Southline Transmission Project

Routing Report

Submitted to:

Bureau of Land Management and
Western Area Power Administration

Submitted by:

Southline Transmission, L.L.C.

1900 North Akard Street

Dallas, TX 75201

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Contents

List of Tables

List of Figures

Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
Applicant	Southline Transmission, L.L.C.
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
DMP	DeMoss Petrie
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
ESRI	Environmental Systems Research Institute
FAA	Federal Aviation Administration
FAQs	frequently asked questions
FLPMA	Federal Land Policy and Management Act
GIS	geographic information system
NM 9	New Mexico State Road 9
NM 11	New Mexico State Road 11
I-10	Interstate 10
IBWC	International Boundary and Water Commission
IFNM	Ironwood Forest National Monument
kV	kilovolt
MW	megawatt
NAIP	National Agricultural Imagery Program
NEPA	National Environmental Policy Act
NGO	non-governmental organization
OHV	off-highway vehicle
POD	Plan of Development
project	Southline Transmission Project
ROW	right-of-way
SEZ	Solar Energy Zone
study	Routing and Siting Study
SWTC	Southwest Transmission Cooperative, Inc.
USBR	U.S. Bureau of Reclamation

USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
Western	Western Area Power Administration
WREZs	Western Renewable Energy Zones
WWEC PEIS	West-Wide Energy Corridor Programmatic Environmental Impact Statement

Executive Summary

Southline Transmission, LLC proposes to construct a high-voltage transmission project to transmit electricity across southern New Mexico and southern Arizona. This Routing Report provides documentation of the routing and siting study (study) performed to identify the proposed route and viable alternatives.

The Southline Transmission Project (project) is designed to provide up to 1,000 megawatts (MW) of initial bidirectional transmission capacity. The project will increase grid reliability, mitigate existing congestion, increase the ability to meet demand growth in the region, and facilitate renewable generation development and public policy goals.

Since 2009, the team has worked closely with the Bureau of Land Management (BLM), Western Area Power Administration (Western), State agencies, local utilities, private landowners, and other stakeholders throughout the design and route selection process to ensure the project meets stakeholder needs and improves the regional transmission system. The project has been designed to minimize environmental and cultural impacts by selecting segments along existing linear corridors, where feasible, such as transmission lines, natural gas pipeline rights-of-way (ROWs), and abandoned rail lines along the route.

The goal of the routing study was to identify viable route options, evaluate potential environmental and land use constraints associated with those routes, and identify the optimal route alternatives for the project. An iterative screening process was conducted for the routing study to identify the optimal route for the project. To accomplish this objective, the routing process focused on identifying and evaluating, to the extent practicable, existing linear facilities that could present opportunities for locating the project. Once candidate routes were identified, they were vetted by the team using the routing criteria. The team narrowed the initial list down to best-fit options, which were evaluated again by the team to determine the proposed route and alternatives. More than 150 individual route segments were evaluated as part of the routing study.

The routing process identified proposed and alternative routes for each of the project's two sections: the New Build Section between Afton and Apache and the Upgrade Section between Apache and Saguaro/Tortolita. The proposed route for New Build Section begins at the Afton substation, follows an existing 345-kilovolt (kV) transmission line northwest to Interstate 10 (I-10), and continues primarily north of I-10 across the state past Deming to the Hidalgo substation. After Lordsburg, the New Build route crosses I-10 and continues around Willcox to terminate at the Apache substation. The Upgrade Section will rebuild Western's existing 115-kV line between the Apache and Saguaro substations in Arizona, and connect that line to additional existing substations.

Combined, the project has a total length of approximately 360 miles. In addition to the route for the double-circuit 345-kV New Build Section (approximately 205 miles) and the project's double-circuit 230-kV Upgrade Section from Apache to Saguaro (approximately 120 miles), the project also includes Segment R5, a 230-kV line that will be required to interconnect with the existing Vail substation (approximately 2.2 miles); Segment B1 between New Mexico State Road 9 (NM 9) and I-10 (approximately 30 miles); and Segment A2, a 230-kV line connecting the Afton substation and the existing Luna-Diablo 345-kV transmission line (approximately 5.2 miles).

The routing study identified both a northern route option and a southern route option for the New Build Section between Afton and Apache. The northern route was ultimately selected as the proposed route based on the overall shorter distance of that route, fewer impacts to previously undeveloped areas, and

the ability to parallel multiple existing linear facilities. The southern route option provides an alternative to the proposed northern route between the Afton substation and the point where the proposed and alternative routes merge at a location approximately 10 miles east of Lordsburg. A number of additional alternative route segments labeled Alternative Route Segments A-H were identified during the routing study that could be used instead of the proposed segments if found to be environmentally preferable.

For the Upgrade Section between Apache and Saguaro/Tortolita, the routing study did not identify any viable alternatives to the proposed upgrade of the existing Western line. Alternative Upgrade Route Segment H, however, could be used as an option to rebuild the Western line in the Benson area.

In addition to providing the results of the routing study, this document presents a summary of the methodologies used to select the proposed and alternative routes, a description of the geographic information system (GIS) database that was developed to support the routing study, and a summary of the public engagement process that was implemented concurrently with and in support of the route selection process. This document also presents a description of the currently proposed transmission line and substation interconnections and as well as a summary of the purpose and need and benefits of the proposed line consistent with the Plan of Development (POD) filed with the BLM for the project.

1 INTRODUCTION

1.1 Overview

Since 2009, the Southline Transmission Project (project) team has worked closely with the Bureau of Land Management (BLM), Western Area Power Administration (Western), State agencies, local utilities, private landowners, and other stakeholders throughout the design and route selection process to ensure the project meets stakeholder needs and improves the regional transmission system.

This Routing Report provides documentation of the routing and siting study (study) performed, including a description of

- The methodology used;
- The routes investigated and carried forward for consideration;
- The routes rejected from further consideration due to environmental, stakeholder, or design consideration;
- The public outreach efforts conducted to develop the proposed project; and
- Routes presented at Applicant-sponsored public meetings held between September and November 2011, and the evolution of those routes based on the stakeholder comments received.

1.1.1 Project Summary

The project is a proposed transmission line designed to collect and transmit electricity across southern New Mexico and southern Arizona. The project will increase grid reliability, mitigate existing congestion, increase the ability to meet demand growth in the region, and facilitate renewable generation development and public policy goals.

The project has been designed to minimize environmental and cultural impacts by selecting segments along existing linear corridors, where feasible, such as transmission lines, natural gas pipeline rights-of-way (ROWs), and abandoned rail lines along the route. In addition, the project includes the upgrade of an existing transmission line owned and operated by Western, thereby minimizing the need for new transmission ROW in the region.

The total length of the project is approximately 360 miles. Please see section 4 of the Plan of Development (POD) for a full project description.

Land Ownership

The project will cross private and State-owned lands as well as public lands under the jurisdiction of the BLM and other Federal agencies. In total, approximately 34 percent of the lands to be crossed by the project are administered by the BLM, less than 1 percent by other Federal entities, 31 percent by private entities, and 35 percent by the State of Arizona and the State of New Mexico. “Other Federal entities” include the U.S. Forest Service (USFS), U.S. Department of Defense (DoD), U.S. Bureau of Reclamation (USBR), and Bureau of Indian Affairs (BIA).

1.1.2 Purpose, Need, and Objectives

The Applicant (Southline Transmission, L.L.C.) proposes to construct a high-voltage electric transmission line in southern New Mexico and southern Arizona (the project). The project would also involve related substation and communications facilities. Although the project would cross some private and State-owned lands, much of the line would traverse public lands controlled by the BLM. A portion of the

project may involve upgrading existing Western transmission facilities. The Applicant and Western have executed a memorandum of understanding (MOU) to provide for the negotiation of an agreement for the joint ownership and development of transmission facilities.

1.1.3 Applicant's Purpose for the Proposed Action

The project has been designed to improve the electric transmission infrastructure in southern New Mexico and southern Arizona in order to strengthen the existing system and to cost effectively provide up to 1,000 megawatts (MW) of initial bidirectional transmission capacity between southern New Mexico and southern Arizona.

The project has been developed to meet the following principal needs:

- *Improve reliability in southern New Mexico and southern Arizona* - There is limited existing electrical transmission capacity in the region, which causes grid reliability risks;
- *Mitigate Existing Congestion* - Existing transmission capacity is fully utilized, and additional capacity in the region is needed to help to relieve congestion and, thereby, increase grid efficiency;
- *Increase the ability to meet demand growth in the region* - The Desert Southwest area is expected to experience substantial long-term growth, thereby creating demand for additional electric transmission capacity; and
- *Facilitate renewable generation development and public policy goals* - Satisfying the renewable portfolio standard requirements of western states will require access by renewable energy facilities to adequate electrical transmission facilities.

To meet these principal needs, the project has been designed to achieve the following project-specific objectives:

a) Create a link that provides benefits to population load centers on both ends of the line by connecting the Las Cruces and El Paso areas on the eastern portion of the line with the Tucson and Phoenix areas on the western portion.

b) Provide multiple intermediate access points with proposed connections to more than 10 existing substations, whose inclusion is prioritized by regional planning.

c) Provide a solution that fits with broader regional utility planning and needs. Provide for the efficient, cost-effective, and bidirectional transmission of up to 1,000 MW of initial rated capacity.

d) Utilize an innovative public-private partnership to select lines for upgrade that would create effective transmission capacity additions.

e) Maximize the use of existing ROWs and designated utility corridors in order to help minimize environmental and social impacts.

f) Meet North American Electric Reliability Corporation and Western Electricity Coordinating Council standards and guidelines.

g) Provide a path consistent with renewable resource land use efforts.

1.1.4 Agencies' Need for the Proposed Action

On December 4, 2009, and as amended on December 22, 2010, the Applicant submitted to the BLM an SF-299 *Application for Transportation and Utility Systems and Facilities on Federal Lands.* The BLM is required by the Federal Land Policy and Management Act (FLPMA) to respond to SF-299 applications for ROW grants. The BLM is authorized to grant ROW for electrical transmission lines under FLPMA Title V (43 U.S.C. 1761 – 1771).

Western's need for the proposed action is to facilitate the construction of transmission facilities that will help ensure reliability of the electric transmission grid needed to carry out Western's core functions. Additionally, the proposed action furthers Western's strategic goal of constructing transmission facilities and entering into public-private partnerships.

1.1.5 Project Siting

The project team's goal in siting the project is to meet the purpose and need while minimizing environmental and cultural impacts. For the routing study, the team chose to focus on possible appropriate options for the transmission line that would follow existing linear facilities to the maximum extent possible to minimize potential adverse impacts to both environmental and social resources. Using this approach, the project team conducted an iterative routing study process whereby all reasonable options for construction of the proposed transmission line within the designated study area shown in figure 1-1 were identified and evaluated through a geographic information system (GIS)-based screening process.

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 Section of the line as well as for the Upgrade Section, and resulted in the identification of proposed and alternative routes that represent the optimal routes for the project.

The basis for the study area was the location of the defined end points and a geographic area in between that would offer a reasonable range of geographically diverse options for connecting the two end points. Secondarily, the location of the existing linear facilities, including roads, transmission and distribution lines, railroads, and pipelines, were defined as routing opportunities and helped define the reasonable geographic boundary of the study area as shown in figure 1-1. In the eastern part of the study area, the U.S./Mexico border also served as a study area boundary.

Development of the New Build Section

For the New Build Section, the defined end points were the existing Afton (New Mexico) substation to the east and the existing Apache (Arizona) substation to the west. This portion of the transmission line will consist of a newly constructed 345-kilovolt (kV) transmission line that will be located in parallel to existing linear facilities where practical. The study area for the New Build Section was defined between these two end points and encompassed all reasonable existing linear facilities between these two points. An analysis of potential constraints was then conducted for the study area that identified environmental and land use resources with varying levels of compatibility/constraint with the project. Areas of constraints included such resources as proposed wilderness study areas, areas of high residential development, ecologically and culturally sensitive lands, and other resources. Through an iterative screening process, including input from stakeholders obtained at Applicant-sponsored public meetings and workshops, routing opportunities and constraints were evaluated and a series of viable routing options were identified. Following additional database development and additional analysis, including input from the BLM, Western, and other stakeholders, the proposed and alternative routes for the New Build Section were selected.

Development of the Upgrade Section

The fixed end points for the Upgrade Section consisted of the Apache substation to the east and the Saguaro substation to the west. Based upon results of regional planning and technical studies, two existing transmission lines were considered for upgrading: an existing Western 115-kV line and an existing Southwest Transmission Cooperative, Inc. (SWTC) path consisting of 230-kV and 115-kV lines. No additional options were considered because these were the only routes that met the technical needs of the project. Both Upgrade Section options were evaluated for constraints. Due to the number and complexity of environmental constraints associated with the SWTC option that were identified through the stakeholder outreach process, and the additional electrical advantages associated with upgrading the existing Western line, the SWTC route was eliminated from further consideration and the Western route was selected as the proposed route.

1.2 Project Description

1.2.1 Applicant-Proposed Route

The Applicant-proposed and alternative routes are summarized in figures 1-2 through 1-4. Please see the project's POD for more information.

Proposed New Build Section (Afton to Apache)

The New Build Section would begin at the Afton substation and follow an existing 345-kV transmission line northwest to Interstate 10 (I-10) (see figure 1-3), past the Aden Hills off-highway vehicle (OHV) area. From there, the route would cross I-10 just past Doña, and continue north of I-10 to Carne. Approaching Deming from the east, the route would run north of Deming and then follow existing roads west. The route would head northwest to the Hidalgo substation. From the Hidalgo substation, the route would continue due west, north around Lordsburg, and south to follow an existing pipeline ROW. The project route would then cross I-10 west of San Simon and follow an existing pipeline route south of the highway and north of the Dos Cabezas Peaks Area of Critical Environmental Concern (ACEC). The route would then turn south (east of the Town of Willcox) and along existing transmission facilities, east of the Willcox Playa, to the Apache substation. The termination point at the Apache substation would be the western extent of the project's New Build Section. The total length of the transmission line using the proposed northern route from the Afton substation to the Apache substation would be approximately 205 miles.

The project route would also include an approximately 30-mile segment between New Mexico State Road 9 (NM 9) and I-10, which would enable potential access to the rich 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 existing Afton substation and the existing Luna-Diablo 345-kV transmission line. The in-and-out loop of the Luna-Diablo line into the Afton substation is a technical requirement of the project and serves to strengthen the existing system.

Total New Build length, including all proposed segments, is approximately 240 miles.

Proposed Upgrade Section (Apache to Saguaro)

The Upgrade Section is approximately 120 miles in length, and would start at the Apache substation and terminate at the Saguaro substation (see figure 1-4). This section of the project route is a rebuild and upgrade of the existing Western 115-kV transmission line through Cochise, Pima, and Pinal counties, and will interconnect with more than 10 existing substations along the route. The Applicant anticipates following the same path as the existing transmission line. A new line segment approximately 2 miles in

length will be required to interconnect with the existing Tucson Electric Power Vail substation, located just north of the Western line.

1.3 Substations

More than 10 existing substations will interconnect with the project along the route. In addition, the project anticipates developing one new substation in Luna, Grant, or Hidalgo County, New Mexico. Further technical and construction detail can be found in the project's POD.

1.3.1 Substations on or Adjacent to BLM Lands

There are three substations that may require BLM ROW grants. Those substations include: 1) the existing Afton substation in New Mexico; 2) a potential newly constructed station in Luna, Grant, or Hidalgo County, New Mexico (referred to as intermediate substation below); and 3) the Nogales substation in Arizona.

1.3.2 Substations Related to the New Build Section

Afton Substation

The Afton substation is an existing station. A new yard would be built adjacent to the existing switchyard, and would accommodate two-phase shift transformers. In addition, two line positions from the Luna and Diablo substations would be looped into the new yard.

Intermediate Substation

An intermediate new station may be located between the Afton and Hidalgo substations. Four transmission lines would be terminated at that station.

Hidalgo Substation

The Hidalgo substation is an existing station. Existing main buses would be expanded to accommodate one additional line position. A new yard would be built adjacent to the existing switchyard, and would accommodate four line positions. Transmission lines from the Intermediate or Afton substations and the Apache substation would be terminated at Hidalgo.

1.3.3 Substations Related to the Upgrade Section

Apache Substation

The Apache substation is an existing station. A new yard would be built adjacent to the existing 230-kV switchyard and would accommodate line positions from the Adams Tap and Pantano substations.

Adams Tap Substation

The Adams tap substation is an existing station. A new yard would be built adjacent to the existing switchyard, and would accommodate line positions from the Apache and Nogales substations.

Pantano Substation

The Pantano substation is an existing station. The existing 230-kV yard would be expanded to accommodate additional line positions from the Apache and Vail substations.

Vail Substation

The Vail substation is an existing station. A new yard would be built to accommodate line positions from the Pantano and Tucson substations.

Nogales Substation

The Nogales substation is an existing station. A new yard would be built that would accommodate line positions from the Adams tap and Del Bac substations.

Del Bac Substation

The Del Bac substation is an existing station, and an optional stop for the project. This existing station would be rebuilt to accommodate line positions from the Nogales and Tucson substations.

Tucson Substation

The Tucson substation is an existing facility. A new yard would be built to accommodate eight line positions from the Vail, Del Bac, Rattlesnake, Saguaro, and Tortolita substations.

DeMoss Petrie (DMP) Substation

The DMP substation is an existing station. The buses would be expanded for two additional transformer positions.

Rattlesnake Substation

The Rattlesnake substation is an existing station. A new yard would be built to accommodate line positions from the Tucson and Marana substations.

Marana Substation

The Marana substation is an existing station. A new yard would accommodate line positions from the Rattlesnake and Saguaro substations.

Tortolita Substation

The Tortolita substation is an existing station. A new yard would accommodate line positions from the Marana and Tucson substations

Saguaro Substation

The Saguaro substation is an existing station. A new yard would accommodate line positions from the Marana and Tucson substations.

1.4 Fiber Optic Communications and Regeneration Sites

The 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). The fiber optic network would require regeneration sites at periodic distances along the transmission line, as determined in the detailed engineering studies. In general, these regeneration sites would be within the transmission line ROW.

1.5 Access Roads

Surface access roads would be required in order to reach each transmission line tower, each substation, and each regeneration site. The project has been designed to use existing access roads where possible. In some cases, the existing roads would require improvement. Engineering studies are ongoing to determine the location(s) of new access roads.

1.6 Temporary Work Areas

During construction, there would be requirements for temporary workspace, including wire splicing and pulling sites, and construction yards. While final locations for temporary workspace have not yet been determined, it is envisioned that these sites would most likely be located in or adjacent to the ROW.

2 ALTERNATIVES DEVELOPMENT

2.1 Overview of the Routing Process

2.1.1 Route Selection Objectives

The goal of the routing study was to identify viable route options, evaluate potential environmental and land use constraints associated with those routes, and identify the optimal route alternatives for the project. The specific criteria used for the routing study are identified in section 2.1.4, Routing Criteria. The overarching goals were to minimize potential impacts and conflicts between the project and other existing infrastructure, environmentally and culturally sensitive areas, and human activities by routing along existing linear facilities to the extent practical, avoiding unreasonable circuitous routes, avoiding extreme costs, and minimizing nonstandard design requirements. The routing objectives were accomplished through the identification of the proposed segments that minimized potential impacts to environmental, social, and cultural resources while meeting the purpose and need for the project. The specific routes considered and either discarded or carried forward for analysis are discussed in sections 2.2.3, 2.2.4, and 2.2.5.

2.1.2 Summary of Routing Process

An iterative screening process was conducted for the routing study to identify the optimal route for the project. To accomplish this objective, the routing process focused on identifying and evaluating, to the extent practicable, existing linear facilities that could present opportunities for locating the project. Once candidate routes were identified, they were vetted by the team using the routing criteria. The team cast a wide net initially and then winnowed the list down to best-fit options, which were evaluated again by the team to determine the proposed route and alternatives.

The major steps undertaken as part of the study's routing process were:

- Step 1: Selection of the study area for the project that defined the extent of the geographical area within which feasible routes for the project were identified;
- Step 2: Development of the study's routing criteria (opportunities and constraints) that were used in evaluating potential routes;
- Step 3: Development of a geo-referenced database on a GIS platform to identify and analyze routing opportunities and constraints;
- Step 4: Identification of route options that minimized adverse impacts while maximizing use of the highest-value route opportunities, informed by public and agency feedback; and
- Step 5: Identification of the proposed route and reasonable alternatives based on an iterative analysis of the routing opportunities and constraints, which balanced engineering and economic costs with environmental and land use considerations identified through the public engagement process.

The steps implemented during the routing study are discussed further below.

2.1.3 Study Area Definition

The study area (see figure 1-1) for the project routing study was defined by the end points and by the characteristics of the New Build Section and Upgrade Section of the line.

Study Area for the New Build Section

The approach to routing the New Build Section was driven by the objective of minimizing potential environmental and land use impacts by routing the transmission line adjacent to existing linear facilities where practicable. Following this approach, the study area for the New Build Section encompassed the geographic area between the defined end points and existing linear facilities that presented a reasonable opportunity for the New Build Section to be located within close proximity. The two end points for the New Build Section are the existing Afton substation, located southwest of Las Cruces, in Doña Ana County, New Mexico, and the existing Apache substation, located south of Willcox, in Cochise County, Arizona. The New Build Section may also have an intermediate connection at or near the existing Hidalgo substation located near Lordsburg, New Mexico, and a potential new intermediate connection in Luna, Grant, or Hidalgo County. Existing linear facilities included transmission and distribution lines, roads, railroads, and pipelines.

Study Area Definition for the Upgrade Section

Unlike the New Build Section, the objective of the Upgrade Section of the project is to upgrade an existing transmission line, replacing the existing structures and conductors within the same ROW to the extent possible. Therefore, the study area for the Upgrade Section was selected based on the alignment of the two existing transmission lines that were considered for upgrading, i.e., an existing Western 115-kV line and an existing SWTC 230-kV line. Because no additional existing transmission lines offered viable opportunities for upgrading between the Apache and Saguaro substations, the study area focused only on the existing Western and SWTC transmission lines. The study area for the Upgrade Section consisted of a 4-mile-wide corridor, or 2 miles on either side of the existing Western and SWTC transmission lines. The selection of a 4-mile-wide corridor for the Upgrade Section study area provided adequate flexibility for the evaluation of potential modifications to the existing Western and SWTC ROWs.

2.1.4 Routing Criteria

Routing criteria were developed as part of the routing study to guide the identification and analysis of potentially viable routes for the New Build Section of the project. The study employed two general types of routing criteria for this portion of the project: routing opportunities and routing constraints (see table 2-1).

Opportunities – Routing opportunities were used as the basis for identifying potential optional route segments. Routing opportunities for the project's New Build Section consisted primarily of existing linear facilities such as transmission and distribution lines, roads, railroads, and pipelines. The use of existing linear features/corridors for routing purposes make it unnecessary to introduce a new linear feature into the land use patterns of an area and help minimize associated impacts. This approach to linear facility siting is generally consistent with the land use planning direction of Federal, State, and local land management agencies and siting authorities. As part of the routing study, all reasonable efforts were made to identify and analyze viable routing opportunities within the study area.

Constraints – Routing constraints are those resources and land use features that have differing levels of compatibility with new transmission line construction. Two general categories of constraints were identified:

- Avoidance Areas – These are areas where siting the line would be extremely difficult or nearly impossible for one or more reasons (economics, statutory prohibition, permitting timeframes, construction difficulty, etc.). These areas were excluded from consideration.

- Sensitive Areas – These are areas where siting the line would be possible but specific issues or conditions exist that could make developing the project more difficult, more time consuming, or more costly. These also included areas identified by stakeholders as those of greater concern.

The routing opportunities were used to identify potential optional routing segments for the project. The impact of these segments on the identified areas of routing constraints was then analyzed to identify potential routes with the least possible adverse impacts to the environment and human activities.

TABLE 2-1. ROUTING OPPORTUNITIES AND CONSTRAINTS

Opportunities and Constraints
Routing Opportunities
Existing Linear Facilities • Existing Transmission Line Corridors (69 kV and above) • Designated Federal Corridors • Railroads (Active and Abandoned) • Federal Interstate Highway ROWs • Pipeline ROWs • Undivided Highways • County Roads • Other Existing Utility ROWs • Section 368 Energy Corridors • Township, Section, and Range / Property Boundaries
Routing Constraints
Federal and State Special Use Lands • National Parks / Monuments / Recreation Areas / Landmarks • State Parks / Recreation Areas • Wilderness Areas / Wilderness Study Areas • Indian Lands (BIA) • Military Reservation / Installation (including the Fort Huachuca Electronics Testing Area) • Federal / State Wildlife Refuges BLM Designated Lands • ACECs • BLM Visual Resource Management (VRM) Class I Areas Cultural and Historic Resources • Cultural and Historical Resources • National Historic Districts / National Register Sites • Historic and Scenic Trails Privately Owned Protected Lands • Nature Conservancy Preserves (distinguish between areas of interest and owned/managed properties) • Private Lands Managed by Other Private Management Groups Land Use/Land Cover • Municipal Areas (towns / cities) • County Parks / Recreational Areas • Airports and Aviation Flight Paths • Sensitive Recreation Areas • Visually Sensitive Areas • Existing Residential Areas • Prime Farmlands

TABLE 2-1. ROUTING OPPORTUNITIES AND CONSTRAINTS

Opportunities and Constraints
• Waterfowl Nesting or Rearing Areas, including Playas • Pre-1955 Carbonate Mining Claims Environmentally Sensitive Areas • State Scientific / Natural Areas • Designated Unique Habitats • Threatened and Endangered Species Critical Habitat • Wetlands and Waters of the United States

2.1.5 Data Collection for the Routing Study

Development of a comprehensive database was a key component of the project routing study because the database made it possible to efficiently identify, measure, label, and track the segments under consideration. The data obtained were primarily in electronic format and were obtained from various Federal, State, and local agencies as well as commercial and other sources. The Environmental Systems Research Institute (ESRI) ArcInfo™ GIS platform was used to manage the electronic data and analyze the various routing options under evaluation. The database developed for the project included a broad range of physical, ecological, cultural, and land use data from a number of sources.

A summary of the various sources and data collected is provided below.

Aerial Photography

Two sources of aerial photography were used extensively during the routing study:

- National Agricultural Imagery Program (NAIP) color imagery for New Mexico and Arizona, 2009, and
- Google Earth™ imagery accessed between May 2011 and December 2011.

Aerial imagery from these sources was used to identify and evaluate various resources within the study area. The NAIP imagery was also used in the production of map books and other visual displays employed during the public engagement process. The aerial photography was used to verify the location of various existing facilities, especially existing transmission lines, roads, and railroads.

Maps

A number of electronic and hardcopy maps were obtained for the routing study, including electronic U.S. Geological Survey (USGS) 7 ½-minute topographic quadrangle maps, transmission line information, maps of historic railroads, private ownership maps, and other mapped resources. A series of land development and zoning maps were obtained from county and city sources as well as Federal Aviation Administration (FAA) maps depicting the locations of airports and commercial and DoD flight paths. These maps showed the location of special use areas, zoning, and other land use categories. The FAA maps were used to evaluate the location of both commercial and DoD flight paths that could be impacted by the project. These maps were used throughout the overall data development process. Aviation flight paths were evaluated to determine if they would result in a significant constraint to any of the identified candidate corridors. While there are numerous commercial and military training routes in the general study area, all flight paths and training routes have a minimum elevation of 1,500 feet above ground level. This elevation is well above the transmission line structure height and, therefore, did not represent a constraint to the routing process. In addition to aviation flight paths, airports were also considered as a potential constraint and were mapped throughout the study area.

GIS Data Sources

An extensive electronic database was developed using the ESRI ArcInfo™ GIS platform. Electronic data were obtained from a number of sources including the BLM, commercial sources, USGS, and various State and county agencies. A list of data obtained and their sources is presented in table 2-2, Data Sources for Routing Opportunities, and table 2-3, Data Sources for Routing Constraints. The GIS database was the primary mapping and analysis tool used during the routing study. The GIS database was used to create overlays of various data layers, such as existing linear facilities with surface ownership and other resource-based data. The GIS database was used extensively to generate a series of maps depicting the various routing opportunities and constraints, and to conduct analyses of potential impacts associated with various route options. The GIS database was also effectively used at series of public open house meetings that were held to obtain input from local stakeholders. At the open house meetings, an interactive GIS station was used to demonstrate the study's overall routing process graphically, resulting in a clearer understanding of the overall process and its relevance to areas of local stakeholder concern.

TABLE 2-2. DATA SOURCES FOR ROUTING OPPORTUNITIES

Opportunities	Data Source and Needs
Existing Transmission Lines (69 kV and above)	Source: Platts data set Refine transmission line database
Designated Federal Corridors	Source: Designated Federal energy corridors
Railroads (active and abandoned)	Source: USGS and ESRI data
Federal Interstate Highway ROWs	Source: USGS and ESRI data
Pipeline ROWs	Source: Platts data set
Undivided Highways	Source: USGS and ESRI data
Existing Canals	Source: National Hydrography Dataset data
Other Existing Utility ROWs	Source: Lower-voltage distribution line coverages for mapping and analysis
Township Section and Range / Property Boundaries	Source: USGS data

TABLE 2-3. DATA SOURCES FOR ROUTING CONSTRAINTS

Constraints	Data Source
National Parks / Monuments / Recreation Areas / Landmarks	Source: BLM, National Park Service (NPS), Arizona and New Mexico State Park data, U.S. Department of Interior (DOI) NPS Federally designated Wild and Scenic Rivers data, Federal Highway Administration Scenic Roads data
State Parks / Recreation Areas	National Atlas, State sites
Wilderness Areas / Wilderness Study Areas	Source: BLM and National Atlas
ACECs	Source: BLM
Indian Lands	Source: National Atlas
Cultural and Historical Resources (limited for opportunity and constraints analysis)	Source: Cultural sources generally include BLM (historic trails and sites) and NPS (National Register of Historic Places [NRHP]); Arizona and New Mexico State inventories

TABLE 2-3. DATA SOURCES FOR ROUTING CONSTRAINTS

Constraints	Data Source
Nature Conservancy Preserves (distinguish between areas of interest and owned/managed properties)	Source: Nature Conservancy data, and Natural Resources Conservation Service (NRCS) data for conservation easements
State Scientific / Natural Areas	Source: Arizona or New Mexico separately designated scientific or natural areas;
Military Reservation / Installation (Include Fort Huachuca Electronics Testing Area)	Source: Onsite meetings and phone calls with key Installation employees; installation maps
Prime Farmlands	Source NRCS locations and acres of prime farmland and unique soils (will need hydric soils later); NRCS
Agricultural Areas (center-pivot irrigation systems)	Source: Research needed – U.S. Department of Agriculture (USDA), possibly Arizona or New Mexico, and USGS National Land Cover Dataset
Federal / State Wildlife Refuges	Source: U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department (AZGFD), and New Mexico Department of Game and Fish (NMDGF) data, Arizona and New Mexico State Natural Heritage Programs; USFWS
Threatened and Endangered Species Critical Habitat	Source: BLM and USFWS
Waterfowl Nesting or Rearing Areas	Source: Covered in above categories
Designated Unique Habitats	Source: Covered in above categories
County Parks / Recreational Areas	Source: County and city land use plans and comprehensive plans for designated parks and recreational areas near the transmission corridor
Municipal Areas (towns / cities)	Source: County and city land use plans and comprehensive plans for boundaries; individual municipalities
Federal, State, and Agency-Owned Land (not otherwise protected)	Source: Land ownership database; BLM surface ownership
Scenic Areas (including scenic travel routes)	Source: BLM, county, and city land use plans and comprehensive plans for scenic areas
Airports and Aviation Flight Paths	Source: FAA for FAA-registered airports and some non-registered airports; ESRI and FAA
VORTAC Tower Sites	Source: Federal Communications Commission
National Wild and Scenic Rivers	Source: Covered above in NPS data research
Geologically Unstable or Highly Erosive Areas	Source: State geological surveys; USGS and State Geological Surveys
National Historic Districts / National Register Sites	Source: Arizona and New Mexico State inventories; NPS NRHP
Visually Sensitive Areas (including VRM I classifications)	Source: VRM data from BLM
Historic and Scenic Trails	Source: County and city land use plans and comprehensive plans for historic and scenic trail data; BLM and local municipalities
Lands under the Management of Private Organizations	Counties and non-governmental organizations (NGOs); BLM surface ownership
Wetlands and Waters of the United States	EDR report information; USFWS National Wetlands Inventory
Sensitive Recreation areas	Source: City land use plans and comprehensive plans for sensitive recreation areas; BLM, USFS, and local municipalities
100-Year Floodplains	Source: Federal Emergency Management Agency
Existing Residential Areas	Source: USGS

Field Inspections

Members of the routing team conducted ground-level field inspections within the study area where accessible from public roads to ground truth and confirm electronic data used in the GIS database.

2.2 Development of Potential Routes

2.2.1 Identification of Route Options

The identification of potential route options for the project's New Build Section was based on opportunities to parallel existing linear facilities and avoid constrained areas to the maximum extent possible (see figure 2-1). For the New Build Section, the route option identification process focused on following a wide range of existing linear facilities, including transmission and distribution lines, highways, including I-10 and other roads, railroads, pipelines, and existing Energy Policy Act Section 368 Federal energy corridors on BLM lands. One of the advantages of following existing linear features is that they either provide access to the line route or include existing access roads. Use of the existing roads for project access greatly reduces new disturbance and overall project impacts.

The BLM is a multi-use agency that encourages energy development within existing utility corridors. The project is committed to using Section 368 energy corridors to minimize the use of new ROW. Section 368 of the Energy Policy Act requires the U.S. Department of the Interior (DOI), in conjunction with the U.S. Department of Agriculture (USDA), U.S. Department of Energy (DOE), U.S. Department of Commerce, and 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. In response to Section 368, the BLM and DOE prepared the West-Wide Energy Corridor Programmatic Environmental Impact Statement (WWEC PEIS) with multiple cooperating agencies. The WWEC PEIS serves as an amendment to existing management plans and established multiple energy corridors on public lands that are compatible with local BLM land use plans. The Final WWEC PEIS, issued in November 2008, can be downloaded at http://corridoreis.anl.gov/documents/fpeis/index.cfm. The project route makes use of select segments of the available Section 368 energy corridors

In addition, the project team noted the location of Western Renewable Energy Zones (WREZs) in developing the project (see figure 2-2 for the location of the project in proximity to local WREZs). The Western Governors' Association and DOE released a joint WREZ Phase 1 report on June 15, 2009, that is an initial step to identifying areas in the Western interconnection that have both the potential for large-scale development of renewable resources and low environmental impacts. The project team also reviewed the results of the Arizona Renewable Resource and Transmission Identification Subcommittee, a stakeholder-informed process to identify renewable energy resource areas in Arizona and support the identification of transmission corridors required to serve those resource areas.

For the Upgrade Section, the route identification process evaluated two options: 1) upgrading the existing SWTC line, and 2) upgrading the existing Western line (see figure 2-3). These were the only two existing lines available to be upgraded to a capacity that would meet project objectives and, therefore, the only two lines considered for the Upgrade portion of the line.

The first step in the identification of route options was mapping existing linear facilities within the study area. In the case of the New Build Section, an analysis of all linear facilities was conducted 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 due to their alignment/direction. Once the initial

identification and screening of potential route options had been completed, the remaining route segments were then evaluated through the screening and alternatives analysis process described below.

An initial mapping and analysis of constraints was conducted within the study area, the results of which are presented in figures 2-4 and 2-5 for the New Build Section and Upgrade Section, respectively. By overlaying the areas of routing opportunity with the constraints, a series of viable routing opportunities were developed (see figures 2-6 and 2-7 for the New Build Section and Upgrade Section, respectively). The viable route segments represent the routing options that do not cross exclusionary constraint areas and that meet the project's overall needs to interconnect the various end points in a logical and efficient manner. The viable routing opportunities were used as the basis of analysis for subsequent phases of the routing study and were presented at the public open house and agency workshop meeting as described below.

2.2.2 Public Informational Meetings and Agency Workshops

Public engagement was an integral part of the study's overall routing process. It allowed the project team to understand initial concerns from a wide range of project stakeholders so these concerns could be integrated into the study's routing process from the outset. The overall goal of the public engagement process was to involve interested stakeholders and the general public in a transparent and credible process to 1) learn about the project and the project team's approach to siting transmission lines; 2) provide feedback on potential routing options; and 3) understand the different opportunities for continued participation throughout project development process, including participation in the comment periods provided as part of the National Environmental Policy Act (NEPA) review.

Public Process Tools

Project Phone Line and Email Address

The project team established a project phone line (1-888-752-2822) and email address (connect@southlinetransmissionproject.com) to enable members of the public to provide comments and ask questions about the project. The project team has tracked all incoming questions and comments, and responded to inquiries. All communications are logged in the stakeholder contact database so that the project team can review and consider the feedback during project development.

Stakeholder Contact and Communications Database

The project team established a database that currently includes more than 800 stakeholder names, organizations, and contact information, as well as outreach and correspondence with all stakeholders. Hosted online, the information included in the contact database is readily available to all project team members. The information in the database will be used to send periodic e-newsletters to project stakeholders; these contacts were also provided to BLM and Western for outreach purposes associated with the NEPA process.

Project Website

The project team launched a bilingual (English and Spanish) project website in the summer of 2011 to store information about the project, including maps, frequently asked questions (FAQs), timelines, and information about how the public can participate in project development. The website will continue to be expanded throughout project development and will serve as an archive of presentations, handouts, maps, and any additional information shared with the public. The project website is www.southlinetransmissionproject.com.

Project Informational Materials

To enable stakeholders to understand the project and provide informed feedback about the project and potential route options, the project team developed informational materials including a project fact sheet, FAQs, and project maps (high-level and detailed versions). These materials were provided at in-person meetings and subsequently made available on the project website.

Public Engagement Meetings

From June through December 2011, the project team worked with project stakeholders to iteratively refine the project study area and the selection of possible and optional routes submitted to the BLM and Western for the environmental review process.

In July and August, the project team contacted and met with numerous stakeholders representing local, county, and State governments, tribes, chambers of commerce, non-governmental organizations (NGOs), local landowners, military, energy interests, farm and ranch interests, and local, State, and Federal agencies to receive feedback on the overall routing approach and specific environmental, cultural, and other land uses that might impact the selection of potential routes.

In August and September, the project team compiled the information received from stakeholders (both general and site-specific data) and developed a number of potential route corridors. These broad swaths included all potentially viable options. 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 land use conflicts.

In October, November, and December, the project team 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 for the BLM and Western to use in the environmental review process. This final set of potential and alternative routes reflects a significant amount of feedback from stakeholders, including information about military and flight operations, visual impacts, feasibility of crossing certain sections of land, potential impacts to sensitive species and habitats, and potential impacts to cultural resources. Some of the specific information obtained from stakeholders includes:

- Public input asking for power lines to follow major roads; however, there is a high visual impact for lines built in close proximity to highways because of their visibility to the public;
- Public desire to isolate lines from homes and important visual resources;
- Providing opportunities to interconnect future renewable energy projects is good for the local economy;
- BLM concern that a route going south out of Afton toward NM 9, heading west, and then extending north again to the I-10 corridor would create miles of additional transmission lines;
- The project should avoid Wilderness Study Areas;
- The Florida Mountains are visually sensitive and a portion has been designated as a BLM Visual Resource Management (VRM) Class I area;
- Landowner concerns about obstructed views in general;
- Pre-1955 claims in this area that could prohibit the BLM from issuing a ROW unless claimant concurrence is obtained;
- High likelihood for cultural sites around playas;

- High potential for sand hill cranes around Willcox Playa;
- DoD interest in routes near the Willcox Playa;
- Potential impacts from electronic interference with the Buffalo Soldier Electronic Testing Range;
- Avoidance of the Dos Cabezas Wilderness Area and BLM ACEC;
- Tumamoc Hill is a culturally, environmentally, and historically important site; and
- The new resource management plan for the Ironwood Forest National Monument (IFNM) may prohibit upgrading the existing SWTC line.

A summary of the stakeholder interviews, stakeholder outreach meetings, public information meetings, routing workshops, and agency webinars held as part of the routing study is presented in appendix A to this report.

2.2.3 Routing Refinement

Screening of the route options and selection of the proposed route was conducted in an iterative manner using the routing constraint criteria and the electronic database to identify those route options that best met the objectives of the project. Following the initial screening of the potential route options, an analysis was conducted by overlaying the various environmental and land use constraints with the potential route segments. Those route options that crossed or were in close proximity to exclusionary criteria, such as wilderness study areas, VRM Class I areas, and National and State parks, were eliminated from further consideration. During this timeframe, the project team contacted and met with numerous stakeholders representing local, county, and State governments, tribes, chambers of commerce, non-governmental organizations, local landowners, military, energy interests, farm and ranch interests, and local, State, and Federal agencies, to receive feedback on the overall routing approach and specific environmental, cultural, and other land uses that might impact the selection of potential routes.

Additional data refinement was then conducted for areas crossed by the remaining route options. The next step in the route options evaluation was to prepare a set of viable route options that served the objectives of the project based on their avoidance of exclusionary and high-sensitivity constraint areas, and the ability to support logical route development. These viable route options were then presented to members of the public and other stakeholders at a series of five open house meetings held in September 2011 and at a public meeting in Benson, Arizona, in November 2011 (see section 2.2.2.2, Public Engagement Meetings, for further details on the meetings). Using the results of these meetings and resource-specific comments from a series of routing study workshop teleconferences held with Western and the Las Cruces and Safford BLM field offices in November 2011, the viable route options were further assessed and a refined set of route alternatives was developed, focusing on corridors of a defined width linking the end points of the study area. The corridors for the New Build Section were given a width of 2 miles, or 1 mile on either side of a centerline/existing linear facility in most cases. The corridor width was reduced to a total of 1,000 feet in areas near residential and commercial developments, such as areas around Deming, Lordsburg, Willcox, and Columbus. The corridors for the Upgrade Section consisted of a total width of 500 feet, or 250 feet on either side of the existing transmission lines. A workshop was held by the project routing team to review the results of the routing study to that point and to define the proposed and alternative routes based on all available data.

Naming Conventions

The project team then developed naming conventions for the retained options. As noted above, at the highest level, the entire project is referred to as the Southline Transmission Project. The project is

broken down into two sections: the Upgrade Section and the New Build Section. For both sections, the project team identified some viable alternatives. The main alternative to the New Build is the Alternative Southern Route. Smaller variations on the Upgrade, the New Build, and the Alternative Southern Route are labeled as Alternative Route Segments A-H. An individual segment of a route is referred to as a "segment," with a unique identification number and letter combination (e.g., Segment B7)

Summary of Viable Route Options

Figures 2-8 and 2-9 present the individual viable route segments that were evaluated. A summary of the viable route segment refinement process, including the length and reasons all viable segments were retained or eliminated, is presented in table 2-4.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
			New Build Section Segments
A1	6.1	Dona Ana	Retained – Alternative Southern Route. Follows open land. Avoids existing telecommunications tower passed by A9 and A10, as well as ranching operations at A11.
A2	5.2	Dona Ana	Retained – Proposed Route. Essential component. Provides interconnect to existing 345-kV line. Follows existing 345-kV line.
A3	4.6	Dona Ana	Retained – Alternative Southern Route. Follows road instead of open land for reduced new ground disturbance.
A4	6.5	Dona Ana	Eliminated. Follows open land.
A5	2.8	Dona Ana	Retained – Alternative Southern Route. Follows county road. A5-and A8 together reduce land disturbance by offering a shorter total line length than the alternative segments that extend from Afton to NM 9.
A6	5.0	Dona Ana	Eliminated. Follows open land. Additional line length and ground disturbance.
A7	5.1	Dona Ana	Retained – Alternative Route Segment A.–Follows open land and rural road. Additional line length and ground disturbance.
A8	11.3	Dona Ana	Retained – Alternative Southern Route. Follows open land. A5-and A8 together reduce land disturbance by offering a shorter total line length than the alternative segments that extend from Afton to NM 9.
A9	3.0	Dona Ana	Eliminated. Follows rural road and passes near existing telecommunications tower.
A10	4.0	Dona Ana	Eliminated. Follows open land and passes near existing telecommunications tower.
A11	1.7	Dona Ana	Eliminated. Follows open land and passes near existing ranching operation.
A12	17.0	Dona Ana	Eliminated. Follows open land.
A13	4.8	Dona Ana	Alternative Route Segment A. Follows rural road. Additional line length and ground disturbance.
A14	19.5	Dona Ana	Eliminated. Follows county road and open land, and passes near visually sensitive areas including the Aden Lava Flow Wilderness Study Area and Kilbourne Hole, a geologic formation south of Afton.
B1	20.4	Luna	Retained – Proposed Route Cross Country. Passes through areas identified as having solar potential according to the WREZ map.
B2	21.5	Luna	Eliminated. Follows existing 69-kV line. Passes close to Florida Mountains Wilderness Study Area. Significant visual impact concerns. See note 2

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
B3	12.4	Luna	Eliminated. Follows NM 11. See note 2
B4	19.2	Luna	Eliminated. Follows rural roads and cross country. Would backtrack and add line length.
B5	10.4	Luna	Eliminated. Follows rural roads and open land. See note 2.
B6	4.6	Luna	Eliminated. Follows rural roads and open land. See note 2.
B7	8.6	Luna	Eliminated. Follows rural roads, existing 69-kV line, and open land. See note 2.
B8	15.0	Luna	Eliminated. Follows Route 11. Passes near a number of residences. See note 2.
B9	9.5	Luna	Eliminated. Follows rural roads. See note 2.
B10	11.6	Luna	Eliminated. Follows rural roads. Passes by some residences. See note 2.
B11	14.8	Luna	Eliminated. Follows rural roads. See note 2.
B12	8.1	Luna	Retained – Proposed Route. Follows property lines. Passes through areas identified as having solar potential according to the WREZ map.
C1	19.1	Grant	Eliminated. Follows State Road 146. Backtracks compared to proposed segment.
C2	12.0	Grant	Retained – Alternative Southern Route. Follows abandoned rail route.
C3	4.6	Hidalgo	Eliminated. Follows existing railroad and State road. See note 1.
C4	3.5	Hidalgo	Eliminated. Follows existing railroad. See note 1. Requires backtracking to use. Adds line length.
C5	10.0	Hidalgo	Eliminated. Follows existing 69-kV transmission line. See note 1.
C6	1.3	Grant	Retained – Alternative Southern Route. Essential connection from South route up to N24 and Hidalgo substation. Follows existing 115-kV transmission line.
C7	2.9	Hidalgo	Eliminated. Follows Muir Road. Passes near center-pivot irrigation. Redundant segment to proposed.
C8	13.2	Hidalgo	Retained – Alternative Route Segment D. Follows county road using C8, C17, N30, and N82 combination. Does not allow interconnection at Hidalgo substation.
C9	4.5	Grant	Eliminated. Follows existing 69-kV transmission line. See note 1.
C10	5.7	Hidalgo	Eliminated. Follows Existing 69-kV transmission Line. See note 1.
C11	1.5	Hidalgo	Eliminated. Follows existing railroad, 69-kV transmission line, and State road. See note 1.
C12	2.2	Grant	Eliminated. Follows existing railroad. See note 1.
C13	7.9	Grant	Eliminated. Follows existing railroad and backtracks compared to proposed segment.
C14	3.1	Grant	Eliminated. Follows existing 69-kV transmission line. See note 1.
C15	7.3	Hidalgo	Eliminated. Follows rural road. See note 1.
C16	2.1	Grant	Retained – Alternative Southern Route. Follows old rail route. Connector not needed for proposed route.
C17	1.7	Grant	Retained – Alternative Route Segment D. Follows abandoned rail line. Using C8, C17, N30, and N82 combination does not allow interconnection at Hidalgo substation.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
C18	3.1	Grant	Retained – Alternative Southern Route. Follows existing 115-kV line.
C19	3.0	Luna	Retained – Alternative Southern Route. Follows existing 115-kV line.
C20	3.1	Hidalgo	Eliminated. Follows county road. Redundant to proposed.
C21	1.0	Hidalgo	Eliminated. Follows existing 69-kV transmission line. Segment not needed.
C22	9.7	Hidalgo	Eliminated. Follows existing pipeline.
C23	5.9	Grant	Eliminated. Follows existing 69-kV transmission line. Backtracks compared to proposed segment.
C24	7.7	Grant	Eliminated. Follows existing 69-kV transmission line. Not needed once I-10 segments were eliminated.
C25	5.8	Grant	Retained – Alternative Southern Route. Follows rural road.
D1	4.0	Hidalgo	Eliminated. Follows county road. See note 1.
D2	18.5	Hidalgo	Eliminated. Follows county road east and north of Cotton City. See note 1.
D3	3.5	Hidalgo	Eliminated. Follows open land. See note 1.
D4	5.5	Hidalgo	Eliminated. Follows NM 9 and NM 338. Passes by some residential areas near Animas. Northern part of segment follows natural gas pipeline. See note 1.
D5	11.6	Hidalgo	Eliminated. Follows open land and some rural roads. Passes west of Cotton City. See note 1.
D6	4.1	Hidalgo	Eliminated. Follows State Roads 145 and 338. Passes north and west of Cotton City. See note 1.
D7	3.3	Hidalgo	Eliminated. Follows existing 69-kV transmission line. See note 1.
D8	3.9	Hidalgo	Eliminated. Follows existing 69-kV transmission line. See note 1.
D9	5.9	Hidalgo	Eliminated. Follows existing 69-kV transmission line and county road. See note 1.
D10	5.1	Hidalgo	Eliminated. Follows Route 338. See note 1.
D11	7.0	Hidalgo	Eliminated. Follows existing 69-kV transmission line a portion of the way and open land for the remainder. See note 1.
D12	2.1	Hidalgo	Eliminated. Follows existing 69-kV transmission line. See note 1.
D13	3.0	Hidalgo	Eliminated. Follows rural road. See note 1.
D14	1.0	Hidalgo	Eliminated. Follows existing 69-kV transmission line. See note 1.
D15	4.4	Hidalgo	Eliminated. Follows rural roads. See note 1.
E1	5.6	Cochise	Retained – Proposed Route. Follows 230-kV transmission line. Avoids downtown Willcox and reduces visual impacts.
E2	16.8	Cochise	Retained. Proposed Route. Follows existing 230-kV transmission line. Avoids downtown Willcox and reduces visual impacts.
E3	10.3	Cochise	Retained – Alternative Route Segment G. Follows existing pipeline followed by an existing 345-kV transmission line. Avoids downtown Willcox and reduces visual impacts. Alternative route west of Willcox increases line length over the proposed route.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
E4	3.9	Cochise	Retained – Alternative Route Segment G. Follows 345-kV transmission line and rural roads. Avoids downtown Willcox and reduces visual impacts. Alternative route west of Willcox increases line length over the proposed route.
E5	4.3	Cochise	Retained – Alternative Route Segment G. Follows rural road and open land. Avoids downtown Willcox and reduces visual impacts. Alternative route west of Willcox increases line length over the proposed route.
E6	5.3	Cochise	Retained – Alternative Route Segment G. Crosses open land. Avoids downtown Willcox and reduces visual impacts. Alternative route west of Willcox increases line length over the proposed route.
E7	10.2	Cochise	Retained – Alternative Route Segment G. Follows existing 69-kV transmission line. Avoids downtown Willcox and reduces visual impacts. Alternative route west of Willcox increases line length over the proposed route.
E8	1.2	Cochise	Eliminated. Follows county road. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E9	1.5	Cochise	Eliminated. Follows county road. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E10	0.5	Cochise	Eliminated. Follows existing 69-kV transmission line. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E11	3.0	Cochise	Eliminated. Follows existing 69-kV transmission line. Goes through downtown Willcox. Increased visual impacts. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E12	2.4	Cochise	Eliminated. Follows existing 69-kV transmission line. Near golf course, airport.
E13	4.8	Cochise	Eliminated. Follows I-10. Increased visual impacts along highway.
E14	8.0	Cochise	Eliminated. Follows 69-kV transmission line. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E15	6.4	Cochise	Eliminated. Follows existing natural gas pipeline.
E15	1.2	Cochise	Eliminated. Follows existing natural gas pipeline. Goes through downtown Willcox. Increased visual impacts.
E16	2.2	Cochise	Eliminated. Follows county road. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E17	2.0	Cochise	Eliminated. Follows county road. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.
E18	6.4	Cochise	Eliminated. Follows county road. Near golf course and airport.
E19	2.9	Cochise	Eliminated. Follows rural road. Closer to downtown Willcox than proposed or alternate route around Willcox, which could result in greater visual impacts.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
E21	0.6	Cochise	Eliminated. Follows existing 69-kV transmission line. Near golf course and airport.
E22	8.4	Cochise	Eliminated. Follows I-10. Goes through downtown Willcox. Increased visual impacts.
N1	19.2	Dona Ana	Retained – Proposed Route. Follows existing 345-kV line, Section 368 energy corridor, and existing gas pipeline. Passes just south of and avoids Aden Hills OHV Area.
N2	14.1	Dona Ana	Eliminated in favor of N4, which follows existing 345-kV line instead of I-10. Follows pipeline and short Section 368 segments.
N3	10.3	Luna	Eliminated in favor of following existing 345-kV line. Follows I-10. Follows open land. Segment not needed. Extended length of line without benefit. Originally identified to provide access to Mason Draw Solar Energy Zone (SEZ), which has subsequently been removed for BLM SEZ EIS.
N4	12.8	Dona Ana	Retained – Proposed Route. Follows existing 345-kV line and existing gas pipeline.
N5	2.5	Luna	Retained – Proposed Route, follows existing pipeline.
N6	10.4	Luna	Retained – Proposed Route. Follows existing 345-kV line and existing gas pipeline.
N7	6.1	Luna	Eliminated. Follows along I-10 and railroad in area of visual impact concern due to proximity of I-10 and residences.
N8	14.9	Luna	Eliminated. Follows natural gas pipeline. Connected to N2, which was eliminated in favor of N4, which follows existing 345-kV line instead of I-10. Follows pipeline and short Section 368 segments.
N9	12.2	Luna	Retained – Proposed Route. Follows existing 345-kV transmission line east and north of Deming.
N10	1.2	Luna	Retained – Proposed Route. Follows 345-kV transmission line north of Deming. Reduces visual impacts.
N11	11.0	Luna	Retained – Proposed Route. Follows existing 345-kV transmission line north of Deming. Reduces visual impacts.
N12	2.9	Luna	Eliminated. Follows I-10. Eliminated for concern about visual impacts in a highly trafficked area.
N13	12.1	Luna	Eliminated. Follows existing pipeline and passes by some residences.
N14	4.6	Luna	Eliminated. Follows existing pipeline and passes by a number of residences.
N15	3.6	Luna	Eliminated. Follows county road. Not needed as an interconnecting north-south segment.
N16	5.0	Luna	Eliminated. Follows natural gas pipeline. Not needed once I-10 segments were eliminated.
N17	17.8	Grant	Retained – Proposed Route. Follows 345-kV transmission line and natural gas pipeline. Includes some Section 368 energy corridor. Shortest segment to allow efficient interconnection at Hidalgo substation with proposed route.
N18	9.0	Luna	Eliminated. Follows I-10 in area of concern for visual impacts.
N19	7.0	Grant	Eliminated. Follows I-10 in area of concern for visual impacts.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
N20	3.3	Grant	Retained – Alternative Southern Route. Follows existing 115-kV transmission line. Shortest connection from South route up to N24 and Hidalgo substation.
N21	8.4	Grant	Eliminated. Follows pipeline. Heads into downtown Lordsburg, which would increase visual impacts. Also would add additional length to proposed route up to Hachita. Longer than proposed N23, N24 route.
N22	3.9	Grant	Retained – Alternative Southern Route. Follows existing 115-kV transmission line. Shortest connection from South route up to N24 and Hidalgo substation.
N23	9.6	Grant	Retained – Proposed Route. Follows 345-kV transmission line and natural gas pipeline. Shortest segment to allow efficient interconnection at Hidalgo substation with proposed route.
N24	5.4	Hidalgo	Retained – Proposed Route. Follows 345- and 115-kV transmission line and natural gas pipeline. Shortest segment to allow efficient interconnection at Hidalgo substation with proposed route.
N25	5.0	Hidalgo	Eliminated. Follows pipeline. Heads into downtown Lordsburg, which would increase visual impacts. Also would add additional length to proposed route up to Hachita. Longer than proposed N23, N24 route.
N26	6.7	Hidalgo	Eliminated. Follows I-10 in area of concern for visual impacts.
N27	6.2	Hidalgo	Eliminated. Follows existing 69-kV transmission line. Not needed once I-10 segments were eliminated.
N28	4.5	Hidalgo	Retained – Proposed Route. Follows 345- and 115-kV transmission line and natural gas pipeline. Follows some open land north of Lordsburg. Avoids visual impacts in Lordsburg.
N29	4.3	Hidalgo	Eliminated. Cross country segment. Not needed.
N30	6.7	Hidalgo	Retained – Alternative Route Segment D. Follows segments of Section 368 energy corridor. Provides alternative route south of Lordsburg for interconnection of the southern alternative route. Using C8, C17, N30, and N82 combination does not allow interconnection at Hidalgo substation.
N31	9.8	Hidalgo	Retained – Proposed Route. Follows existing natural gas pipeline.
N32	21.9	Cochise	Retained – Proposed Route. Follows existing natural gas pipeline.
N33	10.7	Hidalgo	Retained – Alternative Route Segment E. Does not follow existing linear feature.
N34	1.6	Hidalgo	Eliminated – North. Connector not needed for proposed.
N35	16.3	Cochise	Retained – Alternative Route Segment E. Does not follow existing linear feature.
N36	4.1	Hidalgo	Eliminated. Follows I-10 through area of concern for visual impacts.
N37	7.7	Hidalgo	Eliminated. Follows I-10 through area of concern for visual impacts.
N38	13.6	Cochise	Eliminated. Follows I-10 through area of concern for visual impacts and residential development.
N39	5.0	Cochise	Eliminated. Follows I-10 through area of concern for visual impacts.
N40	5.0	Cochise	Eliminated. Follows I-10 through area of concern for visual impacts and residential development.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
N41	13.2	Cochise	Eliminated. Follows existing pipeline. Passes by Dos Cabezas Wilderness Area and ACEC (VRM Class I).
N42	8.3	Cochise	Retained – Proposed Route. Follows natural gas pipeline.
N43	5.8	Cochise	Retained – Alternative Route Segment F. Follows existing 69-kV transmission line, railroad, and I-10. Alternative around the north of Bowie.
N44	3.8	Cochise	Retained – Alternative Route Segment F. Follows existing 69-kV transmission line. Alternative around the north of Bowie.
N45	3.6	Cochise	Eliminated. Goes through Bowie near residences and areas with potential for visual impacts. Closer to town than proposed.
N46	2.6	Cochise	Retained – Alternative Route Segment F. Follows I-10. North segment extends south of Bowie, but closer than proposed.
N47	16.2	Cochise	Eliminated. Follows natural gas pipeline. Closer to Dos Cabezas ACEC (VRM Class I) than proposed.
N48	15.0	Cochise	Retained – Proposed Route. Follows natural gas pipeline.
N49	14.7	Cochise	Retained – Alternative Route Segment F. Follows railroad, 69-kV transmission line, and I-10. Area with potential for visual impacts.
N50	1.2	Cochise	Alternative. Follows I-10. Area of visual concern.
N51	1.9	Cochise	Retained as alternative. Follows I-10 area of visual concern.
N52	5.9	Dona Ana	Eliminated. Follows open land. Segment not needed. Extended length of line without benefit. Originally identified to provide access to Mason Draw SEZ, which has subsequently been removed for BLM SEZ EIS.
N53	23.6	Luna	Eliminated in favor of N6, which is shorter and follows existing 345-kV line and natural gas pipeline instead of open land and 115-kV line. Follows rural roads.
N54	6.4	Luna	Eliminated due to residential and commercial development. Closer to the center of Deming than proposed.
N55	5.8	Luna	Eliminated. Follows I-10 through Deming. Concern for locating in close proximity to residences and commercial areas as well as visual impact concerns.
N56	2.4	Luna	Eliminated. Follows I-10 and through areas of visual impact concern. Segments through Deming were eliminated.
N57	2.2	Luna	Eliminated. Follows existing railroad. Segment not needed because other interconnecting segments that cross through Deming were eliminated.
N58	1.5	Luna	Eliminated Not needed to connect N9 and N10.
N59	5.2	Luna	Eliminated. Follows existing 69-kV transmission line and backtracks, adding additional line distance.
N60	4.1	Luna	Eliminated. Follows existing pipeline and passes by a number of residences.
N61	6.2	Luna	Eliminated. Follows existing 69-kV transmission line and natural gas pipeline. Adds unnecessary distance to the route.
N62	9.1	Luna	Eliminated. Follows existing transmission line. Adds unnecessary distance.
N63	7.6	Luna	Eliminated. Follows existing pipeline across previously undeveloped land.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
N64	4.4	Luna	Eliminated. Follows existing pipeline. Segment not needed and crosses previously undeveloped land.
N65	2.5	Luna	Eliminated. Follows existing pipeline. Not needed once I-10 segments were eliminated.
N66	4.1	Luna	Retained – Proposed Route. Follows 345-kV transmission line, away from I-10. Reduces visual impacts.
N67	12.4	Grant	Eliminated. Follows existing pipeline and rural road. Segment not needed and crossed areas with minimal existing development.
N68	6.7	Luna	Eliminated. Follows I-10 in area of concern for visual impacts.
N69	4.5	Grant	Eliminated. Follows I-10 in area of concern for visual impacts.
N70	2.9	Grant	Eliminated. Follows I-10 in area of concern for visual impacts.
N71	7.1	Grant	Eliminated. Follows I-10 in area of concern for visual impacts.
N72	1.9	Hidalgo	Retained – Proposed Route. Follows 345-kV transmission Line. Avoids visual impacts in Lordsburg.
N73	2.6	Hidalgo	Retained – North. Follows 345-kV transmission Line. Together, N73 and N75 add significantly more line length than proposed and, therefore, more ground disturbance.
N74	3.1	Hidalgo	Retained – Proposed Route. Follows open land north of Lordsburg. Avoids visual impacts in Lordsburg.
N75	29.9	Hidalgo	Eliminated. Follows existing 345-kV transmission line and open land. Together, N73 and N75 add significantly more line length than proposed and, therefore, more ground disturbance.
N76	8.4	Hidalgo	Retained – Proposed Route. Follows open land north and west of Lordsburg. Avoids visual impacts in Lordsburg.
N77	6.2	Hidalgo	Eliminated. Follows open land. Not needed once I-10 segments were eliminated.
N78	1.1	Cochise	Retained – Alternative Route Segment E. Follows I-10 natural gas pipeline through area of concern for visual impacts.
N79	1.5	Cochise	Eliminated. Follows rural road. Unneeded interconnection segment.
N80	2.5	Luna	Eliminated. Follows existing pipeline. Connector south and west of Deming not needed for proposed route.
N81	2.9	Cochise	Retained – Proposed Route. Follows natural gas pipeline south of Bowie.
N82	1.3	Hidalgo	Retained – Alternative Route Segment D. Follows Section 368 corridor. Connector not needed for proposed route. Using combination of Segments C8, C17, N30, and N82 does not allow interconnection at the Hidalgo substation.
N83	2.0	Luna	Retained – Proposed Route. Follows existing 345-kV transmission line. Essential for connecting N4 to N6.
N84	1.7	Cochise	Retained – Alternative Route Segment F. Follows I-10 south and west of Bowie.
N85	4.2	Cochise	Retained – Alternative Route Segment E. Follows existing 69-kV transmission line, railroad, and I-10.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
N86	1.7	Luna	Eliminated. Follows natural gas pipeline. Segment not needed once I-10 segments were eliminated for visual impact concerns.
N87	3.1	Luna	Eliminated. Follows I-10 in area of elevated concern for visual impacts.
N88	1.7	Hidalgo	Eliminated. Follows Route 90. Connector to N73 and N75 not needed with proposed route.
S1	1.3	Dona Ana	Retained – Alternative Route Segment A. Follows NM 9. Additional line length and ground disturbance.
S2	12.8	Dona Ana	Retained – Alternative Southern Route. Follows NM 9. Segment stays south of highway near West Potrillo Mountains Wilderness Study Area.
S3	10.3	Luna	Retained – Alternative Southern Route. Follows open land set back from West Potrillo Mountains Wilderness Study Area.
S4	11.2	Luna	Retained – Alternative Southern Route Follows NM 9.
S6	8.4	Luna	Retained – Alternative Southern Route Follows NM 9.
S7	8.7	Luna	Retained – Alternative Southern Route Follows open land. Shorter distance than alternative S18.
S8	20.3	Luna	Retained – Alternative Southern Route Follows NM 9.
S9	2.7	Grant	Eliminated. Follows NM 9. See note 1.
S10	3.2	Grant	Eliminated. Follows NM 9. See note 1.
S11	8.0	Grant	Eliminated. Follows NM 9. See note 1.
S12	10.5	Hidalgo	Eliminated. Follows NM 9. See note 1.
S13	12.5	Luna	Retained – Alternative Route Segment B. Follows NM 9, near West Potrillo Mountains Wilderness Study Area.
S18	10.4	Luna	Retained – Alternative – Route Segment C. Follows NM 9.
S19	5.2	Grant	Eliminated. Follows abandoned railroad. See note 1.
S20	**3.1**	Dona Ana	Retained – Alternative Route Segment A. Follows NM 9. Additional line length and ground disturbance.
S21	1.4	Dona Ana	Retained – Alternative Route Segment A. Follows NM 9. Additional line length and ground disturbance.
S22	2.4	Dona Ana	Retained – Alternative Route Segment A. Follows NM 9. Additional line length and ground disturbance.
S23	10.0	Luna	Retained – Alternative Southern Route Follows NM 9, rural roads, and open land. Passes south of Columbus through primarily open land.
S24	1.6	Grant	Eliminated. Follows NM 9. See note 1.
S25	2.9	Luna	Eliminated. Follows rural road around to the north of Columbus. Interconnects to S25.
S26	6.7	Luna	Eliminated. Follows rural roads and open land around to the north of Columbus. Passes close to residential areas and possible private landing strips immediately to the north.

TABLE 2-4. SUMMARY OF VIABLE ROUTE OPTIONS

Segment	Distance (Miles)	County	Segment Status (Retained or Eliminated)
			Upgrade Section Segments
R1	46.9	Cochise	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R2	15.5	Cochise	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R3	11.8	Cochise	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R4	3.8	Pima	SWTC Eliminated. See section 2.2.6.
R5	2.8	Pima	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R6	4.3	Pima	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R7	11.7	Pima	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R8	2.5	Pima	Retained – Proposed Route. Follows existing Western 115-kV transmission line.
R9	2.2	Pima	Retained – Proposed Route. Follows existing Western 115 kV transmission line.
R10	70.8	Cochise	SWTC Eliminated. See section 2.2.6. Follows existing SWTC 115-kV transmission line.
R11	15.0	Cochise	Retained – Alternative Route Segment H. Follows existing SWTC 115-kV transmission line.
R12	5.6	Pima	SWTC Eliminated. See section 2.2.6. Follows existing SWTC 115-kV transmission line.
R13	4.5	PIma	SWTC Eliminated. See section 2.2.6. Follows existing SWTC 115-kV transmission line.
R14	18.9	Pima	Retained – Proposed Route. Follows existing Western 115-kV transmission line.

Note 1 – Most route segments west of Hachita were eliminated in favor of shorter routes to the Lordsburg area. Route segments west of Hachita would require backtracking to reach this area, thus extending the overall length of the transmission line without any benefit as compared to the Alternative Southern Route.

Note 2 – Early in the process of defining potential routes, a number of potential interconnecting segments were identified between the I-10 corridor and the NM 9 corridor in southern New Mexico. These interconnecting routes were initially developed to provide options for changing the route from one corridor to the other in the event a significant constraint was identified. No significant constraints were identified and, thus, the north-south interconnecting segments between the northern and southern routes were not required to facilitate the logical routing of the New Build Section, and these segments were eliminated.

The alternatives that were retained for the New Build Section and Upgrade Section are shown in figures 2-10 and 2-11, respectively. The corridors shown represent the routes with the fewest environmental, land use, and engineering constraints between the end-point substations. The corridors for the New Build Section and Alternative Route Segments A-H have a total width of 2 miles, or 1 mile on either side of an existing linear facility. In areas of increased residential development, such as around

Deming, Lordsburg, Willcox, and Columbus, the corridor width was reduced to a total of 1,000 feet. The corridor width for the Upgrade Section was defined as 500 feet, with the exception of Alternative Route Segment H around the Town of Benson and the Vail substation interconnection, which has a 2-mile total width consistent with corridor widths of other new proposed lines.

2.2.4 Corridors Considered for the New Build Section

The full set of routing corridors considered for the New Build Section included a number of segments to the north and to the south, with several potential interconnections between the two. The northern route options primarily followed existing transmission lines, highways, roadways (including I-10), railroad lines, and pipelines. A few of the northern route options also followed Section 368 energy corridors across some areas of BLM land.

Northern Route Options

All of the northern routes evaluated out of the Afton substation follow an existing 345-kV transmission line in a northwesterly direction for approximately 19 miles. This option also follows a Section 368 Federal energy corridor across BLM lands and an existing railroad, and runs adjacent to the Afton Solar Energy Zone (SEZ). At this point, one of several options continues to follow the existing 345-kV transmission line for another approximately 91 miles to a point just north of Lordsburg. This option also runs north of Deming and crosses primarily open land under a mixture of BLM, State, and private land ownership. Other option evaluated in this area follow I-10, an existing 115-kV transmission line, and an existing pipeline, as well as several intermittent Section 368 Federal energy corridors. Of these additional options, one follows I-10 through Deming while another follows an existing natural gas pipeline and Section 368 Federal energy corridor to a point south of Deming. Between Deming and Lordsburg, there are three primary northern corridor options: a northern option following the existing 345-kV transmission line; a central option following I-10; and an option following an existing pipeline and 69-kV transmission line. These options provide opportunities to traverse either north or south of Lordsburg.

West of Lordsburg, one option continues to follow I-10 to the west and south to a point where the route turns and follows Highway 191 to the existing Afton substation. Other option between Lordsburg and Willcox follow existing pipelines and a portion of a Section 368 Federal energy corridor across Lordsburg Playa. These options avoid the Northern Peloncillo Mountains VRM Class I area to the north, as well as the Dos Cabezas Peak ACEC and VRM Class I areas. Near Willcox, there is an option that follows an existing 230-kV transmission line along the eastern boundary of Willcox Playa to the existing Apache substation. There are also a number of options that extend north and west of the City of Willcox, most of which follow either existing transmission lines or roads.

Southern Route Options

The southern route options follow existing rural roads south from the Afton substation to NM 9. All options in this area were selected to avoid the West Potrillo Mountains Wilderness Study Area. The southern route options then follow NM 9 through Columbus and Hachita to Animas, where a number of options extend north and intersect with one of the northern route options. The options connecting the northern and southern routes followed mostly existing highways and rural roads, a historic railroad line, and transmission and distribution lines. A north-south connection was identified west of the West Potrillo Mountains Wilderness Study Area that is intended to serve as a potential interconnection for a new substation that could be constructed in this general area. The north-south connections between the general areas of Columbus and Deming follow existing transmission lines and county roads. As can be seen in figure 2-10, the southern route options all interconnected with the northern route options

near the cities of Lordsburg or Deming. The westernmost interconnection between the southern and northern route options was located approximately 16 miles southwest of Lordsburg.

An additional southern route option was evaluated that involved potentially siting the transmission line either within or adjacent to the International Boundary and Water Commission's (IBWC) 60-foot-wide Roosevelt Easement, which exists along the southern extent of the project study area. This 60-foot exclusion area is maintained for public lands that exist along the international border with Mexico. Potentially accessing the Roosevelt easement was an attractive option because the easement contains a road maintained by the Border Patrol that could potentially be used as an access road for the project. However, through communication with the IBWC in Washington, D.C., it was determined that construction of the transmission line within and paralleling the Roosevelt Easement would not be allowed and that the development of new spur roads from the existing road located within the easement would also not be permitted. For these reasons, potential use of the Roosevelt Easement for project siting was eliminated from further consideration.

2.2.5 Corridors Considered for the Upgrade Section

The corridors considered for the Upgrade Section consisted of the existing Western 115-kV line and the SWTC 230-kV and 115-kV lines between the Apache and Saguaro substations in Arizona. Both transmission lines exit the Apache substation, with the Western line heading west and the SWTC line running south and then west. Both lines join approximately 4 miles west of the substation and continue west in adjoining ROWs for a distance of approximately 15 miles. Both lines cross approximately 0.5 miles of the Coronado National Forest in this area. The SWTC line then heads north and west of the City of Benson, while the Western line continues in a westerly direction. The two lines rejoin west of Benson for another 12 miles, where they again separate, with the SWTC line running south of the City of Vail and the Western line extending north of Vail. Both lines cross through the Fort Huachuca Buffalo Soldier Electronic Testing Range in this area. The Western and SWTC lines run along ROWs for the next 4.5 miles, at which point the lines diverge, with the Western line turning to the northwest and the SWTC line continuing due west. From the Apache substation to this point, both existing lines cross primarily open land, with the exception of the towns of Benson and Vail. From the point where the two lines diverge, the Western line runs to the northwest for about 12.5 miles and then turns north through the City of Tucson, crossing a mix of open commercial and residential areas, ending at the Tucson substation. The Western line in this area runs about 1.2 miles west of the Tucson Airport and crosses about 3 miles of the San Xavier Indian Reservation. From this point, the Western line heads north and west for a distance of approximately 35.5 miles to the Saguaro substation. Over this distance, the existing line crosses residential areas, open land, and agricultural land uses.

Starting at the point where the Western and SWTC lines diverge, the SWTC line heads due west for approximately 8.75 miles, where the line turns due south for a distance of about 8 miles. Over this area, the SWTC line crosses primarily open land and runs near the small community of East Sahuarita. The existing line then heads predominately west for about 11 miles and then turns northwest for a distance of about 17.5 miles, where it intersects with the existing Three Points substation. In this area, the line again crosses open land as well as about 2.25 miles of the San Xavier Indian Reservation. The line then runs due north for a distance of approximately 25.5 miles, where it intersects with the existing Western line immediately north of the Marana substation. In this area, the line crosses predominately open land, as well as approximately 3 miles of the Tohono Indian reservation and about 3 miles of the IFNM.

2.2.6 Elimination of the SWTC Option

As described in section 2.2.5, the SWTC Upgrade segment crosses approximately 3 miles of the IFNM (figure 2-12). The monument was established by Presidential Proclamation 7320 for the purpose of

protecting biological, cultural, geological, and other resource values. The BLM Tucson Field Office has the responsibility of planning for and managing the IFNM. In the September 2011, the BLM issued the IFNM Proposed Resource Management Plan (PRMP)/FEIS. In this planning document, several options are evaluated for managing existing and future utility corridors within the borders of the IFNM. Alternative B is very restrictive. The less-restrictive Alternative C is listed as the "preferred alternative" but the FEIS selectively gives preference to the more restrictive Alternative B option for utility corridors, which is a change from the DEIS, as noted below:

> *Under Alternative B, allocating the IFNM as an exclusion area without identifying any utility corridors would result in considering land use authorizations for rights-of-way only when required by law. This would exclude the potential for new rights-of-way for electric generating facilities (including renewables), transmission lines, pipelines, and other utilities, but would best protect the objects of the monument... Under Alternative C… Allocating the IFNM as an avoidance area (except for 241 acres that are identified as utility corridors) would limit opportunities for rights-of-way (including renewable energy projects) unless no other viable alternatives exist to avoiding placement of facilities within the IFNM. Corridors on 241 acres would provide limited opportunities for major utilities.*
>
> *The Proposed Plan would not provide for utility corridors, which is consistent with Alternative B; this differs from the preferred alternative in the Draft RMP/EIS, which included Alternative C for utility corridors.* (Source: PRMP/FEIS Executive Summary, Land Use Impacts, September 2011, http://www.blm.gov/az/st/en/prog/planning/ironwood/reports.html.)

The IFNM FEIS record of decision has not yet been signed and an implementation plan has not yet been delivered for this PRMP (as of February 27, 2012), However, the restrictive nature of these conclusions indicates that IFNM management staff would most likely not allow expansion of the existing SWTC ROW to upgrade the transmission line as part of the project.

Further, as indicated in figure 2-12, the project study area, as drawn, must cross IFNM property. The project team investigated expanding the study area to the east to cross lands outside of the IFNM boundary. However, as shown in figure 2-12, the neighboring land uses are also highly restrictive and unlikely to be readily compatible with new transmission line ROW. These land uses include wilderness areas, Sonoran Desert Conservation Plan - Biological Core Areas, State/local recreation areas, or parks (e.g., the Tucson Mountain County Park), the USBR-managed Tucson Mitigation Corridor, and the Saguaro National Park.

Regional transmission planning and technical studies also indicate that an upgrade of the Western 115-kV line would better meet the region's technical transmission needs. In addition, access to the existing substations along the Western line also provided additional opportunities to strengthen the existing regional and local transmission system.

Finally, upgrading the Western line better meets Western's need to facilitate the construction of transmission facilities, which will help ensure reliability of the electric transmission grid needed to carry out Western's core functions including the strategic goal of entering into public-private partnerships.

Due to these land use restrictions and technical and commercial requirements, the project team eliminated the SWTC option from further consideration.

2.3 Description of Project and Alternatives

A description of the project and alternatives for the project is presented below. The individual numbered segments are shown on figures 2-10 and 2-11 for the New Build Section and Upgrade Section, respectively.

2.3.1 Project Description

The project consists of the northern New Build Section and the Western Upgrade Section (see figures 2-13 and 2-14). Combined, the project has a total length of approximately 360 miles. In addition to the route for the double-circuit 345-kV New Build Section (approximately 205 miles) and the project's double-circuit 230-kV Upgrade Section from Apache to Saguaro (approximately 120 miles), the project also includes Segment R5, a 230-kV line that will be required to interconnect with the existing Vail substation (approximately 2.2 miles); Segment B1 between NM 9 and I-10 (approximately 30 miles); and Segment A2, a 230-kV line connecting the Afton substation and the existing Luna-Diablo 345-kV transmission line (approximately 5.2 miles). A detailed description of the proposed route is presented in the following two subsections.

Proposed New Build Section

The proposed New Build Section begins at the Afton substation and follows an existing 345-kV transmission line northwest to I-10 along Segments N1 and N4 past the Aden Hills OHV area. From there, the route would cross I-10 immediately beyond Doña, and continue north of I-10 along Segment N6 to Carne. Approaching Deming from the north, using Segment N9, the route would run north of Deming and then follow existing roads. Using Segments N10 and N11, the route heads west of Deming. The route would extend northwest along Segments N17, N23, and N24 to the Hidalgo substation at T22S, R17W, Section 9. From the Afton substation to the Hidalgo substation, the proposed route would follow an existing 345-kV transmission line. From the Hidalgo substation, the route would continue due west adjacent to the existing 345-kV transmission line, north around Lordsburg, and south along Segment N28. Using Segments N31 and N32, the route would follow an existing pipeline route. The proposed project route would then cross I-10 west of San Simon and follow an existing pipeline route south of the interstate and north of the Dos Cabezas Peaks ACEC along Segments N42 and N48. The route would then extend south along Segments E1 and E2 east of the Town of Willcox and Willcox Playa to the Apache substation. The proposed route would follow an existing 230-kV transmission line corridor along these segments around Willcox Playa. The termination point at the Apache substation would represent the western extent of the New Build portion of the project. The total length of the transmission line using the proposed northern route from the Afton substation to the Apache substation would be approximately 205 miles.

The proposed New Build portion of the project would also include Segment B1, which runs north-south between NM 9 and I-10. Segment B1 is east of Deming and the Florida Mountains, and west of the Potrillo Mountains. The total length of that segment would be approximately 30 miles and would serve as an interconnection to a possible new substation that could be constructed in the future. The project's proposed plan of service would also include a 5.2-mile in-and-out loop between the existing Afton substation and the existing Luna-Diablo 345-kV transmission line. The objective of this segment would be to interconnect the project to the existing Luna-to-Diablo 345-kV transmission line. The shortest distance to complete the loop is shown as Segment A2.

Proposed Upgrade Section

The proposed Upgrade Section of the transmission line would involve upgrading the existing Western transmission line between the Apache and Saguaro substations. This portion of the project, represented

by Segments R1, R2, R4, and R6, is an upgrade of a the existing Western 115-kV transmission line through Cochise, Pima, and Pinal counties, and the Applicant anticipates following the same path as the existing transmission line. A new, approximately 2-mile line, designated by Segment R5, will be required to interconnect with the Vail substation, located just north of the Western line at T15S, R15E, Section 4. The Upgrade Section is approximately 120 miles in length and could interconnect with more than 10 substations along the route.

2.3.2 Alternatives

The routing study identified both a northern route option and a southern route option for the New Build Section. The northern route was ultimately selected as the proposed route based on the overall shorter distance of that route, fewer impacts to previously undeveloped areas, and the ability to parallel multiple existing linear facilities. The southern route option provides an alternative to the proposed northern route between the Afton substation and the point where the proposed and alternative routes merge at a location approximately 10 miles east of Lordsburg. A description of the southern option is presented below as the Alternative Southern Route.

New Build Alternative – The Alternative Southern Route

The Alternative Southern Route would start at the Afton substation. This route would extend south to NM 9, continue west along NM 9 to Columbus, and then back north to the Hidalgo substation. From this point to the Apache substation, the Alternative Southern Route would be the same as the proposed project route.

The Alternative Southern Route from Afton to Lordsburg would originate at the Afton substation and follow, where possible, existing rural roads for 24 miles south to NM 9 along Segments A1, A3, A5, and A8. From there, the corridor would follow NM 9 and portions of an abandoned railroad track to Columbus along Segments S2 through S6, and then run northwest to Hachita along Segments S7 and S8. Portions of Segments S7 and S8 follow an abandoned railroad track. From Hachita, the alternative route would continue northwest along Segment C2 for 20 miles until intersecting an existing 69-kV transmission line, and then turn due north, following the existing transmission line along Segments C6, N20, and N22. In Segment N20, the alternative route would cross I-10. The route would then turn northwest along Segment N24, paralleling two existing 345-kV transmission lines. At Segment N24, the Alternative Southern Route would intersect the proposed project route into the Hidalgo substation. From the Hidalgo substation, the route would continue due west along Segment N28, north around Lordsburg, and south to an existing pipeline route that the proposed route follows using Segments N31 and N32. The route would then cross I-10 west of San Simon and follow an existing pipeline route south of the interstate and north of the Dos Cabezas Peaks ACEC along Segments N42 and N48. The route would then extend south along Segments E1 and E2, east of the Town of Willcox and Willcox Playa, to the Apache substation. The total length of the Alternative Southern Route from the Afton substation to the Apache substation would be approximately 240 miles. Using this Alternative Southern Route from Afton to Apache, the total project length would be approximately 395 miles, including the Upgrade portion of the project from Apache to Saguaro (approximately 120 miles); Segment B1 between NM 9 and I-10 (approximately 30 miles); and Segment A2, connecting the Afton substation and the existing Luna-Diablo 345-kV transmission line.

Alternative Route Segments

A number of additional alternative route segments were identified during the routing study that could be used instead of the proposed segments if found to be environmentally preferable:

- **Alternative Route Segment A:** includes individual Segments A7, A13, S1, S20, S21, and S22 south of Afton off the Alternative Southern Route.

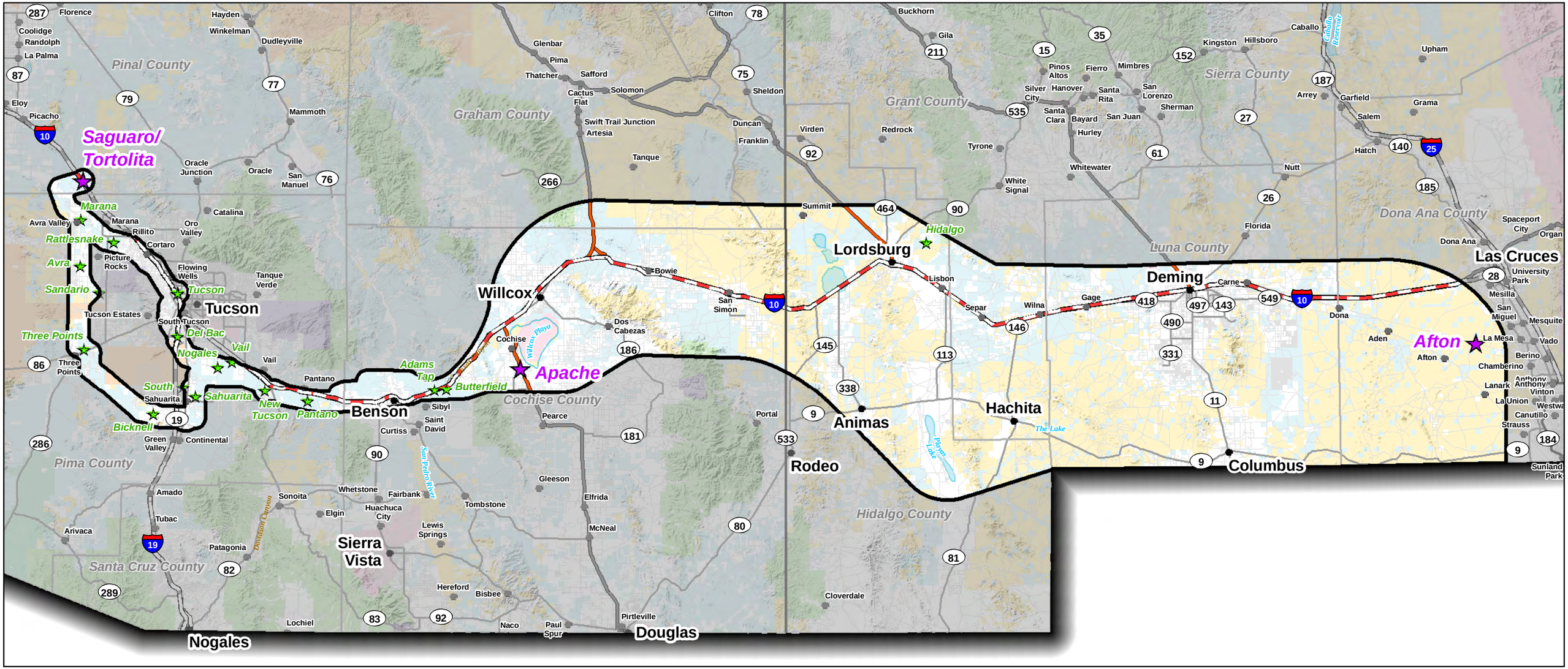
- **Alternative Route Segment B:** includes individual Segment S13 off the Alternative Southern Route.
- **Alternative Route Segment C:** includes individual Segment 18 off the Alternative Southern Route.
- **Alternative Route Segment D:** includes individual Segments C8, C17, and N30. This alternative provides a route to the south of Lordsburg.
- **Alternative Route Segment E:** includes individual Segments N33, N35, N78, N82, and N85. This alternative provides a route option north of I-10 and follows a Section 368 energy corridor.
- **Alternative Route Segment F:** includes individual Segments N43, N44, N45, N46, N49, and N84. This combination provides a route alternative along I-10 around Bowie.
- **Alternative Route Segment G:** includes individual Segments E3, E4, E5, E6, E7 and E13. This combination provides a north and western route option around Willcox. Segment E3 follows an existing gas pipeline and 345-kV transmission line, while Segments E4 through E7 follow an existing below-230-kV transmission line.
- **Alternative Route Segment H:** includes individual Segment R11 and provides an alternative off the Upgrade north of Benson.

Upgrade Section Alternative

Because of the limited number of opportunities to upgrade an existing transmission line between the Apache and Saguaro substations, no viable alternatives to the proposed upgrade of the existing Western line were identified (see section 2.2.6, Elimination of the SWTC Option).

However, Alternative Route Segment H, listed above, could be used as an option to upgrade the Western line in its current location through the Town of Benson. If determined to be environmentally preferable, the Western line could be upgraded along a segment north of Benson, generally following the path of an existing transmission line owned by SWTC.

SOUTHLINE TRANSMISSION PROJECT



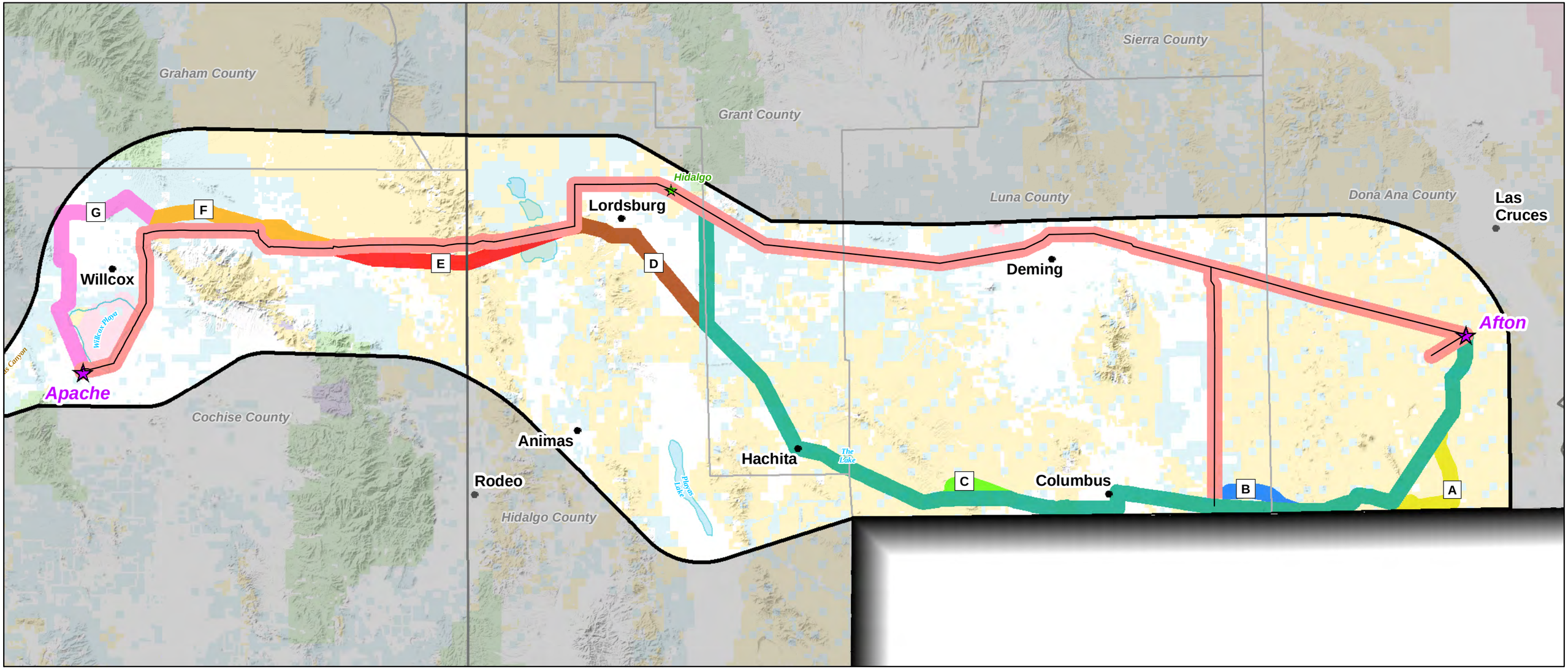
1:1,100,000

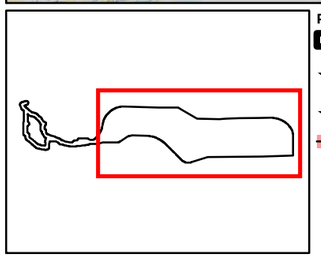
Figure 1-1
Study Area

Date: 4/11/2012


Southline Transmission Project
Phoenix
Mesa
Arizona
Casa Grande
Saguaro/Tortolita
Tucson
Willcox
Benson
Apache
New Mexico
Lordsburg
Deming
Las Cruces
Afton
Hachita
Columbus
El Paso
Mexico
LEGEND
Proposed Route
Alternative Routes
Substation End Points
Intermediate Substations
City/Town
Figure 1-2
Proposed and Alternative Routes
N
0 12.5 25 50
Miles
February, 2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Proposed Route

- Alternative Southern Route
- Alternative Route Segment A
- Alternative Route Segment B
- Alternative Route Segment C
- Alternative Route Segment D
- Alternative Route Segment E
- Alternative Route Segment F
- Alternative Route Segment G

Reference Features
- City/Town
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

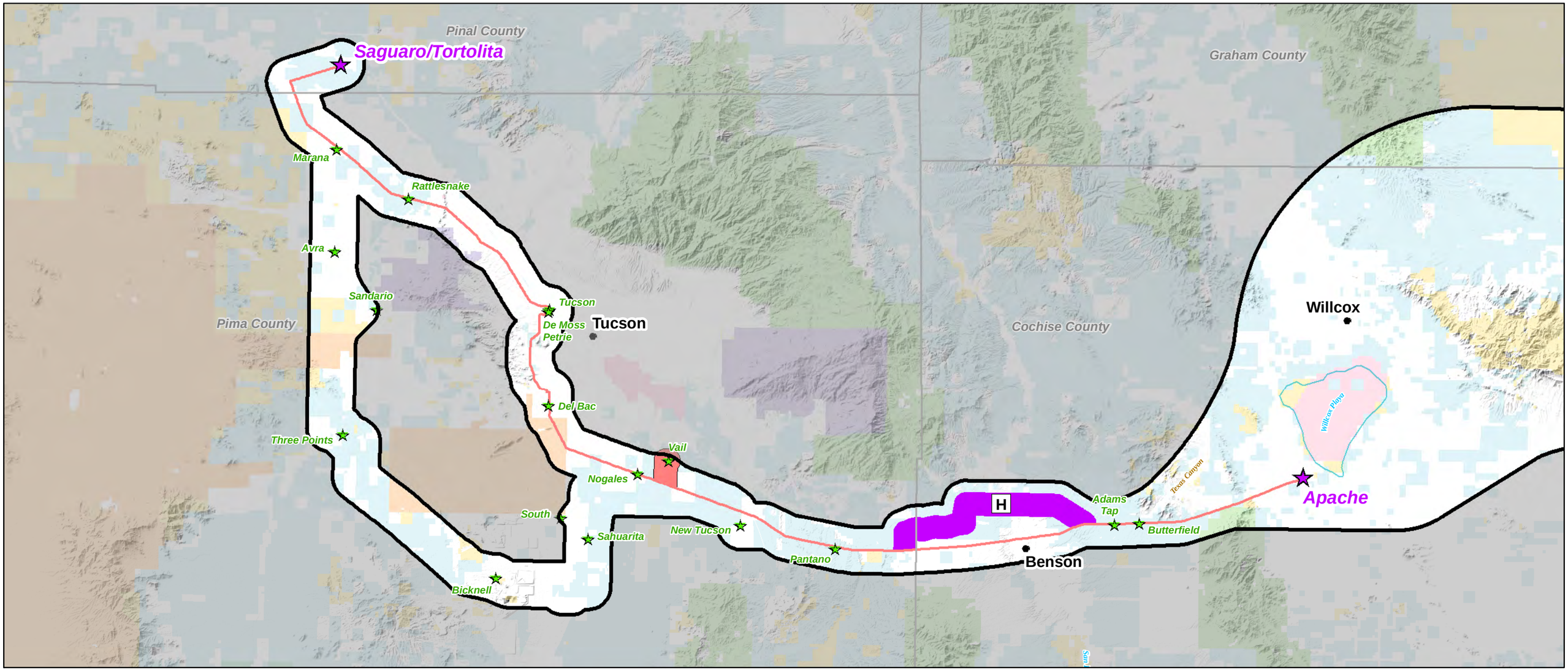
0 5 10
Miles

1:760,000

Figure 1-3
Proposed and Alternative Routes
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Proposed Upgrade Route (Western)
- Alternative Route Segment H

Reference Features
- City/Town
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

0 5 10
Miles

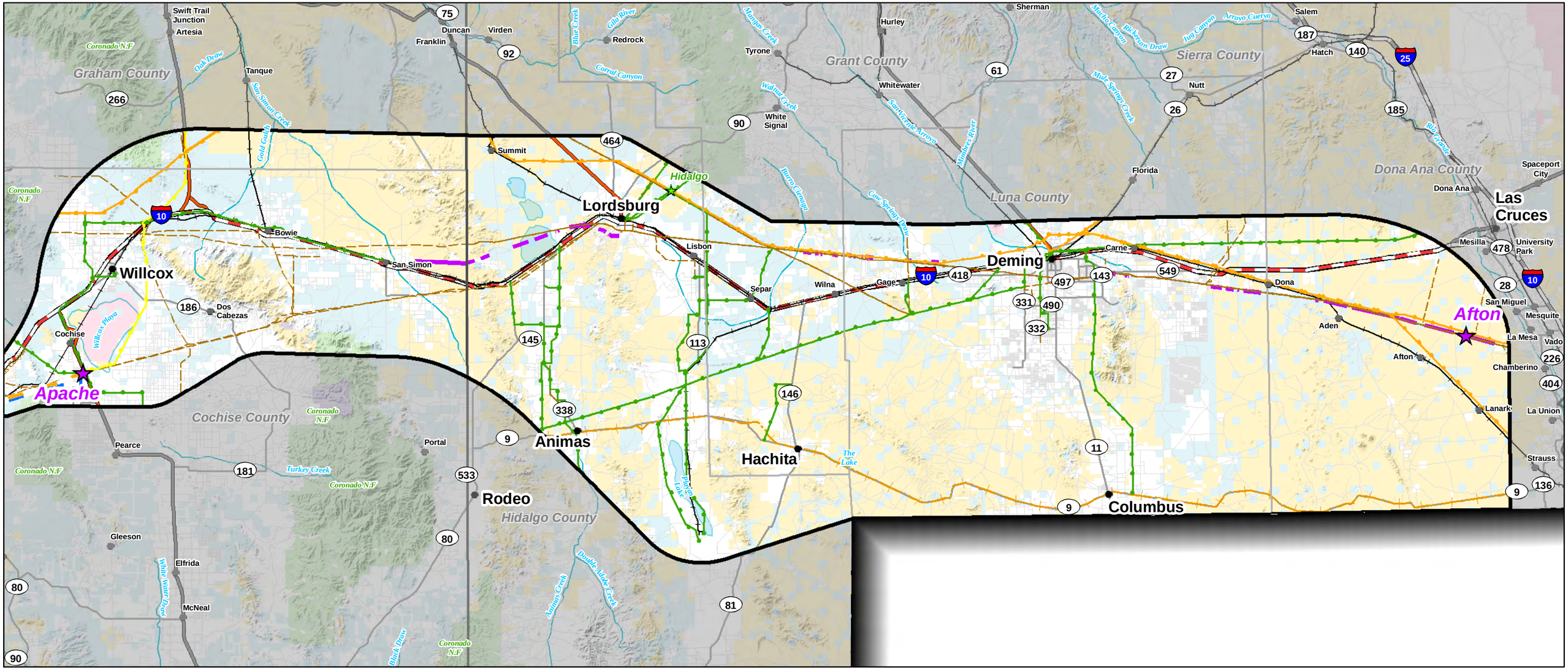
Upgrade Study Corridor: 500 feet
New Build Study Corridor: 2 miles

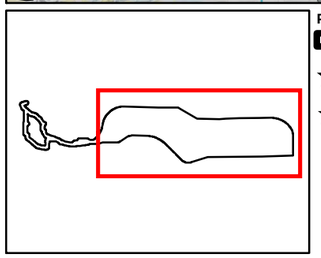
1:500,000

Figure 1-4
Final Proposed and Alternative Routes
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- Railroad
- Abandoned Railroad
- River/Stream
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Opportunities
- Section 368 Energy Corridor
- Gas Pipeline

Existing Transmission Lines
- 345kV
- 230kV
- Below 230kV

N

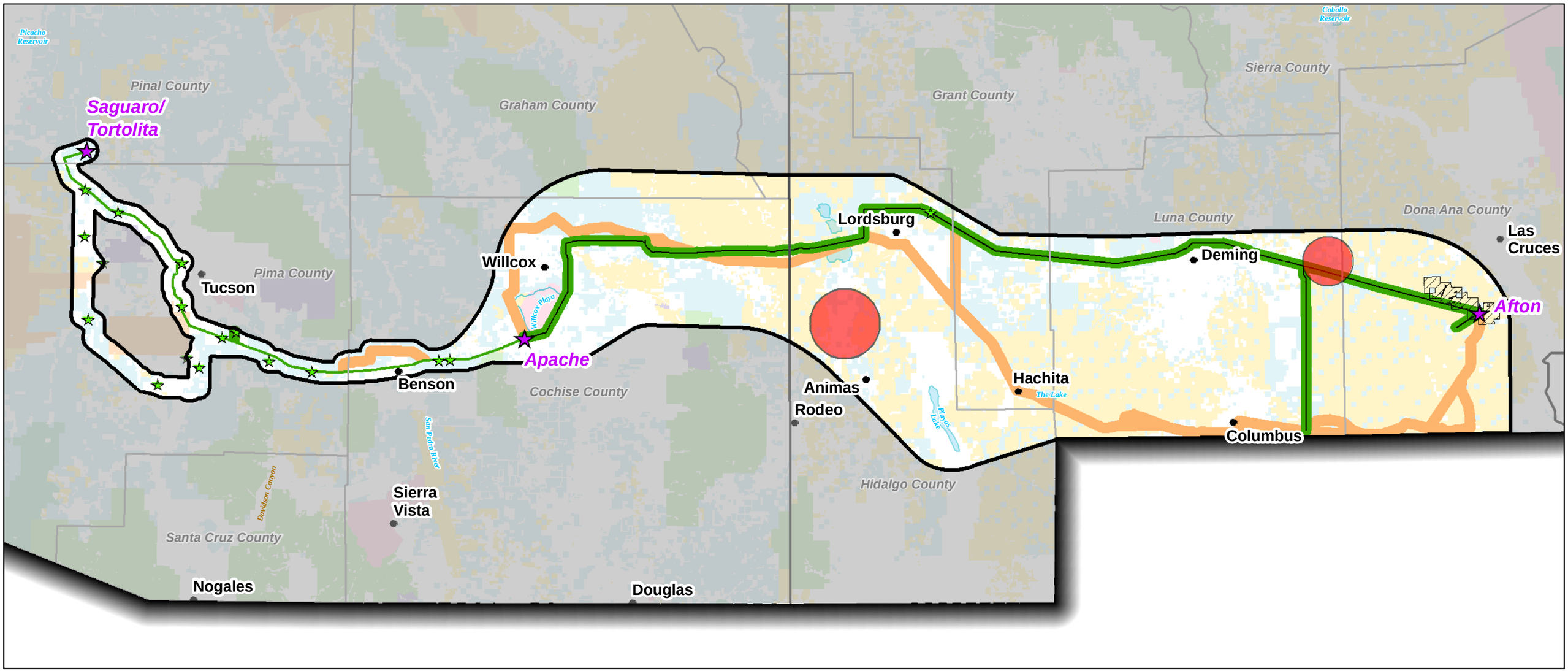
0 5 10
Miles

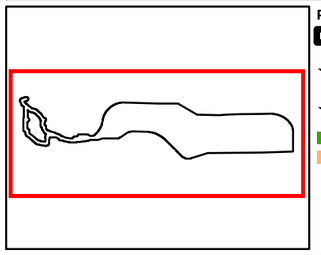
1:760,000

Figure 2-1
Opportunities
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Proposed Route
- Alternative Routes

Reference Features
- City/Town
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State
- Solar Energy Zone (SEZ)

1,000s of GWh/yr
- 20-25
- 15-20
- 10-15
- 5-10
- 1-5

Notes:
Western Renewable Energy Zone (WREZ) seeks to identify those areas in the West with vast renewable resources to expedite the development and delivery of renewable energy to where it is needed (http://www.westgov.org/rtep/219).

Qualified Resource Area (QRA) represent areas of high-quality renewable energy resources for purposes of evaluating interstate transmission lines (http://www.westgov.org/rtep/219).

Solar Energy Zone (SEZ) is defined by the Bureau of Land Management Programmatic Environmental Impact Statement (BLM PEIS) as an area with few impediments to utility-scale production of solar energy where BLM would prioritize solar energy and associated transmission infrastructure development (http://solareis.anl.gov/sez/index.cfm).

N

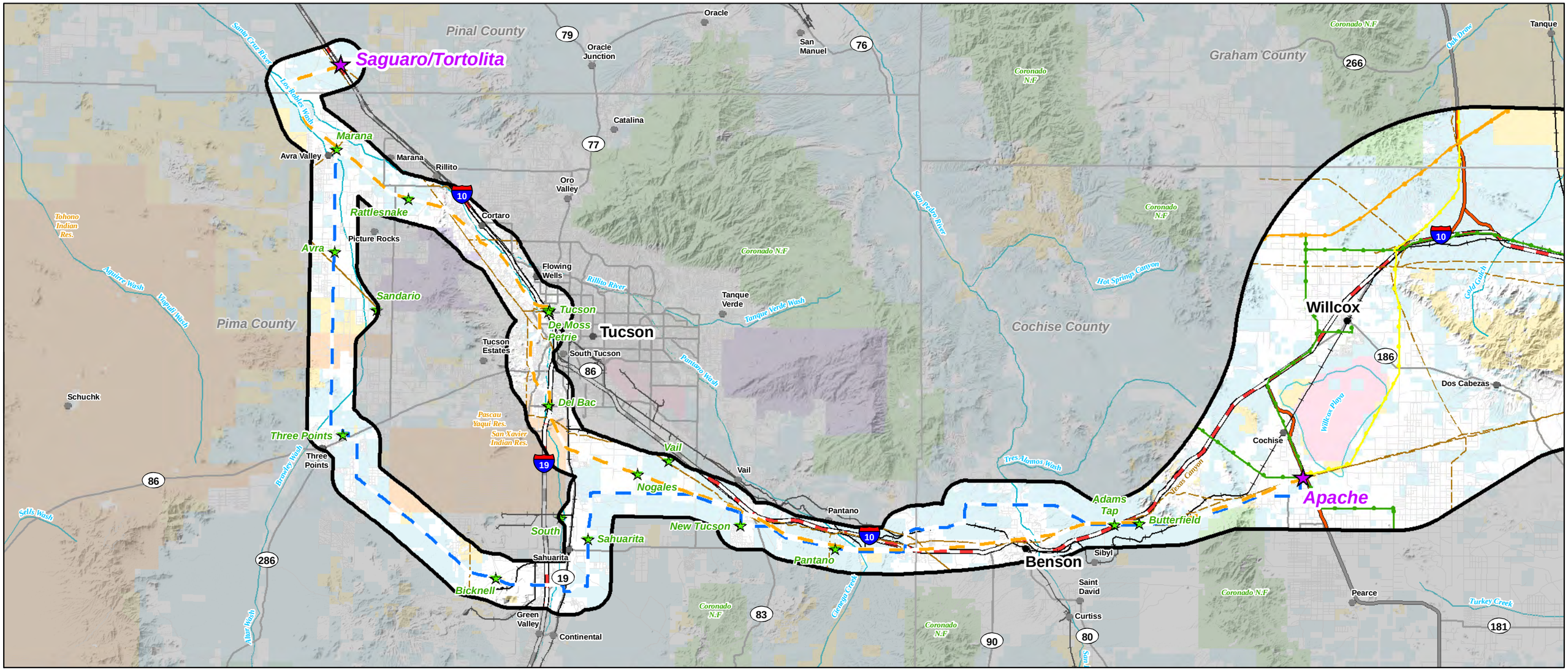
0 12.5 25
Miles

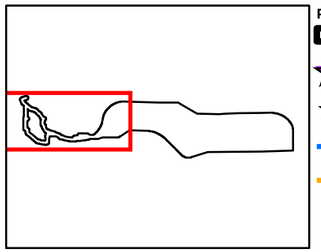
1:1,100,000

Figure 2-2 Renewable Energy Zones

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Southwest Transmission Cooperative line for potential improvement
- Western Area Power Administration line for potential improvement

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- Railroad
- Abandoned Railroad
- River/Stream
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Opportunities
- Section 368 Energy Corridor
- Gas Pipeline

Existing Transmission Lines
- 345kV
- 230kV
- Below 230kV

N

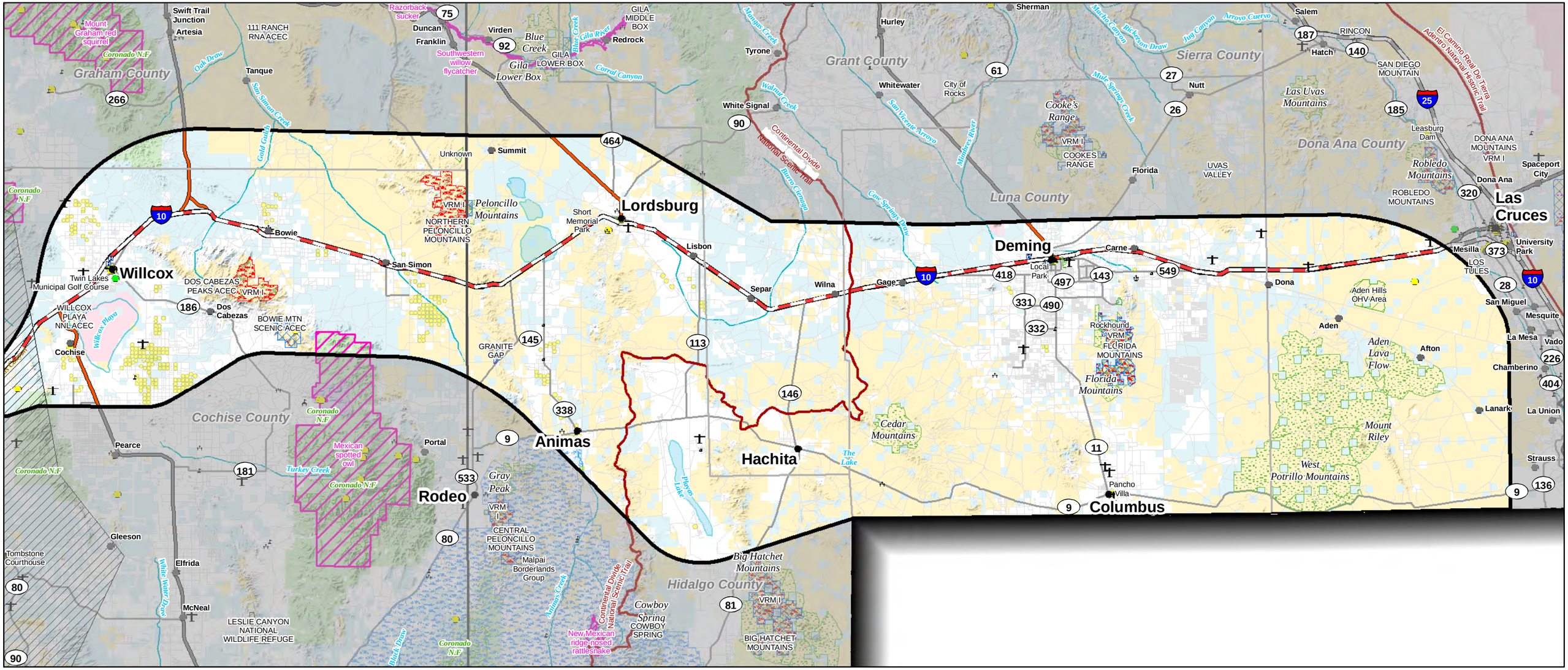
0 5 10
Miles

1:500,000

Figure 2-3
Opportunities
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- River/Stream
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Constraints
- Airport
- School
- Hospital
- Church
- Cemetery
- National Register of Historic Place
- National Trail/Historic Trail
- Areas of Critical Environmental Concern
- Ft. Huachuca Electronics Testing Area

- Threaten and Endangered Species Habitat
- Wilderness Area
- Wilderness Study Area
- Sonoran Desert Conservation Plan - Biological Core Area
- National/Local Conservation Area
- National Wildlife Refuge
- Visual Resource Management Class I
- State/Local Recreation Area or Park
- Malpai Borderlands Group
- Center Pivot Irrigated Farmland
- State Scientific Area

N

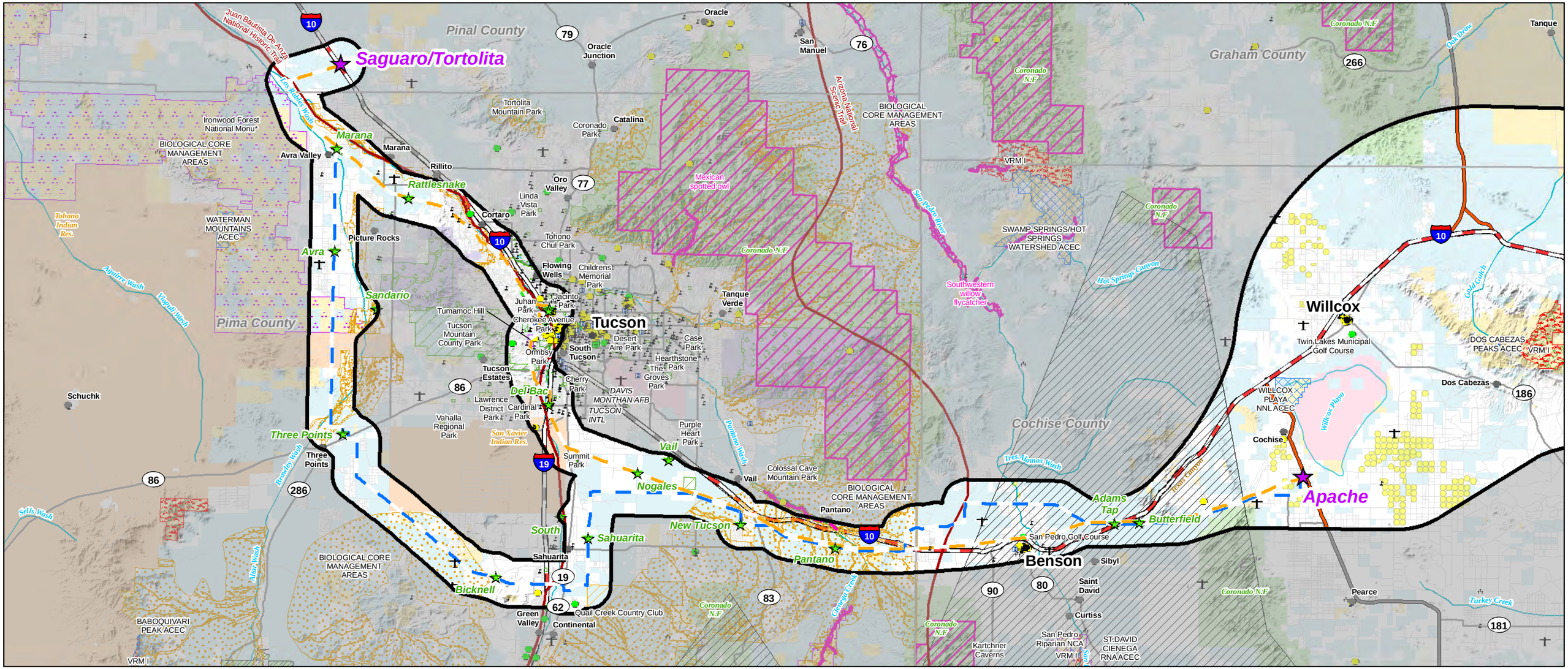
0 5 10
Miles

1:760,000

Figure 2-4
Constraints
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Southwest Transmission Cooperative line for potential improvement
- Western Area Power Administration line for potential improvement

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- River/Stream
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Constraints
- Airport
- School
- Hospital
- Church
- Cemetery
- National Register of Historic Place
- National Trail/Historic Trail
- Areas of Critical Environmental Concern
- Ft. Huachuca Electronics Testing Area
- Threaten and Endangered Species Habitat
- Wilderness Area
- Wilderness Study Area
- Sonoran Desert Conservation Plan - Biological Core Area
- National/Local Conservation Area
- National Wildlife Refuge
- Visual Resource Management Class I
- State/Local Recreation Area or Park
- Malpai Borderlands Group
- Center Pivot Irrigated Farmland
- State Scientific Area

N

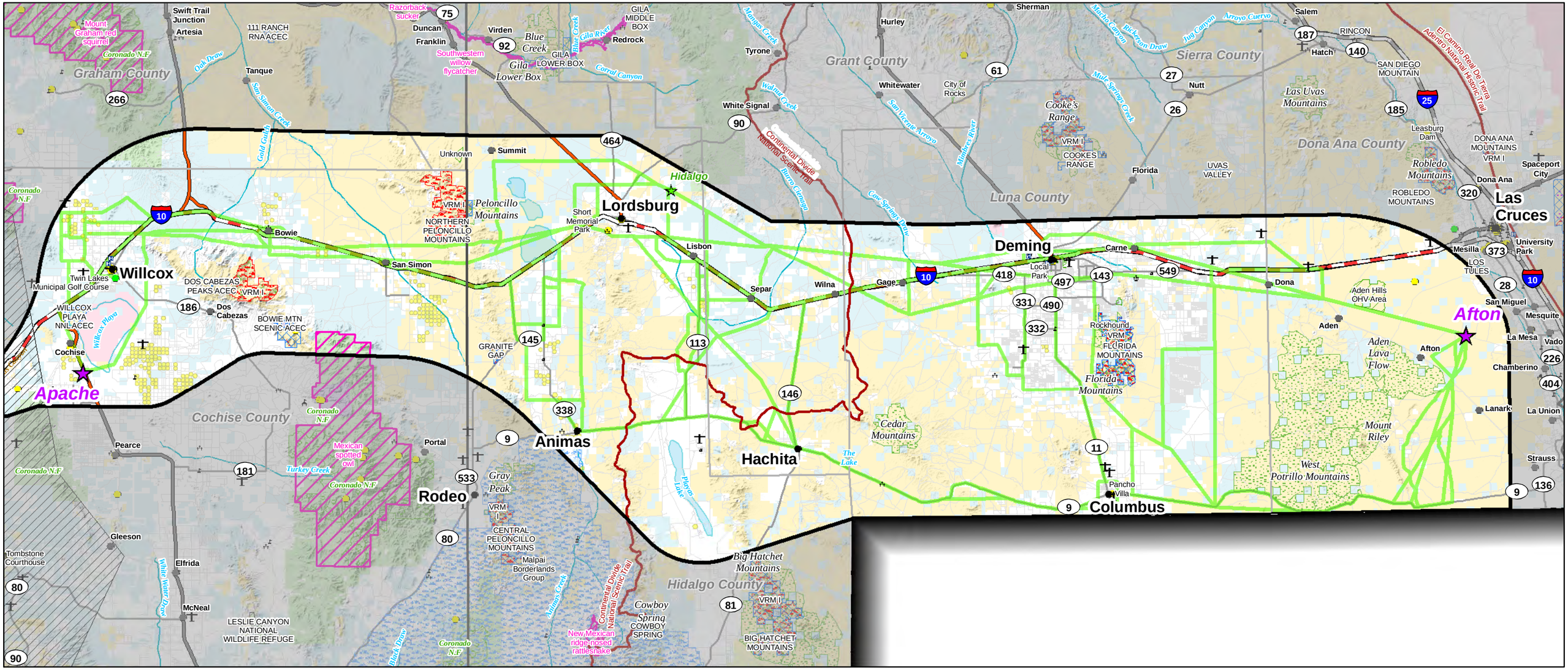
0 5 10
Miles

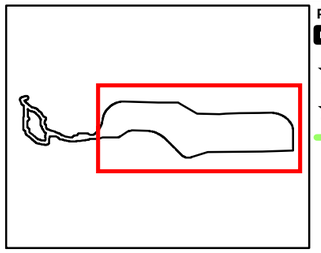
1:500,000

Figure 2-5 Constraints
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Viable Opportunity

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- River/Stream
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Constraints
- Airport
- School
- Hospital
- Church
- Cemetery
- National Register of Historic Place
- National Trail/Historic Trail
- Areas of Critical Environmental Concern
- Ft. Huachuca Electronics Testing Area

- Threaten and Endangered Species Habitat
- Wilderness Area
- Wilderness Study Area
- Sonoran Desert Conservation Plan - Biological Core Area
- National/Local Conservation Area
- National Wildlife Refuge
- Visual Resource Management Class I
- State/Local Recreation Area or Park
- Malpai Borderlands Group
- Center Pivot Irrigated Farmland
- State Scientific Area

N

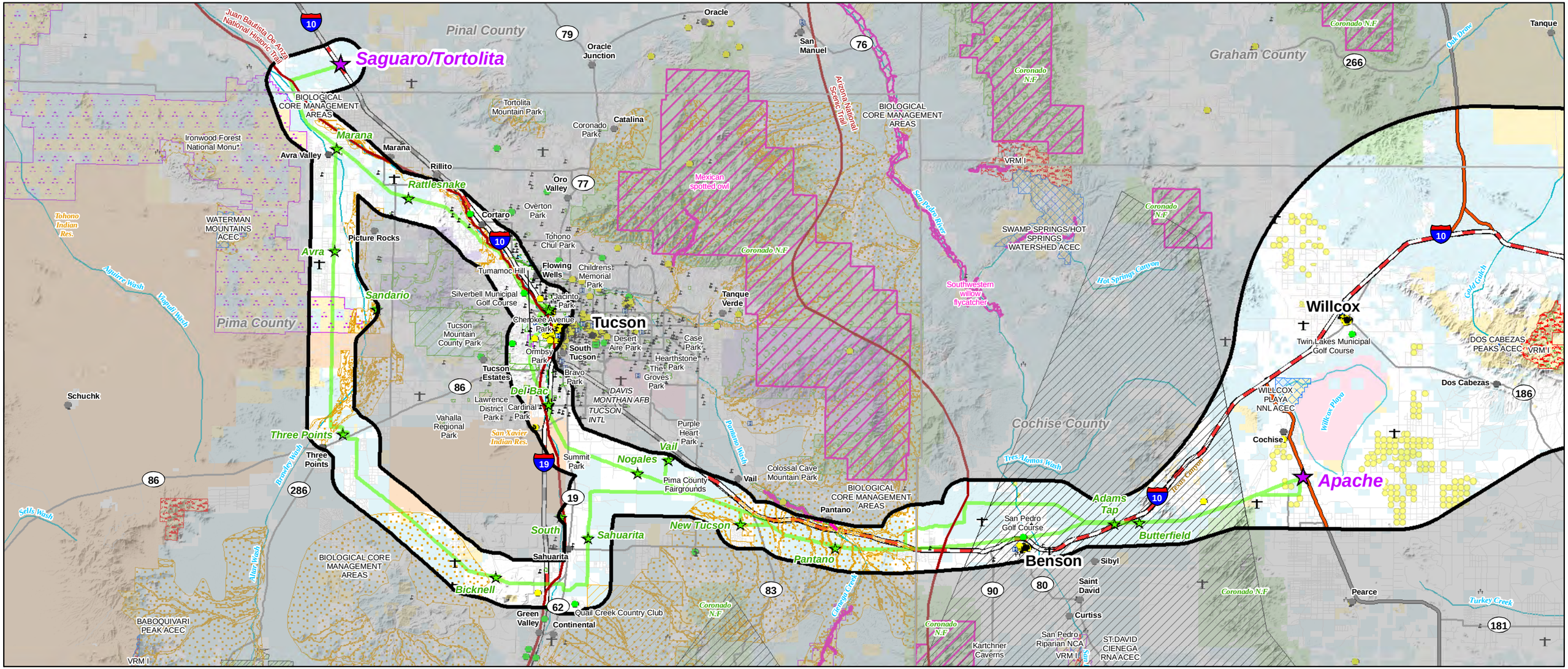
0 5 10
Miles

1:760,000

Figure 2-6
Viable Opportunities with Constraints
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Viable Opportunity Segment

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- River/Stream
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Constraints
- Airport
- School
- Hospital
- Church
- Cemetery
- National Register of Historic Place
- National Trail/Historic Trail
- Areas of Critical Environmental Concern
- Ft. Huachuca Electronics Testing Area

- Threaten and Endangered Species Habitat
- Wilderness Area
- Wilderness Study Area
- Sonoran Desert Conservation Plan - Biological Core Area
- National/Local Conservation Area
- National Wildlife Refuge
- Visual Resource Management Class I
- State/Local Recreation Area or Park
- Malpai Borderlands Group
- Center Pivot Irrigated Farmland
- State Scientific Area

N

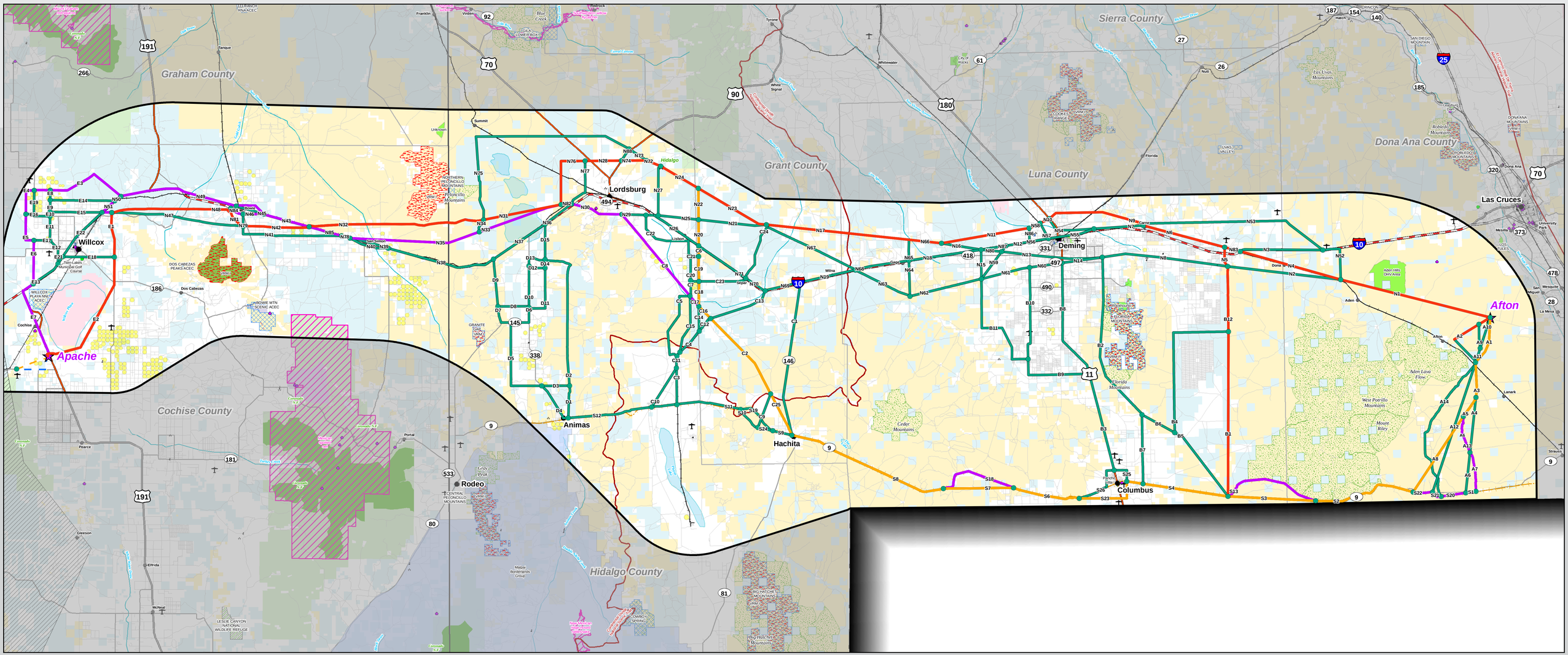
0 5 10
Miles

1:500,000

Figure 2-7
Viable Opportunities with Constraints
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Southwest Transmission Cooperative Line for Potential Improvement
- Western Area Power Administration Line for Potential Improvement
- Proposed Transmission Route
- Transmission Alternative Southern Route
- Transmission Alternative
- Viable Opportunity

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural, or City Street
- Railroad
- Abandoned Railroad
- County Boundary
- River/Stream
- Water Body
- Bureau of Indian Affairs

- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

Constraints
- Airport
- School
- Hospital
- Church
- Cemetery
- National Register of Historic Places
- National Trail/Historic Trail
- Malpai Borderlands Group
- State/Local Recreation Area or Park
- Wilderness Area
- Wilderness Study Area

- National/Local Conservation Area
- National Wildlife Refuge
- Visual Resource Management Class I
- Ft. Huachuca Electronics Testing Area
- Area of Critical Environmental Concern
- State Scientific Area
- Center Pivot Irrigated Farmland
- Threatened and Endangered Species Habitat
- Sonoran Desert Conservation Plan - Biological Core Area

N

0 2.5 5 10
Miles
1:345,000

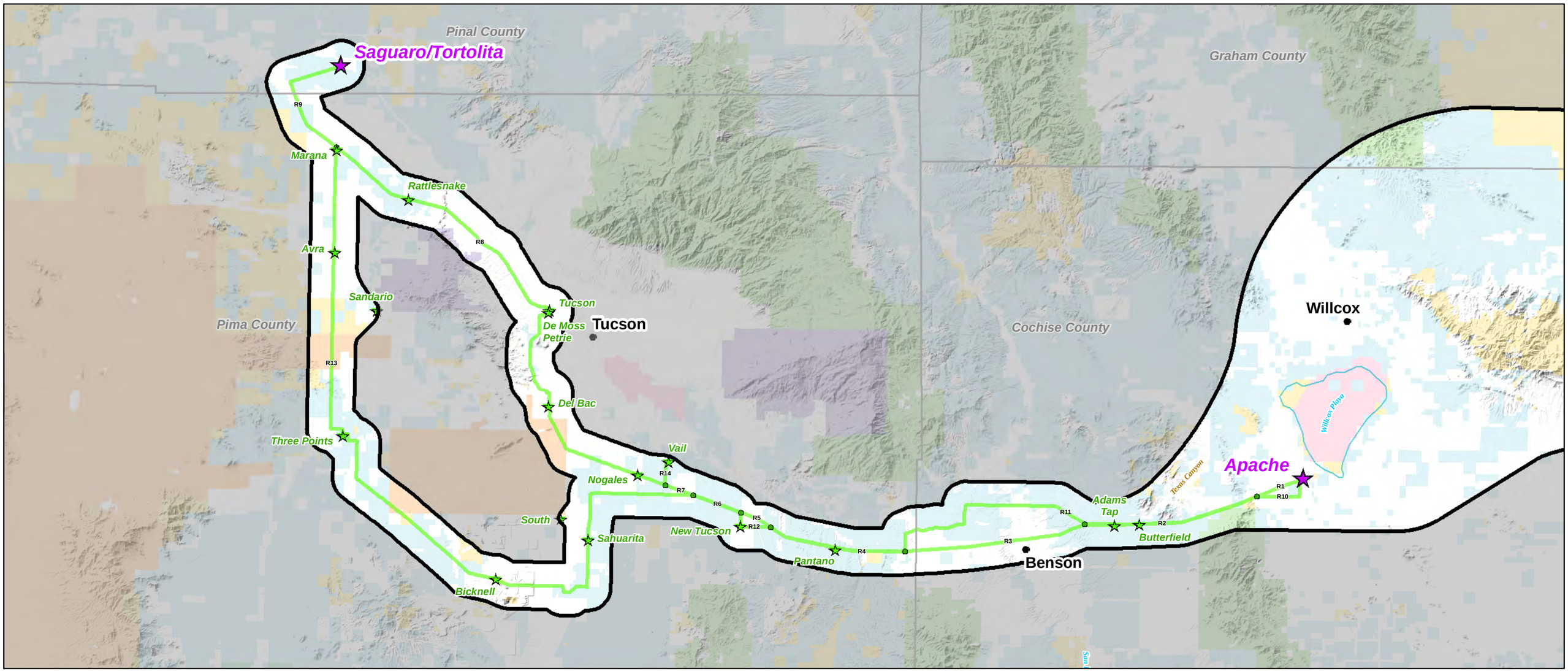
Figure 2-8
Viable Opportunities by Segment
New Build Section

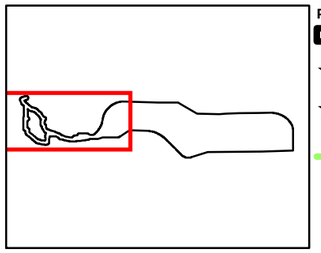
Source:
POWERmap, www.powermap.platts.com 2011 Platts, A Division of The McGraw-Hill Companies

Additional Sources:
BLM, 2010; ESRI, 2008; National Atlas, 2006; DOE, 2009; FAA 2011; USFWS, 2011; RGIS, 2011; Malpai Borderlands Group, 2011; FEMA, 2010; Bing, 2011; NRCS, 2011; Pima County, 2011

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Segment Endpoint
- Viable Opportunity Segment

Reference Features
- City/Town
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

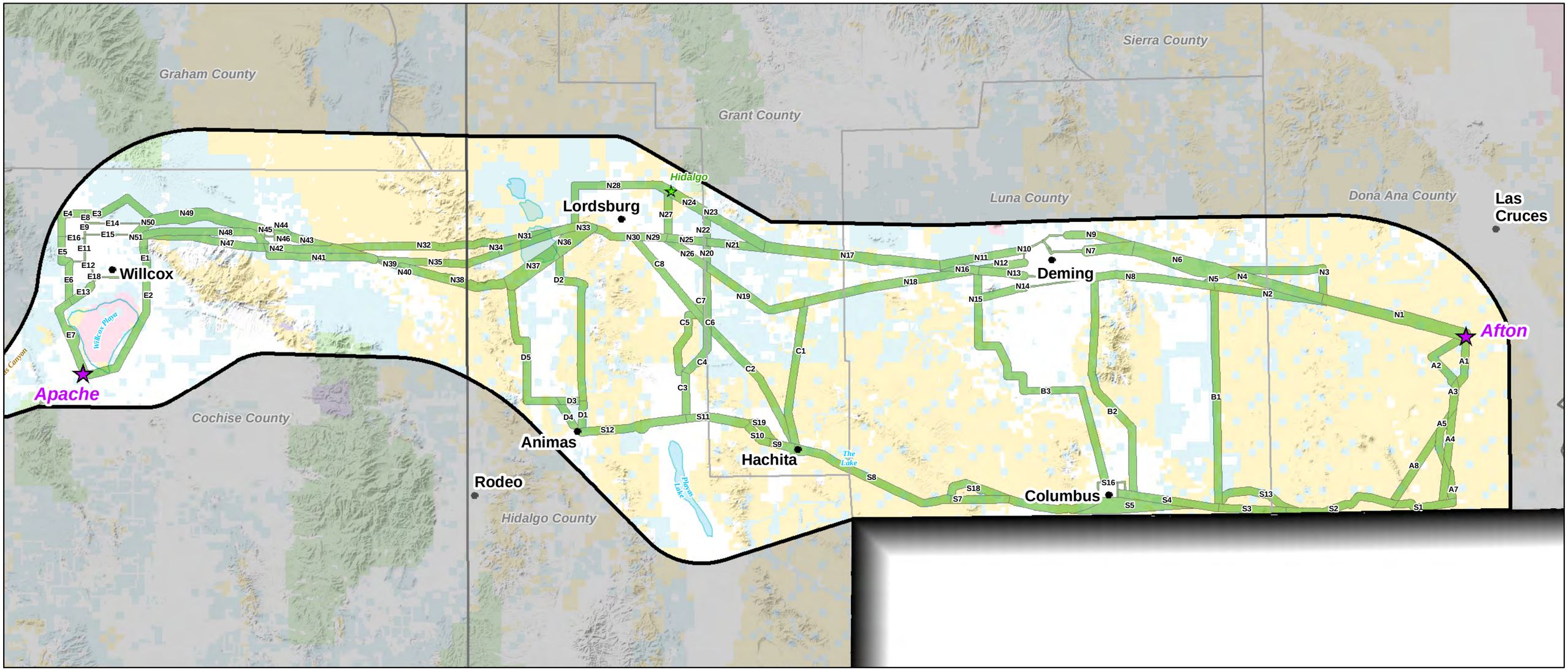
0 5 10
Miles

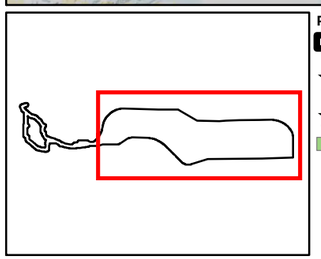
1:500,000

Figure 2-9
Viable Opportunities by Segment
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Corridor Segments

Reference Features
- City/Town
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

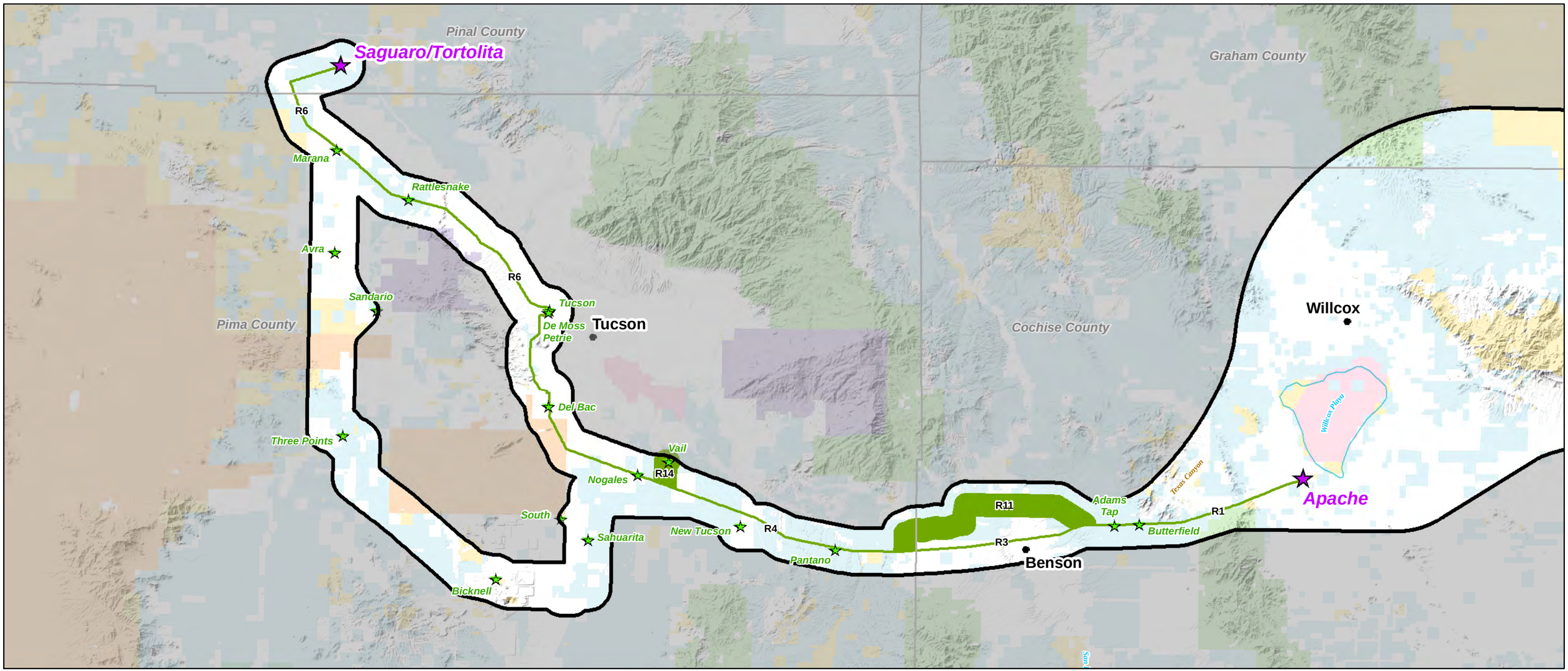
0 5 10
Miles

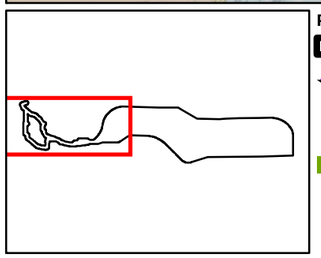
1:760,000

Figure 2-10
Corridors by Segment
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Corridor Segment

Reference Features
- City/Town
- Waterbody
- County Boundary

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

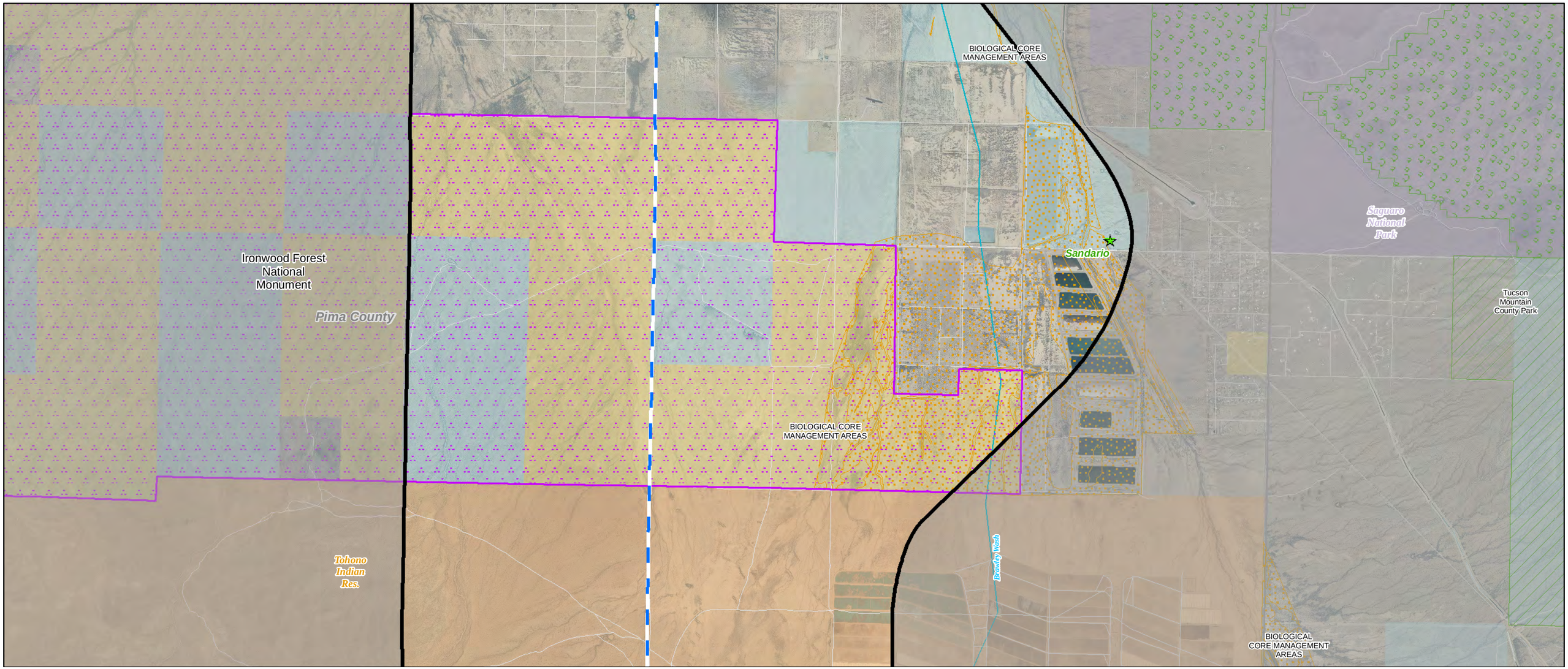
0 5 10
Miles

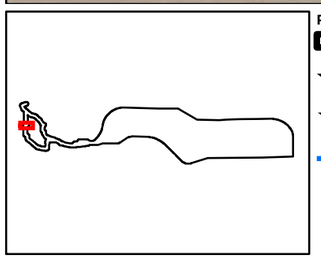
1:500,000

Figure 2-11
Corridors by Segment
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Southwest Transmission Cooperative Line for Potential Improvement

Reference Features
- City/Town
- Interstate
- US Highway
- State or County Highway
- Local, Neighborhood, Rural or City Street
- River/Stream
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State
- Wilderness Area
- Sonoran Desert Conservation Plan - Biological Core Area
- Ironwood Forest National Monument
- State/Local Recreation Area or Park
- BOR Tucson Mitigation Corridor

N

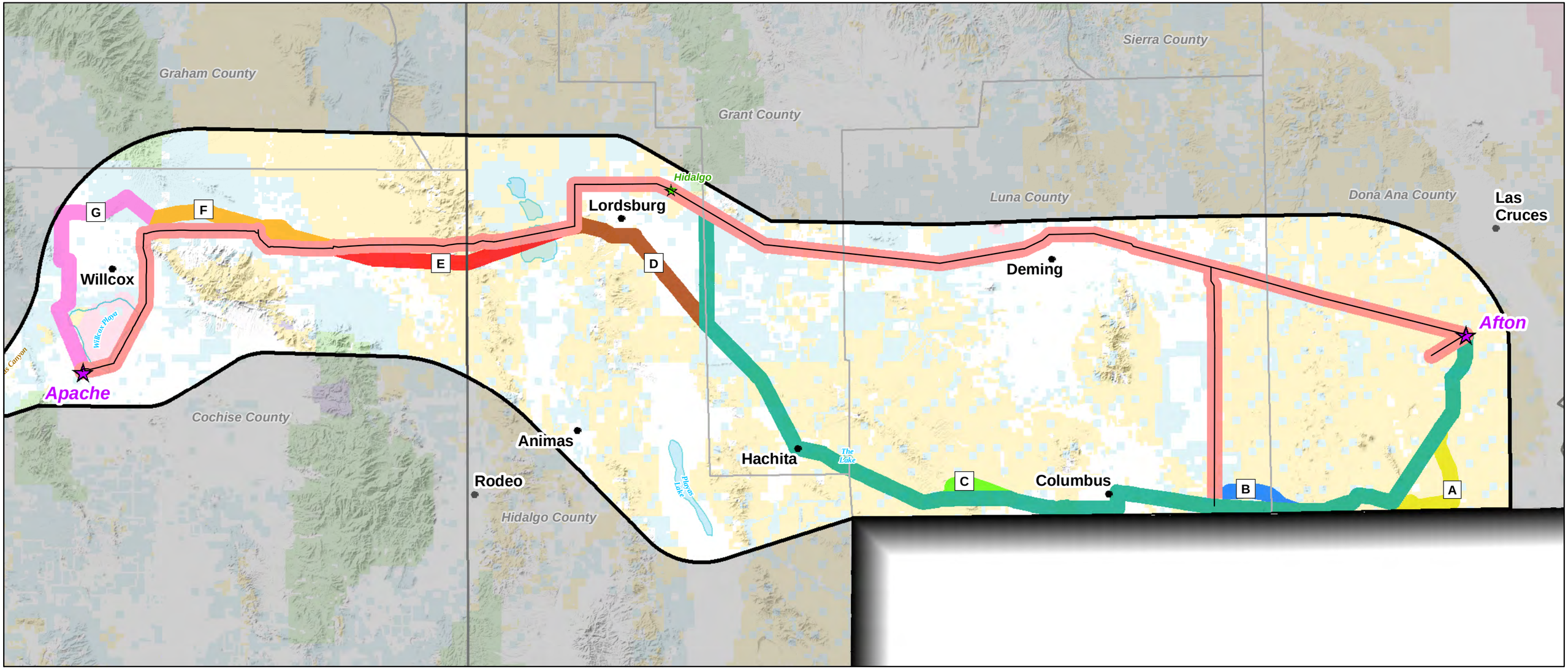
0 2,000 4,000
Feet

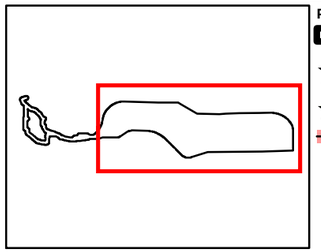
1:48,000

Figure 2-12
SWTC Route within the Ironwood Forest National Monument
Upgrade Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT





Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Proposed Route
- Alternative Southern Route
- Alternative Route Segment A
- Alternative Route Segment B
- Alternative Route Segment C
- Alternative Route Segment D
- Alternative Route Segment E
- Alternative Route Segment F
- Alternative Route Segment G

Reference Features
- City/Town
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

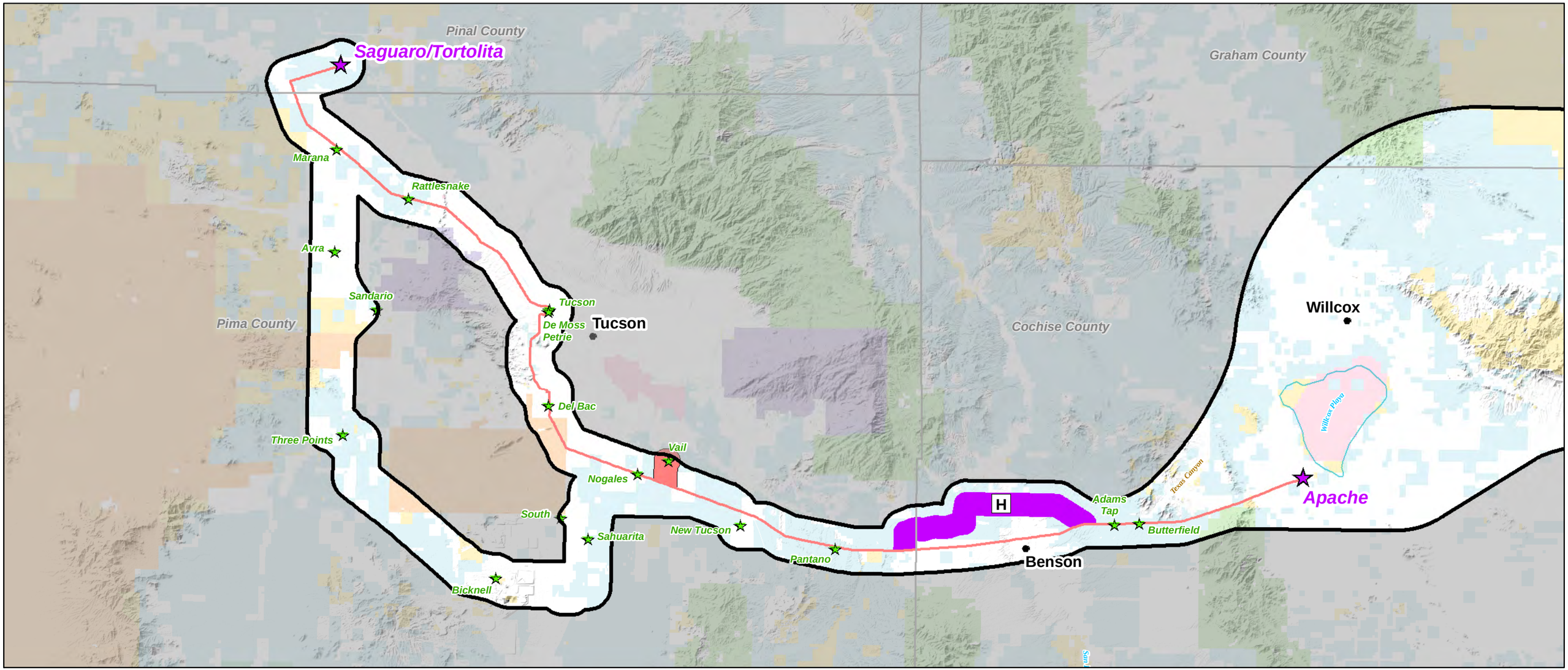
0 5 10
Miles

1:760,000

Figure 2-13
Proposed and Alternative Routes
New Build Section

Date: 4/11/2012

SOUTHLINE TRANSMISSION PROJECT



Project Features
- Proposed Study Area
- Key Interconnection Substation
- Existing Substation for Potential Interconnection
- Proposed Upgrade Route (Western)
- Alternative Route Segment H

Reference Features
- City/Town
- Waterbody
- County Boundary
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- US Forest Service
- US Fish and Wildlife Service
- National Park Service
- Private
- State

N

0 5 10
Miles

Upgrade Study Corridor: 500 feet
New Build Study Corridor: 2 miles

1:500,000

Figure 2-14
Proposed and Alternative Routes
Upgrade Section

Date: 4/11/2012

APPENDIX A

Stakeholder Interviews, Stakeholder Outreach Meetings, Public Information Meetings, Routing Workshops, and Agency Webinars

Appendix A: Stakeholder Interviews, Stakeholder Outreach Meetings, Public Information Meetings, Routing Workshops, and Agency Webinars

Stakeholder Interviews: June – August 2011

An independent third party, Kearns & West, conducted phone interviews with stakeholders identified by the project team and referred to the team by other stakeholders. Interviews were conducted from June 28 to August 19, 2011.

Approximately 100 stakeholders were contacted, 45 of which were interviewed. Members of the project team also met with more than 25 additional stakeholders, for a total of approximately 70 stakeholder interviews. These stakeholders represented the following interests:

- Chambers of Commerce
- City and County Government
- Energy Interests
- Farm/Ranch Interests
- Federal Agencies
- Interested Citizens/Residents
- Military
- NGOs
- State Agencies
- Tribes

The findings from these interviews were summarized in a stakeholder assessment report. Key findings included stakeholders' current awareness of the project, interests and concerns, lessons learned from other transmission projects, feedback on Hunt Consolidated and Black Forest Partners, and feedback on the proposed public engagement process and additional recommended stakeholders. The findings informed how the project team would engage stakeholders and the public most effectively.

Stakeholder Outreach Meetings: July – August 2011

The following outreach meetings were conducted prior to the public meetings and workshops. These outreach meetings were conducted to inform key stakeholders about the project early in the route study and selection process. Input from these meetings was used to refine potential route options, which were later shared at the public informational meetings, prior to the formal scoping process.

- City of Deming, NM, July 6, 2011;
- Luna County, NM, July 6, 2011;
- Las Cruces, NM, Chamber of Commerce, July 11, 2011;
- Southwest Transmission Cooperative, July 18, 2011;
- Fort Huachuca, AZ, July 18, 2011;

- Cascabel Working Group, Tucson Audubon, Community Watershed Alliance, Empire-Fagan Organization, July 19, 2011;
- City of Wilcox, AZ, July 20, 2011;
- New Mexico NGOs, July 26, 2011;
- New Mexico Public Regulation Commission, July 27, 2011;
- Arizona State Lands Department, August 2, 2011;
- Tucson Metropolitan Chamber of Commerce, August 2, 2011;
- Cochise County, AZ, August 3, 2011;
- Arizona NGOs, August 4, 2011;
- Arizona Department of Environmental Quality (ADEQ), August 5, 2011;
- City of Columbus, NM, August 17, 2011;
- Columbus, NM, City Council, August 17, 2011;
- Natural Resource Defense Council (NRDC), San Francisco, August 22, 2011;
- Pima County, AZ, September 12, 2011;
- Hidalgo County, NM, September 13, 2011; and
- Tucson City Council, Ward One, September 28, 2011

Public Informational Meetings: September 2011

The project team hosted five public informational meetings across the project study area in September 2011. These meetings were designed to share information about the project with potentially affected communities and gather public input early in the route study and selection process, prior to the formal Federal environmental review process. More than 125 attendees participated at the following locations:

Date & Time	Sept. 21, 2011 *5:00 PM – 8:00 PM*	Sept. 22, 2011 *5:00 PM – 8:00 PM*	Sept. 27, 2011 *5:00 PM – 8:00 PM*	Sept. 28, 2011 *5:00 PM – 8:00 PM*	Sept. 29, 2011 *5:00 PM – 8:00 PM*
Location	Lordsburg High School Cafeteria 501 West 4th St Lordsburg, NM	Mimbres Valley Special Events Center 2300 E. Pine St Deming, NM	Willcox Community Center 312 W. Stewart St Willcox, AZ	Four Points by Sheraton, University Plaza Ballroom 1900 E. Speedway Blvd. Tucson, AZ	Marana Health Center 13395 N. Marana Main St Marana, AZ

The project team used a wide variety of notification methods for these meetings including:

1. An email to all stakeholders on the project information list,
2. Direct calls and emails to more than 50 stakeholders,

3. Newspaper ads placed in 15 different publications,
4. Calls to cities and counties to encourage information-sharing on city/county websites,
5. Direct mailings to tribal leaders potentially affected by the project, and
6. Posting information on the project website

At the meetings, the project team provided an array of informational materials, including:

1. Project fact sheet,
2. Informational project posters,
3. Frequently asked questions,
4. Comment forms,
5. Large-scale hardcopy maps, and
6. An interactive GIS mapping database

All materials were made available in both English and Spanish to enable more inclusive public participation.

The comments received at these meetings were compiled by the project team and were used to refine the potential and alternative project route options.

Public Routing Workshops: September 2011

Two public routing workshops were held approximately the same time as the pre-NEPA public informational meetings, consisting of one each in Arizona (Tucson) and New Mexico (Deming). These workshops were intended to provide an opportunity for a variety of stakeholders representing agencies and broader constituencies to jointly conduct a detailed GIS map-based review of the potential route alternatives and provide feedback on the potential route alternatives and potential land and resource issues. Attendees at these workshops included local governments, tribes, non-profit organizations, Federal and State agencies, and other interested organizations.

Date & Time	September 28, 2011 *9:00 AM – 1:00 PM*	September 22, 2011 *9:00 AM – 1:00 PM*
Location	Four Points by Sheraton, University Plaza Ballroom 1900 East Speedway Blvd. Tucson, AZ	Mimbres Valley Special Events Center 2300 E. Pine St Deming, NM
Invitees	• Ak-Chin Indian Community • Arizona Corporation Commission • Arizona Department of Transportation • Arizona Game and Fish Department • Arizona Natural Resource Conservation Districts • Arizona Public Service • Arizona State Land Department • Arizona Wilderness Coalition • Bureau of Land Management • Cascabel Working Group	• Audubon New Mexico • Bureau of Land Management • City of Lordsburg • City of Deming • City of Las Cruces • Columbus Electric Cooperative • Comanche Nation • Defenders of Wildlife • Doña Ana County • Doña Ana County Farm Bureau • El Paso Electric

- City of Benson
- City of South Tucson
- City of Tucson
- Coalition for Sonoran Desert Protection
- Cochise County
- Cochise County Farm Bureau
- Davis Monthan Air Force Base
- Gila River Indian Community
- Graham County
- Greenlee County
- Navajo Nation
- Pascua Yaqui Tribe
- Pima County
- Pima County Farm Bureau
- Pinal County
- Salt River Pima-Maricopa Indian Community
- Salt River Project
- San Carlos Apache Tribe
- Sierra Club
- Sky Island Alliance
- Sonoran Institute
- Southern Arizona Buffelgrass Coordination Center
- Southwest Transmission Cooperative
- Sulphur Springs Valley Electric Cooperative
- The Hopi Tribe
- The Nature Conservancy
- The Wilderness Society
- Tohono O'odham Nation
- Tonto Apache
- Town of Marana
- Town of Willcox
- Trico Electric Coop
- Tucson Audubon
- Tucson Electric Power
- U.S. Army Fort Huachuca
- U.S. Fish and Wildlife Service
- Western Area Power Administration
- White Mountain Apache Tribe
- Yavapai-Apache Nation
- Fort Bliss
- Fort Sill Apache Tribe of Oklahoma
- Grant County
- Grant County Farm Bureau
- Hidalgo County
- Hidalgo County Farm Bureau
- Holloman Air Force Base
- International Boundary and Water Commission
- Luna County
- Luna County Farm Bureau
- Mescalero Apache Tribe
- Natural Resources Defense Council
- New Mexico Department of Transportation
- New Mexico Game and Fish Department
- New Mexico Public Regulation Commission
- New Mexico State Land Office
- New Mexico Wilderness Alliance
- PNM
- Pueblo of Acoma
- Pueblo of Isleta
- Pueblo of Laguna
- Pueblo of Zuni
- Sierra Club
- The Southwest Environmental Center
- The Wilderness Society
- Tri-State
- U.S. Army Corps of Engineers
- U.S. Border Patrol
- U.S. Fish and Wildlife Service
- Village of Columbus
- Western Area Power Administration
- White Sands Missile Range
- Ysleta del Sur Pueblo

Benson Community Meeting: November 2011

The project team held an additional community information meeting in Benson, Arizona, as requested by the Benson community. This meeting provided an additional opportunity for community members to learn about the project and weigh in on potential project route corridors. All the materials from the September public informational meetings were provided to the community members in Benson.

Date & Time	November 10, 2011 *6:30 PM – 8:30 PM*
Location	J6 Community Bible Church Community Room 714 South J Six Ranch Rd Benson, AZ

Agency Routing Webinars: November 2011

The project team held two routing webinars with BLM and Western field staff and supervisors in November 2011 to gather their local knowledge about potential resource issues in the project area. The feedback received from these two webinars contributed to the refinement of potential and alternative project route options.

Individual Stakeholder Contacts: 2011 and 2012

Beginning in spring 2011, members of the project team contacted and met with Federal, State, county, and local officials and relevant agency members to provide information about the project, answer questions, and understand preliminary interests and potential concerns.