arizona (2012, 2014, 2015; Segments P4 and P5).

Airports

Lordsburg Municipal Airport Action Plan

An Airport Action Plan for the Lordsburg Municipal Airport in Lordsburg, New Mexico, was prepared in 2009 (Air Nav, LLC 2009). The airport is regularly used by border patrol, air ambulance, and transient corporate aircraft. The Airport Action Plan addresses non-standard conditions and provides phased development of future landside and airside facilities to accommodate aviation demand.

ARIZONA

Roads

The current STIP for Arizona indicates that several improvements are planned for portions of analysis area roadways through the year 2014. Agency coordination would be recommended for each of these projects to minimize the potential for the construction activities to overlap or increase the impact to the proposed Project. Planned and funded improvements and their date of implementation within the 10-mile analysis area for the New Build Section and Upgrade Section are:

New Build Section

- Construct structures on U.S. 191 over I-10 (2015; Local Alternative Route Segment Gb and Local Agency Alternative WC1b); and
- Various pavement preservation projects for I-10 have been scoped, but are not currently programmed in the STIP.

Upgrade Section

- Reconstruct and widen I-10 mainline, traffic interchanges, and frontage roads between Ina Road and Marana Road (2011 and 2014);
- Reconstruct and widen I-10 mainline and traffic interchange between Prince Road and Ruthrauff Road (2011);
- Reconstruct I-10 mainline and remove existing rail and bridge at MP 288/Cienega Creek (2011);
- Replace Davidson Canyon westbound bridge superstructure on I-10 (2015);
- Retrofit various I-19 bridges to address scour (2011);
- Widen I-19 between SR 86 and San Xavier Road (2014);
- Reconstruct I-19 interchange with SR 86 (2017);
- Widen SR 86 between Valencia Road and Kinney Road (2013);
- Replace structure on Ina Road over Santa Cruz River (2016); and
- Reconstruct North Silverbell Road to include bicycle lanes in both directions and Americans with Disabilities Act–accessible sidewalks; the southern segment will be four travel lanes with curb and a raised landscape median; the northern segment will be two travel lanes with a two-way center left-turn lane (first phase to begin in 2013).

In addition to the STIP plans noted above, a northerly extension of SR 90 has been discussed for the past several years. This extension would cross both proposed route segment U2 and local alternative route segment H.

Airports

The Benson Municipal Airport (E95) Master Plan Study

The Master Plan Study (City of Benson 1990), evaluates the airport's capabilities and role in forecasting future aviation demand and the airport's ability to plan for the timely development of new or expanded facilities to meet that demand through the year 2010. The master plan provides systematic guidelines for the airport's overall maintenance, development, and operation.

The Marana Regional Airport Master Plan

The Marana Regional Airport Master Plan (Town of Marana 2007) provides a 20-year, long-range strategic forecast of future aviation demands on the community and the airport facilities, and of infrastructure needed to support the aviation requirements. The ultimate goal of the master plan is to provide systematic guidelines for the airport's overall development and operation.

Tucson International Airport Master Plan

The Tucson Airport Authority (TAA) is a nonprofit organization created to manage the Tucson International Airport. The TAA (2013) has initiated the 2013 Tucson International Airport Master Plan Update, updating the 2004 master plan. The 2012 update will provide a framework for future facility and infrastructure development to accommodate forecast airport activity demand through 2030.

Pinal Airpark Master Plan

Pinal County manages the Pinal Airpark in cooperation with the DOD and the Arizona Army National Guard. In February 2013, the county initiated a planning process to update its 1991 master plan (Pinal County 1991).

Cochise County Airport Master Plan

The Cochise County Airport Master Plan (Cochise County1997) presents a phased development plan intended to result in construction and maintenance of a safe, efficient, economical, and environmentally acceptable public facility. The plan evaluates both existing and future aviation needs to determine the current and long-range requirements for airport development, and to identify and assess site development alternatives.

3.19 INTENTIONAL ACTS OF DESTRUCTION

Intentional destructive acts have the potential to create health and safety hazards through the damage of transmission line support structures. Intentional destructive acts include acts of sabotage, terrorism, vandalism, and theft that sometimes occur at power facilities, including transmission lines and substations. Vandalism and thefts are the most common intentional destructive act, especially theft of metal and other materials that can be sold when the price of construction materials is high on the salvage market.

3.19.1 Analysis Area

New Build Section

Based on the height of the proposed transmission line support structures, the analysis area for intentional acts of destruction on the transmission lines and substations is 200 feet from the edge of the ROW corridor for proposed transmission lines. Critical facilities (e.g., hospitals, emergency response services) that would receive power from the proposed transmission lines are also analyzed.

Upgrade Section

The analysis area for intentional acts of destruction within the proposed Upgrade Section is the same as identified above for the New Build Section.

3.19.2 Laws, Ordinances, Regulations, and Standards

Although specific requirements for the protection of transmission lines and substations are not codified by law, Federal and other utility companies use industry-standard physical deterrents such as fencing, cameras, warning signs, rewards, etc., to help deter theft, vandalism, and unauthorized access to facilities.

3.19.3 Issues to Be Analyzed

During construction or operation and maintenance, transmission lines, substations, and associated facilities could be targets of intentional destructive acts, such as sabotage, terrorism, vandalism, and theft, with resulting impacts to human health and safety:

- Adjacent areas that could be impacted from an intentional act of destruction
- Potentially impaired critical services (emergency response, hospitals, communications, water supply)

3.19.4 Analysis Area Conditions

Acts of sabotage or terrorism on electrical facilities are rare, although some have occurred. In the past, these acts generally focused on attempts to destroy large steel transmission line towers. For example, in 1999, a large steel transmission line tower in Bend, Oregon, was toppled. In June 2011, almost $1 million in damages was incurred at Alvey Substation near Eugene, Oregon, when unknown individuals were able to breach a security fence and damage equipment in the substation yard during an attempt to disrupt transmission service. Statistics for intentional acts of destruction on existing transmission facilities within the analysis area are not available. The following text identifies adjacent areas that could be impacted from intentional acts of destruction, and existing critical services that could be impacted from power outages resulting from intentional acts of destruction.

New Build Section

The majority of proposed transmission lines in the New Build Section would traverse sparsely populated rural or undeveloped terrain. In general, the line sighting of the proposed transmission lines would avoid populated areas and would not be adjacent to buildings and other infrastructure. The most common adjacent developed areas that could be impacted from intentional acts of destruction in the New Build

Section are limited to transportation and utility infrastructure. Tables 3.19-1 through 3.19-3 below identify the critical services in the New Build Section that could be affected by a power outage.

Upgrade Section

The proposed transmission lines in the Upgrade Section traverse a mix of sparsely populated rural areas and highly populated urban areas in metropolitan Tucson. Adjacent areas to the existing transmission lines that could be impacted from intentional acts of destruction range from undeveloped desert land to commercial, residential, and other land uses within metropolitan Tucson. Tables 3.19-1 and 3.19-4 below identify the critical services in the Upgrade Section could be affected by a power outage.

EXISTING THREATS OF SABOTAGE AND TERRORISM

- Impacts of power outages to people and/or critical services (e.g., communications; water supply; critical care facilities; emergency response).

Communication services within the analysis area include telecommunications, radio, cable, Internet, and satellite services and are provided by local and national service providers.

Due to the generally rural setting of the analysis area, water supply for the majority of the analysis area is drawn by wells from local aquifers. The cities of Las Cruces and Tucson each maintain municipal water utilities drawn from local aquifers. Tucson's water supply comes from the Upper Santa Cruz and Avra Basin Sole Source Aquifer and is supplemented by water from the CAP (Tucson 2004).

Critical care facilities and law enforcement departments within the analysis area are identified in the following tables:

Table 3.19-1 identifies the medical facilities within the New Build Section and the major medical facilities in the Tucson area within the Upgrade Section. Table 3.19-2 identifies the law enforcement agencies within the New Build Section. Table 3.19-3 identifies fire protection services within the New Build Section. Table 3.19-4 identifies fire protection services within the Upgrade Section.

Table 3.19-1. Medical Facilities within the New Build Section Analysis Area and Upgrade Section Analysis Area

County	Facility Name	Facility Address
New Build Section		
Doña Ana, New Mexico	Advanced Care Hospital of Southern New Mexico	4441 East Lohman Avenue, Las Cruces, NM
	Ben Archer Health Center	1600 East Thorpe Road, Las Cruces, NM
	Ben Archer Health Center	255 New Mexico 187, Hatch, NM
	Concentra Urgent Care	2170 East Lohman Avenue, Las Cruces, NM
	Covenant Clinics	3961 East Lohman Avenue, Las Cruces, NM
	First Step Center	390 Calle De Alegra, Las Cruces, NM
	Hillrise Medical Center	1005 South Telshor Boulevard, Las Cruces, NM
	La Cruces Surgical Associates	2803 Doral Court, Las Cruces, NM
	Memorial Medical Center	2450 South Telshor Boulevard, Las Cruces, NM
	Mesilla Valley Hospital	3751 Del Rey Boulevard, Las Cruces, NM
	Mountain View Regional Medical Center	4311 East Lohman Avenue, Las Cruces, NM
	VA Las Cruces Clinic	1635 South Don Roser Drive, Las Cruces, NM

1 **Table 3.19-1.** Medical Facilities within the New Build Section Analysis Area and Upgrade Section
2 Analysis Area (Continued)

County	Facility Name	Facility Address
Grant, New Mexico	Fort Bayard Medical Center	41 Fort Bayard Road, NM
	Gila Regional Medical Center	1313 East 32nd Street, Silver City, NM
	Urgent Care Clinic	1600 East 32nd Street, Silver City, NM
	VA Silver City Clinic	1302 East 32nd Street, Silver City, NM
Luna, New Mexico	Mimbres Memorial Hospital	900 West Ash Street, Deming, NM
Cochise, Arizona	Benson Hospital	450 South Ocotillo, PO Box 2290, Benson, AZ
	Carondelet Holy Cross Hospital	1171 West Target Range Road, Nogales, AZ
	Copper Queen Community Hospital	101 Cole Avenue, Bisbee, AZ
	Northern Cochise Community Hospital	901 West Rex Allen Drive, Willcox, AZ
	Sierra Vista Regional Health Center	300 South El Camino Real, Sierra Vista, AZ
	Southeast Arizona Medical Center	2174 West Oak Avenue, Douglas, AZ
Upgrade Section		
Pima, Arizona	Kino Community Hospital/University Physicians	2800 East Ajo Way, Tucson, AZ
	Northwest Medical Center	6200 North La Cholla Boulevard, Tucson, AZ
	Sierra Vista Regional Health Center	300 El Camino Real, Sierra Vista, AZ
	St. Joseph's Hospital	350 North Wilmot Road, Tucson, AZ
	St. Mary's Hospital	1601 West St. Mary's Road, Tucson, AZ
	Tucson Medical Center	5301 East Grant Road, Tucson, AZ
	University Medical Center	1501 North Campbell Avenue, Tucson, AZ

3 **Table 3.19-2.** Law Enforcement within the New Build Section Analysis Area

County	Law Enforcement Agency	Address
Doña Ana, New Mexico	Anthony Police Department	401 Wildcat Drive, Anthony, NM
	Doña Ana County Sherriff's Department	845 North Motel Boulevard, Las Cruces, NM
	Las Cruces Police Department	217 East Picacho Avenue, Las Cruces, NM
	Hatch Village Police Department	5 Chile Capitol Lane, Hatch, NM 87937
	New Mexico State Police	3000 East University Avenue, Las Cruces, NM
	Sunland Park Police Department	1000 McNutt Road #C, Sunland Park, NM
Grant, New Mexico	Bayard Police Department	800 Central Avenue, Bayard, NM
	Grant County Sheriff Department	214 North Black Street, Silver City, NM
	Hurley Town Police Department	101 Cortez Avenue, Hurley, NM (Hurley Town Hall)
	Silver City Police Department	1011 North Hudson Street, Silver City, NM
Hidalgo, New Mexico	Hidalgo County Sheriff	305 Pyramid Street, Lordsburg, NM
	Lordsburg Police Department	404 West Wabash Street, Lordsburg, NM
	New Mexico State Police	808 High Street, Lordsburg, NM

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Table 3.19-2. Law Enforcement within the New Build Section Analysis Area (Continued)

County	Law Enforcement Agency	Address
Luna, New Mexico	Columbus Police Department	214 Broadway, Columbus, NM
	Deming Police Department	700 East Pine Street, Deming, NM
	Luna County Sheriff	3000 East Pine Street, Deming, NM
Cochise, Arizona	Benson Police Department	360 South Gila Street, Benson, AZ
	Cochise County Government: Division #1	100 Colonia De Salud # 102, Sierra Vista, AZ
	Cochise County Sheriff	126 West 5th Street # 2, Benson, AZ
	Cochise County Sheriff's Department	205 North Judd Drive, Bisbee, AZ
	Cochise County Sheriff's Office	450 South Haskell Ave # C, Willcox, AZ
	Huachuca City Fire Department	505 Gonzales Boulevard, Huachuca City, AZ
	Public Safety Department	2599 East Tacoma Street, Sierra Vista, AZ
	Sierra Vista Police Department	911 North Coronado Drive, Sierra Vista, AZ
	Tombstone Police Department	315 East Fremont Street, Tombstone, AZ

Table 3.19-3. Fire Protection Agencies within the New Build Section Analysis Area

County	Fire Departments
Doña Ana, New Mexico	Chamberino Volunteer Fire Department
	East Mesa Volunteer Fire Department
	La Mesa Volunteer Fire Department
	Las Alturas Volunteer Fire Department
	Las Cruces Fire Department
	Mesquite Volunteer Fire Department
	NASA-JSC-White Sands Test Facility
	New Mexico State University Fire and Emergency Services
	Santa Teresa Volunteer Fire Department
	South Valley Volunteer Fire Department
	Town of Mesilla Volunteer Fire Department
Grant, New Mexico	Bayard Volunteer Fire Department
	Cliff-Gila Volunteer Fire Department
	Fort Bayard Volunteer Fire- and Rescue
	Pinos Altos Volunteer Fire Fire and Rescue
	Santa Rita Hanover Fierro Volunteer Fire Department
	Sapillo Creek Volunteer Fire and Rescue
	Town of Hurley Fire Department
	Town of Silver City Fire Department
	Tyrone Volunteer Fire and/ Rescue Department
	Upper Mimbres Volunteer Fire and Rescue

Table 3.19-3. Fire Protection Agencies within the New Build Section Analysis Area (Continued)

County	Fire Departments
Hidalgo, New Mexico	Animas Volunteer Fire and Rescue Department
	Cotton City Volunteer Fire Department
	Hidalgo County Fire Department District 1
	Lordsburg Fire Department
	Playas Fire District
Luna, New Mexico	Babocomari Fire District
	Columbus Volunteer Fire Department
	Cooks Peak Fire District 403
	Deming Fire Department
	Savoy Volunteer Fire Department
	Sunshine Volunteer Fire Department
Cochise, Arizona	Benson Fire Department
	Bisbee Fire Department
	Douglas Fire Department
	Elfrida Fire Department
	Fry Fire District
	Huachuca City Fire Department
	Mescal Volunteer Fire Department
	Naco Fire District
	Pirtleville Fire District
	Presidential Estates/Babocomari/Woody Hills Fire District
	San Simon Volunteer Fire Department
	Sierra Vista Fire Department
	Sunnyside Fire District
	Sunsites-Pearce Fire Department
	Tombstone Volunteer fire Department
	Willcox Fire Department
	Willcox Rural Fire Department

Table 3.19-4. Fire Protection Agencies within the Upgrade Section Analysis Area

County	Fire Departments
Cochise, Arizona	Babocomari Fire District
	Benson Fire Department
	Bisbee Fire Department
	Douglas Fire Department
	Elfrida Fire Department
	Fry Fire District

Table 3.19-4. Fire Protection Agencies within the Upgrade Section Analysis Area (Continued)

County	Fire Departments
	Huachuca City Fire Department
	Mescal Volunteer Fire Department
	Naco Fire District
	Pirtleville Fire District
	Presidential Estates/Babocomari/Woody Hills Fire District
	San Simon Volunteer Fire Department
	Sierra Vista Fire Department
	Sunnyside Fire District
	Sunsites-Pearce Fire Department
	Tombstone Volunteer Fire Department
	Willcox Fire Department
	Willcox Rural Fire Department
Pima, Arizona	162nd Fighter Wing Fire Department
	Arivaca Volunteer Fire Department
	Avra Valley Fire District
	Corona de Tucson Fire Department
	Drexel Heights Fire District
	Golder Ranch Fire District
	Green Valley Fire District
	Helmet Peak Volunteer Fire Department
	Mount Lemmon Fire District
	Northwest Fire District
	Pascua Pueblo Fire Department
	Picture Rocks Fire District
	Raytheon Systems Co Fire Department
	Rincon Valley Fire District
	Rural/Metro Fire Department – Tucson
	Silverbell Army Heliport Fire Department
	Three Points Fire District
	Tohono O’odham Nation Fire Department
	Tucson Airport Authority Fire Department
	Tucson Country Club Estates Fire District
	Tucson Fire Department

Table 3.19-4. Fire Protection Agencies within the Upgrade Section Analysis Area (Continued)

County	Fire Departments
Pinal, Arizona	Ak-Chin Indian Community Fire Department
	Apache Junction Fire District
	Arizona City Fire District
	Casa Grande Fire Department
	Coolidge Fire Department
	Dudleyville Volunteer Fire Department
	Eloy Fire District
	Florence Fire Department
	Mammoth Volunteer Fire District
	Maricopa Fire District
	Oracle Volunteer Fire District
	Queen Valley Fire District
	Regional Fire and Rescue Department, Inc.
	San Manuel Fire Department Association
	Stanfield Volunteer Fire Department
	Superior Fire Department
	Thunderbird Fire District