U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

The Honorable William Rhodes, Governor
ATTN: Mr. Barnaby V. Lewis
Gila River Indian Community
Cultural Resources Management Program
315 W. Casa Blanca Rd.
Sacaton, AZ 85247

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona

Dear Governor Rhodes:

The Secure Border Initiative (SBI), SBI*net* System Program Office (SPO), a program in the Commissioner's Office of U.S. Customs and Border Protection (CBP), is preparing an Environmental Assessment (EA) for the siting, construction, and operation of a technology-based border security system that will cover a portion of the international border in Arizona. The EA will be prepared in compliance with Section 102(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality's NEPA implementing regulations at 40 C.F.R. 1500 et seq., and Department of Homeland Security's *Management Directive 5100.1 – Environmental Planning Program* and Section 106 of the National Historic Preservation Act, as amended.

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While no final decisions have been made, the proposed action to be described and analyzed in an EA would cover a portion of the United States-Mexico border designated as the Tucson Border Patrol Sector. The sector is comprised of twelve Arizona counties, and contains eight Border Patrol Stations (Ajo, Casa Grande, Douglas, Naco,

Nogales, Sonoita, Tucson, and Willcox). The Sector is divided into three geographic operational corridors.

The Douglas/Naco corridor is adjacent to the New Mexico state line. The San Bernadino Valley is bordered on the east by the Guadalupe and Peloncillo Mountain ranges and to the west by the Chiricahua Mountains, within the Coronado National Forest. The San Pedro Valley is in the western portion of the Douglas-Naco Corridor. The San Pedro Valley's eastern border is the Dragoon and Mule Mountain ranges. To the west are the Whetstone Mountains.

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The need for this proposed action is to decrease illegal border activities in the Tucson Sector. Not only does illegal border activity have direct and indirect costs for all U.S. citizens, it has environmental costs as well. IEs have contributed heavily to the destruction of native vegetation and left litter throughout the Tucson Sector. IEs passing through border areas threaten public lands, destroy historic and cultural structures and artifacts, harm endangered plant and animal species, and adversely affect other sensitive resources. Additionally, vehicles used by smugglers and IEs are abandoned in national parks and other environmentally sensitive areas. Dealing with the detrimental effects of IEs is an ever-increasing burden on Federal and State land managers and private landowners.

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SBI*net* intends to evaluate the following potential environmental impact areas:

- Land Use and Zoning
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- Floodplains
- Wetlands
- Water Resources/Water Quality
- Farmlands
- Noise
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- Vehicular Transportation
- Air Resources/Air Quality
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- Solid and Hazardous Waste Generation
- Energy Use
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We look forward to hearing any concerns you may have regarding known sacred sites or other traditional cultural properties within the proposed project area.

Cultural resource pedestrian surveys are required to determine the existence of cultural resources within the pertinent project areas. Once those surveys have taken place, a report will be produced and sent to you for review and comment and at that time we will ask the State Historic Preservation Officer for concurrence with the appropriate determinations.

If you have any questions pertaining to this project, please do not hesitate to contact Ms. Patience Patterson, Environmental Branch Manager at (202) 344-1131, or Michael Potter, Project Manager, 1300 Pennsylvania Avenue, NW, Room 7.5, Washington, DC 20229 at (202) 344-1928.

Sincerely,

Kirk Evans
Program Manager, SBI*net*

Copy furnished:

Michael Potter, Project Manager
1300 Pennsylvania Avenue, NW
Room 7.5
Washington, DC 20229

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

The Honorable Wayne Taylor, Jr., Chairman
ATTN: Mr. Leigh J. Kuwanwisiwma
Hopi Tribal Council
Main Street
Kykotsmovi, AZ 86039

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona

Dear Chairman Taylor:

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Kirk Evans
Program Manager, SBI*net*

Copy furnished:

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1300 Pennsylvania Avenue, NW
Room 7.5
Washington, DC 20229

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

Mr. James Garrison, State Historic Preservation Officer
ATTN: Ms. Joanne Medley
Arizona State Parks
1300 West Washington
Phoenix, Arizona 85007

SUBJECT: Section 106 Project Re-Initiation in support of an Environmental Assessment for the siting, construction and operation of a technology-based border security system near Tucson, Arizona. **Ref: SHPO-2007-1248/1362 (33613/33641)**

Dear Mr. Garrison:

In response to your stamped comment of our non-consultation under Section 106, dated August 2, 2007 for our letter, and the above-mentioned reference number, the following will serve as our re-initiation of the Section 106 compliance for the project noted above.

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Copy furnished:

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SHPO- 2007-1248 (34277)

SHPO- 2007-1362 (34278)

U.S. Department of Homeland Security
Washington, DC 20229

U.S. Customs and
Border Protection

SEP 13 2007

RECEIVED
SEP 14 2007
ARIZONA STATE PARKS/S.H.P.O

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ATTN: Ms. Joanne Medley
Arizona State Parks
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Phoenix, Arizona 85007

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Sincerely,

Kirk Evans
Program Manager, SBI*net*

Thank you for the information. We look forward to continuing to consult and receiving survey reports.

Anne Hedley
for SHPO
Oct. 19, 2007

TOHONO O'ODHAM NATION
CULTURAL AFFAIRS PROGRAM
P.O. BOX 837 • SELLS, ARIZONA 85634
Telephone (520) 383-3622 • Fax (520) 383-3377

September 20, 2007

Kirk Evans
Program Manager, SBInet, U.S. Department of Homeland Security
U.S. Customs and Border Protection
Washington, D.C. 20229

Dear Mr. Evans:

Thanks you for your letter of September 13, 2007, informing the Tohono O'odham Nation of a Section 106 project Re-Initiation in Support of an Environmental Assessment (EA) for the siting, construction and operation of a technology-based border security system near Tucson, Arizona.

The Cultural Affairs Office has a few comments:

1. Please make sure a draft EA is sent to the Tohono O'odham Nation with a minimum of 30 days allowed for comments to be returned.

2. Please send copies of the EA to the following individuals for review

   Ned Norris, Chairman, Tohono O'odham Nation, P.O. Box 837, Sells, Arizona 85634

   Verlon Jose, Chairman, Tohono O'odham Nation Legislative Council P.O. Box 837, Sells, Arizona 85634

   Marla Henry, Chairwoman, Chukut Kuk District, Tohono O'odham Nation P.O. Box 278, Sells, Arizona 85634

   Geneva Ramon, Chairwoman, Gu Vo District, Tohono O'odham Nation, P.O. Box 880 Ajo, Arizona 85321

   Selso Villegas, Director, Department of Natural Resources, Tohono O'odham Nation, P.O. Box 837, Sells, Arizona 85634

   Karen Howe, Ecologist, Wildlife and Vegetation Management, Department of Natural Resources, Tohono O'odham Nation P.O. Box 837, Sells, Arizona 85634

   Peter L. Steere, Manager, Cultural Affairs Office, Tohono O'odham Nation P.O. Box 837, Sells, Arizona 85634

3. **The description of the proposed action is very general, please keep the Tohono O'odham Nation informed when you are able to designate a more specific area that will be covered by this EA.**

4. **On page 2 of your letter – paragraph 4 – line 4 "Alter" is spelled Altar**

   Also in paragraph 4 - In your description of the West Desert corridor, you mention that the Organ Pipe Cactus National Monument, but neglect to mention that a significant portion of this land is taken up by the lands of the Tohono O'odham Nation (3 million acres – 65 + miles of border with Mexico. Hopefully this oversight will be addressed in the draft EA.

5. **Please send copies of the design phase of the proposal to the Tohono O'odham Nation when completed in the Fall, 2007.**

6. **Since a significant portion of the geographic area of the EA will be on the lands of the Tohono O'odham Nation – the Cultural Affairs Office will have approval review on who will conduct the cultural resource inventories on Tohono O'odham Lands. The Wildlife and Vegetation Management Program should have approval review over who will conduct biological surveys on Tohono O'odham lands.**

7. **Any specific project areas for towers, fences etc. located on the Tohono O'odham Nation need to be reviewed and approved by the appropriate District government. The Chukut Kuk and Gu Vo Districts are the two districts of the Tohono O'odham Nation that border on Mexico.**

8. **Suggest that when your very general proposed action is better defined, more specific and detailed, that you contact the Chairman of the Tohono O'odham Nation to make arrangements for a presentation at a public meeting in Sells.**

Sincerely,

Peter L Steere

Peter L. Steere, Manager
Cultural Affairs Office
Tohono O'odham Nation
P.O. Box 837
Sells, Arizona 85634

cc:

Patience Patterson, Environmental Branch Manager
Michael Potter, Project Manager

AK-CHIN INDIAN COMMUNITY
Cultural Resources Office
42507 W Peters & Nall Road • Maricopa, Arizona 85239 • Telephone: (520) 568-1369 • Fax: (520) 568-1366

September 25, 2007

Patience Patterson
Environmental Branch Manager
U.S. Customs and Border Protection
1300 Pennsylvania Avenue
NW, Room 7.5
Washington, DC 20229

Re: EA for the siting, construction, and operation of a technology-based border security system near Tucson, Arizona

Dear Ms. Patterson:

The Ak-Chin Cultural Resources Office did receive a letter dated September 13, 2007 regarding the above-referenced undertaking. The purpose of this security system is to deter and prevent illegal entries into the Tucson Border Patrol Sector.

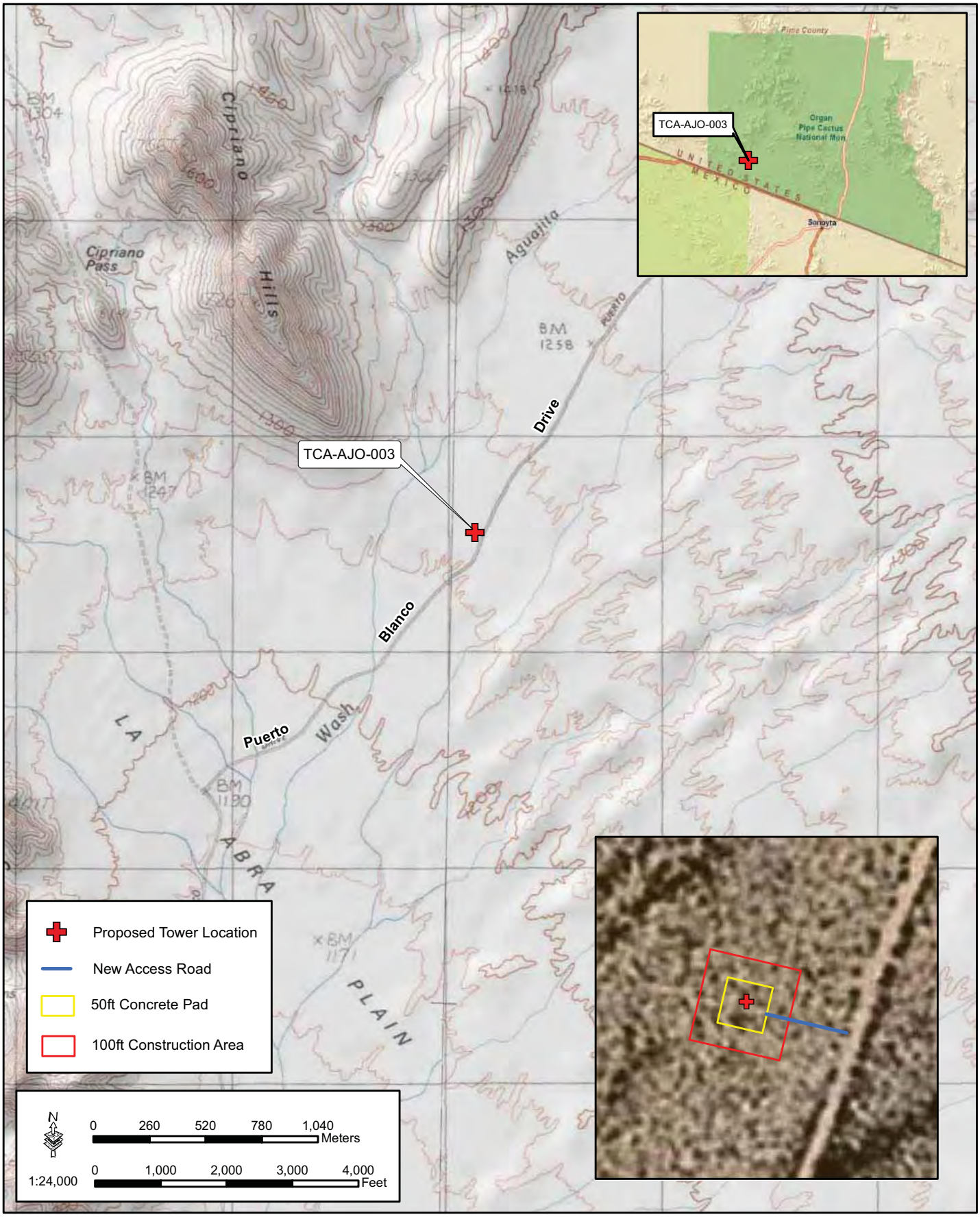
AT this time, our office will defer comments to the Tohono O'odham Nation for comments.

Thank you for informing our office about this undertaking. If you have any questions, please call me at (520) 568-1369. I can also be reached via email at: Ggilbert@ak-chin.nsn.us.

Sincerely,

Gary Gilbert
Cultural Resources Technician II
Cultural Resources Office
Ak-Chin Indian Community

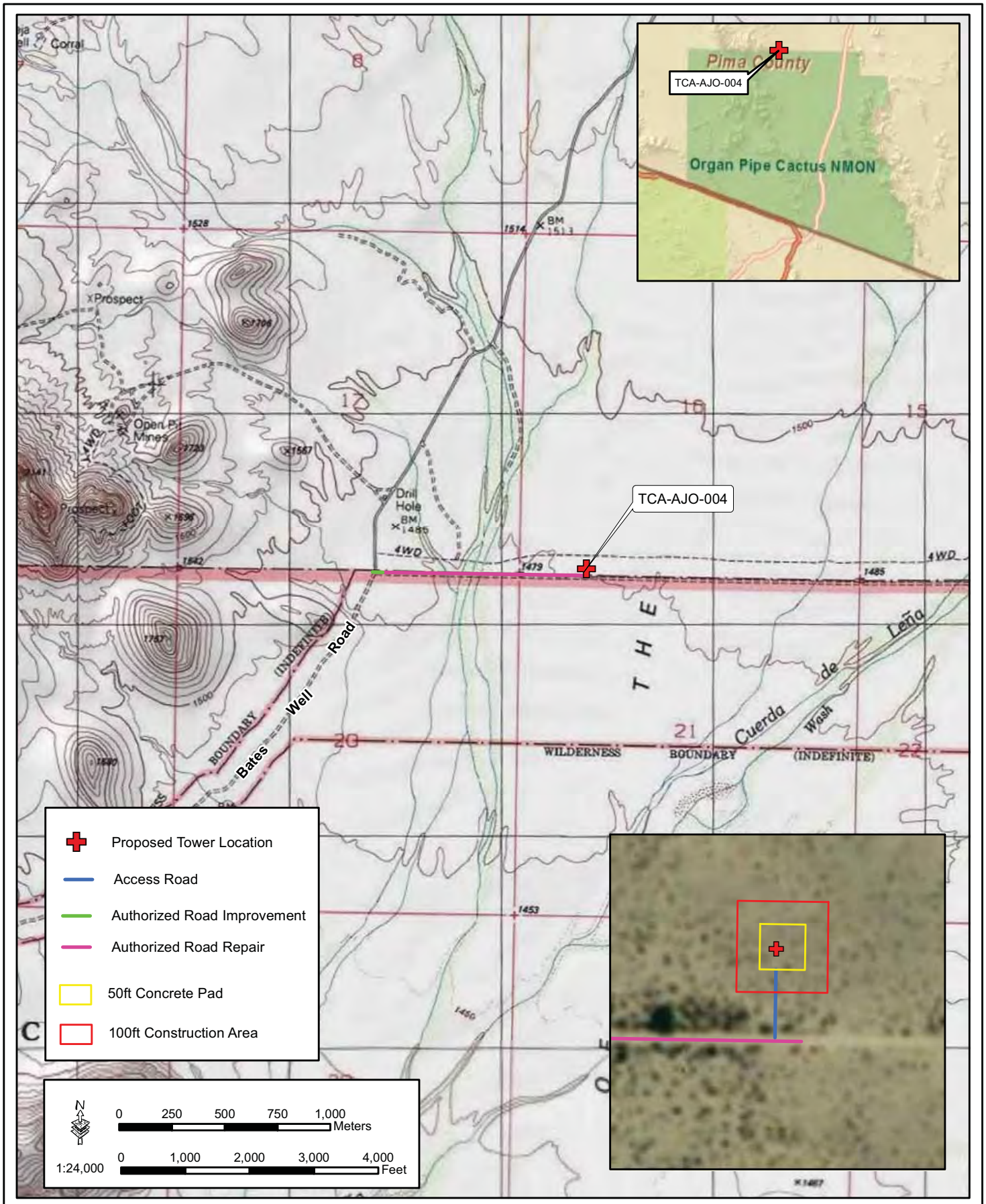
APPENDIX C
TOWER SITE MAPS



TCA-AJO-003 Tower and Access Road

GSRC

April 2009



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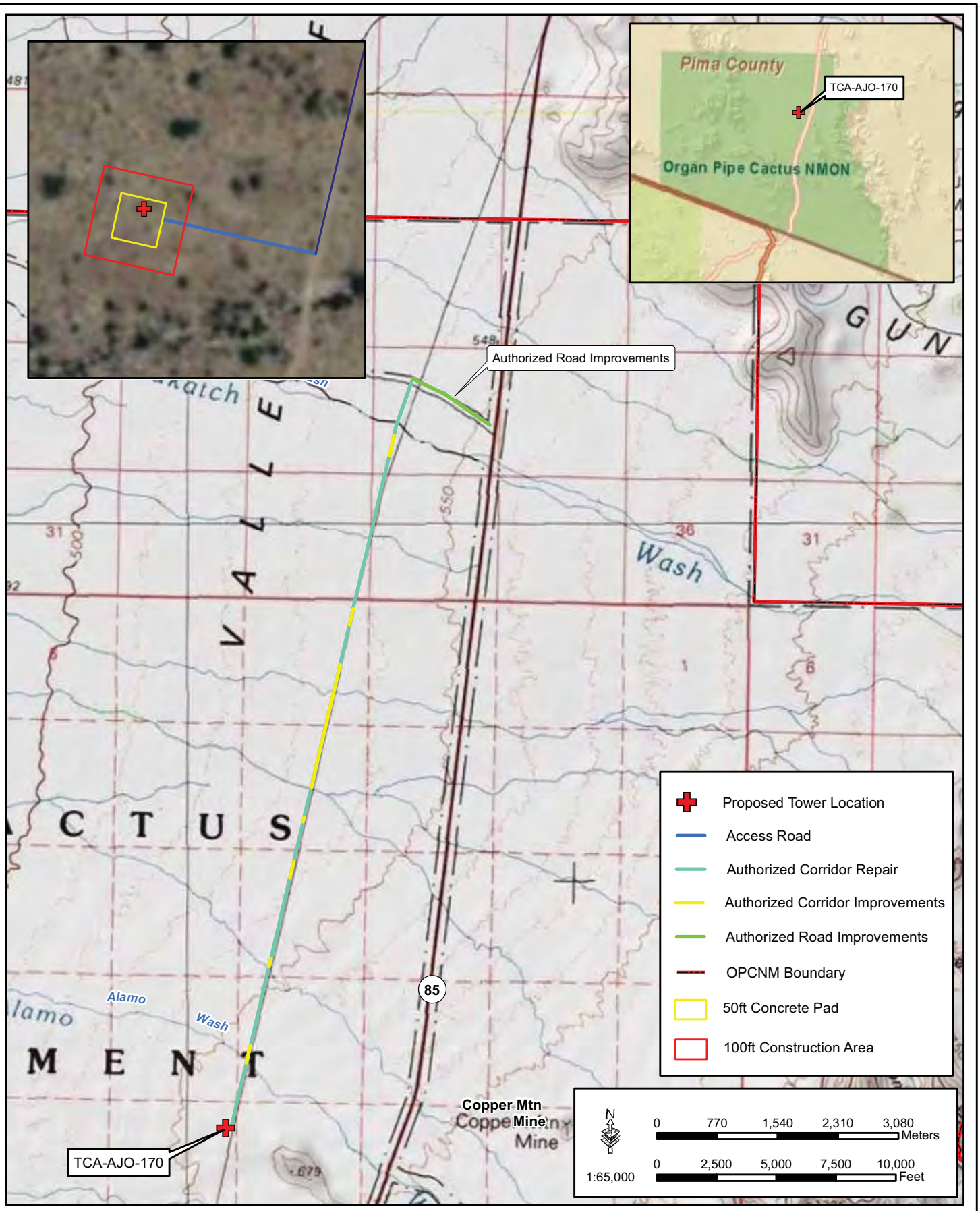
GSRC

August 2009



TCA-AJO-170 Tower and Access Road

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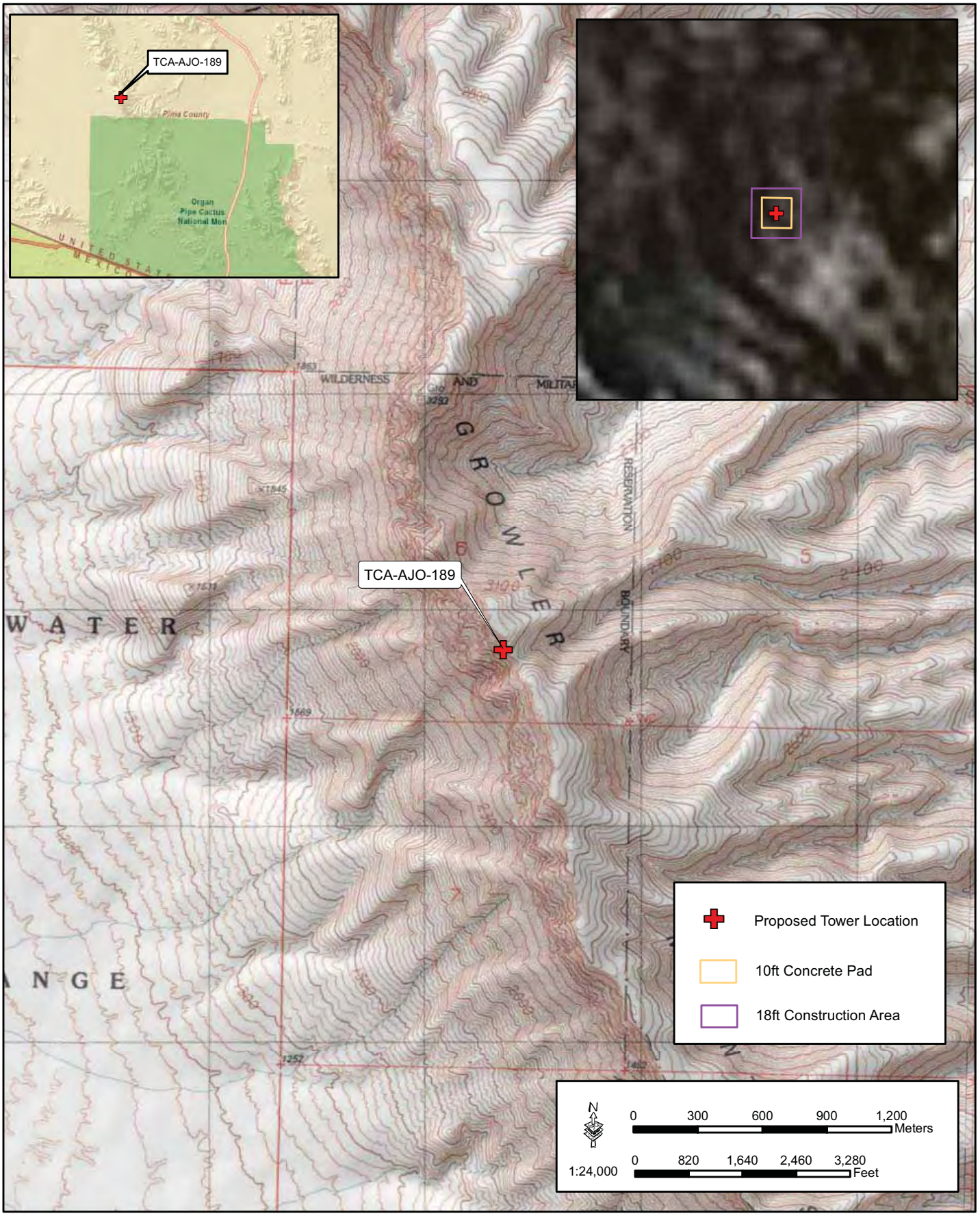

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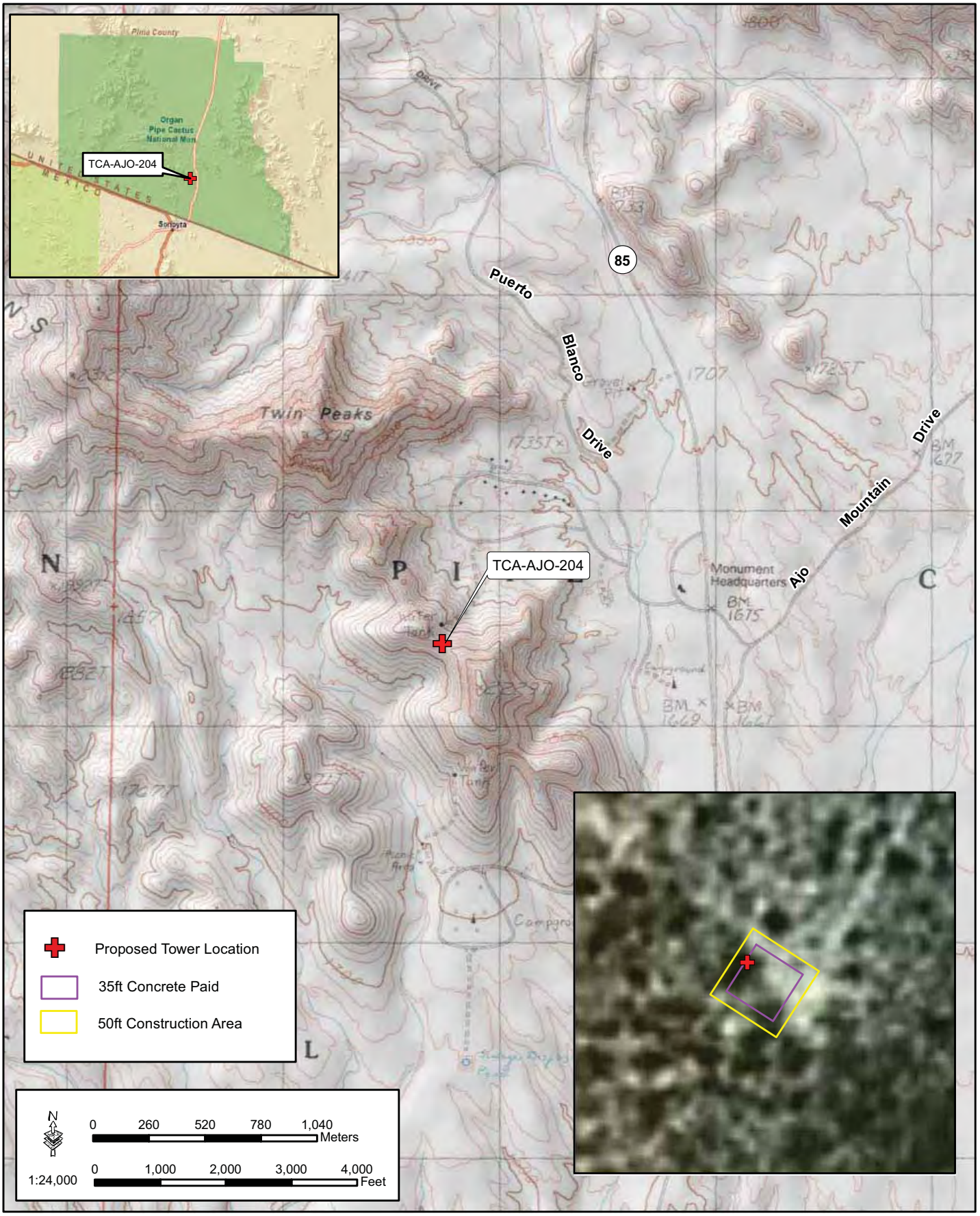
March 2009



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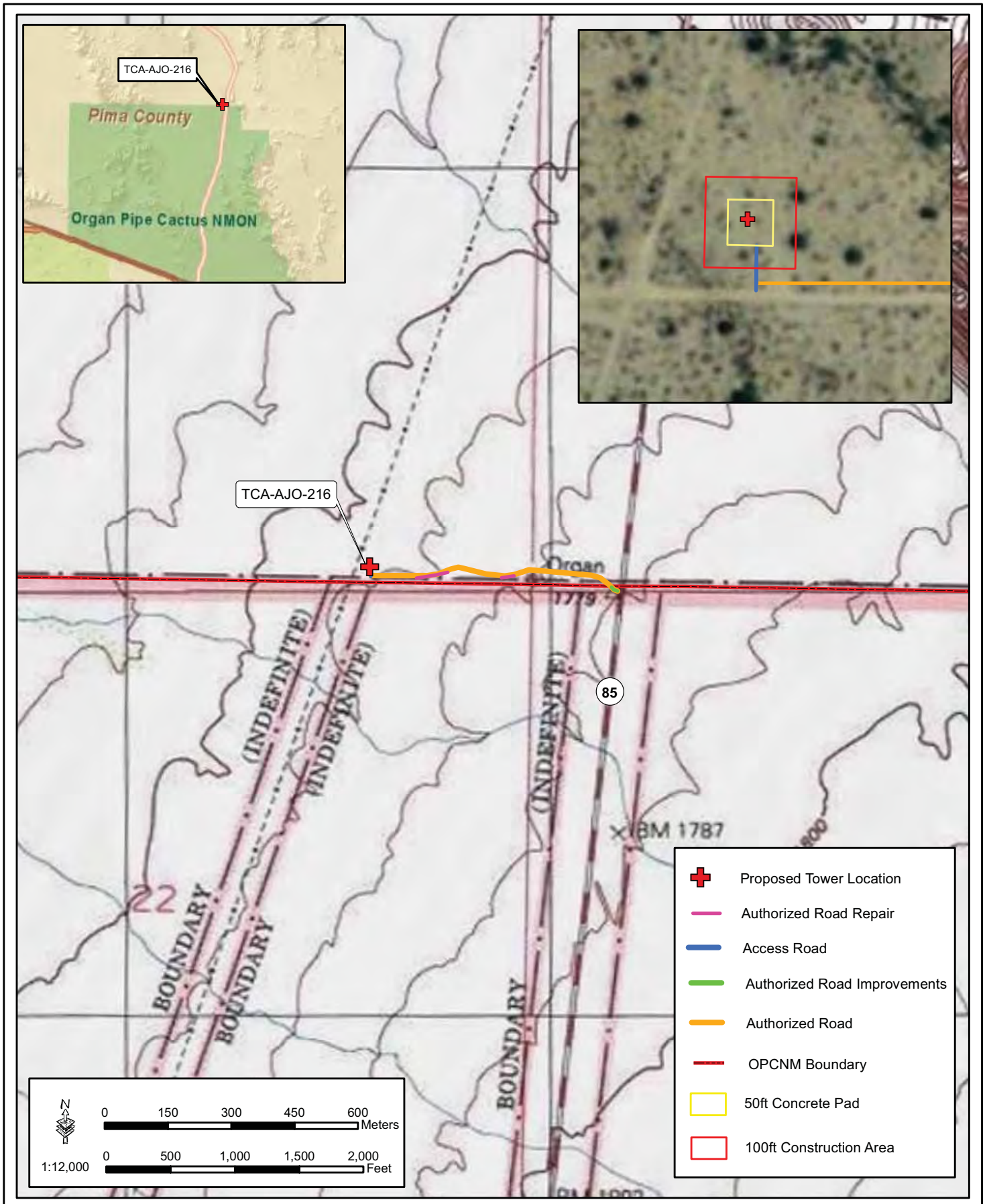
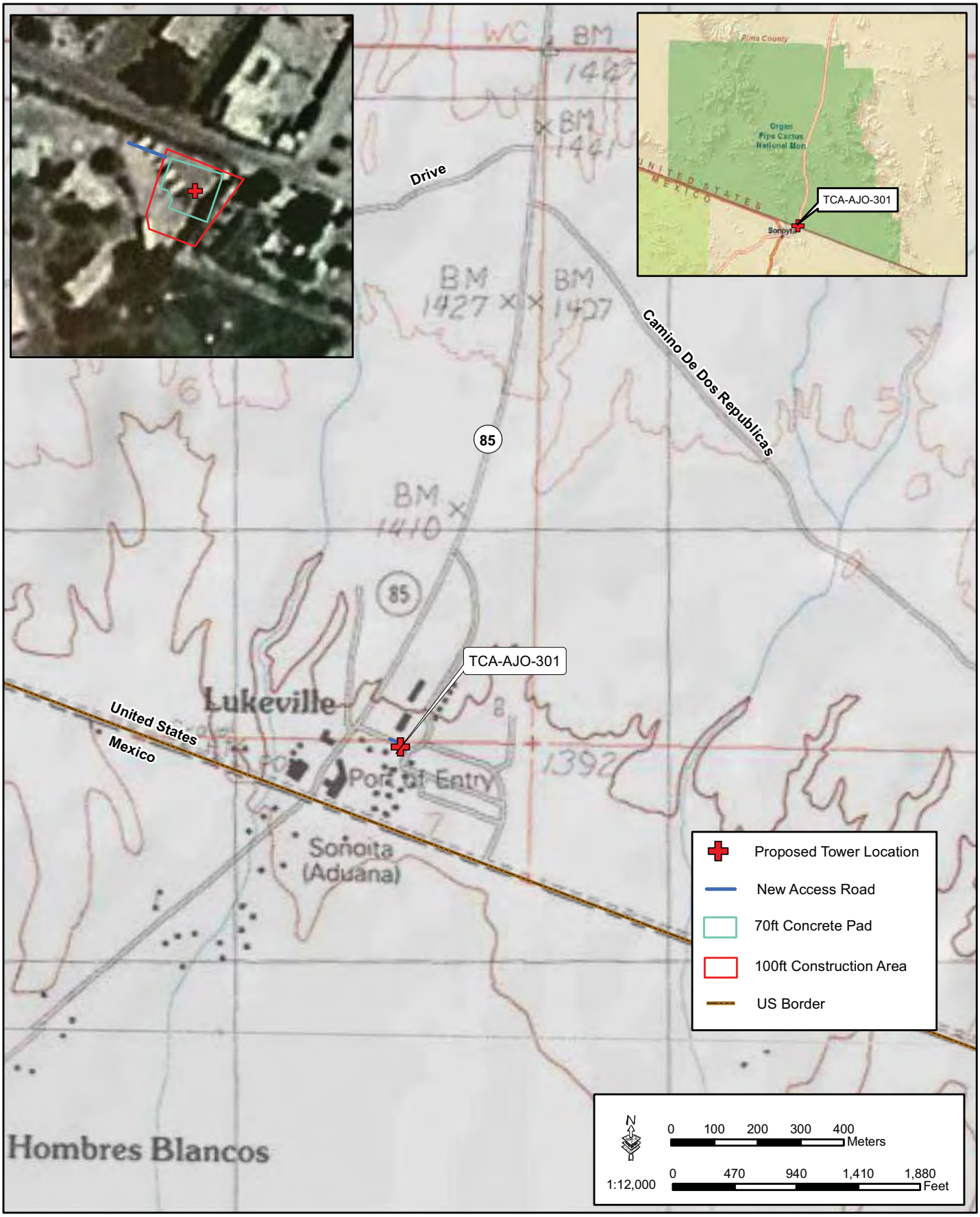


TCA-AJO-216 Tower and Access Road

GSRC

August 2009



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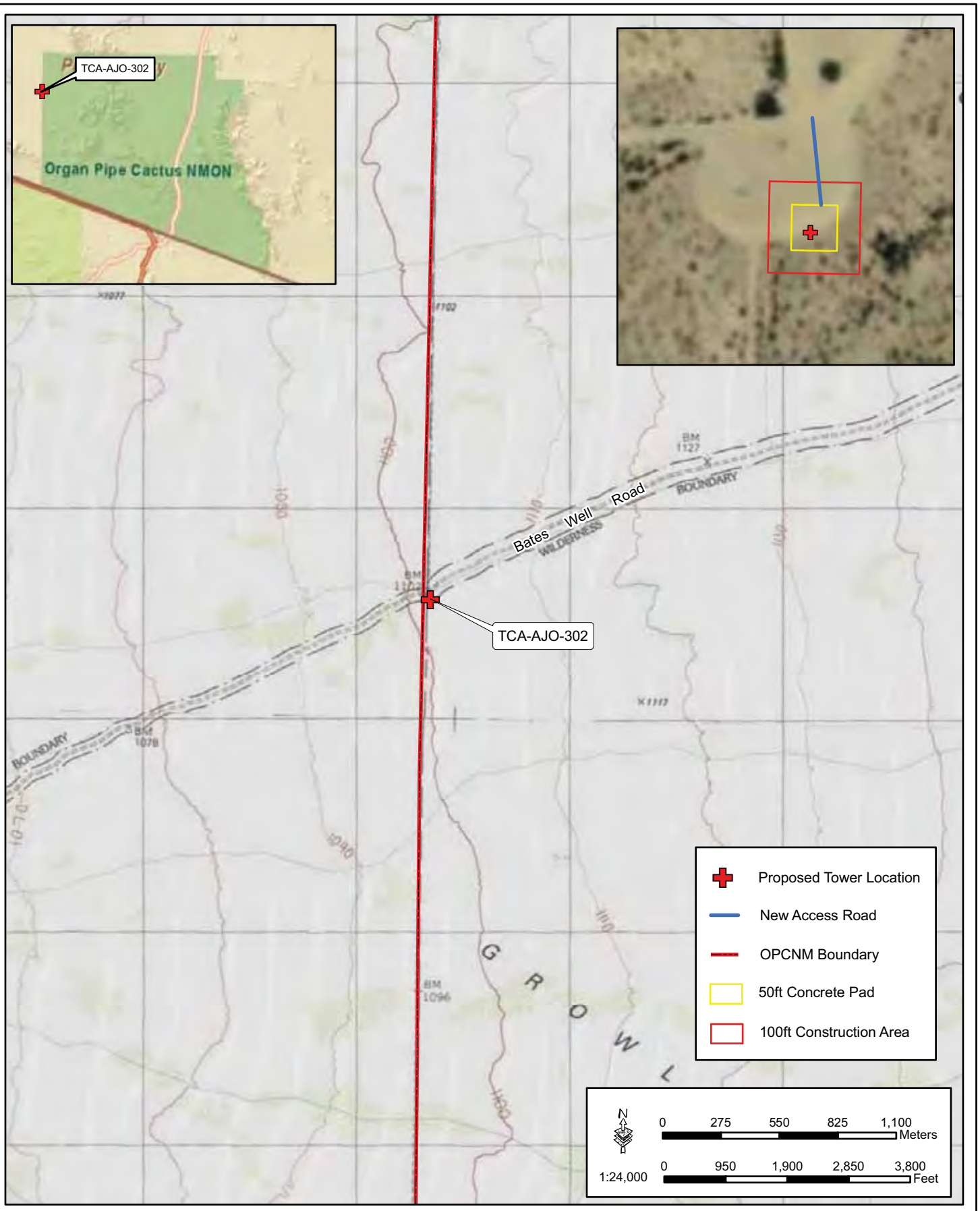
GSRC

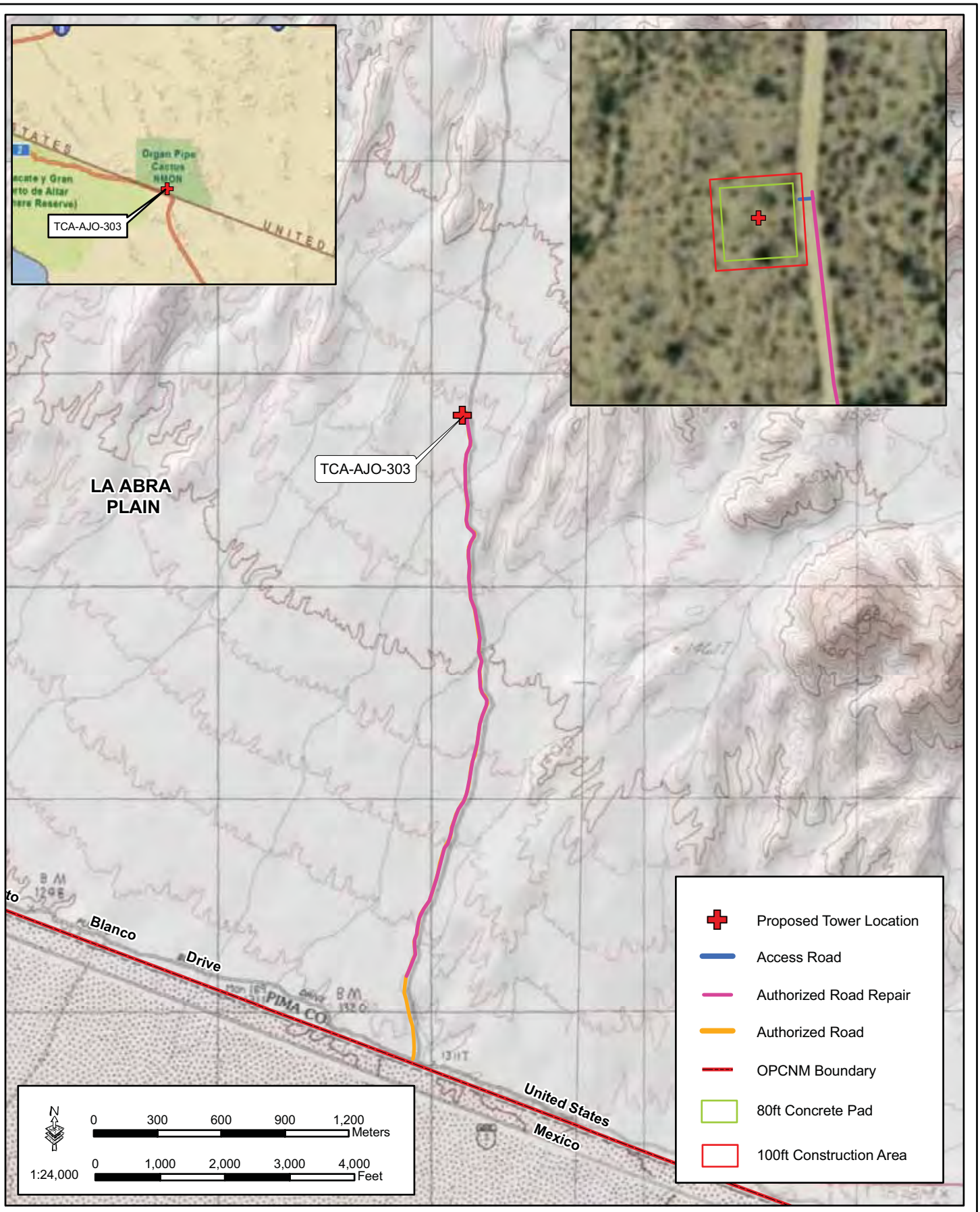
April 2009



TCA-AJO-302 Tower and Access Road

GSRC

March 2009



TCA-AJO-303 Tower and Access Road

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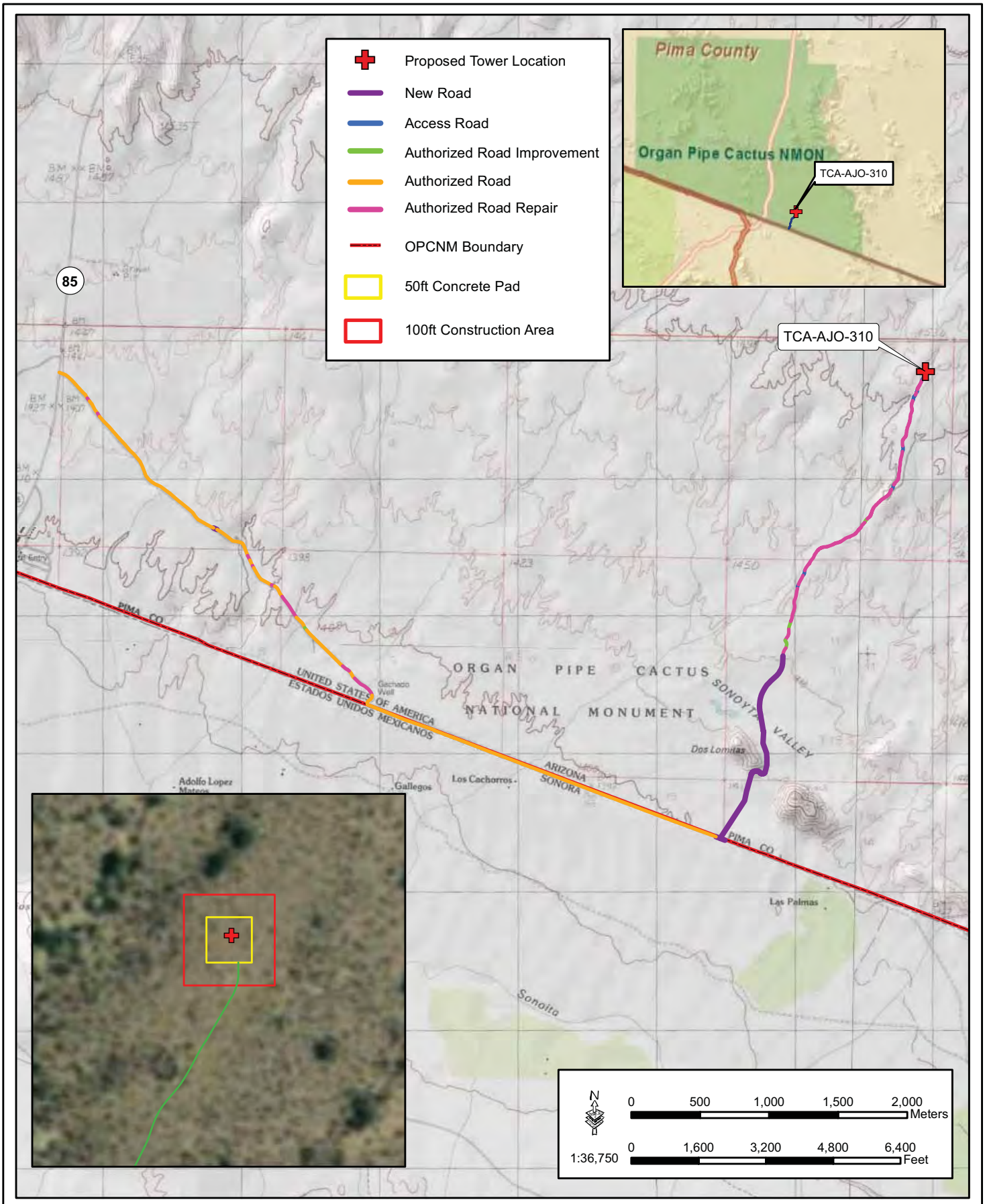
September 2009



TCA-AJO-310 Tower and Access Road

GSRC

June 2009

APPENDIX D
BIOLOGICAL EVALUATION OF 14 PROPOSED CUSTOMS AND BORDER PROTECTION TOWER LOCATIONS

A BIOLOGICAL EVALUATION OF 14 PROPOSED CUSTOMS AND BORDER PROTECTION TOWER LOCATIONS

WITHIN THE ORGAN PIPE CACTUS NATIONAL MONUMENT

Pima County

Prepared for:
United States Customs and Border Protection
Secure Border Initiative (SBI*net*)

Submitted to:
The Boeing Company
499 Boeing Blvd.
PO Box 240002
Huntsville, AL 35824-6402

Submitted by:
Harris Environmental Group, Inc.
58 East 5th Street
Tucson, Arizona 85705-8362

Version 1.6
4 December 2008

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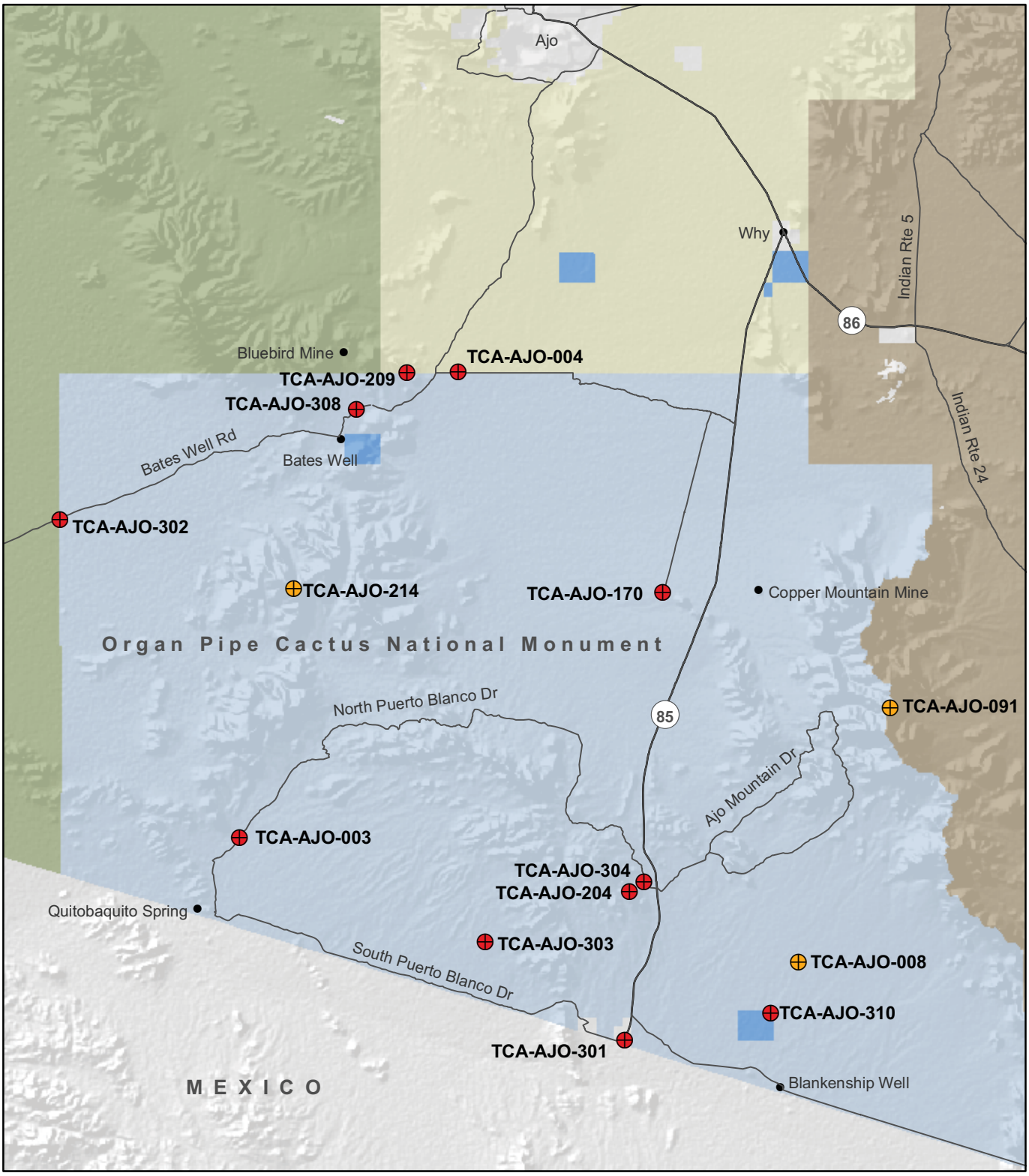
1.0 EXECUTIVE SUMMARY

Harris Environmental Group, Inc. (Harris Environmental) was contracted by the Boeing Company (Boeing) to conduct biological surveys in support of the Secure Border Initiative (SBI*net*) program in the Organ Pipe Cactus National Monument (OPCNM). SBI*net* is part of the United States Department of Homeland Security (DHS) strategy efforts to control international borders through the transformation and improvement of technology, infrastructure, staffing and response platforms. The proposed United States Customs and Border Protection (CBP) action involves construction activities to erect a tower at 14 locations with some ancillary equipment and minor road improvements (Figure 1.1). Biological field surveys were conducted at all of the proposed tower locations and along portions of any existing roadway that would require improvements to facilitate the project.

CBP is preparing a Biological Assessment and an Environmental Assessment for proposed installations within the project area. CBP is conducting consultation with the United States Fish and Wildlife Service (USFWS) and acquiring all applicable land-use permits from OPCNM, Bureau of Land Management (BLM), Arizona State Land Department (ASLD) and other pertinent resource agencies. Table 1.1 shows land jurisdictions and federally-listed species that may occur within the project area. Table 1.2 contains land jurisdictions and a summary of other special-status species of concern to federal and state agencies. Some of the identified species concerns may be eliminated through project design and the incorporation of conservation and avoidance measures into project plans as determined through agency consultation.

The objectives of this Biological Evaluation (BE) were to determine whether habitats in the project area may support special status species. A special status species is any species of interest to any regulatory or management agency of the federal, state, or local government. The special status species considered in this BE were identified from a list published by the USFWS through their Information Planning and Consultation (IPaC) system and the species list provided for Pima County. Other special-status species were identified using the Arizona Game and Fish Department's (AGFD) Heritage Data Management System (HDMS) and the BLM sensitive species list.

The area of potential effect (APE) considered for this project included all of the proposed tower locations and portions of any existing roadway that would require improvements to facilitate the project. The Lesser long-nosed bat and the Sonoran pronghorn are both federally protected species with the potential to occur within the APE. The Lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008) and has the potential to occur at all 14 proposed tower sites. Sonoran pronghorn is listed as *endangered* and as a *species of concern* in the State of Arizona (AGFD 2008) and has the potential to occur at eight proposed tower sites. Other special-status species such as Sonoran desert tortoise, and birds protected by the Migratory Bird Treaty Act (MBTA) are known to occur at all proposed tower locations (see Table 1.2).



Organ Pipe UTM Zone 12 NAD 83	Tower Location - Preferred Tower Location - Rejected Arizona State Land Department Bureau of Land Mgmt. Cabeza Prieta N.W.R Organ Pipe Cactus N.M Private Land Tohono O'Odham Nation	0 2 4 6 8 Miles HARRIS ENVIRONMENTAL GROUP, INC.

Figure 1.01 Overview of the proposed tower locations

Table 1.1. Summary of land jurisdictions and federally protected species concerns.

Tower	Jurisdiction	Species protected under the ESA
TCA-AJO-003	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-004	BLM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-008	OPCNM, ASLD	Lesser Long-nosed Bat
TCA-AJO-091	OPCNM	Lesser Long-nosed Bat
TCA-AJO-170	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-204	OPCNM	Lesser Long-nosed Bat
TCA-AJO-209	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-214	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-301	GSA	Lesser Long-nosed Bat
TCA-AJO-302	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-303	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-304	OPCNM	Lesser Long-nosed Bat
TCA-AJO-308	OPCNM	Lesser Long-nosed Bat, Sonoran Pronghorn
TCA-AJO-310	ASLD	Lesser Long-nosed Bat

Table 1.2. Summary of land jurisdictions and other special status species concerns.

Tower	Jurisdiction	Other special status species concerns
TCA-AJO-003	OPCNM	MBTA bird species, Sonoran desert tortoise
TCA-AJO-004	BLM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-008	OPCNM, ASLD	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, ANPL protected plant species
TCA-AJO-091	OPCNM	MBTA bird species, Sonoran desert tortoise, red-back whiptail
TCA-AJO-170	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-204	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-209	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-214	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-301	GSA	MBTA bird species, Sonoran desert tortoise
TCA-AJO-302	OPCNM	MBTA bird species, Sonoran desert tortoise
TCA-AJO-303	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-304	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, red-back whiptail
TCA-AJO-308	OPCNM	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa
TCA-AJO-310	ASLD	MBTA bird species, Sonoran desert tortoise, Mexican rosy boa, ANPL protected plant species

2.0 INTRODUCTION

Project Summary

Part of the SBI*net* plan includes the installation of towers equipped with surveillance and communications equipment. CBP is preparing an Environmental Assessment for this project that covers locations within the operational region defined as *Organ Pipe* which mostly utilizes land in the OPCNM. This report documents the results of a biological evaluation conducted for 14 proposed tower compounds. Under consideration for this report is ground activity and construction-associated disturbances that would adversely affect natural resources. Consultation with the USFWS is being conducted by CBP.

Project Description

The proposed action involves construction activities to erect a tower at 14 locations with some ancillary equipment and minor road improvements. Biological field surveys were conducted at all of the proposed tower locations and along portions of any existing roadway that would require improvements to facilitate the project. Tower compounds typically encompass about 0.4 hectare (1.0 acre). The tower and its supporting equipment are secured within a 15 meter (m) by 15 m (50 feet [ft] by 50 ft) fenced area. Limited surface disturbance will be necessary to accommodate the tower, grounding rods, communications and power equipment. Unattended Ground Sensors (UGS) will require additional surface disturbance. Cameras and radar units will be mounted on each tower. Microwave equipment will relay data between sites. Aircraft anti-collision lighting will be incorporated above the highest point on each tower.

A propane fueled generator will be used when commercial power is unavailable or for emergency power. Liquid propane tanks will be mounted on pre-formed concrete slabs. Maintenance will include changing oil, oil filter, spark plugs, engine coolant, and batteries. Each generator will be placed in an enclosure and will have a spill containment basin with a volume five times that of the total engine fluids. On average, the generator sound levels range from 82.0 dBA at 1 m (3 ft) to 72.5 dBA at 10 m (34 ft). Solar panels will be a part of the build for all towers which minimizes the use of generators. Road improvements may be required to accommodate construction equipment, materials, and service trucks. Typical construction access roads are 5 m (15 ft) wide with an additional 1 m (4 ft) of shoulder vegetation cut back.

3.0 METHODS

Between October and December 2007 and during March, April, August, and September of 2008, Harris Environmental conducted field visits to 14 proposed tower locations and associated ingress/egress routes for the CBP *Organ Pipe* project. Survey work was conducted by biologists John Cornell, Stephen Emerson, John Lindsey, Robin Llewellyn, Elizabeth Majchrowicz and Thomas Staudt.

Tower compounds and portions of approach and access roads were subjected to systematic pedestrian survey to collect information regarding vegetation communities and wildlife habitat in or adjacent to the APE. Prior to fieldwork, surveyors were provided with lists of special status plants and wildlife known to occur near the project area along with information regarding key

life requisites, associations with specific types of vegetation or substrates, and known elevation range for a given species. Information collected for each tower was recorded on a standardized data sheet.

The APE for this project includes a total of 203.86 hectares (503.76 acres). The coverage includes (Table 3.1 and Table 3.2):

- Block Survey of about 0.4 hectares (1.0 acre) at 14 distinct parcels; for a total of about 5.6 hectares (14 acres) and
- Linear Survey along about 49.27 kilometers (km)/30.61 miles (mi) of roadway. The examined corridor was 40 m-wide (132 ft-wide) with 20 m (66 ft) of coverage on either side of the roadway centerline. Total linear survey coverage was about 198.20 hectares (489.76 acres).

Each field team consisted of the Harris Environmental biologist and archaeologist, Boeing Systems Engineers, a CBP agent, and a team of civil engineers charged with recording geo-referenced spatial data and planning routings and road improvements (if any). Boeing and CBP handled the acquisition of all rights of entry for surveyed areas.

Table 3.1 Approximate survey coverage at each location.

Preferred Towers	Block Survey		Linear Road Survey	
	Acres	Hectares	Miles	Kilometers
TCA-AJO-003	1	0.40	3.33	5.36
TCA-AJO-004	1	0.40	0.64	1.02
TCA-AJO-170	1	0.40	6.03	9.70
TCA-AJO-204	1	0.40	0.00	0.00
TCA-AJO-209	1	0.40	0.82	1.32
TCA-AJO-301	1	0.40	0.00	0.00
TCA-AJO-302	1	0.40	10.05	16.17
TCA-AJO-303	1	0.40	1.34	2.16
TCA-AJO-304	1	0.40	0.00	0.00
TCA-AJO-308	1	0.40	2.91	4.68
TCA-AJO-310	1	0.40	1.19	1.92
Rejected Towers				
TCA-AJO-008	1	0.40	4.31	6.94
TCA-AJO-091	1	0.40	0.00	0.00
TCA-AJO-214	1	0.40	0.00	0.00
Totals	**14**	**5.60**	**30.62**	**49.27**

Table 3.2. Summary of tower compound location information.

Tower	Latitude	Longitude	Jurisdiction	Elevation (amsl)
Preferred Tower Locations				
TCA-AJO-003	31.97806	-112.99953	OPCNM	374 m (1,227 ft)
TCA-AJO-004	32.20079	-112.89474	BLM	452 m (1,483 ft)
TCA-AJO-170	32.09547	-112.79696	OPCNM	563 m (1,846 ft)
TCA-AJO-204	31.95224	-112.81270	OPCNM	586 m (1,921 ft)
TCA-AJO-209	32.20058	-112.91929	BLM	492 m (1,615 ft)
TCA-AJO-301	31.88105	-112.81508	GSA	426 m (1,398 ft)
TCA-AJO-302	32.13009	-113.08538	OPCNM	336 m (1,102 ft)
TCA-AJO-303	31.92797	-112.88192	OPCNM	444 m (1,458 ft)
TCA-AJO-304	31.95661	-112.80584	OPCNM	516 m (1,693 ft)
TCA-AJO-308	32.18275	-112.94334	OPCNM	434 m (1,424 ft)
TCA-AJO-310	31.893536	-112.745856	ASLD	463 m (1,519 ft)
Rejected Tower Locations				
TCA-AJO-008	31.91848	-112.73198	OPCNM	498 m (1,634 ft)
TCA-AJO-091	32.0401	-112.68800	OPCNM	1,204 m (3,950 ft)
TCA-AJO-214	32.09705	-112.97344	OPCNM	727 m (2,385 ft)

Establishing Lists of Special Status Species for Consideration

The special status species considered in this BE were identified from a list published by the USFWS through their IPaC system and the species list provided for Pima County. Other special-status species were identified using the AGFD HDMS and the BLM sensitive species lists.

Other Relevant Documents

In addition to a review of published species lists, documents pertinent to the management of the OPCNM were reviewed, including the following:

- Biological Assessment: International Boundary Vehicle Barrier. Organ Pipe Cactus National Monument (NPS 2003).
- Biological Opinion for the Permanent Vehicle Barrier Project on the Barry M. Goldwater Range and Cabeza Prieta National Wildlife Refuge, Arizona. (USFWS 2006).
- Organ Pipe Cactus Final General Management Plan Development Concept Plans Environmental Impact Statement (NPS 1997).
- Draft Supplemental EIS Re-Analysis of Cumulative Impacts on the Sonoran Pronghorn (NPS 2001).
- Supplement to the Draft General Management Plan (NPS 1996).

Best Management Practices (BMP)

In 2006, CBP and USFWS entered into a *Statement of Work* to develop an expedited consultation system for achieving compliance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended. The IPaC system is intended to provide CBP with current information on species and critical habitats that may be adversely affected by CBP activities. The BMPs should be addressed in project planning and if implemented as part of the proposed action, would avoid,

minimize and/or mitigate for the potential adverse effects to listed or proposed threatened or endangered species, candidate species and proposed or designated critical habitat.

USFWS will review specific information on this project and determine project-specific BMPs and mitigation measures through ESA Section 7 consultation. USFWS provided information on their IPaC system and the 2007 BMP to CBP via email in June 2007 and during an early consultation meeting regarding this project (October 16, 2007). USFWS requested that an IPaC query for species occurring in the project area be included in the Biological Evaluation and information included in the 2007 BMP be considered during project design.

The Arizona Ecological Services Office (AESO) developed potential BMPs using biological information on the 34 threatened and endangered species that occur in southern Arizona. According to USFWS, draft BMPs were discussed with CBP on the 4th and 5th of April 2007 at the CBP Tucson Sector office and on the 20th of April 2007 at the Yuma Sector office (USFWS 2007). Comments on the draft BMPs from CBP were discussed in meetings on the 8th and 9th of May 2007. At that meeting the decision was made to focus BMP development on the construction and maintenance portion of the CBP project list. Thus, the draft BMP document developed at the May 2007 meeting should be considered as applicable to construction.

4.0 ENVIRONMENTAL SETTING

The SBI*net Organ Pipe* project extends across approximately 48 km (30 mi) of the U.S. and Mexico International Border that includes land within portions of southwestern Pima County. The project area begins at the southwestern boundary of the Tohono O'odham Nation and extends west to the southern extent of the San Cristobal Valley and Growler Valley. The proposed locations of the *Organ Pipe* towers fall within two unique subdivisions of the Sonoran desertscrub biotic community as defined by Brown (Brown 1994) and Brown and Lowe (Brown and Lowe 1980). A biotic community is generally described as a community or aggregation of distinct organisms or species occurring within the same habitat or region. The two subdivisions within the project area are described below; Appendix A provides a key for the scientific names of plants and animals used in this report.

Sonoran Desertscrub — Arizona Upland Subdivision

The Arizona upland subdivision of Sonoran desertscrub is characterized by slopes, broken surface areas and dissected sloping plains. The dominant upper-story trees represented throughout this subdivision include blue palo verde, foothill palo verde, ironwood, mesquite and cat-claw acacia. The prevalence of multiple cacti and succulent species within the Arizona upland subdivision is of great significance in characterizing the overall structure and composition of this landscape. The genera *Cylindropuntia* and *Opuntia* are by far the best represented in terms of the numbers of species present throughout the Sonoran desertscrub community. The following are well represented within this subdivision: buckhorn cholla, cane cholla, staghorn cholla, chain-fruit cholla, teddy bear cholla, desert Christmas cactus, pencil cholla, saguaro, organ pipe cactus, senita, night-blooming cereus, hedgehog cactus and fishhook barrel cactus.

Sonoran Desertscrub — Lower Colorado River Subdivision

The lower Colorado River subdivision is the driest and least vegetated of the Sonoran desertscrub subdivisions because of high temperatures and low precipitation. The resulting vegetative structure is also the least variable and diverse. The lower elevations generally offer less topographic relief. Drainages typically take two basic forms distinguished by whether or not they provide "through-flow" to a significant regional drainage. Plants typically associated with the drainage areas of the lower Colorado River subdivision are: mesquite, ironwood, blue palo verde, smoketree, desert willow, desert honeysuckle, canyon ragweed, cat-claw acacia, burrobrush anderson wolfberry and desert broom. Away from drainages, the dominant plant species are creosote, white bursage, ocotillo, brittlebush, foothill palo verde, saguaro and ironwood.

Non-Native Plants and Noxious Weeds

Non-native plants and noxious weeds are typically associated with disturbed areas and were observed at some tower locations during field surveys.

Geomorphology

Arizona is part of the Basin and Range Province of the southwest where linear mountain ranges alternate with basins of varying widths. All of the mountains in the OPCNM are fault-block ranges, but they differ in topography because of differences in type and age of the formations.

They can be classed into four groups:

- Flat-topped, cliff-edged mesas topped with Quaternary basalt lava flows, as in the Bates Mountains of the northwest part of the monument. Slight faulting and tilting of the basalt lavas show that mountain–building forces were active here in comparatively recent times (Chronic 1988).
- Quite rugged, deeply eroded ranges of Tertiary volcanic rocks, with tilted layers of lava, tuff and breccia faulted upward, as in the Ajo Range and the northwest slope of the Puerto Blanco Mountains (Chronic 1988).
- Rounded hills of Mesozoic granite, such as those near Senita Basin in the southern Puerto Blanco Mountains (Chronic 1988).
- Rougher hills of light-colored Mesozoic metamorphic rock-gneiss and schist-as in the rugged central part of the Puerto Blanco Mountains (Chronic 1988).

Of the rocks types exposed in these ranges, the gneiss and schist are the oldest, the basalt lava flows the youngest. Mesozoic granite intruded the gneiss and schist. Volcanism came early enough in Tertiary period that most Tertiary volcanic rocks were bent and broken during mid-Tertiary mountain-building and later disrupted again by Basin and Range faulting.

Geologic Units

The proposed tower locations occur within three geologic units, Quaternary superficial deposits, early Pleistocene to latest Pliocene superficial deposits, middle Miocene to Oligocene volcanic and sedimentary rocks, and Pliocene to middle Miocene deposits.

Quaternary Superficial Deposits (Undivided) (0-2 Ma1)

These deposits include unconsolidated to strongly consolidated alluvial and aeolian deposits, including coarse, poorly sorted alluvial-fan and terrace deposits on middle and upper piedmonts and along large drainages; sand, silt and clay on alluvial plains and playas; and wind-blown sand deposits (AGS 2000). Tower locations in this unit are TCA-AJO-004 and TCA-AJO-302.

Early Pleistocene to Latest Pliocene Superficial Deposits (0.75-3 Ma)

These deposits include coarse relict alluvial-fan deposits form rounded ridges or flat isolated surfaces that are moderately to deeply incised by streams. The deposits are generally topographically high and have undergone substantial erosion. Deposits are moderately to strongly consolidated and commonly contain coarser grained sediment than younger deposits in the same area (AGS 2000).Tower locations in this unit include TCA-AJO-008, TCA-AJO-170, TCA-AJO-301, TCA-AJO-303, and TCA-AJO-310.

Middle Miocene to Oligocene Volcanic and Sedimentary Rocks, Undivided (11-38 Ma)

These deposits include lava, tuff, fine-grained intrusive rock and diverse pyroclastic rocks. These compositionally variable volcanic rocks include basalt andesite, dacite and rhyolite. Thick felsic volcanic sequences form prominent cliffs and range fronts. This unit includes regionally extensive ash-flow tuffs. Most volcanic rocks are 20-30 Ma in central and western Arizona (AGS 2000). Tower locations in this unit include TCA-AJO-091, TCA-AJO-204, TCA-AJO-209, TCA-AJO-214, TCA-AJO-304, and TCA-AJO-308.

Pliocene to Middle Miocene Deposits (2-16 Ma)

These deposits include moderately to strongly consolidated conglomerate and sandstone deposited in basins during and after late Tertiary faulting. The unit includes lesser amounts of mudstone, siltstone, limestone and gypsum. The deposits are generally light gray or tan and commonly form high rounded hills and ridges in modern basins and prominent bluffs. Deposits of this unit are exposed widely in the dissected basins of southeastern and central Arizona (AGS 2000). A single tower location, TCA-AJO-003, occurs in this unit.

Soils

A soil association consists of a group of related geomorphological areas that contribute to the composition of the soil mantle covering the earth's surface. Each association consists of two or more soils that occur together in a characteristic and repetitious manner (Hendricks 1985). Soils associated with the proposed tower locations in the *Organ Pipe* project area are mostly hyperthermic arid soils prevalent at low elevations across much of western and southwestern Arizona.

Hyperthermic Arid Soils

The soils in the *Organ Pipe* area are generally formed from mixed alluvium and colluvium and derived from igneous, basalt, and granite sources. The soils range from deep to shallow, and are well drained. Texture varies from very stony, sandy, and gravelly loams to bedrock and clay (Hendricks 1985). Hyperthermic Soil types (HA) have a mean soil temperature of more than

[1] Ma is defined as "Million Years Ago"

22°C (72°F) and less than 250 millimeters (10 inches) mean annual precipitation and occur across much of south western Arizona, being found in Yuma and western Pima County. Within this type, three different soil associations are present across the proposed tower locations.

- **(HA1) Torrifluvents Association:** Deep, stratified, coarse to fine texture, nearly level to gently sloping soils on floodplains and lower alluvial fans.

- **(HA4) Gunsight-Rillito-Pinal Association:** Deep and shallow, limy, gravelly, medium and moderately coarse-textured, nearly level to strongly sloping soils on alluvial surfaces and valley plains.
- **(HA6) Lithic Camborthids-Rock Outcrop-Lithic Haplargids Association:** Shallow, gravelly and cobbly, moderately coarse to moderately fine textured, gently sloping to very steep soils and rock outcrops on hills and mountains.

5.0 TOWER DESCRIPTIONS AND FIELD OBSERVATIONS

PREFERRED TOWER LOCATIONS

TCA-AJO-003

TCA-AJO-003 is located within the OPCNM in southwestern Pima County, approximately 4.7 km (2.9 mi) north of the U.S./Mexico International Border and 20.4 km (12.7 mi) northwest of the Lukeville Point of Entry (POE) (Figure 5.01). The tower compound is southeast of the Cipriano Hills at an elevation of 374 m (1,227 ft) amsl. The substrate at the tower compound is mostly gravel with scattered cobbles and the soils are composed of sandy loam with coarse sand (Photograph 5.01).

TCA-AJO-003 is on the OPCNM and approached via North Puerto Blanco Drive an unpaved road that connects with South Puerto Blanco Road and provides access to the core of the park along an approximate 40 mile loop road. The approach route travels north within the non-wilderness corridor that exists between the western edge of La Abra Plain and the eastern flank of Quitobaquito Hills. Access to TCA-AJO-003 would be via a short, unpaved road extending from North Puerto Blanco Drive. Survey coverage for this proposed tower installation included the 0.4 hectare (1.0 acre) tower compound, access road, and an approximate 4.4 km (2.5 mi) portion of North Puerto Blanco Drive (Figure 5.02).

Field Observations

TCA-AJO-003 and the surrounding area are within the Arizona Upland Subdivision. Plants include blue palo verde, cat-claw acacia, chain-fruit cholla, creosote, foothill palo verde, graythorn, ironwood, ocotillo, saguaro, triangle-leaf bursage, wolfberry and mixed forbs. Wildlife and evidence of wildlife include Harris' hawk (*Parabuteo unicinctus*), raven (*Corvus* sp.), whiptail (*Aspidoscelis* sp.), zebra-tailed lizard (*Callisaurus draconoides*) and jackrabbit (*Lepus* sp.) scat. Special status species documented include organ pipe cactus, which is categorized as *salvage restricted* on the ADA protected native plant list. The tower compound is approximately 0.4 km (0.2 mi) east of Aguajita Wash, which supports a xeroriparian vegetation community.

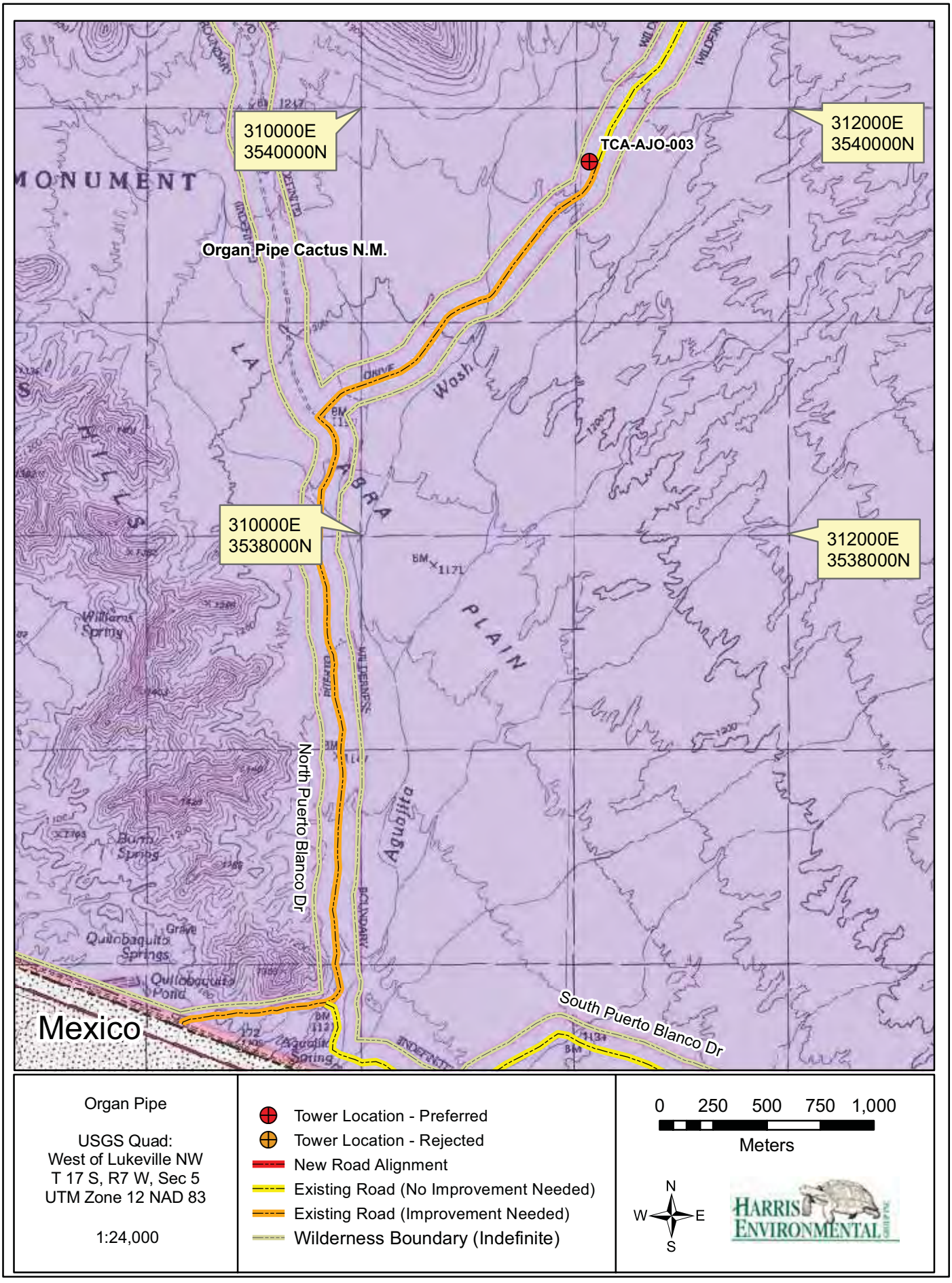


Figure 5.01 UTM registered location and land jurisdiction for TCA-AJO-003. 11

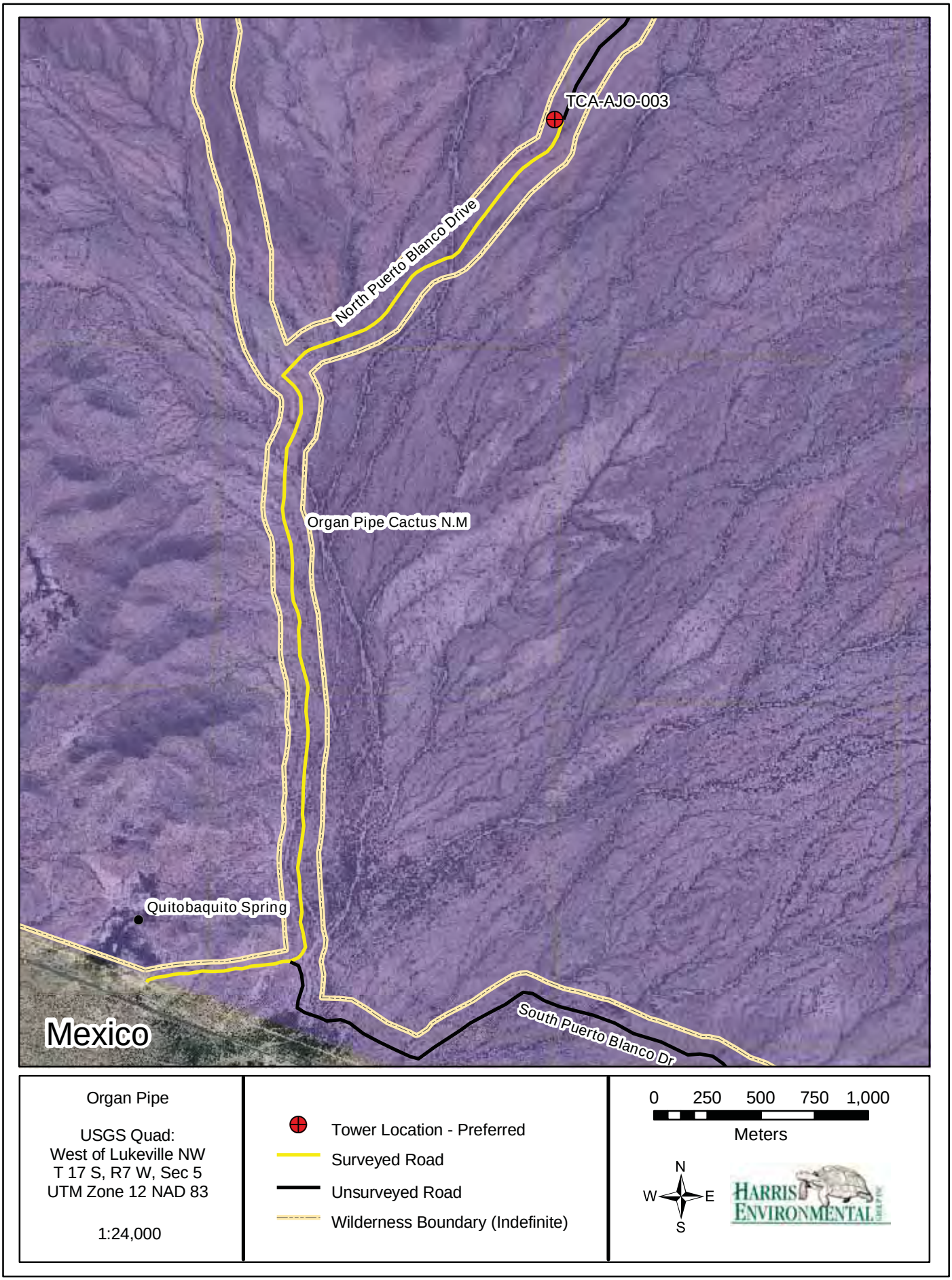


Figure 5.02 Tower Location and Surveyed Area for TCA-AJO-003.

Photograph 5.01 Center of TCA-AJO-003 looking south.

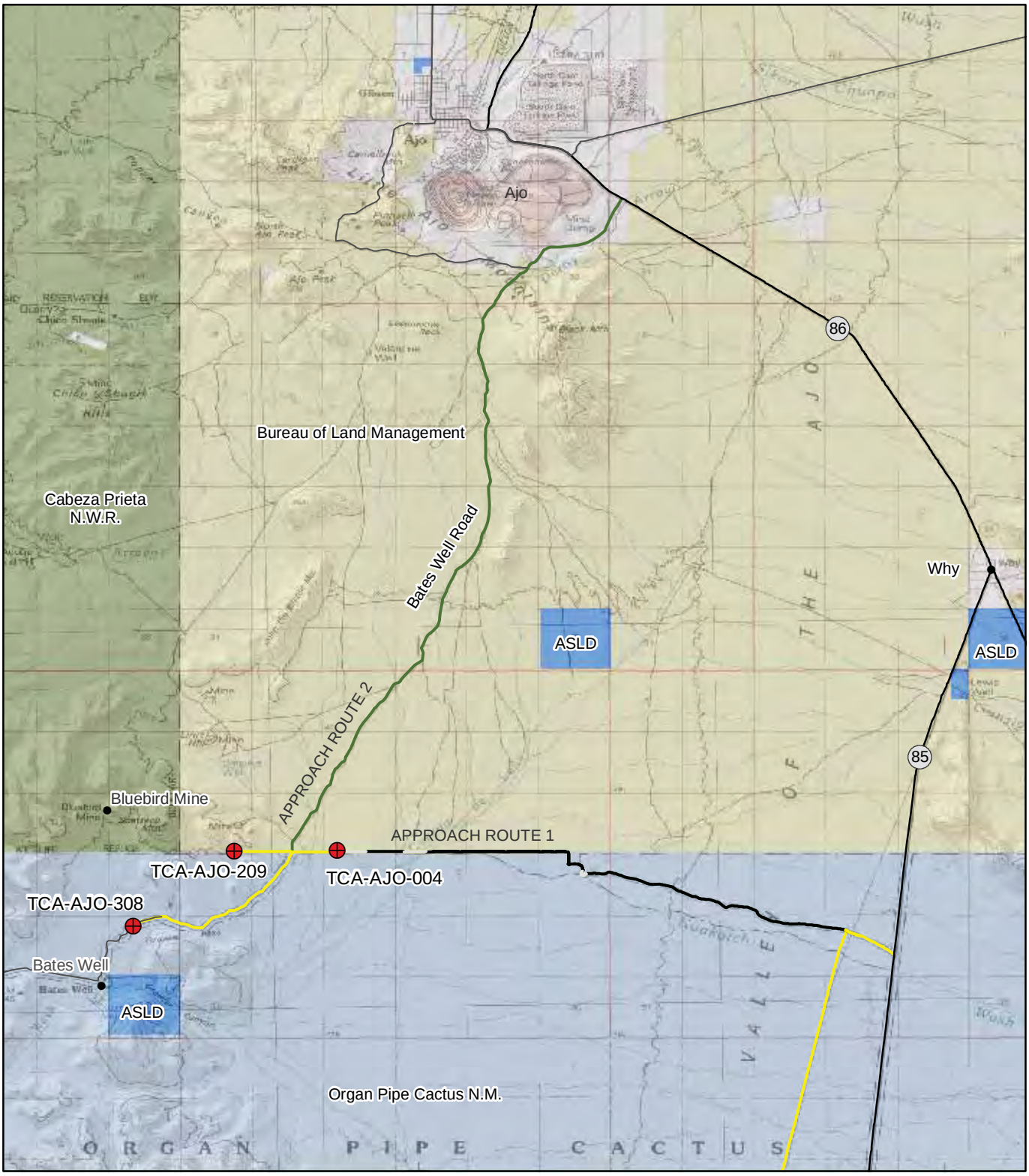
TCA-AJO-004

TCA-AJO-004 is located on BLM land in western Pima County immediately north of the OPCNM border (Figure 5.03). The site is approximately 32.1 km (20.0 mi) north of the U.S./Mexico International Border, and 36.4 km (22.5 mi) northwest of the Lukeville POE. The compound is located at the western edge of the Valley of the Ajo, east of Scarface Mountain and west of the Cuerda de Lena Wash (Photograph 5.02). The elevation is 452 m (1,483 ft) amsl. The substrate at the compound is gravel, with soils composed of fine sandy loam with a high percentage of silt.

TCA-AJO-004 shares a similar position in the northwest part of the OPCNM near TCA-AJO-308 and TCA-AJO-209. TCA-AJO-004 is located 0.9 km (0.6 mi) west of Cuerda de Leña Wash. The location is approached via two possible routes: Approach Route 1 from the east and State Route (SR) 85 and Approach Route 2 from the west via Bates Well Road. Approach Route 1 accesses TCA-AJO-004 via SR 85 south from the Town of Why for about 10.3 km (6.4 mi) and then via an unpaved, unmaintained OPCNM road called "Road 59.4" by CBP personnel. The tower compound is located just off the unpaved route about 13.1 km (8.1 mi) west of SR 85. Approach Route 2 accesses TCA-AJO-004 via Bates Well Road, an OPCNM maintained dirt road. Using this approach, access to TCA-AJO-004 is via an existing and maintained unpaved road that intersects with Bates Well Road about 19.3 km (12.0 mi) south and west of its intersection with the Tucson-Ajo Highway.

Approach Route 1 was rejected to avoid adverse effects to an historic ranch house identified along the route. Only the portion of Approach Route 2 that would require improvements was surveyed. Total survey coverage for this proposed tower installation included the 0.4 hectare (1.0 acre) tower compound, the full extent of the roadway segments that would require improvements on Approach Route 1 and Approach Route 2 (Figure 5.04).

Figure 5.03 UTM registered location and land jurisdiction for TCA-AJO-004.



Organ Pipe Pima County, AZ T14S R5W 1:150,000	Tower Location - Preferred Tower Location - Rejected Preferred Route - Surveyed Preferred Route - Not Surveyed Rejected Route - Surveyed Rejected Route - Not Surveyed	0 1 2 3 4 Miles HARRIS ENVIRONMENTAL GROUP, INC.

Figure 5.04 Tower Location and Surveyed Area for TCA-AJO-004.

Photograph 5.02 TCA-AJO-004 at tower compound center looking south.

Field Observations

TCA-AJO-004 and the surrounding area are within the Lower Colorado River Subdivision of Sonoran desertscrub. Plants observed during the survey include cat-claw acacia, creosote, fishhook barrel cactus, velvet mesquite, white bursage and mixed grasses and forbs. Wildlife and evidence of wildlife documented at the tower compound include avian, lizard and jackrabbit scat. Special status species were not observed during the field survey. The tower compound is approximately 0.5 km (0.3 mi) east of an unnamed wash and 0.9 km (0.6 mi) west of the Cuerda de Leña Wash, both supporting xeroriparian vegetation.

TCA-AJO-170

TCA-AJO-170 is located within the OPCNM in southwestern Pima County, approximately 23.9 km (14.9 mi) north of the U.S./Mexico International Border and the Lukeville POE (Figure 5.05). The tower compound is at the southern end of the Valley of the Ajo, south of Alamo Wash, west of SR 85. The elevation at the tower compound is 563 m (1,846 ft) amsl. The substrate and soils at the tower compound are composed of alluvial gravel mixed with sand (Photograph 5.03).

Approach to TCA-AJO-170 would be via an unpaved, unmaintained road that branches off SR 85 about 26 km (15 mi) north of Lukeville. The road travels west for 1.2 km (0.7 mi) then turning south and stretching 9 km (5.5 mi) before arriving at the proposed tower compound. Access to TCA-AJO-170 would be via a short section of new road stemming from the existing approach route. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and 9.7 km (6.03 mi) of access road (Figure 5.06).

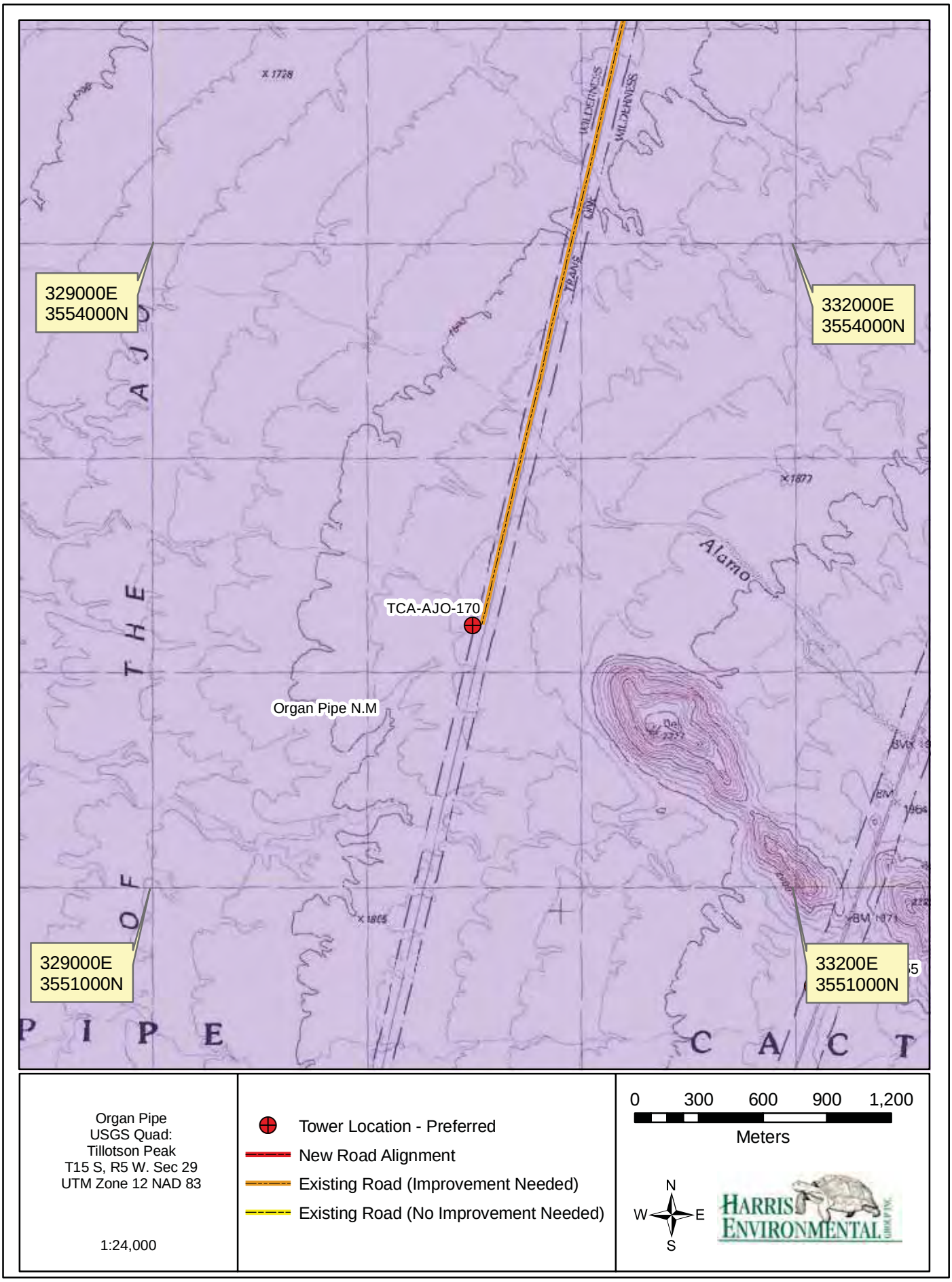


Figure 5.05 UTM registered location and land jurisdiction for TCA-AJO-170.

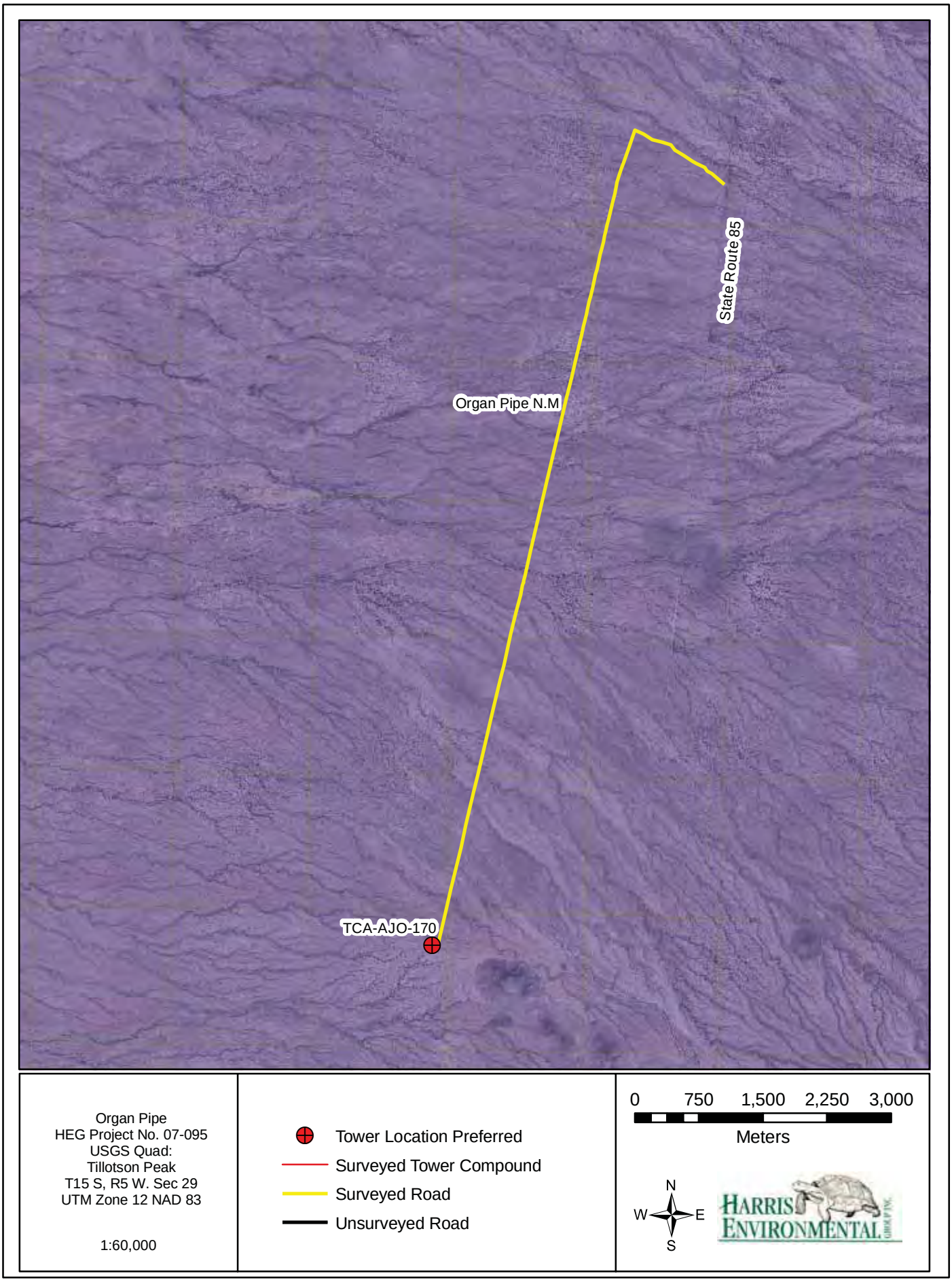


Figure 5.06 Tower location and surveyed area for TCA-AJO-170.

Photograph 5.03 TCA-AJO-170 center looking east.

Field Observations

TCA-AJO-170 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include buckhorn cholla, chain-fruit cholla, creosote, ironwood, ocotillo, palo verde, saguaro and triangle-leaf bursage. Wildlife and evidence of wildlife documented at the tower compound include black-tailed gnatcatcher (*Polioptila melanura*), Gila woodpecker (*Melanerpes uropygialis*), side-blotched lizard (*Uta stansburiana*), western white-throated woodrat midden and Gambel's quail (*Callipepla gambelii*) dusting spots. Special status species were not observed during the field survey. The tower compound is located on a broad swale between two unnamed drainages, approximately 1.0 km (0.6 mi) south of Alamo Wash that support xeroriparian vegetation.

TCA-AJO-204

TCA-AJO-204 is located in western Pima County on the OPCNM approximately 8 km (5 mi) north of the Lukeville POE and the U.S./Mexico International Border (Figure 5.07). The tower compound is approximately 1.2 km (0.7 mi) west of the monument headquarters at an elevation of about 598 m (1,962 ft) amsl. The site is positioned at the extreme southeastern end of the Puerto Blanco Mountains on a small saddle between two hill-tops south of Twin Peaks. The dominant substrate is fractured rock and gravel (Photograph 5.04).

Access to TCA-AJO-204 would be via air lift. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.08).

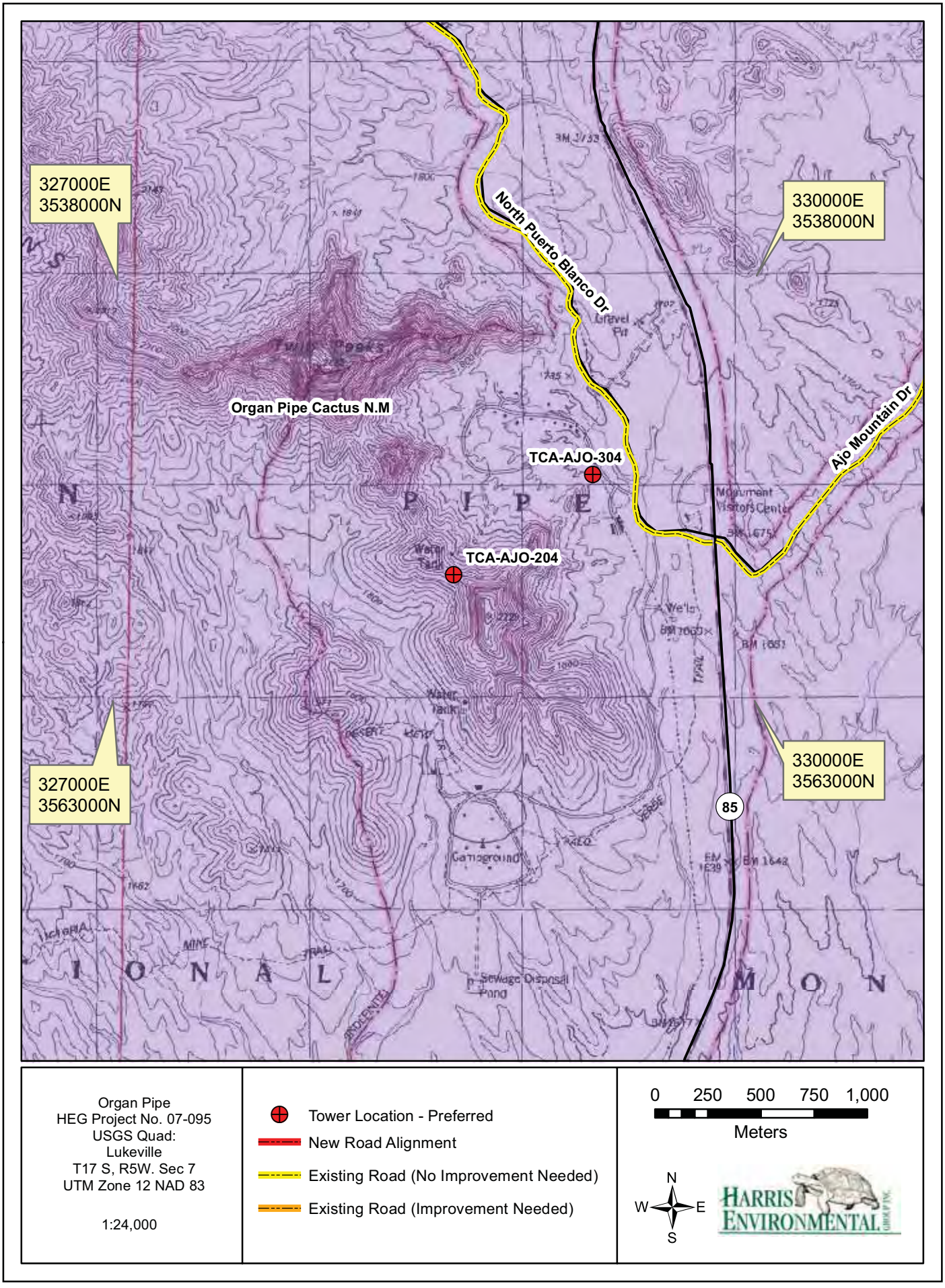


Figure 5.07 UTM registered location and land jurisdiction for TCA-AJO-204.

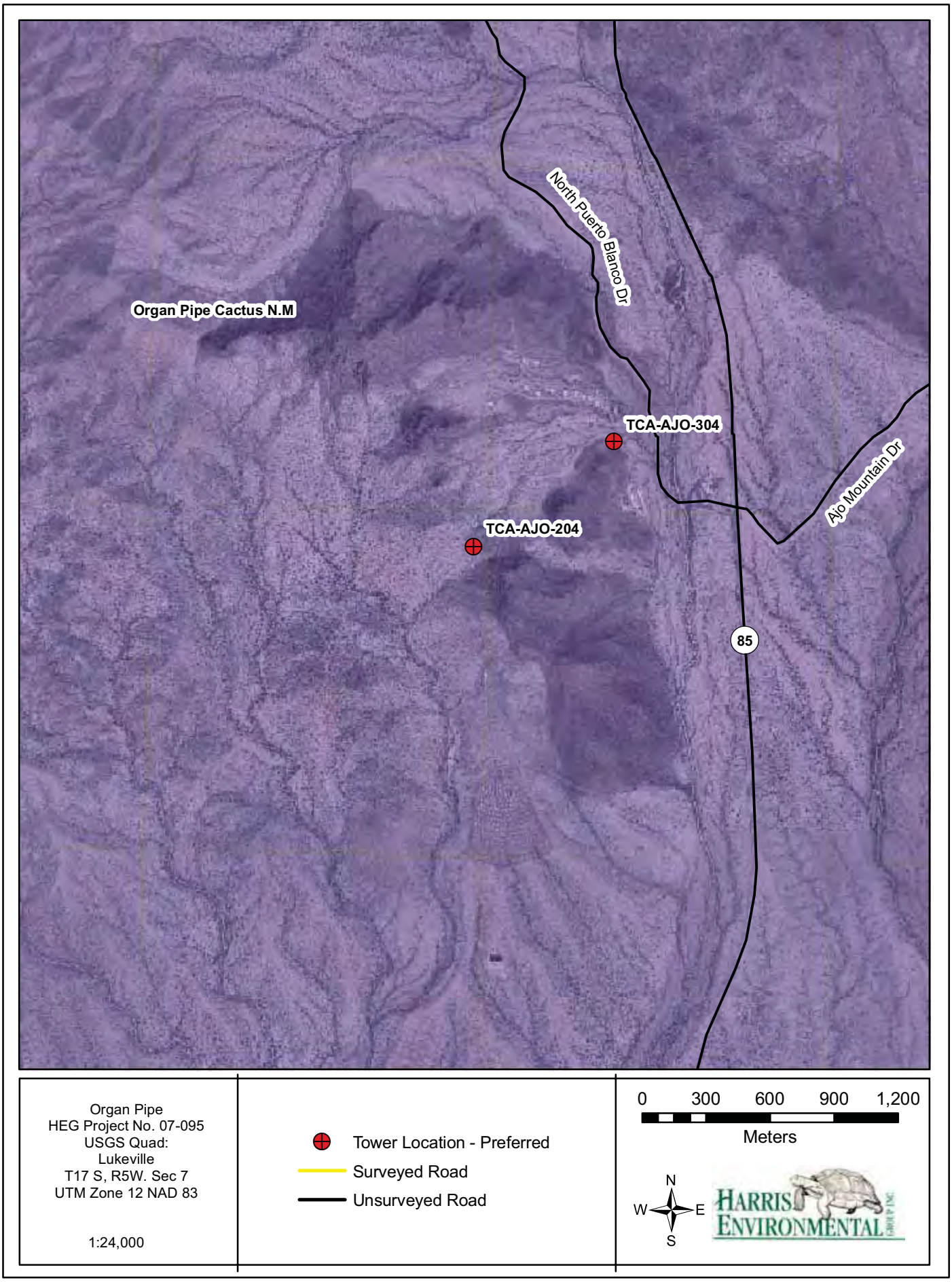


Figure 5.08 Tower location and surveyed area for TCA-AJO-204.

Photograph 5.04 TCA-AJO-204 center looking south.

Field Observations

TCA-AJO-204 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include cane cholla, creosote, hedgehog cactus, organ pipe cactus, palo verde, saguaro, teddy bear cholla and triangle-leaf bursage. Wildlife and evidence of wildlife documented at the tower compound include phainopepla (*Phainopepla nitens*) and rock wren (*Salpinctes obsoletus*). Organ pipe cactus, a *salvage restricted* species, was observed at this tower location. The tower compound is approximately 0.5 km (0.3 mi) east of an unnamed drainage of the Puerto Blanco Mountains. This drainage supports xeroriparian vegetation.

TCA-AJO-209

TCA-AJO-209 was included in *A Biological Evaluation of 60 Proposed Tower Locations for the Tucson West Sector* (Harris Environmental 2008). The information is repeated in this document because this tower is now included in the *Organ Pipe* operational area. TCA-AJO-209 is in western Pima County, approximately 18.6 km (11.6 mi) southwest of the town of Why and 32.2 km (20.0 mi) north of the international border. The proposed installation for the tower compound is on BLM land; however, the southern portion of the surveyed tower compound partially extends on to OPCNM land. Elevation is approximately 492 m (1,615 ft) amsl. Substrate at the tower compound is composed of basalt and limestone cobbles and gravel with soil composed of silty loam with coarse sand (Photograph 5.05).

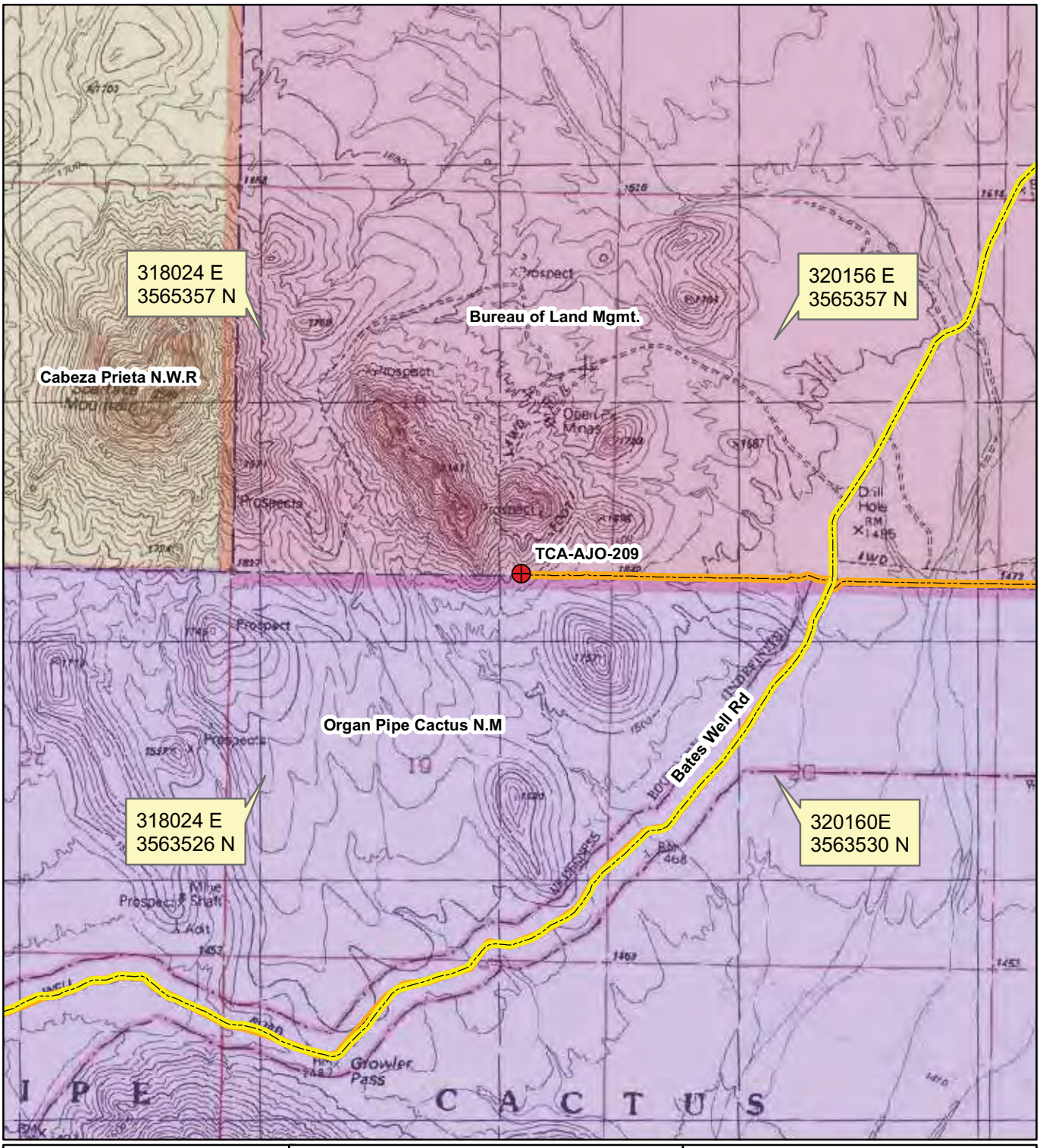
TCA-AJO-209 is approached via Bates Well Road an OPCNM maintained road. Access to TCA-AJO-209 would be via an existing and maintained unpaved road that intersects with Bates Well Road about 19.3 km (12.0 mi) south and west of its intersection with the Tucson-Ajo Highway. The tower compound is about 1.3 km (0.8 mi) west of Bates Well Road. Some road

improvements are proposed for the access road and a portion of Bates Well Road. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and the full extent of the roadway segments that would require improvements (Figure 5.09 and Figure 5.10).

Photograph 5.05 TCA-AJO-209 center looking east.

Field Observations

TCA-AJO-209 and the surrounding area are within the Lower Colorado River Subdivision of Sonoran desertscrub. Plants observed during the survey include foothill palo verde, creosote, limberbush, triangle-leaf bursage, brittlebush, white ratany, saguaro, organ pipe cactus, teddy bear cholla, staghorn cholla, golden-spined hedgehog and mixed grasses and forbs. Wildlife documented included jackrabbit, raven, rodent burrows and a zebra-tailed lizard. Special status species documented include Emory's barrel cactus, organ pipe cactus and staghorn cholla. These species are all categorized as *salvage restricted* on the Arizona Department of Agriculture protected native plant list.



Organ Pipe
HEG Project No. 07-095
USGS Quad:
Bates Well NE
T14S, R06W, Sec 18 & 19
UTM Zone 12 NAD 83

1:24,000

Tower Location - Preferred
New Road Alignment
Existing Road (No Improvement Needed)
Existing Road (Improvement Needed)

0 250 500 750 1,000
Meters

HARRIS ENVIRONMENTAL GROUP, INC.

Figure 5.09 UTM registered location and land jurisdiction for TCA-AJO-209.

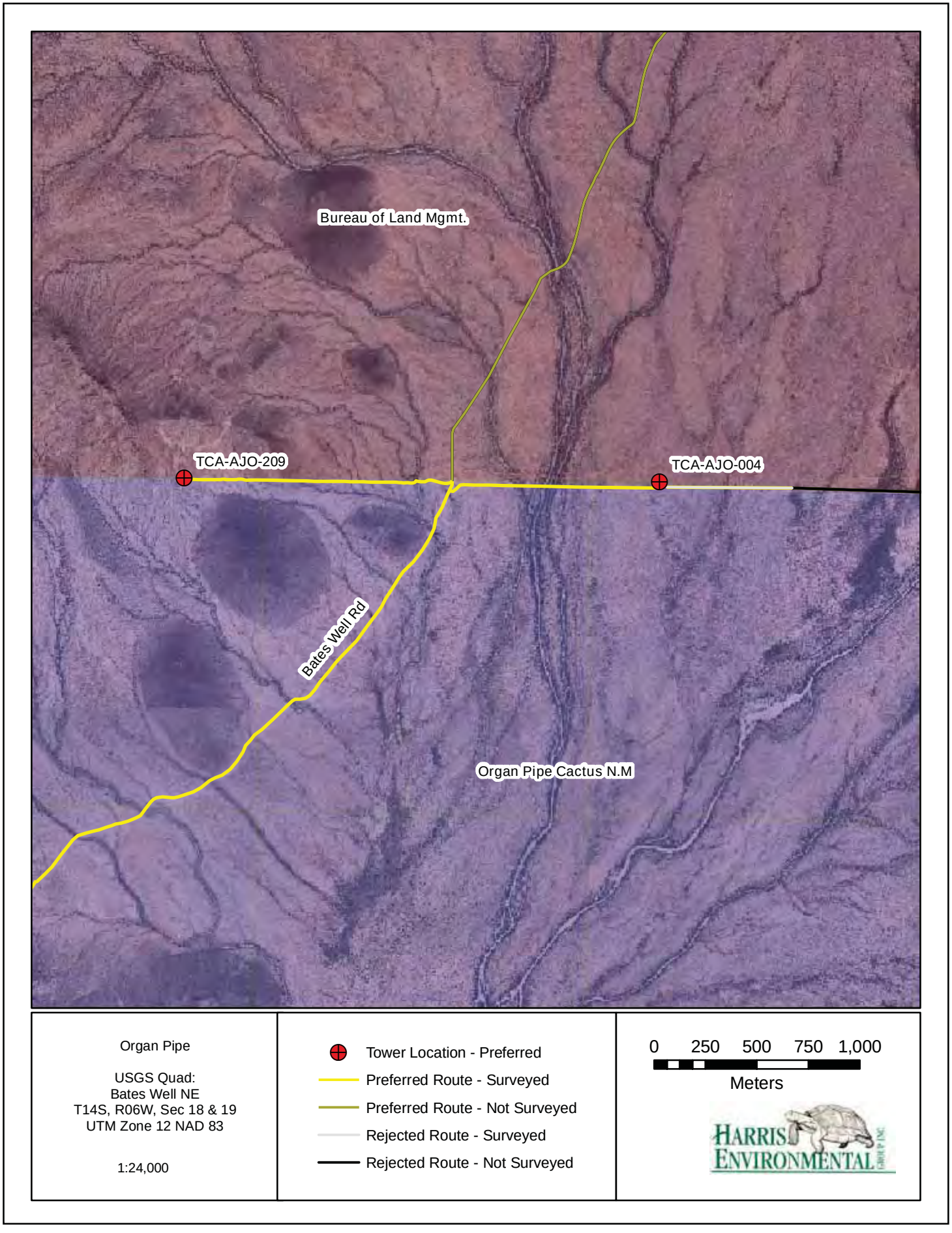


Figure 5.10 Tower Location and Surveyed Area for TCA-AJO-209.

TCA-AJO-301

TCA-AJO-301 is located at the Lukeville POE at the southern border of the OPCNM, southwestern Pima County (Figure 5.11). The tower compound is located within a modified open area surrounded by high oleander hedges. The elevation is 426 m (1,398 ft) amsl. The substrate at the tower compound is partly bare ground, with soils composed of sandy to gravelly loam (Photograph 5.06).

Photograph 5.06 TCA-AJO-301 center looking south.

TCA-AJO-301 is approached from the Town of Why via SR 85 to the Lukeville POE and is accessed via a paved road that winds through the existing facility buildings. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.12).

Field Observations

TCA-AJO-301 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include Mexican palo verde, oleander, Russian thistle and velvet mesquite. Wildlife or special status species were not observed at the tower compound during the field survey.

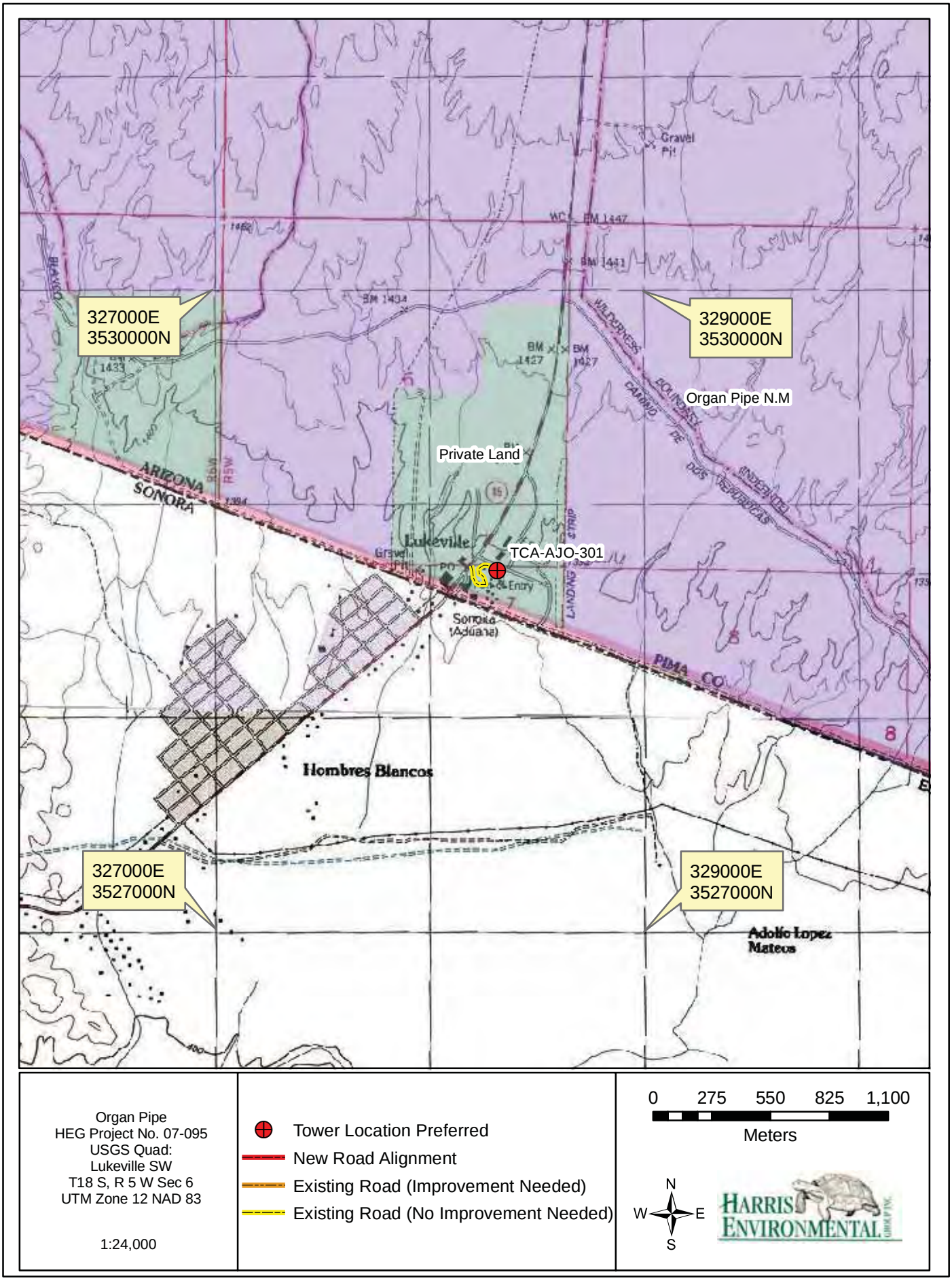


Figure 5.11 UTM registered location and land jurisdiction for TCA-AJO-301.

Figure 5.12 Tower location and surveyed area for TCA-AJO-301.

TCA-AJO-302

TCA-AJO-302 was previously surveyed and recorded as TCA-AJO-286 and is located at the western border of the OPCNM adjacent to the Cabeza Prieta National Wildlife Refuge (CPNWR) (Figure 5.13). The tower compound is approximately 18.6 km (11.6 mi) north of the U.S./Mexico border at the southeast end of the lower San Cristobal Valley. The elevation is 336 m (1,102 ft) amsl. The substrate at the tower compound is silty to sandy soil, devoid of rock (Photograph 5.07).

Photograph 5.07 TCA-AJO-302 center looking south.

Approach to TCA-AJO-302 would be via Bates Well Road an unpaved OCPNM-maintained road that is reached from SR 85. This western section of the access road traverses the greater Growler Valley and crosses the highly braided Growler Wash midway between Bates Well and the location for TCA-AJO-302. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and the full extent of the access routes (Figure 5.14).

Field Observations

TCA-AJO-302 and the surrounding area are within the Lower Colorado River subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include creosote, triangle-leaf bursage and mixed forbs. Wildlife and evidence of wildlife documented at the tower compound include western whiptail (*Aspidoscelis tigris*), desert cottontail (*Sylvilagus audubonii*) scat and rodent (Rodentia) burrows. Special status species were not observed during the field surveys. The tower compound is located between two tributaries of San Cristobal Wash that support a xeroriparian vegetation community.

Figure 5.13 UTM registered location and land jurisdiction for TCA-AJO-302

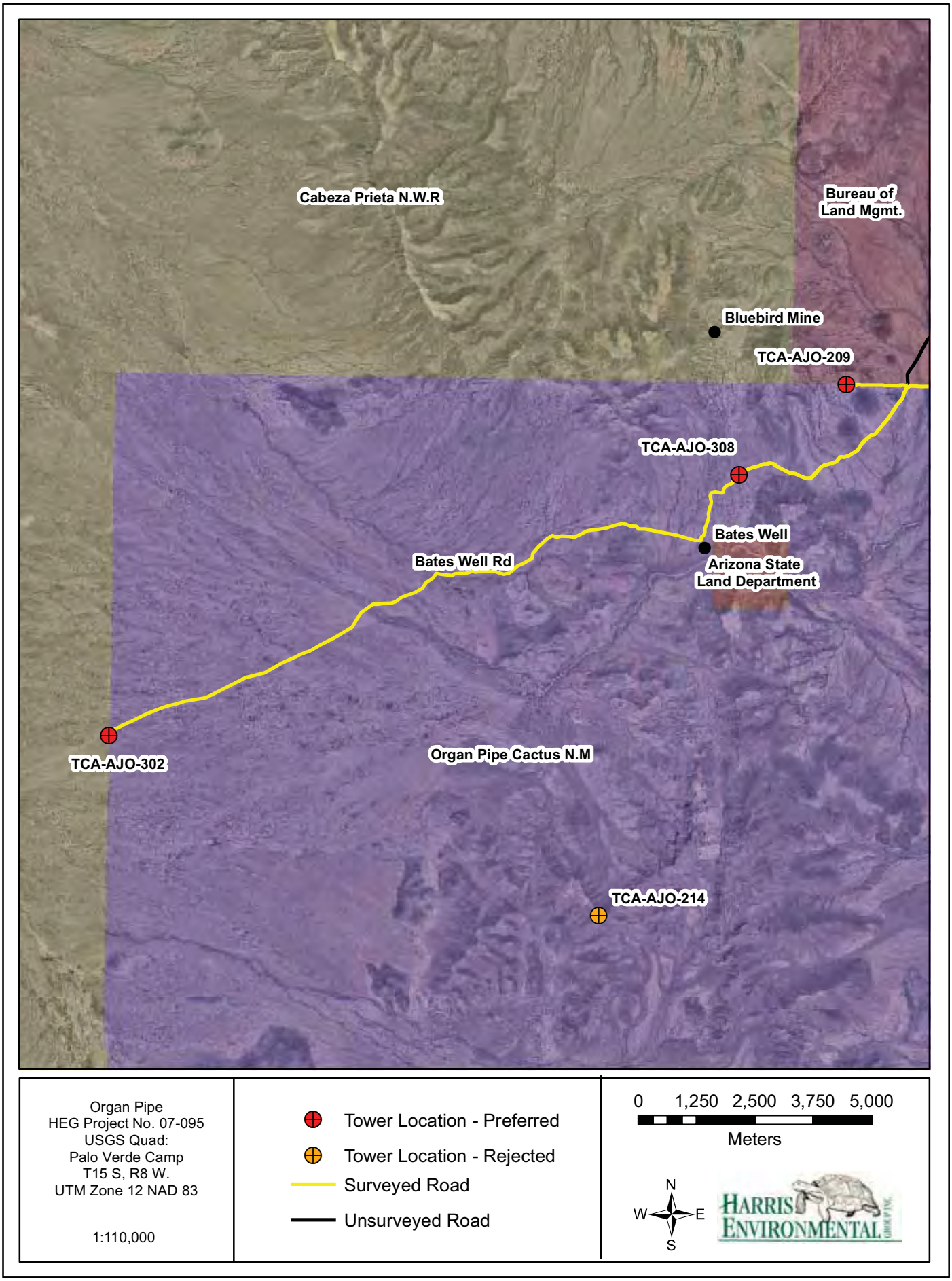


Figure 5.14 Tower location and surveyed area for TCA-AJO-302.

TCA-AJO-303

TCA-AJO-303 is located within the OPCNM, approximately 2.9 km (1.8 mi) north of the U.S./Mexico International Border and 8.1 km (5.0 mi) northwest of the Lukeville POE in southwestern Pima County (Figure 5.15). The tower compound is located at the eastern end of La Abra Plain at the western base of the Sonoyta Mountains. The elevation is 444 m (1,458 ft) amsl. The substrate at the tower compound is sand and small gravel and soils are composed of sandy loam (Photograph 5.08).

Photograph 5.08 TCA-AJO-303 center looking northwest.

TCA-AJO-303 is approached from the Lukeville POE via the International Border Road and is accessed via a maintained National Park Service road approximately 6.6 km (4.1 mi) west of the Lukeville POE. The tower compound is adjacent to the western shoulder of the access road and is located in a flat area that includes the road within the survey area. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound and portions of the approach road (Figure 5.16).

Field Observations

TCA-AJO-303 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include bursage, creosote, ocotillo, saguaro and velvet mesquite. A tree lizard (*Urosaurus* sp.) was the only wildlife documented at the tower compound. Special status species were not observed during field surveys. The tower compound is located between two unnamed drainages of the Puerto Blanco and Sonoyta Mountains which support xeroriparian vegetation.

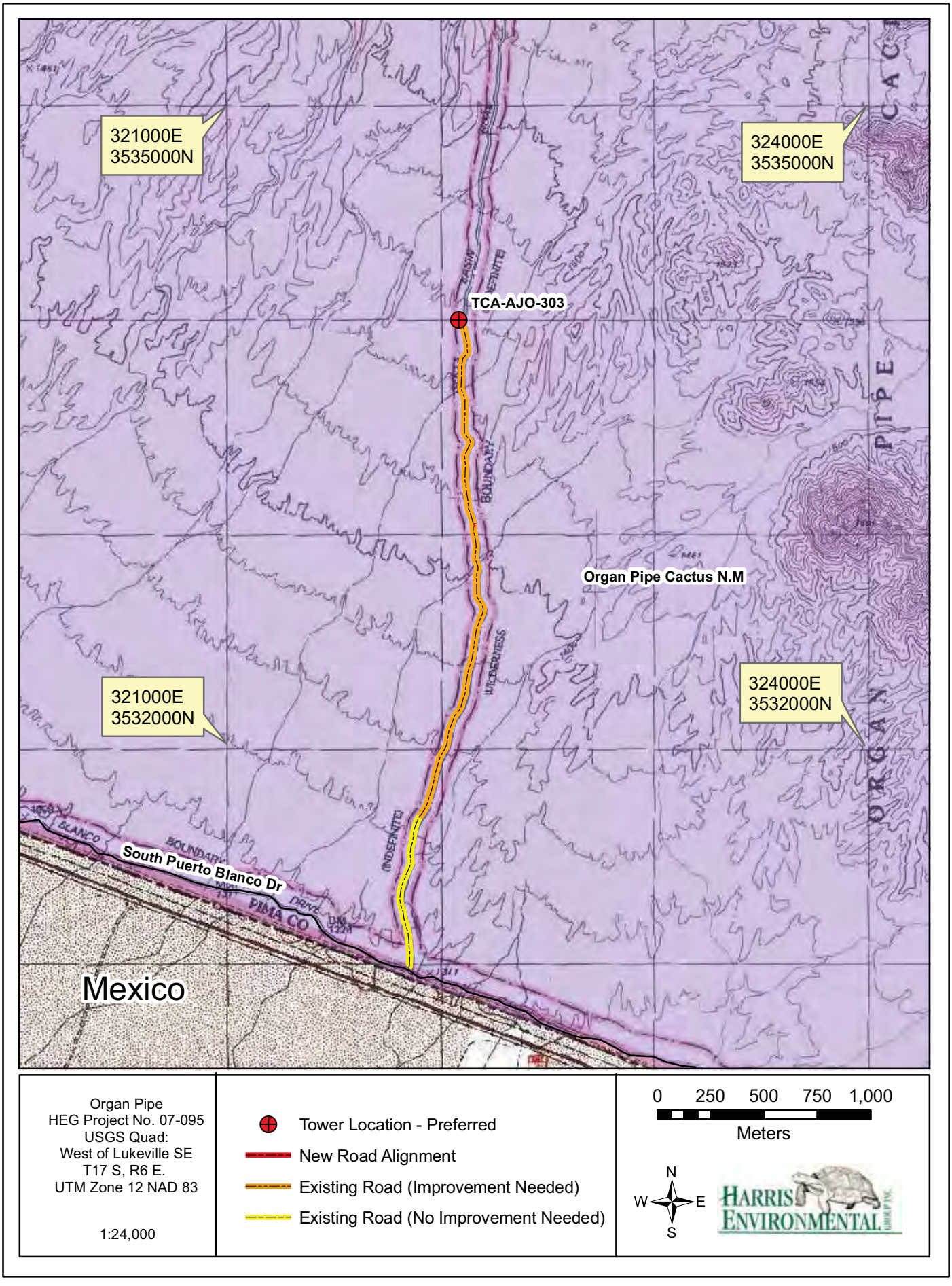


Figure 5.15 UTM registered location and land jurisdiction for TCA-AJO-303.

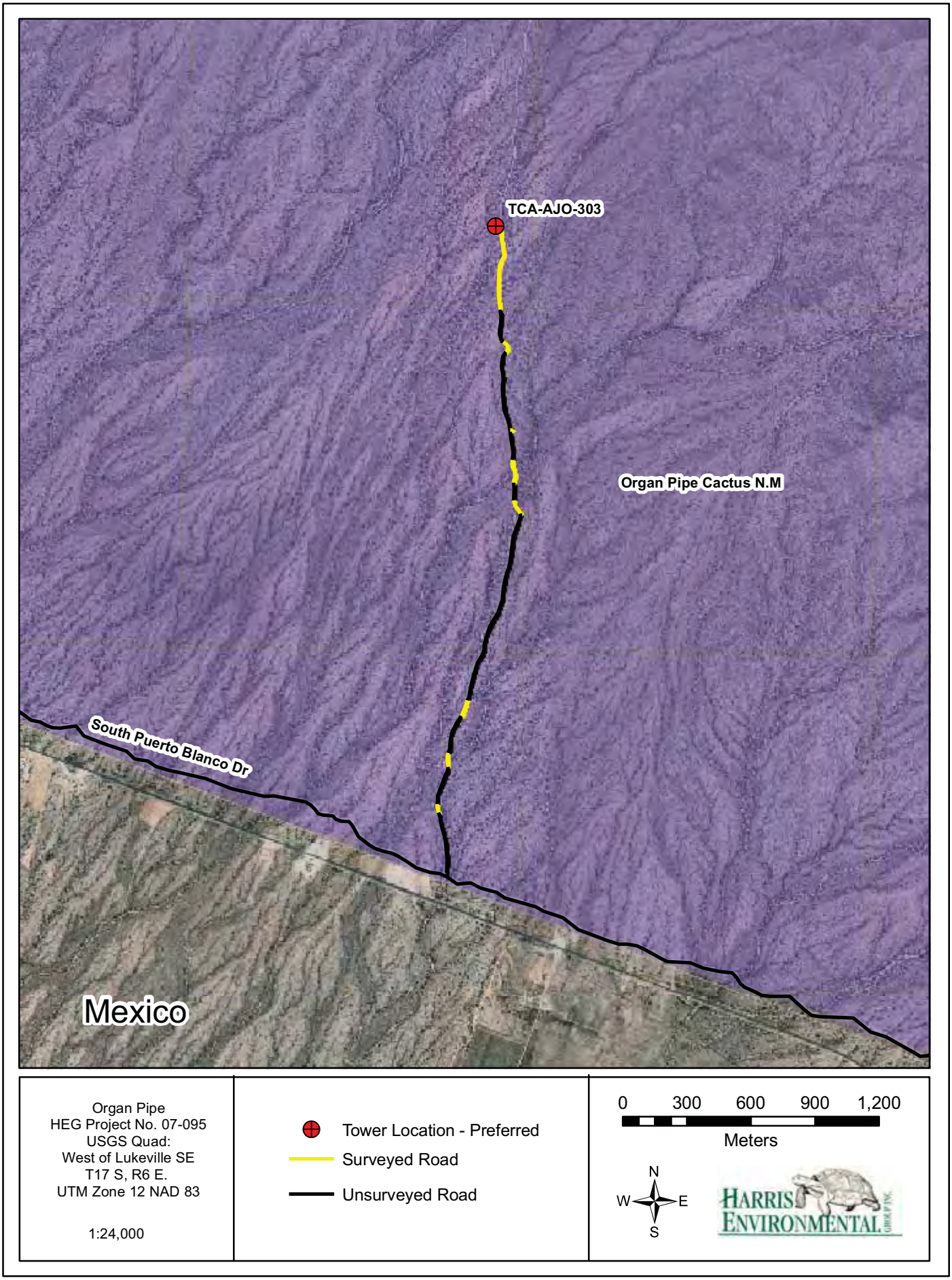


Figure 5.16 Tower location and surveyed area for TCA-AJO-303.

TCA-AJO-304

TCA-AJO-304 is located in the OPCNM, approximately 8.8 km (5.5 mi) north of the U.S./Mexico International Border and the Lukeville POE in southwestern Pima County (Figure 5.17). The tower compound is at the base of a small ridge at the southeast end of the Puerto Blanco Mountains approximately 0.5 km (0.3 mi) northwest of the monument headquarters. The elevation is 516 m (1,693 ft) amsl. The substrate at the tower compound is granitic cobble and pebbles and the soils are composed of volcanic, granitic, and limestone deposits (Photograph 5.09).

Photograph 5.09 TCA-AJO-304 center looking south.

TCA-AJO-304 is approached from the Town of Why via SR 85 to a paved road heading west from the OPCNM headquarters and is accessed via a small unpaved area within the tower compound. The proposed route traverses federal land and requires some surface disturbance along this section of the proposed access. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.18).

Field Observations

TCA-AJO-304 and the surrounding area are within the Arizona Upland subdivision of the greater Sonoran desertscrub vegetative community. Plants observed during the survey include brittlebush, buckhorn cholla, creosote, foothill palo verde, hedgehog cacti, ocotillo, organ pipe cacti, saguaro, staghorn cholla, teddy bear cholla, triangle-leaf bursage and mixed grasses and forbs. Wildlife documented at the tower compound include cactus wren, Gambel's quail, Gila woodpecker, phainopepla and western whiptail. Staghorn cholla and organ pipe cacti, both categorized as *salvage restricted* species on the ADA projected native plants list, were observed during field surveys. The tower compound is approximately 0.1 km (0.5 mi) northwest of a small unnamed drainage that supports xeroriparian vegetation.

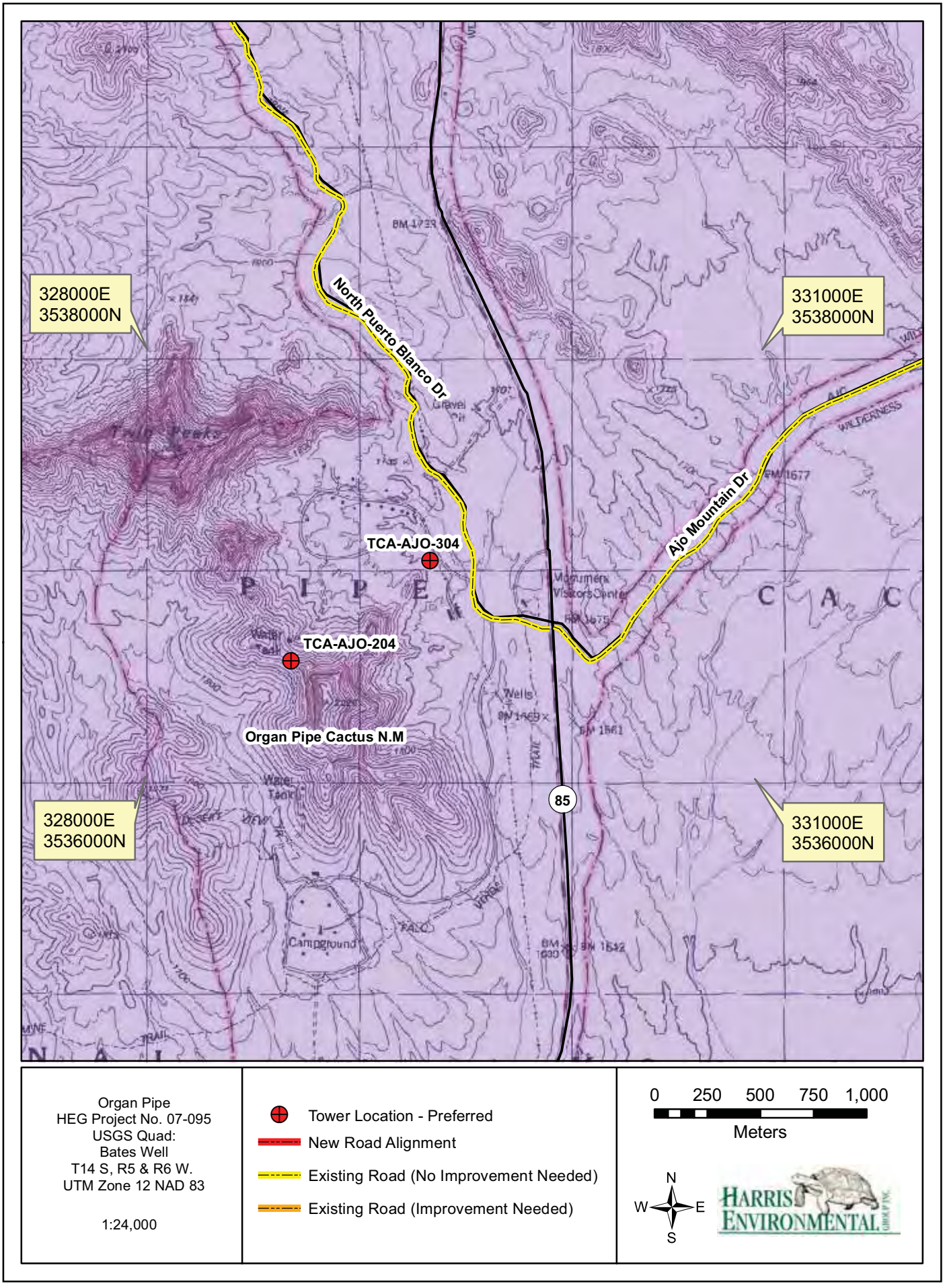


Figure 5.17 UTM registered location and land jurisdiction for TCA-AJO-304.

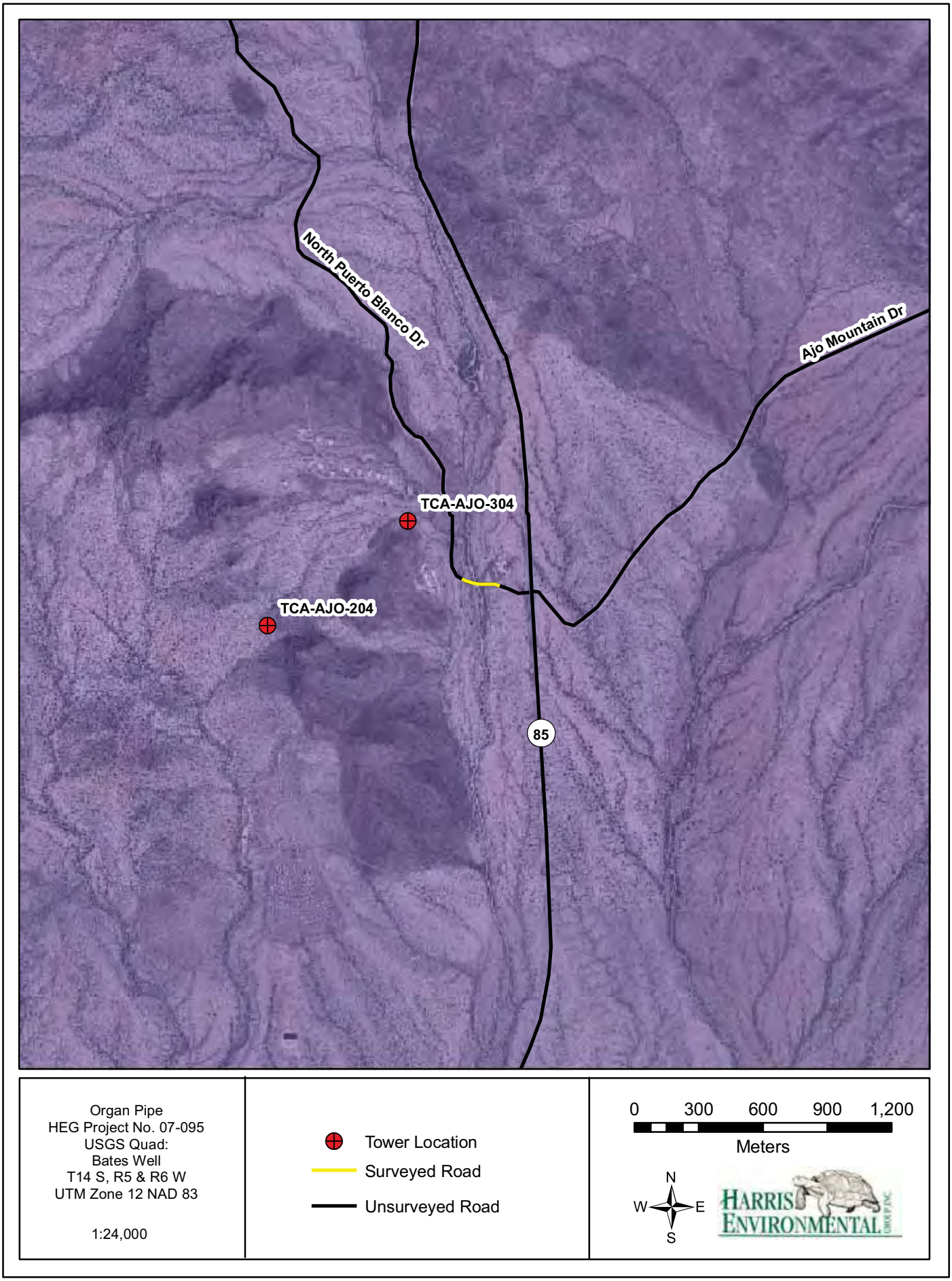


Figure 5.18 Tower location and surveyed area for TCA-AJO-304.

TCA-AJO-308

TCA-AJO-308 is located within the OPCNM in southwestern Pima County, approximately 21.3 km (13.2 mi) southwest of the Town of Why and 29.3 km (18.2 mi) north of the International Border (Figure 5.19). The tower compound is located near Growler Pass, between the Growler Mountains and the Bates Mountains. The elevation is 434 m (1,424 ft) amsl. The substrate at the tower compound is composed of angular rock and gravel with some sand (Photograph 5.10).

Photograph 5.10 TCA-AJO-308 looking south.

Approach to TCA-AJO-308 would be via Bates Well Road an unpaved OCPNM-maintained road that is reached from SR 85. Access to the tower compound is gained from the south shoulder of Bates Well Road within the tower compound. Survey coverage included the 0.4 ha (1.0 acre) tower compound (Figure 5.20).

Field Observations

TCA-AJO-308 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include foothill palo verde, ironwood, creosote, white ratany, triangle-leaf bursage, white bursage, ocotillo, golden-spined hedgehog, pencil cholla, saguaro, buckhorn cholla, teddy bear cholla, chain-fruit cholla and mixed grasses and forbs. There was no evidence of wildlife or special status species documented at the tower compound.

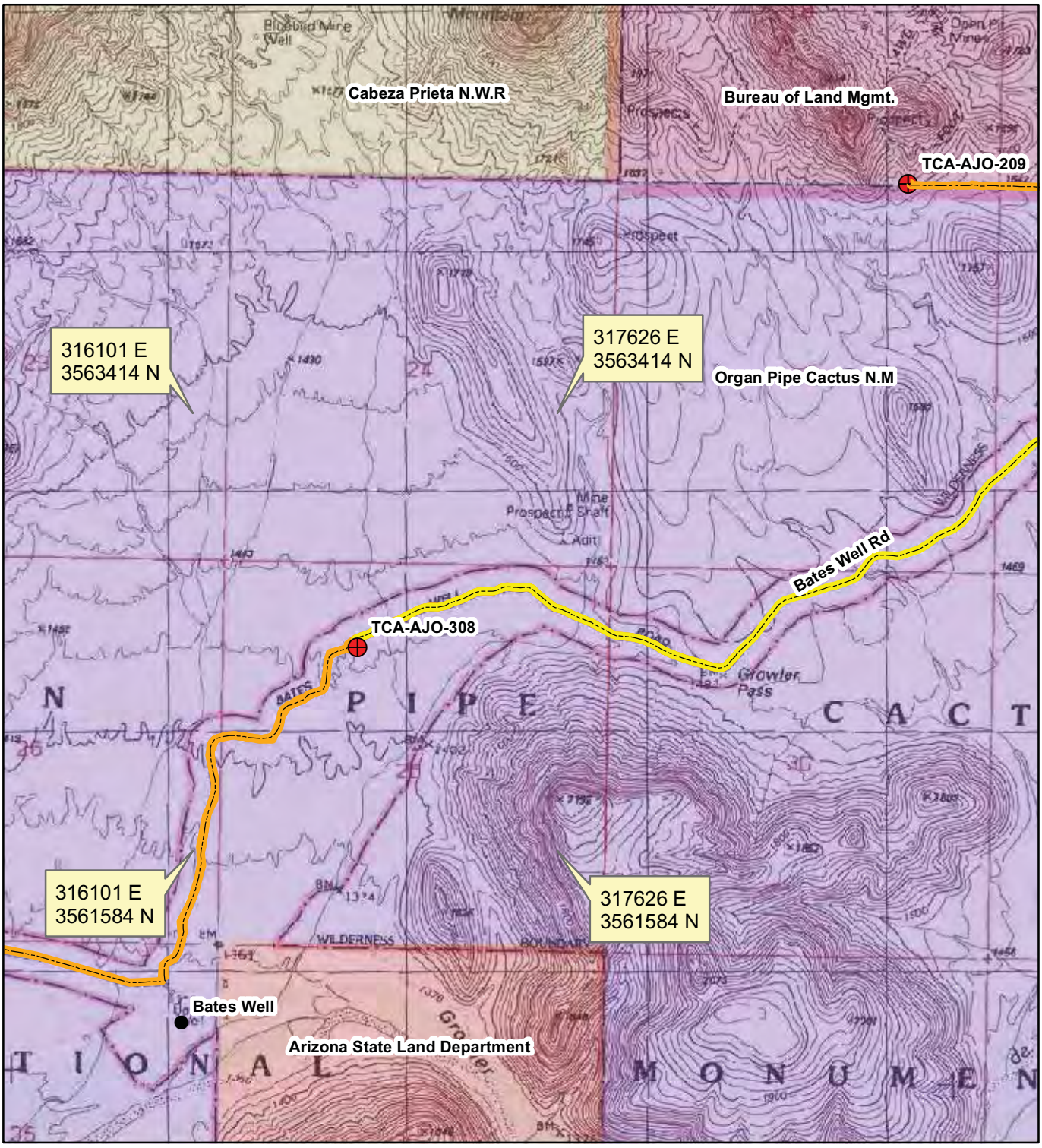


Figure 5.19 UTM registered location and land jurisdiction for TCA-AJO-308.

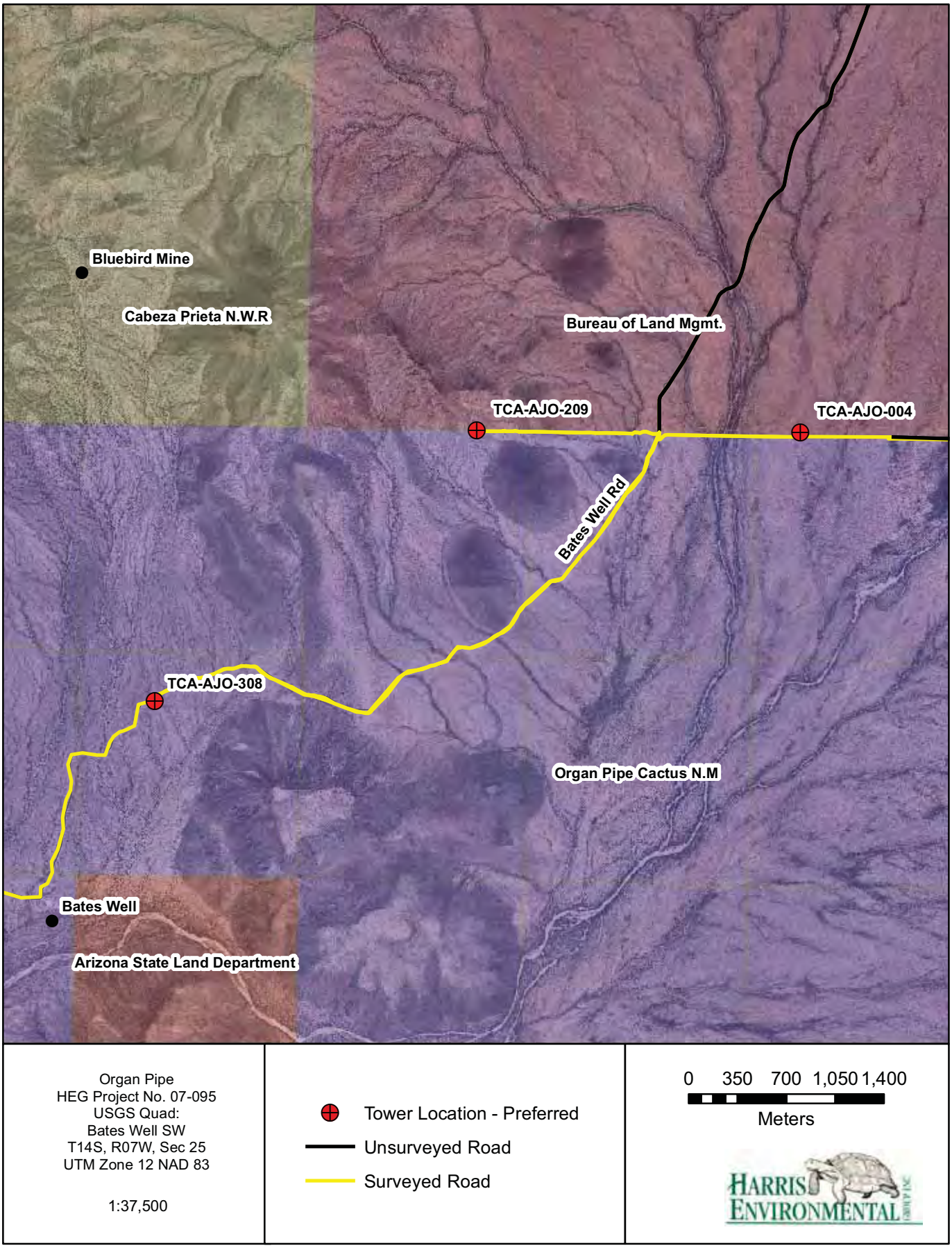


Figure 5.20 Tower location and surveyed area for TCA-AJO-308.

TCA-AJO-310

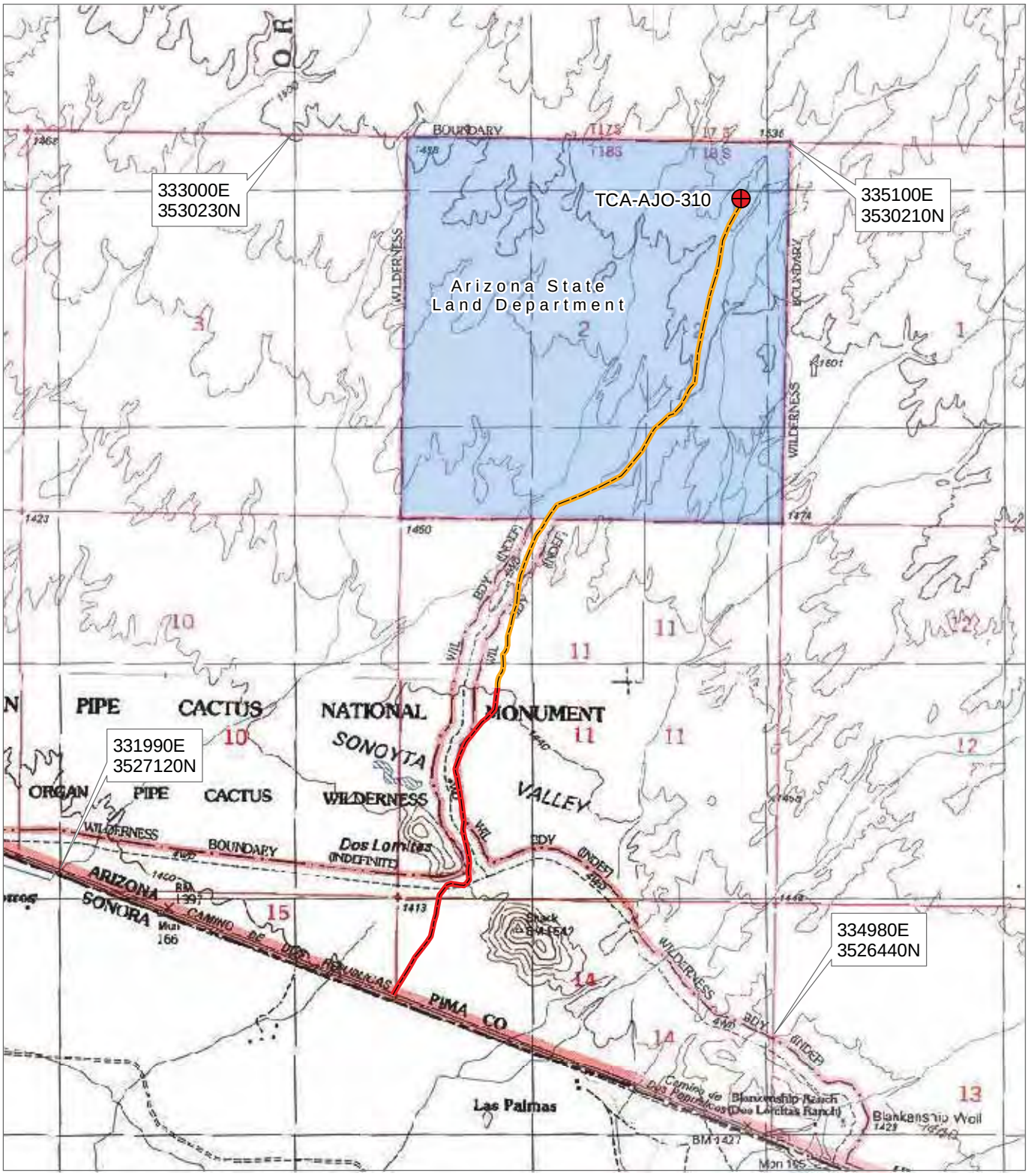
The proposed compound for TCA-AJO-310 is 7.0 km (4.3 mi) northeast of the Lukeville POE and 4.0 km (2.5 mi) north of the U.S./Mexico International Border (Figure 5.21). The compound is located within Sonoyta Valley southwest of the Ajo Mountains. Elevation is approximately 463 m (1,519 ft) amsl. The substrate at the compound is composed of angular gravel with some larger rocks, and soils are composed of fine sand with some silt (Photograph 5.11).

Photograph 5.11 TCA-AJO-310 center looking south.

TCA-AJO-310 is approached from the Lukeville POE via the International Border Road and the compound is accessed via an existing jeep trail heading north to the compound just east of Dos Lomitas approximately 2.0 km (1.2 mi) northwest of Blankenship Well. Survey coverage within ASLD land included the 0.4 ha (1.0 acre) tower compound and approximately 1.92 km (1.19 mi) of the proposed access road (Figure 5.22).

Field Observations

TCA-AJO-310 and the surrounding area are within the Arizona upland subdivision of Sonoran desertscrub. Plants observed during the survey include velvet mesquite, foothill palo verde, ironwood, creosote, triangle-leaf bursage, ocotillo, golden-spined hedgehog, chain-fruit cholla, buckhorn cholla, and mixed grasses and forbs. Wildlife documented at the compound included white-winged dove (*Zenaida asiatica*), Gila woodpecker (*Melanerpes uropygialis*) and verdin (*Auriparus flaviceps*). There were no special status species documented. The compound is between two unnamed xeroriparian washes.



Organ Pipe

Pima County, Arizona
T18S, R5W Sections 2, 11, 14
USGS Quadrangles: Lukeville, South of Lukeville, Diaz Peak, Blankenship Well
UTM Zone 12 NAD83

1:24,000

Tower Location - Preferred
Existing Road (Improvement Needed)
New Road Alignment

0 200 400 600 800 1,000 Meters

N
W E
S

HARRIS ENVIRONMENTAL

Figure 5.21 UTM registered location and land jurisdiction for TCA-AJO-310.

Organ Pipe

Pima County, Arizona
T18S, R5W Sections 2, 11, 14

1:24,000

Tower Location - Preferred
Preferred Route - Surveyed
Rejected Route - Not Surveyed
Rejected Route - Surveyed
T18S R5W Section 2
Wilderness Boundary (Indefinite)

0 200 400 600 800 1,000
Meters

N
W E
S

HARRIS ENVIRONMENTAL

Figure 5.22 Tower location and surveyed area for TCA-AJO-310

REJECTED TOWER LOCATIONS

TCA-AJO-008

TCA-AJO-008 is located within the OPCNM in southwestern Pima County, approximately 7.2 km (4.5 mi) north of the U.S./Mexico International Border and 9.1 km (5.6 mi) northeast of the Lukeville POE (Figure 5.23). The tower compound is located in the Sonoyta Valley, west of the Ajo Range and east of SR 85 at an elevation of 498 m (1,634 ft) amsl. The substrate at the tower compound is described as desert pavement with scattered gravel and cobbles. Soils are composed of sand and silt with a low percentage of clay (Photograph 5.12).

TCA-AJO-008 is approached via the unpaved International Border Road leading east from the Lukeville POE. Approximately 5.7 km (3.6 mi) east of the Lukeville POE three alternate entry routes off of the border road heading northeast were examined to potentially provide access to the proposed tower location. Survey coverage for this rejected tower location included the 0.4 hectare (1.0 acre) tower compound and three rejected access routes, with the exception of about 0.5 mi of the southern end of the central access route and 0.5 mi of the southern end of the easternmost route (Figure 5.24).

Field Observations

TCA-AJO-008 and the surrounding area are within the Arizona Upland Subdivision of Sonoran desertscrub. Plants observed during the survey include buckhorn cholla, chain-fruit cholla, creosote, foothill palo verde, ironwood, saguaro, triangle-leaf bursage, velvet mesquite, white bursage, white ratany and mixed grasses and forbs. Wildlife and evidence of wildlife documented at the tower compound include cactus wren (*Campylorhynchus brunneicapillus*), turkey vulture (*Cathartes aura*), jackrabbit scat and a western white-throated woodrat (*Neotoma albigula*) midden. Desert night-blooming cereus were documented during the field survey and are categorized as s*alvage restricted* on the ADA protected native plant list. The tower compound is located approximately 0.2 km (0.1 mi) west of an unnamed drainage of the Ajo Mountains which supports a xeroriparian vegetation community.

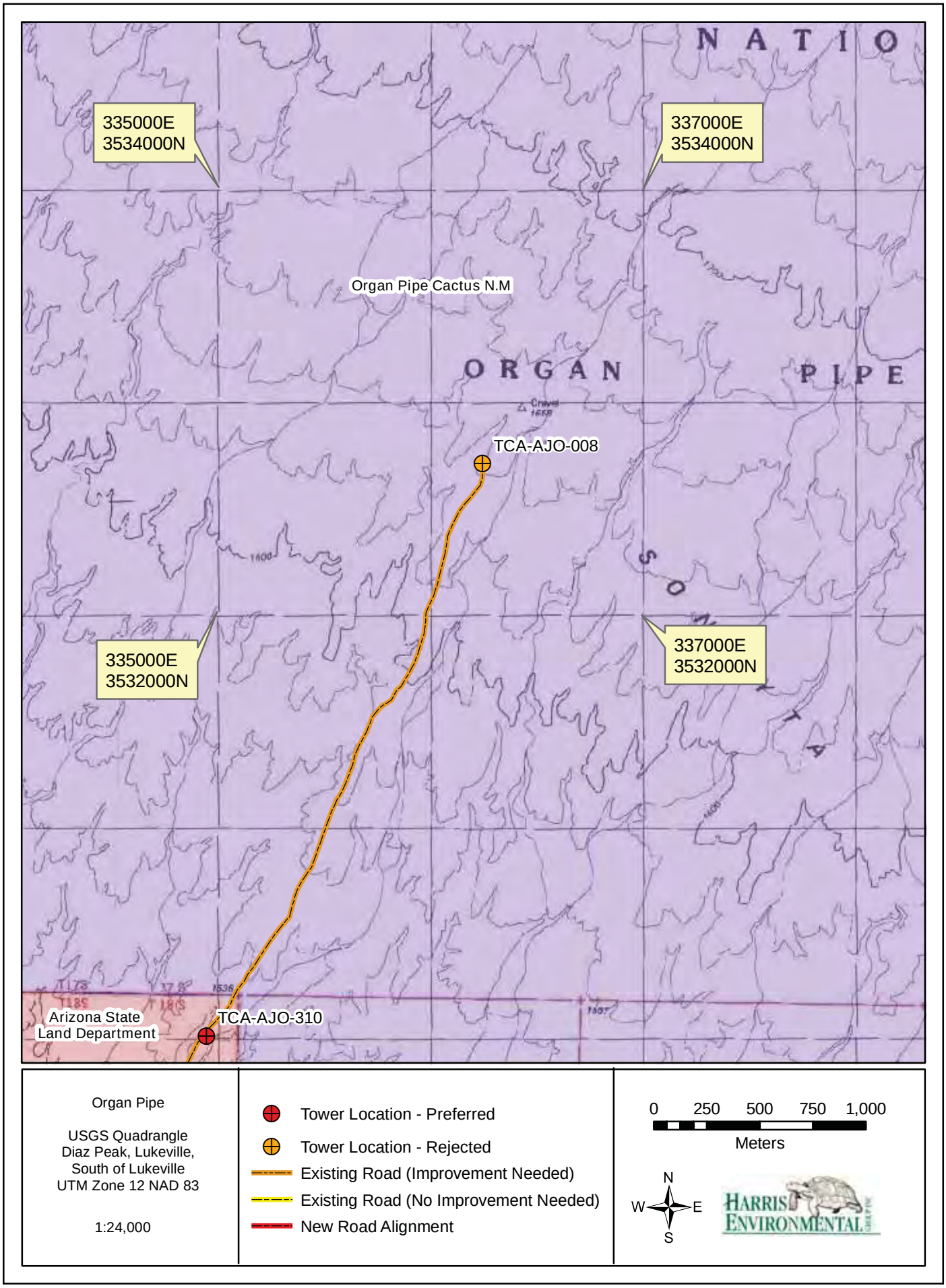


Figure 5.23 UTM registered location and land jurisdiction for TCA-AJO-008.

Organ Pipe

Pima County, Arizona
T18S, R5W Sections 2, 11, 14

1:36,000

Tower Location - Preferred
Tower Location - Rejected
Preferred Route - Surveyed
Rejected Route - Not Surveyed
Rejected Route - Surveyed
Wilderness Boundary (Indefinite)
T18S R5W Section 2

0 500 1,000 1,500 Meters

N
W E
S

HARRIS ENVIRONMENTAL

Figure 5.24 Tower Location and Surveyed Area for TCA-AJO-008.

Photograph 5.12 Center of TCA-AJO-008 looking east.

TCA-AJO-091

TCA-AJO-091 is located within the OPCNM in southwestern Pima County approximately 20.9 km (13.0 mi) north of the U.S./Mexico International Border and 21.5 km (13.4 mi) northeast of the Lukeville POE (Figure 5.25). The location is near the Tohono O'odham Nation western land boundary. The proposed tower compound is located on a flat top of a high basalt dome within the Ajo Mountains at an altitude of 1,447 m (4,748 ft) amsl. Surrounding land is rugged and undeveloped. Granite and volcanic basalt rock outcrops account for much of the tower compound site with decomposing rocky soils providing a substrate for vegetative communities on the peak of this mountain (Photograph 5.13).

Access to TCA-AJO-091 would be via air lift. The steepness and ruggedness of the terrain precludes access to the tower by ground vehicles. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.26).

Field Observations

TCA-AJO-091 and the surrounding area are within the mapped boundaries of the Arizona Upland Subdivision of Sonoran desertscrub; however, vegetation in the tower compound area more closely corresponds to Brown's (1994) semidesert Grassland. Plants observed during the survey include agave, Arizona rosewood, beargrass, juniper, ocotillo, pine-needle milkweed and prickly-pear. A peregrine falcon (*Falco peregrinus*), which is a federal *Species of Concern*, was documented during the field survey. The tower compound is approximately 0.7 km (0.4 mi) east of Arch Canyon which supports xeroriparian vegetation.

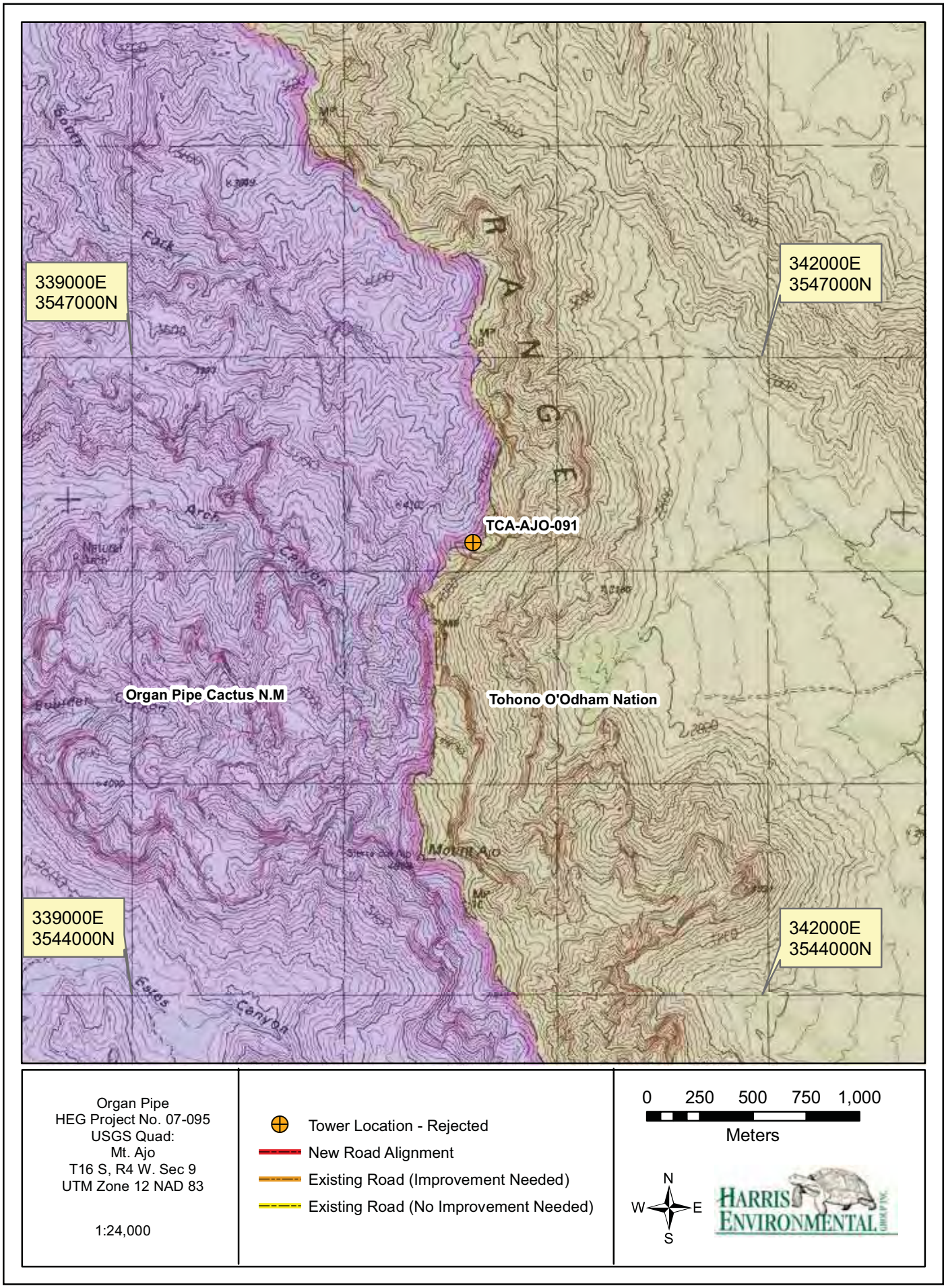


Figure 5.25 UTM registered location and land jurisdiction for TCA-AJO-091.

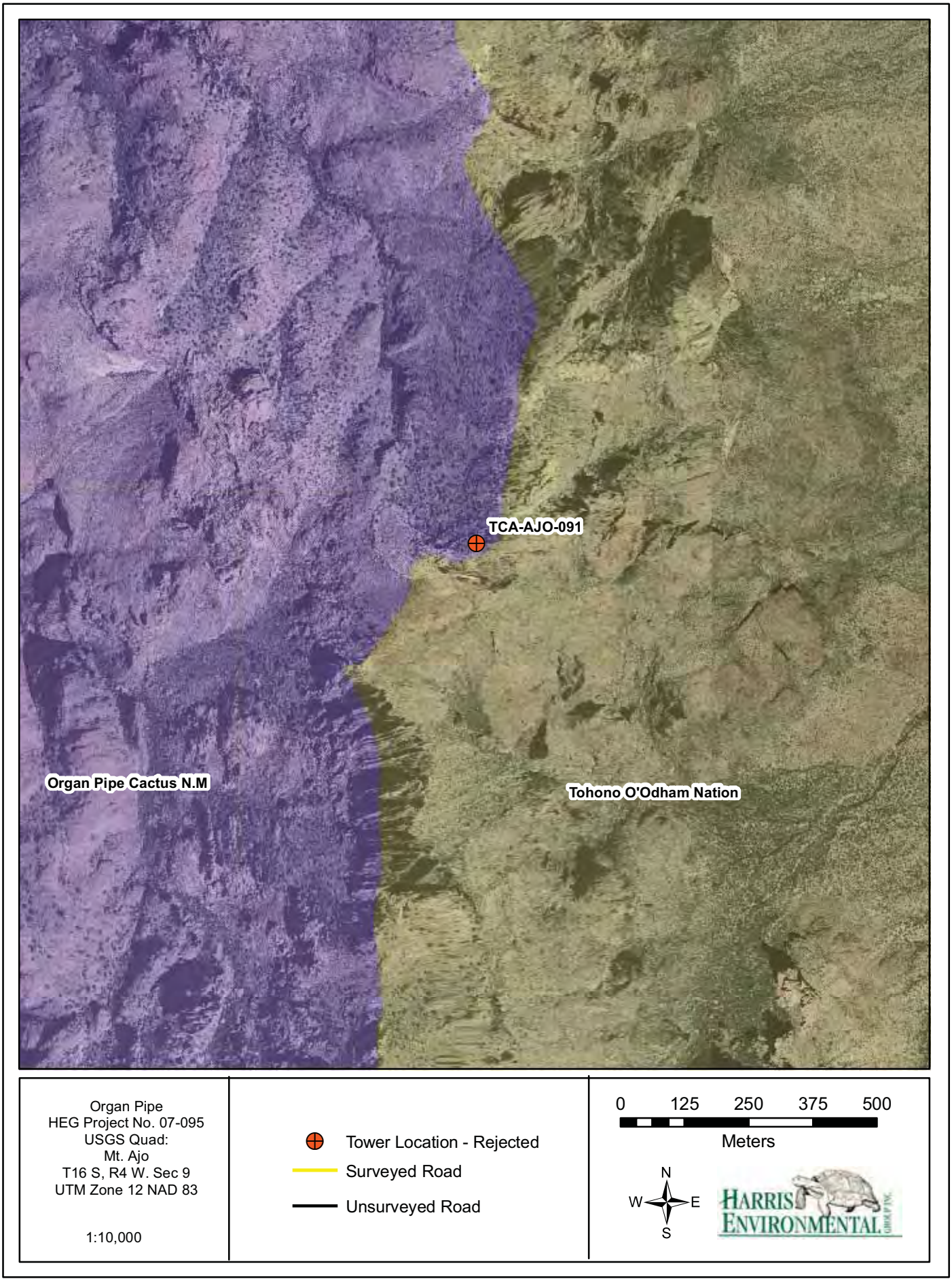


Figure 5.26 Tower location and surveyed area for TCA-AJO-091

Photograph 5.13 Overview of TCA-AJO-091 looking east-southeast.

TCA-AJO-214

TCA-AJO-214 is located in western Pima County on the OPCNM approximately 33.0 km (20.0 mi) southwest of the community of Ajo and 28.2 km (17.5 mi) northwest of the Lukeville POE (Figure 5.27). This location is on a high peak west of Kino Peak in the Bates Mountains at an elevation of 850 m (2,790 ft) amsl. The tower compound is covered with cobbles and small basalt boulders decomposing from the mountain bedrock (Photograph 5.14).

Access to TCA-AJO-214 would be via air lift but the location was rejected. SR 85 is 19 km (12 mi) to the east of the tower. Survey coverage for this proposed tower installation included the 0.4 ha (1.0 acre) tower compound (Figure 5.28).

Field Observations

TCA-AJO-214 and the surrounding area are within the Arizona Upland subdivision of Sonoran desertscrub. Plants observed during the survey include Emory's barrel cactus, foothill palo verde, ocotillo, organ pipe cactus, saguaro, triangle-leaf bursage and white bursage. Wildlife observed at the tower compound includes Gila woodpecker and kingbird (*Tyrannus* sp.). Organ pipe cactus and Emory's barrel cactus, both categorized as *salvage restricted* on the Arizona protected native plant list, were observed during the field survey.

Photograph 5.14 TCA-AJO-214 center looking west.

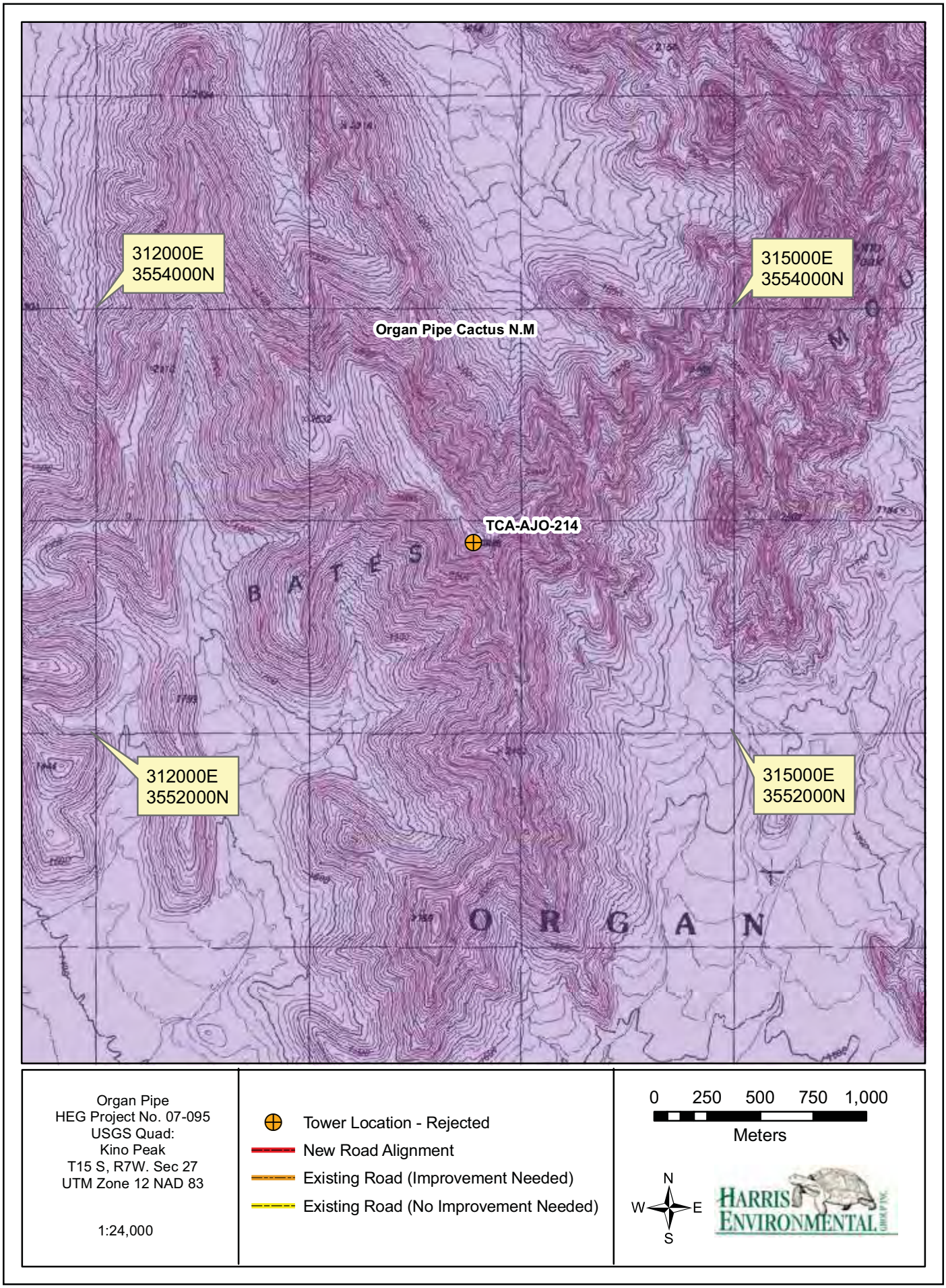


Figure 5.27 UTM registered location and land jurisdiction for TCA-AJO-214.

Figure 5.28 Tower location and surveyed area for TCA-AJO-214.

6.0 RESULTS

The objectives of this BE were to determine whether habitats in the project area may support special status species. A special status species is any species of interest to any regulatory or management agency of the federal, state, or local government. The special status species considered in this BE were identified from a list published by the USFWS through their IPaC system and the species list provided for Pima County. Other special-status species were identified using the AGFD HDMS and the BLM's sensitive species list.

The OPCNM is known to support populations of lesser long-nosed bat and Sonoran pronghorn. Both are federally listed as *endangered* by USFWS and the species also are listed as *wildlife of special concern* in Arizona by AGFD (AGFD 2008). The implementation of any of the proposed tower locations evaluated by this BE have the potential to affect the lesser long-nosed bat. The Sonoran pronghorn has the potential to be affected by eight tower locations. These species are discussed further in the following section on *Species Protected under the Endangered Species Act*. Other special status species also were evaluated and include federal *species of concern*, *wildlife of special concern* in the State of Arizona, *state protected plants*, and *BLM-sensitive* species. The proposed action has the potential to affect 19 species under these designations. These results are discussed in the following section on *Other Special Status Species*.

Species Protected Under the Endangered Species Act

Federally listed, *proposed*, or *candidate* species are known to occur within Pima County (Table 6.1). The known range and suitable habitat for each of these species was reviewed and contrasted with the findings of the biological survey for each proposed tower location. The table indicates "YES" in the Potential to Occur column when the proposed towers or access roads are within the known range and have suitable habitat for *federally-listed*, *proposed*, or *candidate* species. Species outside the known range or that do not have suitable habitat are listed as "NO" under Potential to Occur and are not further discussed in this report.

Lesser Long-nosed Bat (*Leptonycteris yerbabuenae*)

The lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008). Declines in lesser long-nosed bat populations are attributed to reductions in the size and number of maternity colonies as a result of roost site exclusion and disturbance in Sonora and Arizona (AGFD 2003). Further causes may be related to large-scale depletions of agaves in Mexico for tequila production.

Life History Information

This nectarivorous bat consumes the pollen and fruit of agaves and columnar cacti including saguaro and organ pipe cactus. In Arizona, this bat typically forages from dusk to dawn from April through September and has been documented foraging up to 48 km (30 mi) from daytime roost sites in a single nighttime foraging event. Gravid females begin to arrive in Arizona in early April and gather at large maternity colonies. Males arrive later and form separate, smaller colonies. One offspring is born annually in May and is volant by late June. Maternity colonies dissociate by the end of July (AGFD 2003).

Table 6.1. Federally listed, proposed and candidate species occurring in Pima County.

Species by Taxa	Status			Potential to Occur
	ESA	BLM	State	
Amphibians				
Chiricahua leopard frog *Lithobates chiricahuensis*	LT		WSC	NO
Sonoran tiger salamander *Ambystoma tigrinum stebbinsi*	LE		WSC	NO
Birds				
bald eagle *Haliaeetus leucocephalus*	LT(PDL)		WSC	NO
California brown pelican *Pelecanus occidentalis californicus*	LE			NO
masked bobwhite *Colinus virginianus ridgewayi*	LE		WSC	NO
Mexican spotted owl *Strix occidentalis lucida*	LT(DCH)		WSC	NO
southwestern willow flycatcher *Empidonax trailii extimus*	LE(DCH)		WSC	NO
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C		WSC	NO
Yuma clapper rail *Rallus longirostris yumanensis*	LE		WSC	NO
Fish				
desert pupfish *Cyprinodon macularis*	LE(DCH)		WSC	NO
Gila chub *Gila intermedia*	LE(DCH)		WSC	NO
Gila topminnow *Poeciliopsis occidentalis occidentalis*	LE		WSC	NO
Quitobaquito desert pupfish *Cyprinodon eremus*	LE		WSC	NO
Sonora chub *Gila ditaenia*	LT(DCH)		WSC	NO
Mammals				
jaguar *Panthera onca*	LE		WSC	NO
lesser long-nosed bat *Leptonycteris curasoe yerbabuenae*	LE		WSC	**YES**
ocelot *Leopardus pardalis*	LE		WSC	NO
Sonoran pronghorn *Antilocapra americana sonoriensis*	LE		WSC	**YES**
Reptiles				
Sonoyta mud turtle *Kinosternon sonoriense longifemorale*	C			NO

Table 6.1. *(continued)*.

Plants				
Acuña cactus *Echinomastus erectocentrus acunensis*	C		HS	NO
Canelo Hills ladies' tresses *Spiranthes delitescens*	LE		HS	NO
Huachuca water umbel *Lilaeopsis schaffneriana recurva*	LE(DCH)		HS	NO
Kearney blue star *Amsonia kearneyana*	LE		HS	NO
Nichol's turk's head cactus *Echinocactus horizonthalonius nicholii*	LE		HS	NO
Pima pineapple cactus *Coryphantha scheeri robustispina*	LE		HS	NO

Key to Status: C = Candidate, DCH = Designated Critical Habitat, HS = Highly Safeguarded, LE = Listed Endangered, LT = Listed Threatened, PDL = Post delisting, WSC = Wildlife of Special Concern

Lesser long-nosed bat ranges from the southern United States to northern South America in semiarid to arid habitats. Suitable roosting habitat within commuting distance of the food source is requisite. In Arizona, lesser long-nosed bat roosts in caves, mines, and tunnels in desert scrub, grassland, and oak woodlands from 363 m to 2,231 m (1,190 to 7,320 ft) amsl. This bat does not hibernate and leaves Arizona during the winter migration to the southern portions of its range (AGFD 2003).

Habitat Evaluation and Suitability

Lesser long-nosed bat has the potential to occur at all 14 proposed tower sites. The largest documented maternity colony of lesser long-nosed bats (16,000 to 25,000 adult females in May/June) is located in the OPCNM at the Copper Mountain Mine (NPS 2003). A second large maternity roost is also known from the Bluebird Mine on the eastern border of the CPNWR located in the Growler Mountains adjacent to OPCNM. The Bluebird Mine supports an estimated 3,000 lesser long-nosed bats at the peak of annual occupancy (USFWS 2006). Lesser long-nosed bats are extremely sensitive to human disturbance and abandoned the mine in 2002, 2003 and 2005 because of disturbance from illegal activities. In 2004, the bats returned to the mine after CPNWR staff installed a high steel fence to prevent disturbance. The bats returned to the mine in 2005 but abandoned the site again when the fence was damaged (presumably by illegal immigrants or smugglers). Approximate distances to these maternity colonies are presented in Table 6.2.

Discussion

The potential effects this project may have on lesser long-nosed bats include disturbance to maternity colonies and roosting sites, disturbance to foraging areas and placement of obstructions between known colonies or roosting sites and foraging areas. Potential detrimental effects could occur from removal of vegetation, use of artificial light, noise near roosting or maternity colonies, collision hazards and human disturbance from foot and vehicle traffic, or construction of tower structures near roosts or maternity colonies. In addition, the potential to

disrupt foraging and migration routes should be considered. A possible beneficial effect to the lesser long-nosed bat may occur from the reduction in illegal pedestrian and vehicle traffic in the OPCNM.

USFWS established a suggested list of Best Management Practices (BMPs) to address construction and maintenance effects on lesser long-nosed bat. The BMPs (USFWS 2007) recommend that proposed towers should be located at least 8.0 km (5.0 mi) from any known roost site and that project infrastructure is not located between roosts and known foraging sites because of potential disturbance to bats traveling between the two locations. TCA-AJO-004, TCA-AJO-170, TCA-AJO-209 and TCA-AJO-308 all occur within 8.0 km (5.0 mi) from known roost sites and may require additional consultation to analyze potential project effects, particularly if tower deployment is scheduled between May 1 and September 30 because of these towers' proximity to known maternity roosts.

Table 6.2. Distances to known lesser long-nosed bat maternity colonies.

TOWER ID	Bluebird Mine (km)	Bluebird Mine (mi)	Copper Mtn. Mine (km)	Copper Mtn. Mine (mi)
TCA-AJO-003	26.1	16.2	26.9	16.7
TCA-AJO-004	5.2	**3.2***	17.8	11.1
TCA-AJO-008	38.2	23.7	19.8	12.3
TCA-AJO-091	31.0	19.2	8.6	5.4
TCA-AJO-170	19.1	11.9	4.4	**2.7***
TCA-AJO-204	31.3	19.4	17.0	10.6
TCA-AJO-209	3.0	**1.9***	19.6	12.2
TCA-AJO-214	12.7	7.9	21.0	13.1
TCA-AJO-301	38.5	23.9	24.7	15.3
TCA-AJO-302	15.6	9.7	31.8	19.8
TCA-AJO-303	31.8	19.8	22.4	13.9
TCA-AJO-304	31.1	19.3	16.4	10.2
TCA-AJO-308	3.1	**1.9***	20.5	12.8

* These towers are located within 5 miles of a maternity roost.

In the event that tower site preparation or road modifications displace an agave or columnar cacti, affected plants should be salvaged and transplanted. If the plant is not salvageable, a replacement should be purchased and planted outside the APE. Salvage, transplantation, and container planting should be carried out in accordance with a restoration plan which should include guidelines for success criteria and post-transplant monitoring.

Sonoran Pronghorn (*Antilocapra americana sonoriensis*)

Sonoran pronghorn is listed as *endangered* and as a *species of concern* in Arizona (AGFD 2008). Population declines for Sonoran pronghorn in the state are attributed to loss of habitat and drought. Sonoran pronghorn habitat has been drastically altered in southwestern Arizona by the desiccation of major rivers and overgrazing of cattle. Although cattle grazing in key pronghorn habitat ceased in the early 1980s, populations have not recovered. In Mexico, the exploitation of habitat for grazing and agriculture, as well as poaching are still causing population declines. The

presence of fences in key areas of pronghorn movement also is a significant factor in pronghorn mortality, particularly when they restrict accessibility to food and water resources (AGFD 2002).

Life History Information

Sonoran pronghorn is recognized as the smallest of the five extant subspecies of pronghorn. In Arizona, they are found on the CPNWR, OPCNM, Luke Air Force Barry M. Goldwater Gunnery Range (BMGR) and the Tohono O'odham Indian Reservation. In Mexico, they are believed to be confined to northwest Sonora. Sonoran pronghorn habitat is characterized by broad alluvial valleys separated by block-faulted mountains within the Lower Sonoran Desert life zone (AGFD 2002). The population of Sonoran pronghorn in the United States has been as low as 18 individuals in the last decade (USFWS, informal consultation meeting, 16 October 2007). The population is the focus of intensive cooperative management efforts to recover this species. The USFWS is managing a portion of the remaining population as a semi-captive herd on the CPNWR. The 2007 population numbers approximately 80 individuals (USFWS, informal consultation meeting, 16 October 2007).

Habitat Evaluation and Suitability

The current range of Sonoran pronghorn is restricted to portions of the Tohono O'odham Nation, the CPNWR, OPCNM and the BMGR (AGFD 2002). The remaining population in the United States is closely monitored and managed by USFWS. Within the proposed project area Sonoran pronghorn has the potential to occur in the vicinity of eight proposed towers: **AJO-003, AJO-004, AJO-170, AJO-209, AJO-214, AJO-302, AJO-303, and AJO-308**.

Although the proposed towers positioned east of SR 85 contain suitable habitat for Sonoran pronghorn, the International Vehicle Barrier Biological Assessment (NPS 2003) states that SR 85 marks the eastern boundary of the population occurring in the U.S. and the species "no longer (or very rarely) occurs" east of this roadway. Only three records exist of pronghorn east of SR 85 from thirty years of documentation with the most recent occurrences recorded in 2002 (NPS 2003).

Sonoran pronghorn are known to occur within the OPCNM throughout the year. During summer, individuals from north and west of the monument migrate to areas in the southwestern portion of the OPCNM, further emphasizing the importance of conserving the viability of the "crucial habitat" which exists within OPCNM (NPS 2003). Telemetry data and visual records from the monument have shown that areas associated with the Valley of the Ajo, the Growler Valley and San Cristobal Wash are commonly occupied by this species (NPS 2003).

Discussion

Potential adverse effects to this species that should be considered in project evaluation include removal of vegetation, disturbance of individuals during construction, maintenance, and CBP activity related to ongoing law enforcement operations. USFWS is particularly concerned with disturbance of mothers and fawns in their first year because of the potential lower recruitment success (USFWS, informal consultation meeting, 16 October 2007). The potential beneficial effects of the project stemming from reduced illegal pedestrian and vehicle traffic also should be considered in project evaluation. USFWS established a suggested list of BMPs to address construction and maintenance effects on Sonoran pronghorn such as presence of a biological

monitor during construction, limiting access during certain times of the year, ceasing activities when pronghorn are observed and placing limits on the use of certain types of noise or artificial light within movement corridors (USFWS 2007).

Other Special Status Species

This section addresses the potential for other special status species to occur at each proposed tower location including federal *Species of Concern*, BLM *Sensitive* species, Arizona *Wildlife of Special Concern* and protected native plants. Table 6.3 presents the list of species observed (marked with "O") or potentially occurring in the proposed project area (marked with an asterisk). Refer to Appendix C for the list of all other special status species reviewed for this study but determined to have potential to occur.

Table 6.3. Special status species potentially occurring within the *Organ Pipe* project area.

Common Name	Scientific Name	ESA Status	BLM Status	State Status	TCA-AJO-003	TCA-AJO-004	TCA-AJO-008	TCA-AJO-091	TCA-AJO-170	TCA-AJO-204	TCA-AJO-209	TCA-AJO-214	TCA-AJO-301	TCA-AJO-302	TCA-AJO-303	TCA-AJO-304	TCA-AJO-308	TCA-AJO-310
American peregrine falcon	*Falco peregrinus anatum*	SC		WSC				O										
cactus ferruginous pygmy owl	*Glaucidium ridgewayi cactorum*	SC		WSC	*	*	*		*	*	*				*	*	*	*
tropical kingbird	*Tyrannus melancholicus*			WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
western burrowing owl	*Athene cunicularia hypugaea*	SC		WSC	*		*		*					*	*			*
big free-tailed bat	*Nyctinomops macrotis*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
California leaf-nosed bat	*Macrotus californicus*	SC		WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
cave myotis	*Myotis velifer*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
greater western bonneted bat	*Eumops perotis californicus*	SC			*	*	*	*	*	*	*	*	*	*	*	*	*	*
pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	SC			*	*	*	*	*	*	*	*	*	*	*	*	*	*
pocketed free-tailed bat	*Nyctinimops femorosaccus*		S			*					*							
spotted bat	*Euderma maculatum*		S	WSC	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Underwood's mastiff bat	*Eumops underwoodi*	SC	S		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mexican rosy boa	*Charina trivirgata trivirgata*	SC	S			*	*		*	*	*	*			*	*	*	*
red-back whiptail	*Aspidoscelis burti xanthonota*	SC						*		*		*				*		
Sonoran desert tortoise	*Gopherus agassizii*	SC		WSC	*	*	*	*	*	*	*	*		*	*	*	*	*
desert night-blooming cereus	*Peniocereus greggii* var. *transmontanus*			SR			O											O
Emory's barrel cactus	*Ferocactus emoryi*			SR							O	O						
Organ pipe cactus	*Stenocereus thurberi*			SR	O					O	O	O				O		
stag-horn cholla	*Opuntia versicolor*			SR							O					O		

Key to Status: S = Sensitive, SC = Species of Concern, SR = Salvage Restricted, WSC = Wildlife of Special Concern

There is potential habitat for 19 special status species in the project area including four bird species, eight bat species, and three reptile species. Four special status plant species were observed in the project area. These species have varying levels of legal protection depending on the particular species, land jurisdiction on which it occurs, and activity that is being proposed. All of the bird species are protected under the MTBA and may have additional management guidelines when potentially affected by projects on federal land. The OPCNM and BLM have species management guidelines for federal *species of concern* and *BLM-sensitive* species that may require avoidance or mitigation as part of land-use approvals. Removal of ANPL listed plant species from state or private properties requires a permit from the ADA. More information on regulatory context is presented in Section 7.0 and further discussed in Section 8.0.

Migratory Birds

Potential affects to bird species listed under the MBTA, potential loss of habitat for, or potential to kill individuals should be considered. Avoidance measures should be incorporated into project design when possible. Bird species protected under MBTA that may occur in the project area include American peregrine falcon, cactus ferruginous pygmy-owl, tropical kingbird, and western burrowing owl (see Table 6.3). The MBTA prohibits take of any migratory bird, including any part, nest, or egg of any such bird. If construction is proposed during the breeding season for these species (January through September[7]), pre-construction nesting surveys can be conducted to locate active nests. Construction should not occur within 152 m (500 ft) of an active nest.

Special Status Plants

Federally-listed species or other federal plant species of special concern do not occur within the proposed project area. Several plant species that are considered sensitive species by other resources agencies or the ASLD were observed at some tower locations (see section below and Table 6.3). Removal of these species should be avoided where possible and removal of these species from ASLD or private properties requires a permit from the ADA.

Desert Night-blooming Cereus (*Peniocereus greggii var. transmontanus*)

- TCA-AJO-008: multiple individuals are located along the access road.

Emory's Barrel Cactus (*Ferocactus emoryi*)

- TCA-AJO-214: one individual observed within the tower compound.
- TCA-AJO-209: four individuals observed within the tower compound.

Organ Pipe Cactus (*Stenocereus thurberi*)

- TCA-AJO-003: one individual observed along the access road.
- TCA-AJO-170: one large individual (minimum 16 heads) observed near compound center.
- TCA-AJO-204: one individual observed within the tower compound.
- TCA-AJO-209: nine individuals observed within the tower compound.
- TCA-AJO-214: four individuals observed within the tower compound.

Staghorn Cholla (*Opuntia versicolor*)

- TCA-AJO-209: Staghorn cholla observed within the tower compound.
- TCA-AJO-304: Staghorn cholla observed within the tower compound.

[7] The specific breeding season varies by species.

7.0 REGULATORY CONTEXT

Endangered Species Act (ESA)

USFWS maintains a list of *threatened* and *endangered* species in each county. The list includes species that are candidate for listing and proposed to be listed for protection under the ESA, as amended (16 USC §1531 *et seq*.). The ESA specifically prohibits *take* of a listed species. *Take* is "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct" (ESA, Section 3, paragraph 19). Further, *harm* is "…an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering" (50 CFR §17.3). USFWS also tracks species protected under legal conservation agreements, which precludes the need for protection through listing. Such species are typically categorized as *Species of Concern* (SC).

Migratory Birds Treaty Act (MBTA)

USFWS enforces the MBTA of 1918 (16 USC 703-712) as amended. The MBTA prohibits individuals to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, including any part, nest, or egg of any such bird." USFWS maintains a list of birds protected under the MBTA.

Bureau of Land Management (U.S. Department of the Interior)

BLM sensitive species are taxa that are not federally listed, proposed, or candidate species. BLM policy is to provide these species with the same level of protection as is provided for candidate species. BLM Manual 6840 states that this designation is intended "to ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed". The Sensitive Species designation is normally used for species that occur on BLM administered lands for which BLM has the capability to significantly affect the conservation status of the species through management.

The BLM Manual 6840 provides the following factors by which a native species may be listed as "*Sensitive*":

(1) Species that could become endangered or extirpated from a state, or within a significant portion of its range in the foreseeable future;

(2) Species under status review by the USFWS and/or National Marine Fisheries Service;

(3) Species undergoing significant current or predicted downward trends in: habitat capability that would reduce a species' existing distribution; and/or population or density such that federally-listed, proposed, candidate, or State-listed status may become necessary;

(4) Species that typically consist of small and widely dispersed populations;

(5) Species that inhabit ecological refugia, or specialized or unique habitats; or

(6) Species that are State-listed, but which may be better conserved through application of BLM sensitive species status.

Desert Tortoise

The BLM has specific guidance for desert tortoise management and compensation contained in the *Strategy for Desert Tortoise Habitat Management on Public Lands in Arizona* (BLM IM No. AZ-92-46) and *Supplemental Guidance for Desert Tortoise Compensation* (BLM IM No. AZ-99-008). Acquisition of land-use permits on BLM property that results in loss of habitat for Sonoran desert tortoise may require compensation. The *Guidelines for Handling Sonoran Desert Tortoises Encountered During Development Projects* (AGFD 1997) should be followed if desert tortoises are encountered during construction and need to be moved from the construction area.

Wildlife of Special Concern in Arizona

All resident, migratory, native and introduced wildlife in Arizona are property of the state, except fish and bullfrogs (*Rana catesbeiana*) in private ponds, or wildlife and birds held in captivity under permit. The AGFD is charged with managing wildlife under the provisions of the Arizona Revised Statutes (ARS) Title 17 and the Arizona Administrative Code (AAC) Title 12, Chapter 4. The AGFD tracks animal and native plant species. The AGFD formerly listed 116 species as extinct, endangered, threatened and candidate in Arizona (AGFD 1988). While these terms were identical to those used by USFWS, the AGFD categories were advisory and provided no legal protection for take or habitat modification. To avoid confusion, AGFD drafted a list of *Wildlife of Special Concern in Arizona* (WSC) that eliminated the endangered and threatened categories. The revised list is not yet officially approved, but it is published for public review (AGFD 1996). The AGFD HDMS currently identifies species from both lists (AGFD 1988, 1996) as WSC.

Native Plants of Arizona

The Arizona Department of Agriculture administers the Arizona Native Plant Law ([ANPL] 7 ARS §3-901 *et seq*.), although the AGFD maintains the database and tracks many of the plants protected under the legislation. The ANPL categorizes many native plants as *highly safeguarded* (HS), *salvage restricted* (SR), *salvage assessed* and *harvest restricted*. The *highly safeguarded* category includes native plants in Arizona that are in jeopardy or in danger of extinction. The *salvage restricted* category is extensive and includes native plants that are vulnerable to theft or vandalism. *Salvage assessed* plants have sufficient value to support the cost of salvage. *Harvest restricted* plants are subject to excessive harvest because of their intrinsic value.

It is unlawful to destroy, collect and transport protected native plants from private or state lands without permission from the landowner and a permit from the Arizona Department of Agriculture. No permit, tag, or seal is required to transplant native plants within the same parcel on federal or tribal lands. Landowners may legally destroy or remove plants growing on their land, but must notify the Arizona Department of Agriculture 20 to 60 days prior to the destruction of any protected native plants. Exceptions exist for destroying protected native plants that include maintenance of developed properties less than 4 ha (10 acres), maintenance of existing utilities and their associated rights of way and emergencies.

8.0 DISCUSSION

CBP is preparing a Biological Assessment and an Environmental Assessment for proposed installations within the *Organ Pipe* project area. CBP is conducting consultation with the USFWS and acquiring all applicable land-use permits from OPCNM, BLM, ASLD and other pertinent resource agencies. The APE considered for this project included all of the proposed tower locations and portions of any existing roadway that would require improvements to facilitate the project.

The lesser long-nosed bat and the Sonoran pronghorn are both federally protected species with the potential to occur within the APE. The lesser long-nosed bat is federally-listed as *endangered* and as a *wildlife species of special concern* in the State of Arizona (AGFD 2008). The species has the potential to occur at all 14 proposed tower sites. Sonoran pronghorn is federally listed as *endangered* and as a *species of concern* in the State of Arizona (AGFD 2008) and has the potential to occur at eight proposed tower sites (see Table 1.1). Other special-status species such as Sonoran desert tortoise, and birds protected by MBTA are known to occur at all proposed *Organ Pipe* tower locations (see Table 1.2).

CBP is acquiring applicable land-use permits from OPCNM, BLM, and ASLD. The OPCNM and BLM have species management guidelines for federal *species of concern* and *BLM-sensitive* species that may require avoidance or mitigation as part of land-use approvals. Direct handling of any special status wildlife species requires acquisition of appropriate scientific collecting permits. Removal of ANPL listed plant species from ASLD land or private properties requires a permit from the Arizona Department of Agriculture.

Construction and maintenance of border security infrastructure is a significant component of this project. The BMPs may apply to CBP activities where there will be ground, light and/or noise disturbance to federally-listed species near the project area because of the placement, replacement, relocation, or maintenance of facilities, including roads. Some maintenance activities may not create new ground disturbance, but may introduce noise or lighting impacts or physical off-site effects. Depending on the federally-listed species or habitat within the project area some or all of the categories of BMPs should be included in the project plan (USFWS 2007).

Construction and maintenance activities that may occur within or near the habitat of a federally-listed species should conduct species-specific surveys if habitat is present. Survey protocols exist for several species and should be followed if necessary to accurately discern presence or absence. Protocols are provided via the IPaC system[8]. If species are not found following protocol surveys, then implementation of measures to minimize disturbance to individuals would not be necessary. However, other practices may still be required to avoid, minimize and mitigate impacts to habitat if habitat components were adversely affected.

[8] The IPaC system is a beta system and the field protocols were not yet available at the time this document was prepared.

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APPENDIX A

Common and Scientific Plant Names used in this report.

Common name	Scientific name
Acuña cactus	*Echinomastus erectocentrus acunensis*
Agave	*Agave* sp.
Ajo rock daisy	*Perityle ajoensis*
Anderson wolfberry	*Lycium andersonii*
Aravaipa wood fern	*Thelypteris puberula sonorensis*
Arizona giant sedge	*Carex ultra*
Arizona rosewood	*Vauquelinia californica*
Bartram stonecrop	*Graptopetalum bartramii*
beardless chinch weed	*Pectis imberbis*
beargrass	*Nolina microcarpa*
blue palo verde	*Parkinsonia floridum*
blue sand lily	*Triteleiopsis palmeri*
brittlebush	*Encelia farinosa*
broadleaf twayblade	*Listera convallarioides*
buckhorn cholla	*Cylindropuntia acanthocarpa*
buffelgrass	*Pennisetum ciliare*
burrobrush	*Hymenoclea salsola*
bursage	*Ambrosia* sp.
cactus apple	*Opuntia englemannii flavispina*
cane cholla	*Cylindropuntia spinosior*
Canelo Hills ladies' tresses	*Spiranthes delitescens*
canyon ragweed	*Ambrosia ambrosioides*
cat-claw acacia	*Acacia greggii*
chain-fruit cholla	*Cylindropuntia fulgida*
Chisos coral root	*Hexalectris revoluta*
counter-clockwise fishhook cactus	*Mammalaria mainiae*
creosote	*Larrea tridentata*
crested coral root	*Hexalectris spicata*
Dahlia rooted cereus	*Peniocereus striatus*
Dalhouse spleenwort	*Asplenium dalhousiae*
desert broom	*Baccharis sarothroides*
desert Christmas cactus	*Cylindropuntia leptocaulis*
desert honeysuckle	*Anisacanthus thurberi*
desert night-blooming cereus	*Peniocereus greggii* var. *transmontanus*
desert willow	*Chilopsis linearis*
Emory's barrel cactus	*Ferocactus emoryi*
fallen ladie's tresses	*Schiedeella arizonica*
fishhook barrel cactus	*Ferocactus wislizenii*
foothill palo verde	*Parkinsonia microphyllum*
Gentry indigobush	*Dalea tentaculoides*
golden barrel cactus	*Ferocactus cylindraceus eastwoodiae*

Appendix A (*continued*).

Common name	Scientific name
golden-spined hedgehog	*Echinocereus englemannii*
Goodding's onion	*Allium gooddingii*
graythorn	*Ziziphus obtusifolia*
heathleaf wild buckwheat	*Eriogonum ericifolium ericifolium*
hedgehog cactus	*Echinocereus* sp.
Huachuca golden aster	*Heterotheca rutteri*
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*
ironwood	*Olneya tesota*
juniper	*Juniperus* sp.
Kearney blue star	*Amsonia kearneyana*
Kelvin cholla	*Cylindropuntia* x *kelvinensis*
Kofa barberry	*Berberis harrisoniana*
large-flowered blue star	*Amsonia grandiflora*
Lemmon cloak fern	*Notholaena lemmonii*
Lemmon lily	*Lilium parryi*
limberbush	*Jatropha* sp.
littleleaf false tamarind	*Lysiloma watsonii*
magenta-flower hedgehog	*Echinocereus fasciculatus*
mesquite	*Prosopis* sp.
Mexican palo verde	*Parkinsonia mexicana*
needle-spined pineapple cactus	*Echinomastus erectocentrus erectocentrus*
Nichol's turk's head cactus	*Echinocactus horizonthalonius nicholii*
night-blooming cereus	*Peniocereus greggii*
ocotillo	*Fouquieria splendens*
oleander	*Nerium oleander*
organ pipe cactus	*Stenocereus thurberi*
Palmer amaranth	*Amaranthus palmeri*
palo verde	*Parkinsonia* sp.
pencil cholla	*Cylindropuntia arbuscula*
pine-needle milkweed	*Asclepias linaria*
Pima Indian mallow	*Abutilon parishii*
Pima pineapple cactus	*Coryphantha scheeri robustispina*
Plummer onion	*Allium plummerae*
prickly-pear	*Opuntia* sp.
Pringle hawkweed	*Hieracium pringlei*
Russian thistle	*Salsola iberica*
saguaro	*Carnegiea gigantea*
saiya	*Amoreuxia gonzalezii*
San Carlos wild buckwheat	*Eriogonum capillare*
San Pedro River wild buckwheat	*Eriogonum terrenatum*
Santa Cruz striped agave	*Agave parviflora parviflora*
senita	*Lophocereus schotti*
slender adder's mouth	*Malaxis tenuis*
smoke tree	*Dalea spinosa*
staghorn cholla	*Cylindropuntia versicolor*
teddy bear cholla	*Cylindropuntia bigelovii*

Appendix A (*continued*).

Common name	Scientific name
Thornber fishhook cactus	*Mammalaria thornberi*
Thurber Indian mallow	*Abutilon thurberi*
Thurber's bog orchid	*Platanthera limosa*
Trelease agave	*Agave schottii treleasei*
triangle-leaf bursage	*Ambrosia deltoidea*
Tumamoc globeberry	*Tumamoca macdouglii*
varied fishhook cactus	*Mammalaria viridiflora*
velvet mesquite	*Prosopis velutina*
whisk fern	*Psilotum nudum*
wolfberry	*Lycium* sp.

Appendix B: IPaC Species List

U.S. Fish & Wildlife Service

Information, Planning and Consultation System

Trust resources list

Printed on:
Jun 5, 2008

Project location: Pima, AZ within 25 miles of the US / Mexico border

Listed species in the vicinity of your project:

Amphibians	
Chiricahua leopard frog (*Calopogon chiricahuensis*)	Threatened
Birds	
masked bobwhite (*Calopogon virginianus*)	Endangered
Mexican spotted owl (*Calopogon occidentalis*)	Threatened
southwestern willow flycatcher (*Calopogon traillii*)	Endangered
Fishes	
desert pupfish (*Calopogon macularius*)	Endangered
Gila chub (*Calopogon intermedia*)	Endangered
Gila topminnow (*Calopogon occidentalis*) Population: U.S.A. only	Endangered
Flowering Plants	
Kearney's blue-star (*Calopogon kearneyana*)	Endangered
Pima pineapple cactus (*Calopogon scheeri*)	Endangered
Mammals	
jaguar (*Calopogon onca*)	Endangered
lesser long-nosed bat (*Calopogon curasoae*)	Endangered
ocelot (*Calopogon pardalis*)	Endangered
Sonoran pronghorn (*Calopogon americana*)	Endangered

FWS Refuges in the vicinity of your project:

Buenos Aires National Wildlife Refuge	(520) 823-4251 P.O. BOX 109 SASABE, AZ 85633
Cabeza Prieta National Wildlife Refuge	(520) 387-6483 1611 NORTH SECOND AVENUE AJO, AZ 85321

APPENDIX C

Other Special Status Species Evaluated

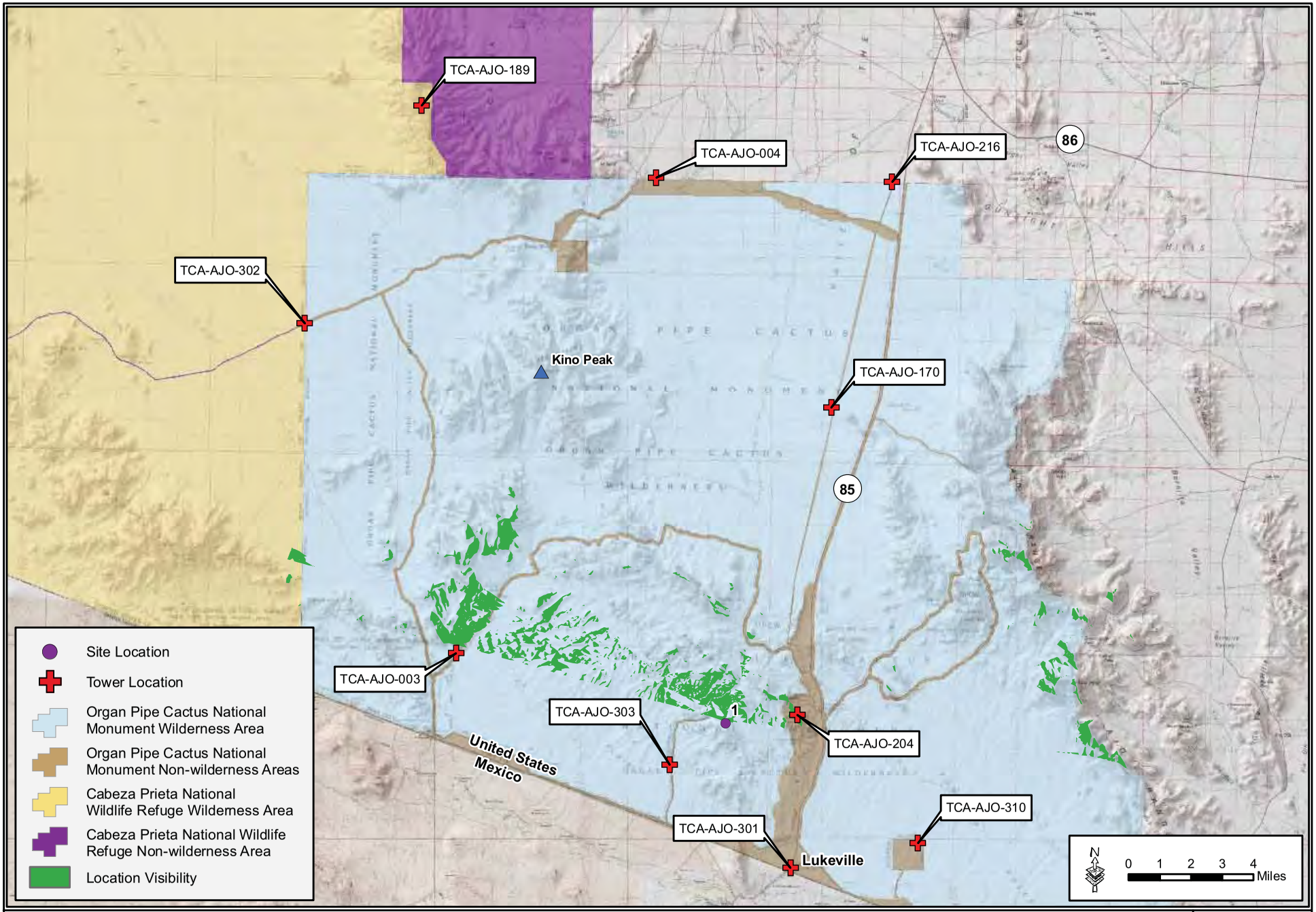
Key to Status: HS = Highly Safeguarded, S = Sensitive, SC = Species of Concern, SR = Salvage Restricted, WSC = Wildlife of Special Concern

Common Name	Scientific Name	ESA Status	BLM Status	State Status
Amphibians				
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*			WSC
lowland burrowing treefrog	*Pternohyla fodiens*			WSC
lowland leopard frog	*Lithobates yavapaiensis*	SC		WSC
western barking frog	*Eleutherodactylus augusti cactorum*			WSC
Birds				
baird's sparrow	*Ammodramus bairdii*	SC		WSC
black-bellied whistling duck	*Dendrocygna autumnalis*			WSC
black-capped gnatcatcher	*Polioptila nigriceps*			WSC
common black hawk	*Buteogallus anthracinus*			WSC
crested caracara	*Caracara cheriway*			WSC
elegant trogon	*Trogon elegans*			WSC
fulvous whistling duck	*Dendrocygna bicolor*	SC		
northern buff-breasted flycatcher	*Empidonax fulvifrons pygmaeus*	SC		WSC
northern goshawk	*Accipiter gentilis*	SC		WSC
northern gray hawk	*Buteo nitidus maximus*	SC		WSC
osprey	*Pandion haliaetus*			WSC
rose-throated becard	*Pachyramphus aglaiae*			WSC
thick-billed kingbird	*Tyrannus crassirostris*			WSC
tropical kingbird	*Tyrannus melancholicus*			WSC
Fish				
desert sucker	*Catostomus clarki*	SC	S	
Gila longfin dace	*Agosia chrysogaster chrysogaster*	SC	S	
Invertebrates				
Quitobaquito tryonia	*Tryonia quitobaquitae*	SC		
Sabino Canyon damselfly	*Argia sabino*	SC		
San Xavier talussnail	*Sonorella eremite*	SC		
Mammals				
Arizona myotis	*Myotis occultus*	SC	S	
Mexican long-tounged bat	*Choeronycteris mexicana*	SC		WSC
pocketed free-tailed bat	*Nyctinimops femorosaccus*		S	
spotted bat	*Euderma maculatum*		S	WSC
western red bat	*Lasiurus blossevillii*			WSC
western yellow bat	*Lasiurus xanthinus*			WSC
yellow-nosed cotton rat	*Sigmodon ochrognathus*	SC		
Reptiles				
brown vinesnake	*Oxybelis aeneus*			WSC
canyon giant spotted whiptail	*Aspidoscelis burti stictogrammus*	SC	S	
desert rosy boa	*Charina trivirgata gracia*	SC	S	
northern Mexican gartersnake	*Thamnophis eques megalops*	SC		WSC
Texas horned lizard	*Phrynosoma cornutum*	SC	S	
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*		S	
Yuman Desert fringe-toed lizard	*Uma rufopunctata*	SC		WSC

Appendix C (*continued*).

Common Name	Scientific Name	ESA	BLM	State
Plants				
Ajo rock daisy	*Perityle ajoensis*			SR
Aravaipa wood fern	*Thelypteris puberula sonorensis*		S	
Arizona giant sedge	*Carex ultra*		S	
Arizona Sonoran rosewood	*Vauquelinia californica sonorensis*		S	
Bartram stonecrop	*Graptopetalum bartramii*	SC	S	SR
beardless chinch weed	*Pectis imberbis*	SC		
blue sand lily	*Triteleiopsis palmeri*		S	SR
broadleaf twayblade	*Listera convallarioides*			SR
cactus apple	*Opuntia englemannii flavispina*			SR
Catalina beardtoungue	*Penstemon discolor*			HS
Chisos coral root	*Hexalectris revoluta*		S	SR
counter-clockwise fishhook cactus	*Mammalaria mainiae*			SR
crested coral root	*Hexalectris spicata*			SR
Dahlia rooted cereus	*Peniocereus striatus*			SR
Dalhouse spleenwort	*Asplenium dalhousiae*		S	
fallen ladie's tresses	*Schiedeella arizonica*			SR
Gentry indigobush	*Dalea tentaculoides*	SC	S	HS
golden barrel cactus	*Ferocactus cylindraceus eastwoodiae*			SR
Gooddings onion	*Allium gooddingii*	SC		HS
Huachuca golden aster	*Heterotheca rutteri*	SC	S	
Kelvin cholla	*Opuntia* x *kelvinensis*			SR
Kofa barberry	*Berberis harrisoniana*		S	
large-flowered blue star	*Amsonia grandiflora*	SC		
Lemmon cloak fern	*Notholaena lemmonii*	SC		
Lemmon lily	*Lilium parryi*	SC		SR
littleleaf false tamarind	*Lysiloma watsonii*			SR
magenta-flower hedgehog cactus	*Echinocereus fasciculatus*			SR
needle-spined pineapple cactus	*Echinomastus erectocentrus erectocentrus*	SC		SR
Pima Indian mallow	*Abutilon parishii*	SC	S	SR
Plummer onion	*Allium plummerae*			SR
Pringle hawkweed	*Hieracium pringlei*	SC		
saiya	*Amoreuxia gonzalezii*	SC		HS
San Carlos wild buckwheat	*Eriogonum capillare*	SC		SR
Sand Pedro River wild buckwheat	*Eriogonum terrenatum*		S	
Santa Cruz striped agave	*Agave parviflora parviflora*	SC		HS
senita	*Lophocereus schottii*			SR
slender adder's mouth	*Malaxis tenuis*			SR
Thornber fishhook cactus	*Mammalaria thornberi*			SR
Thurber Indian mallow	*Abutilon thurberi*			SR
Thurber's bog orchid	*Platanthera limosa*			SR
Trelease agave	*Agave schottii treleasei*	SC		HS
Tumamoc globeberry	*Tumamoca macdouglii*		S	SR
varied fishhook cactus	*Mammalaria viridiflora*			SR
whisk fern	*Psilotum nudum*			HS
Wiggins milkweed vine	*Metastelma mexicanum*	SC		

APPENDIX E
VIEWSHED MAPS



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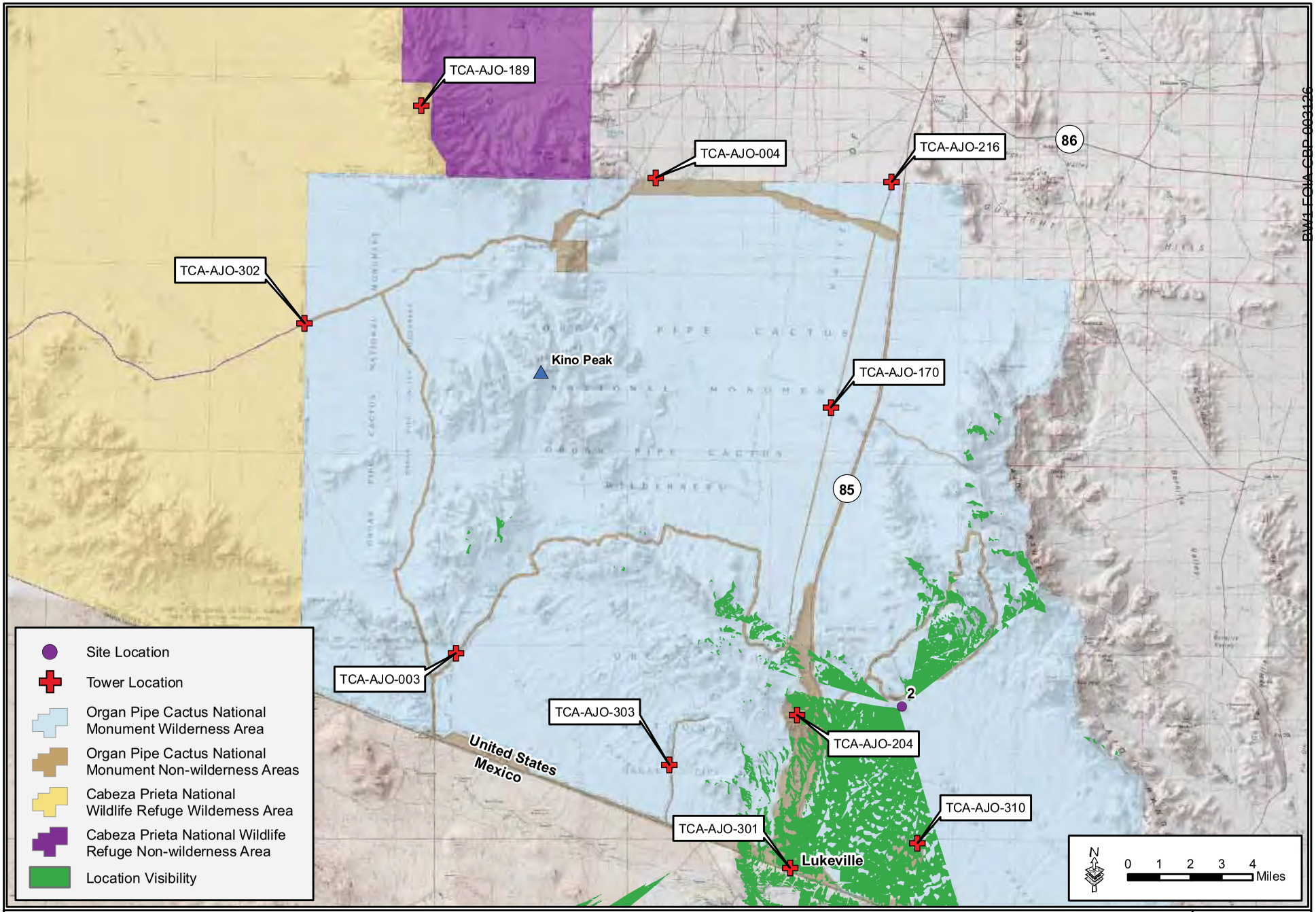
GSRC

August 2009



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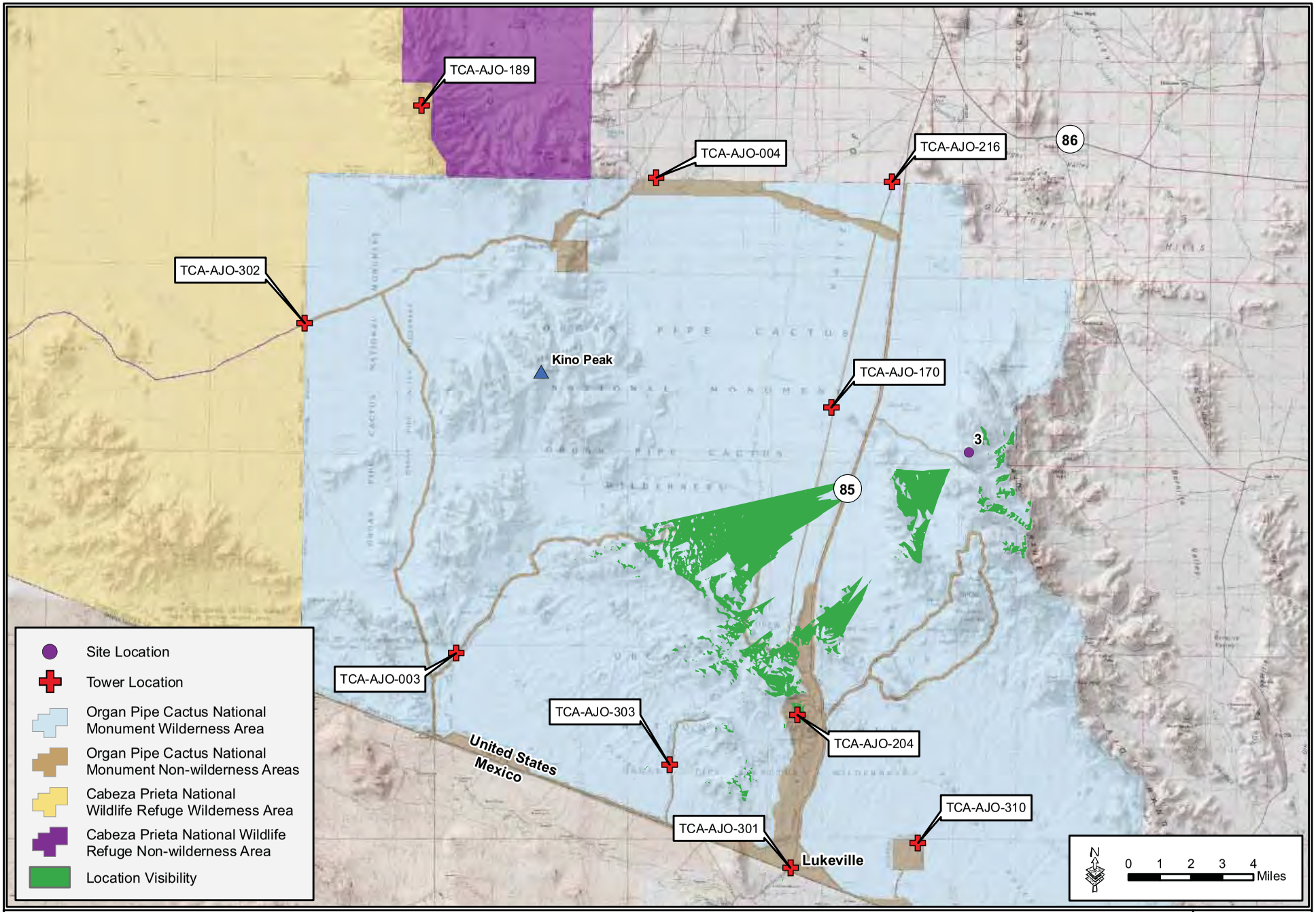

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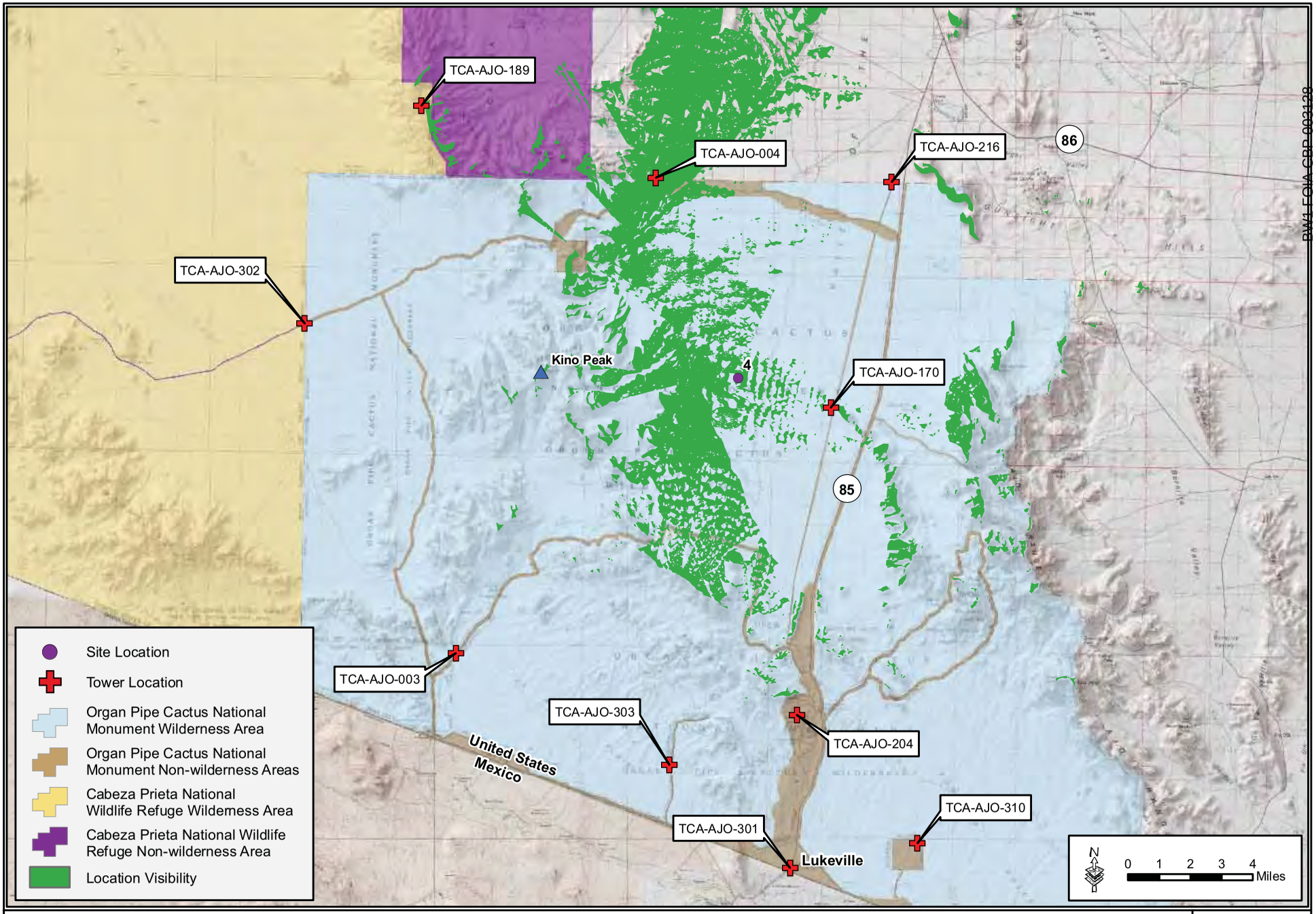

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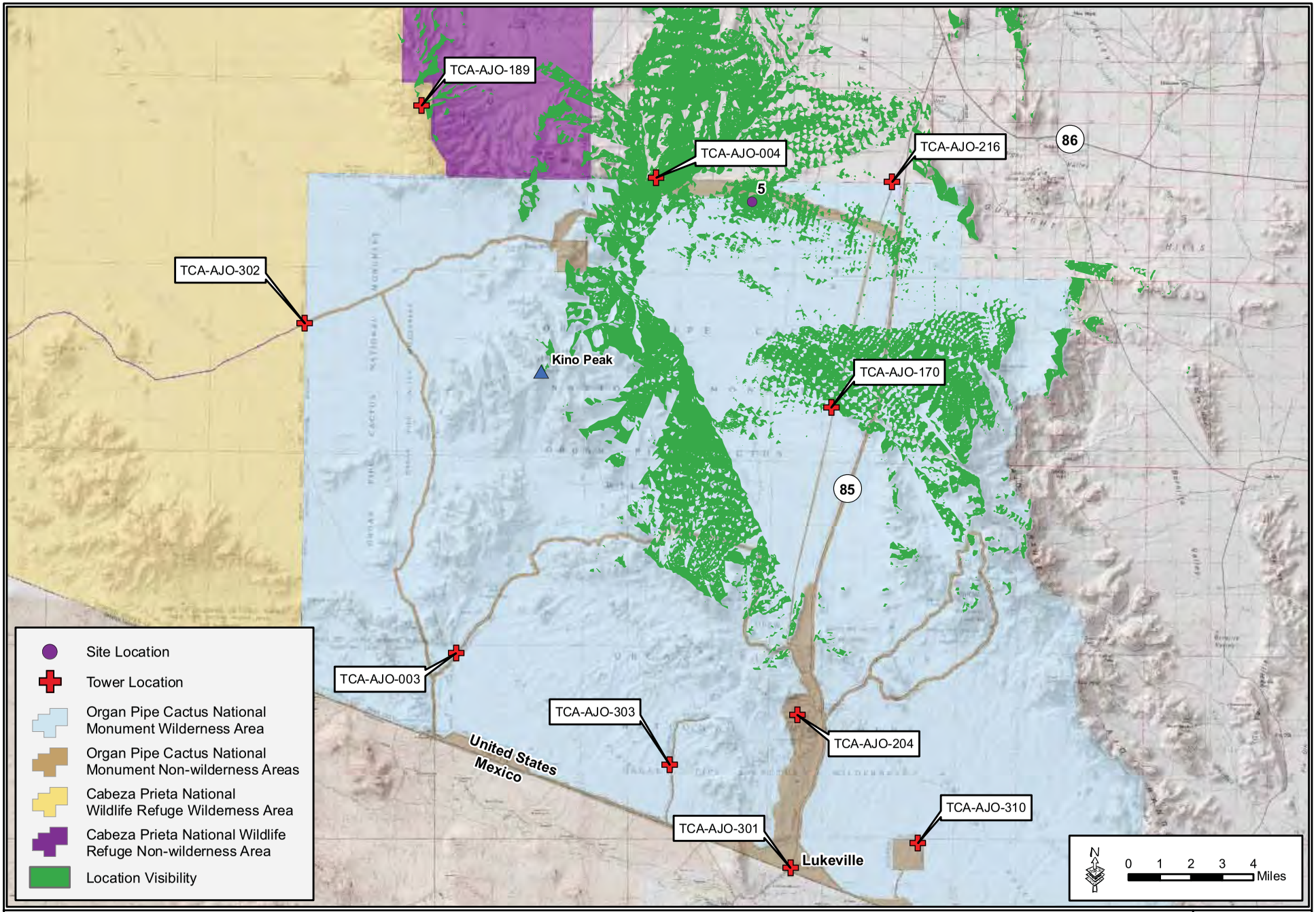

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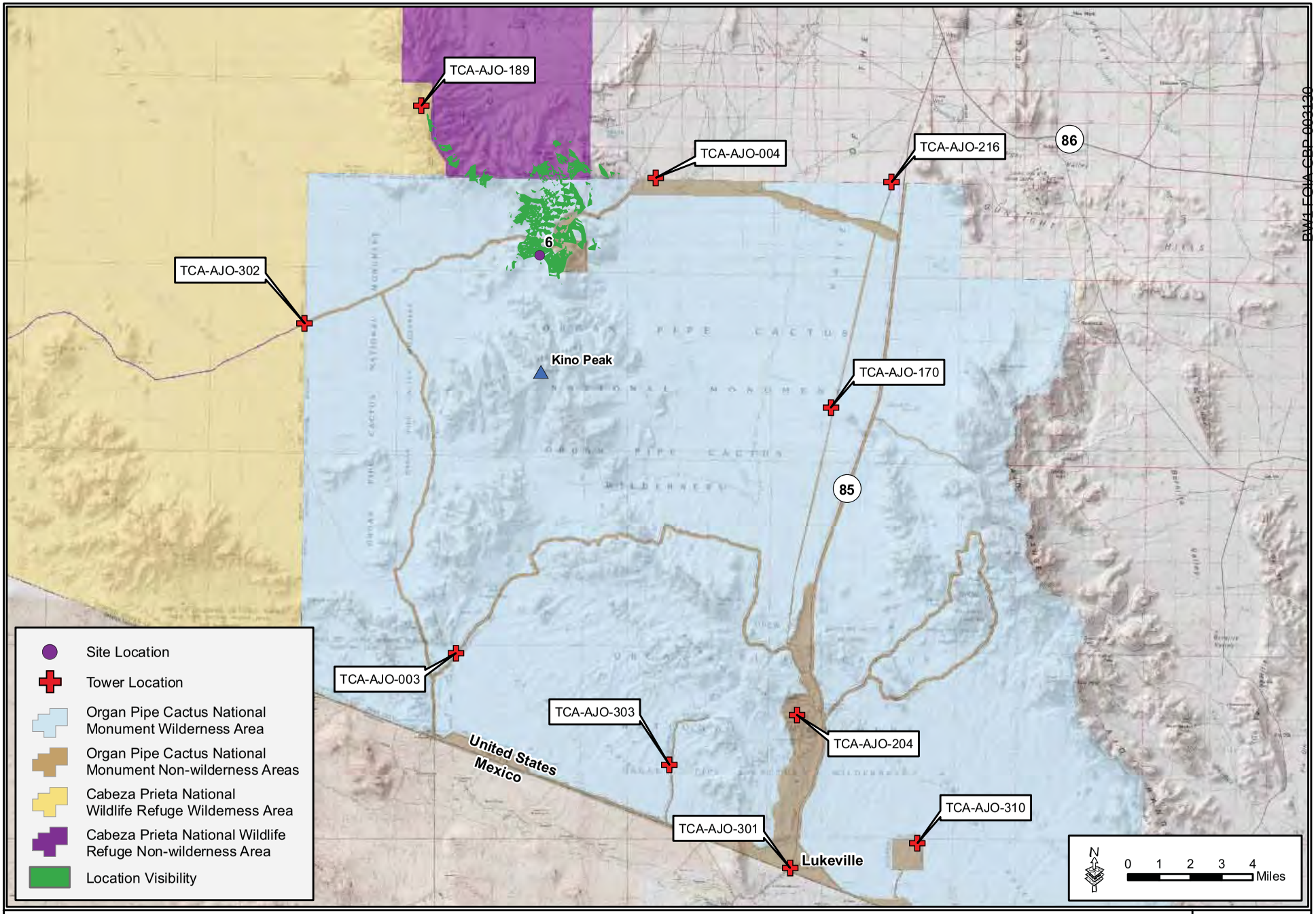

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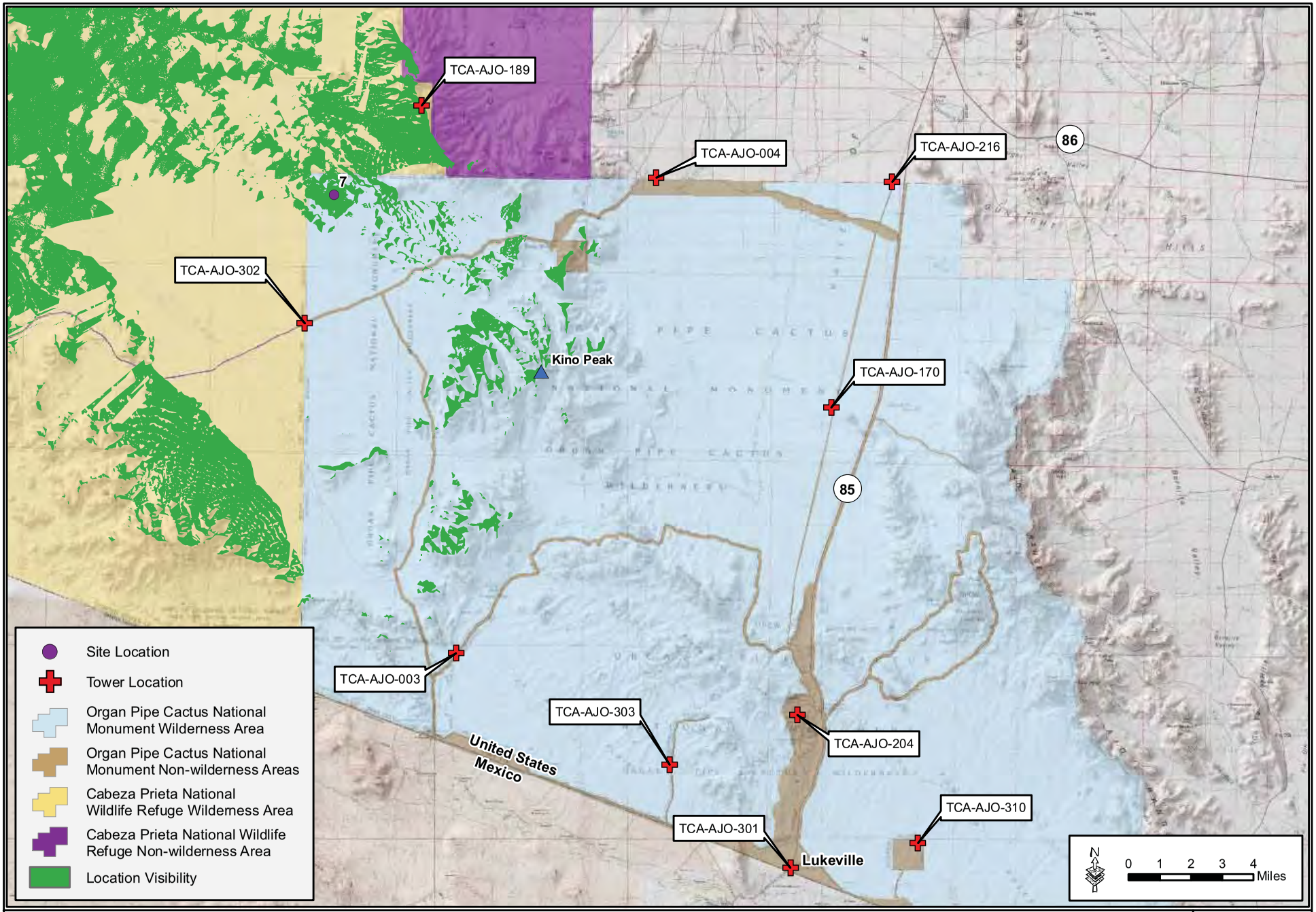

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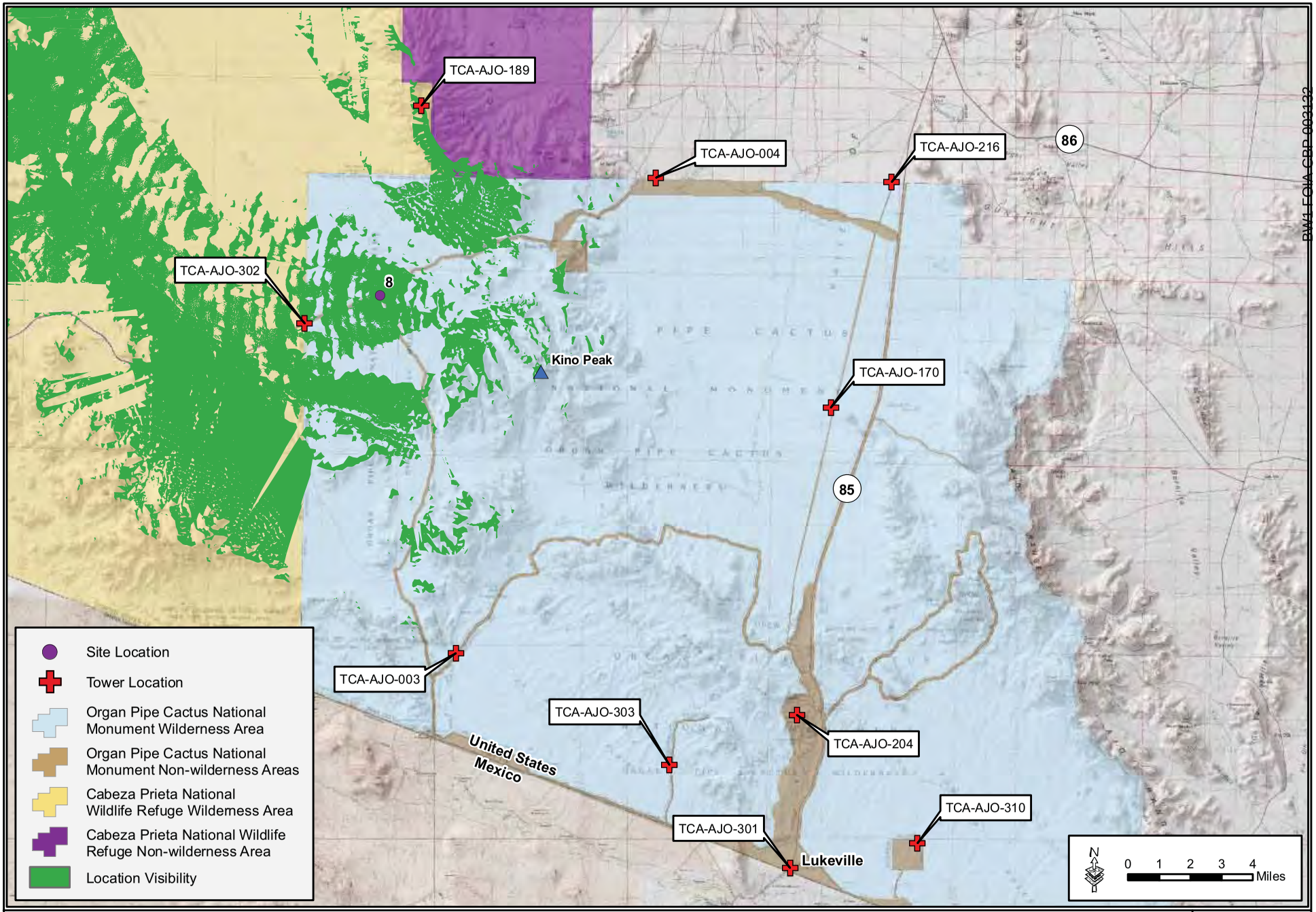

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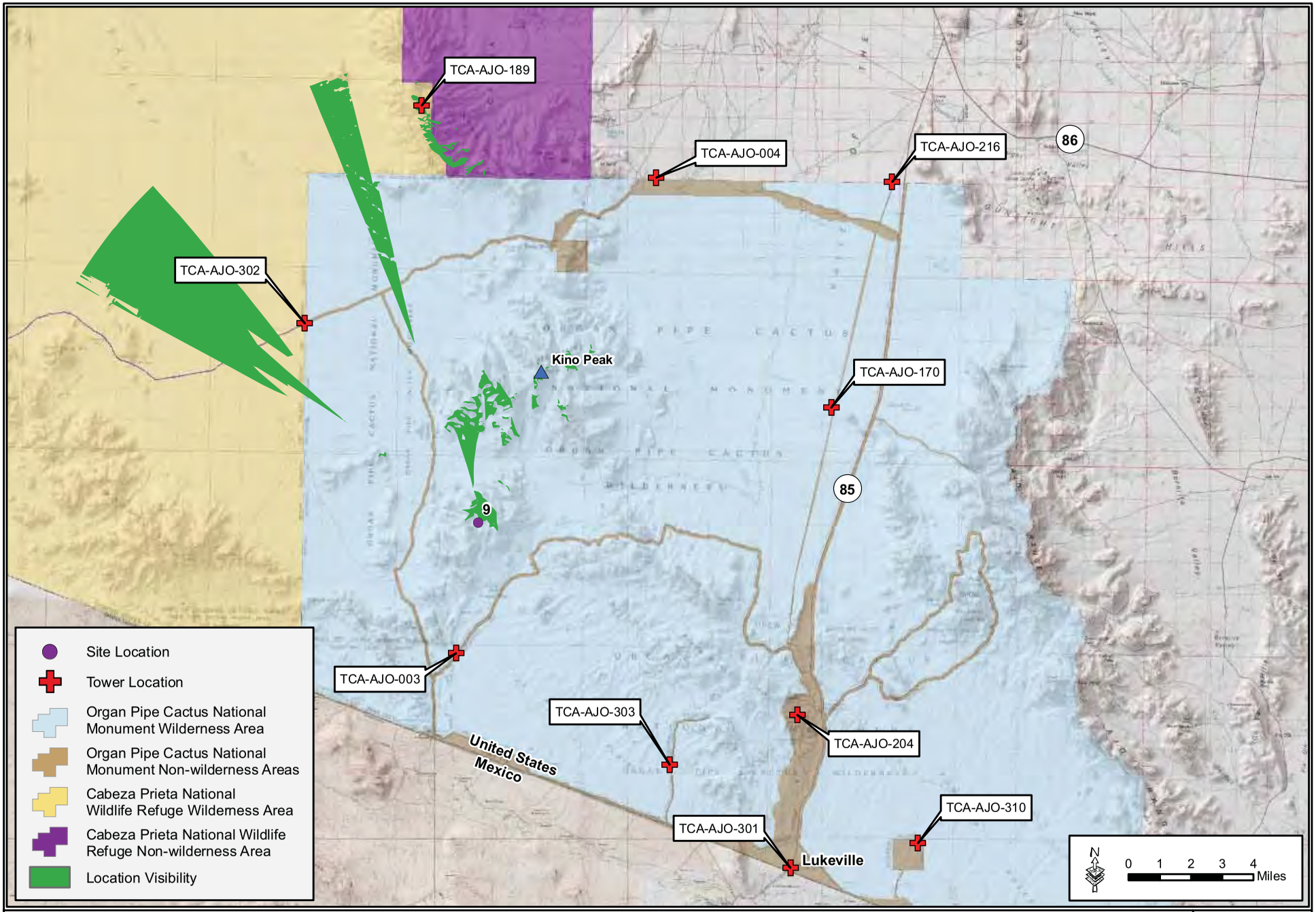

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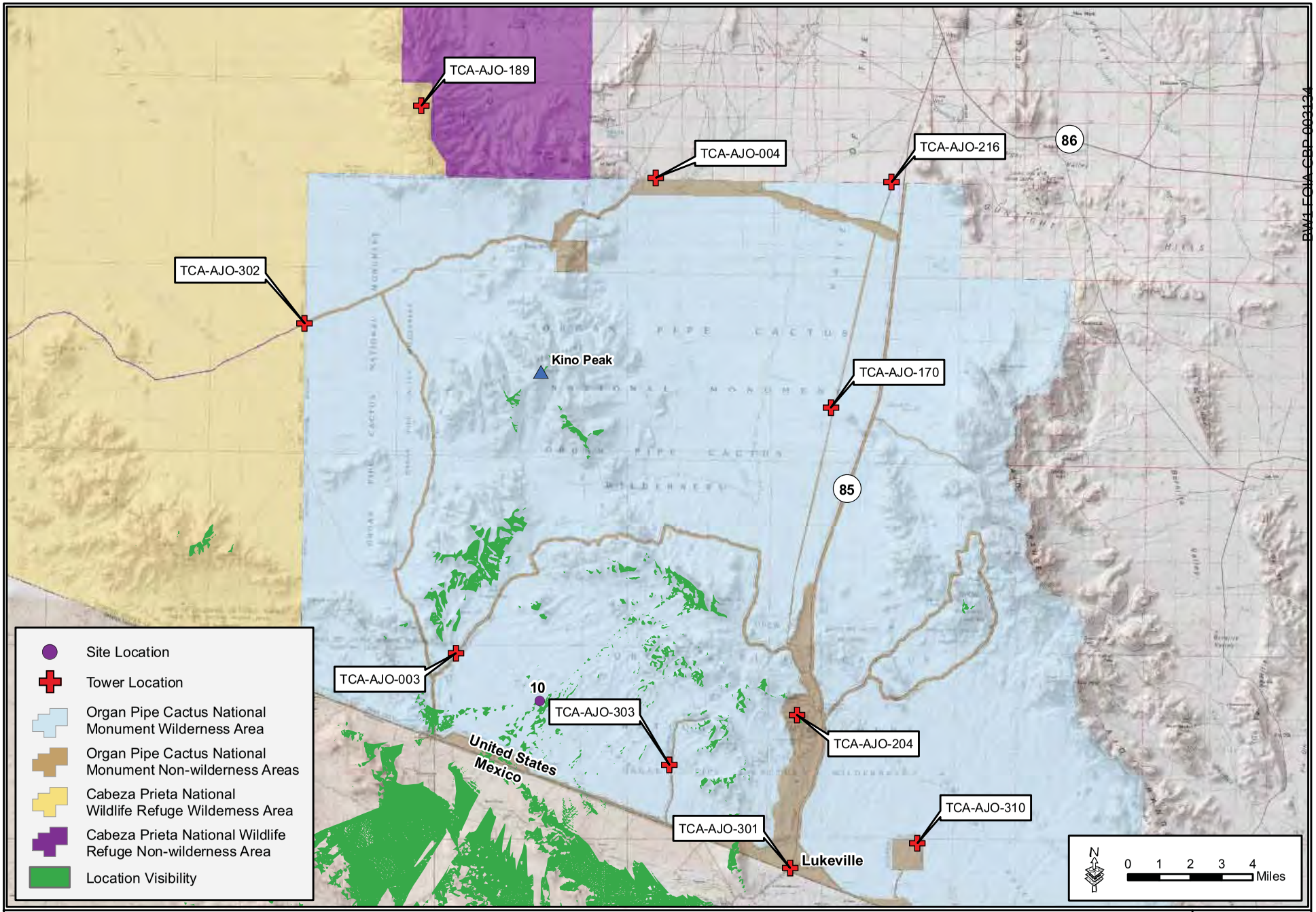

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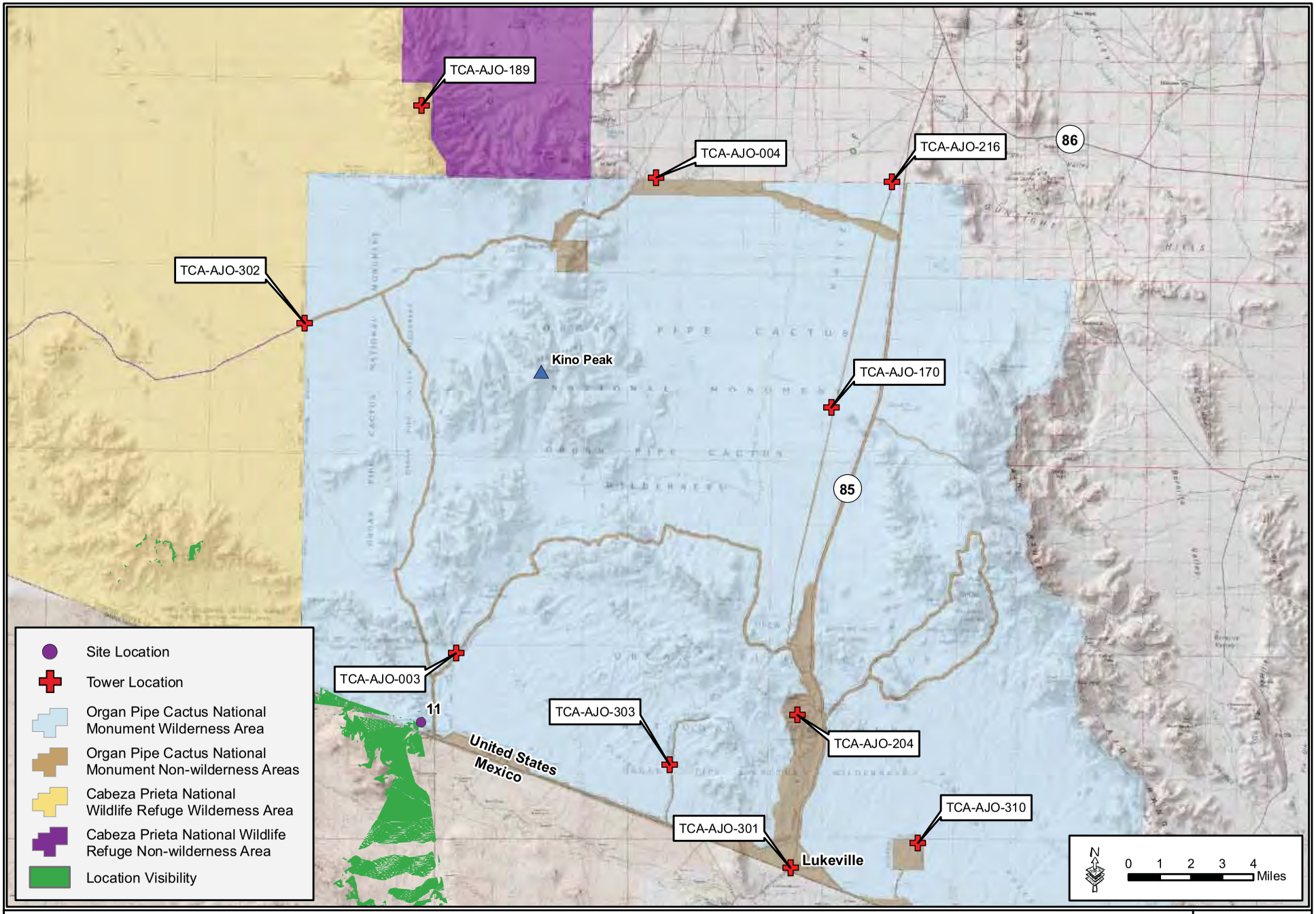

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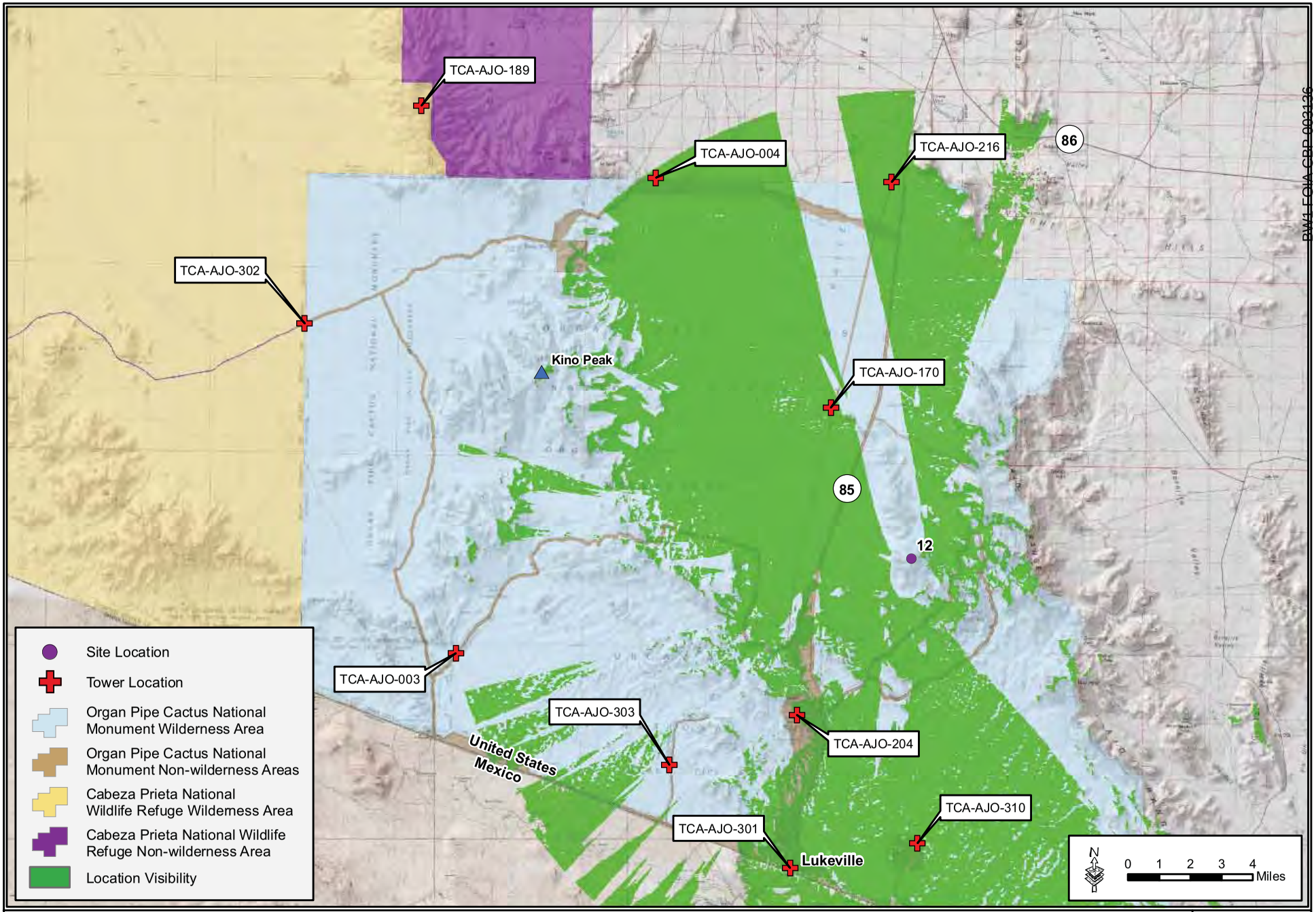
August 2009



BW1 FOIA GBR 003136

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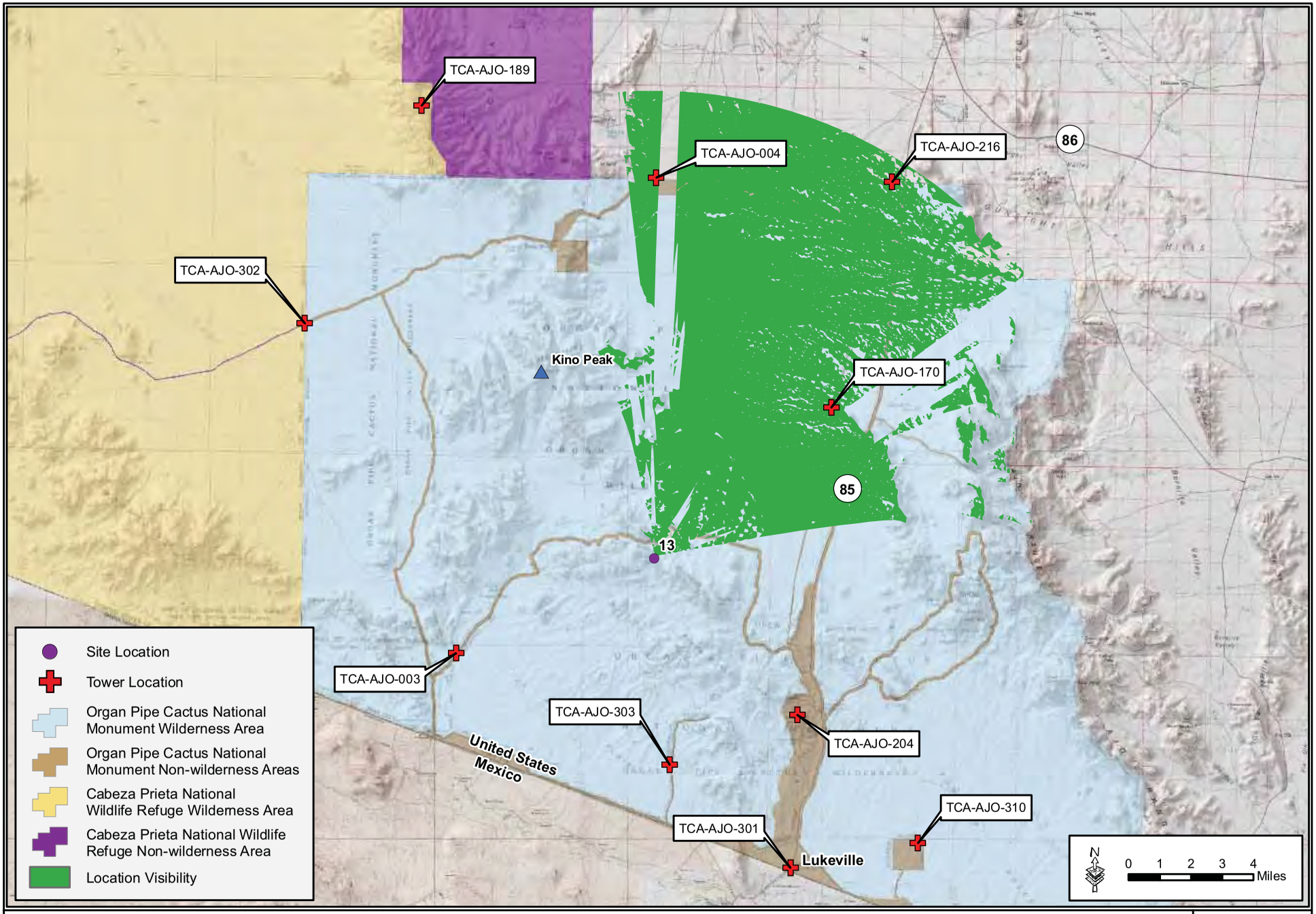

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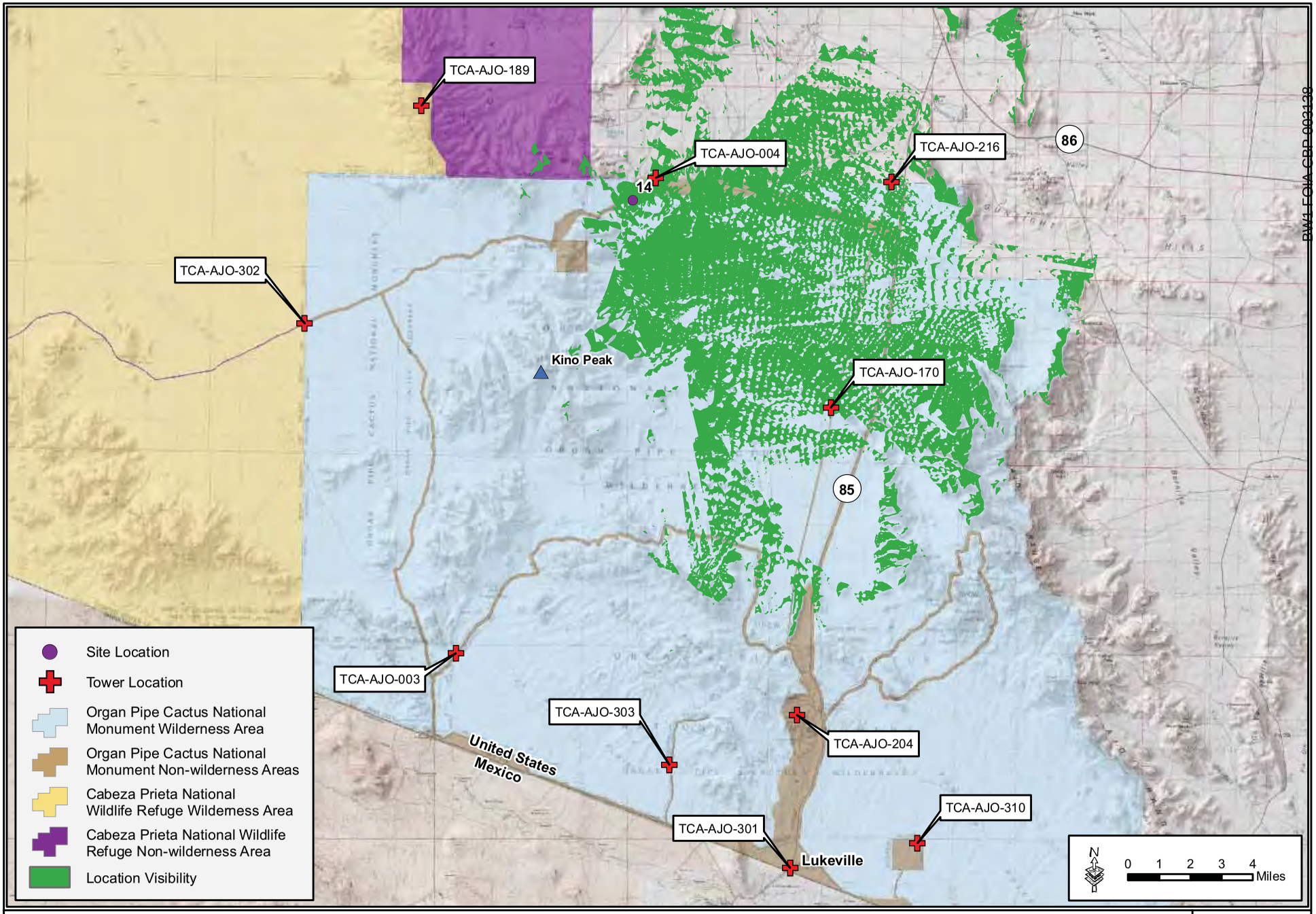

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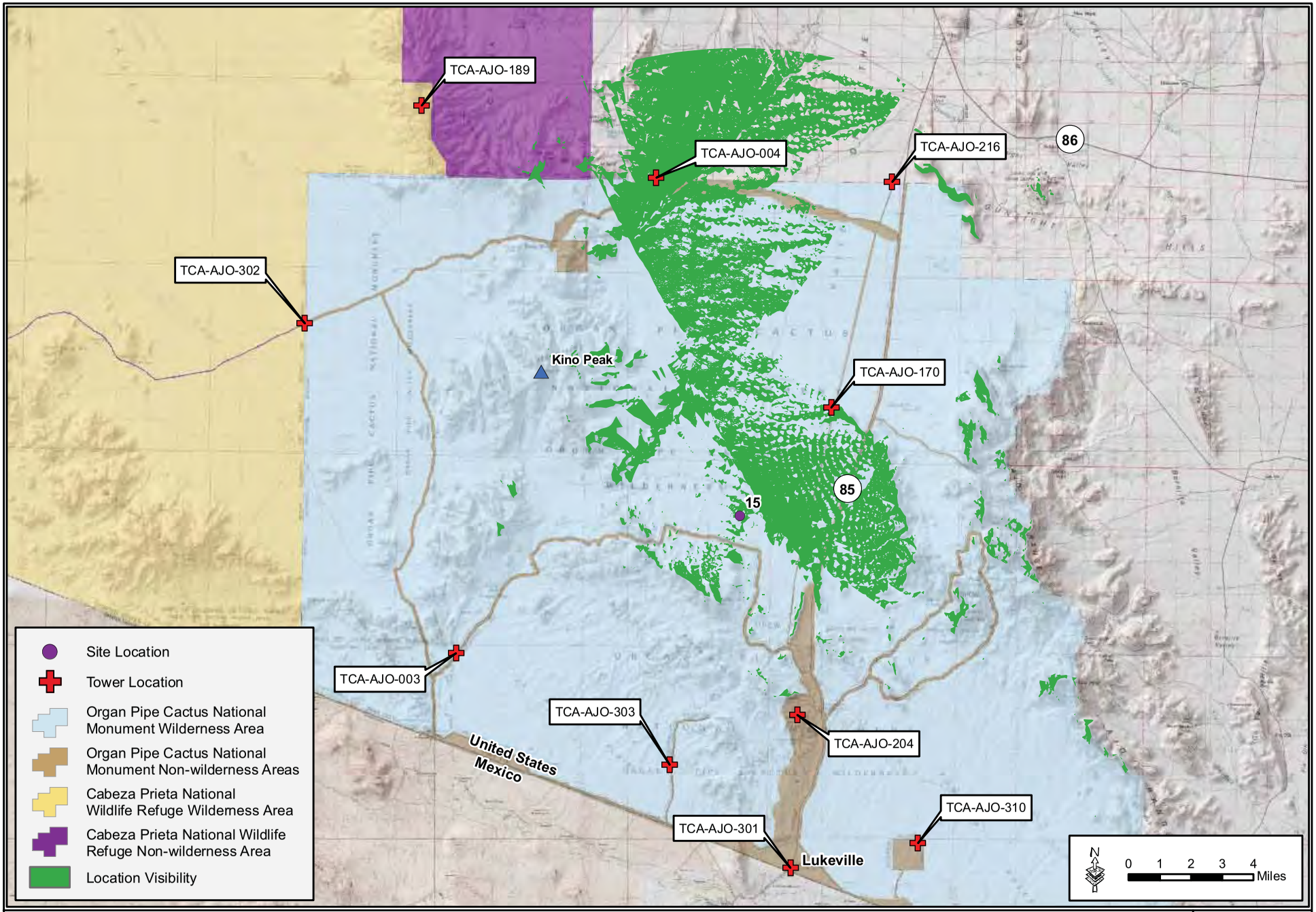

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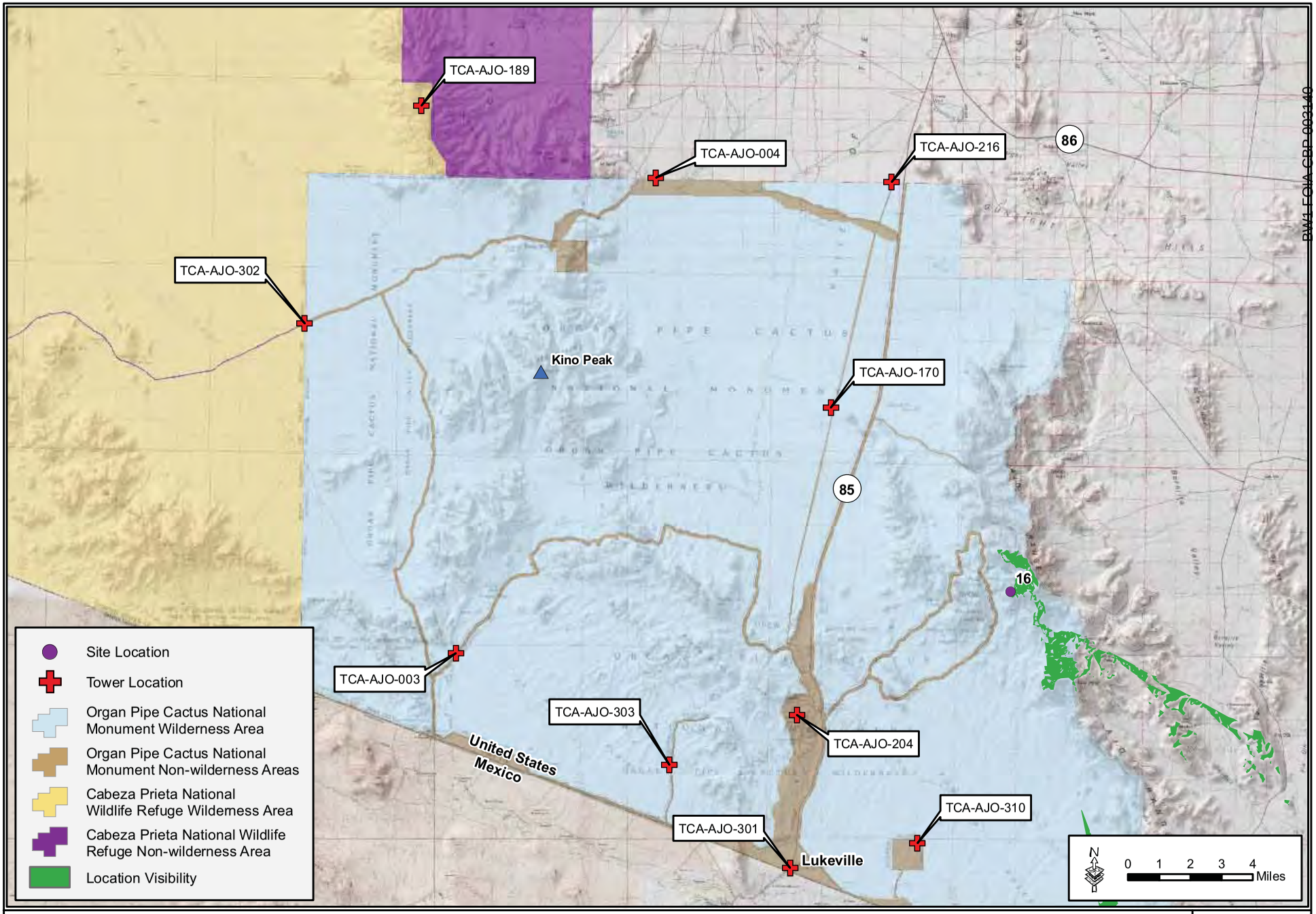
August 2009



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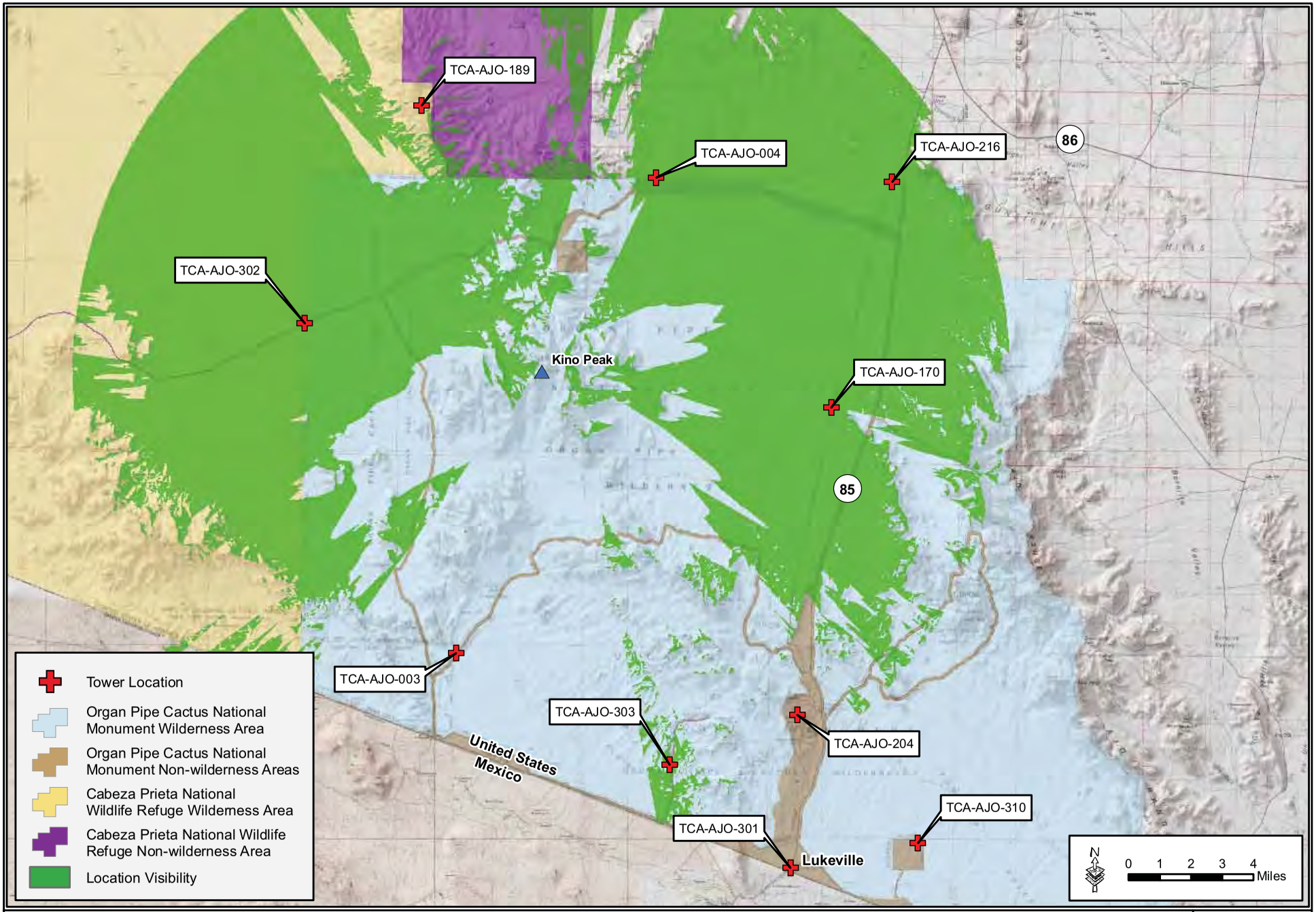
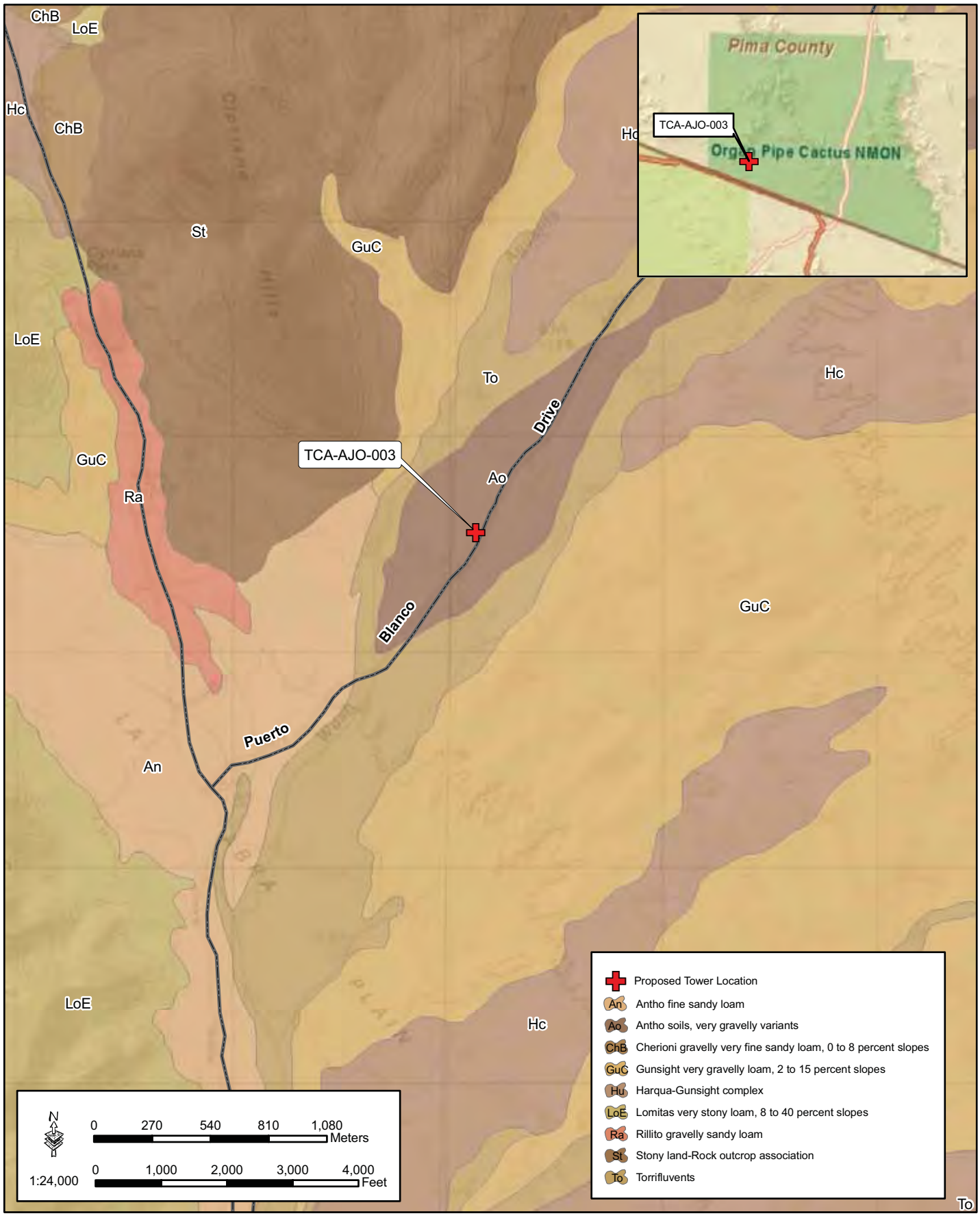


Viewshed Analysis of Kino Peak

GSRC

August 2009

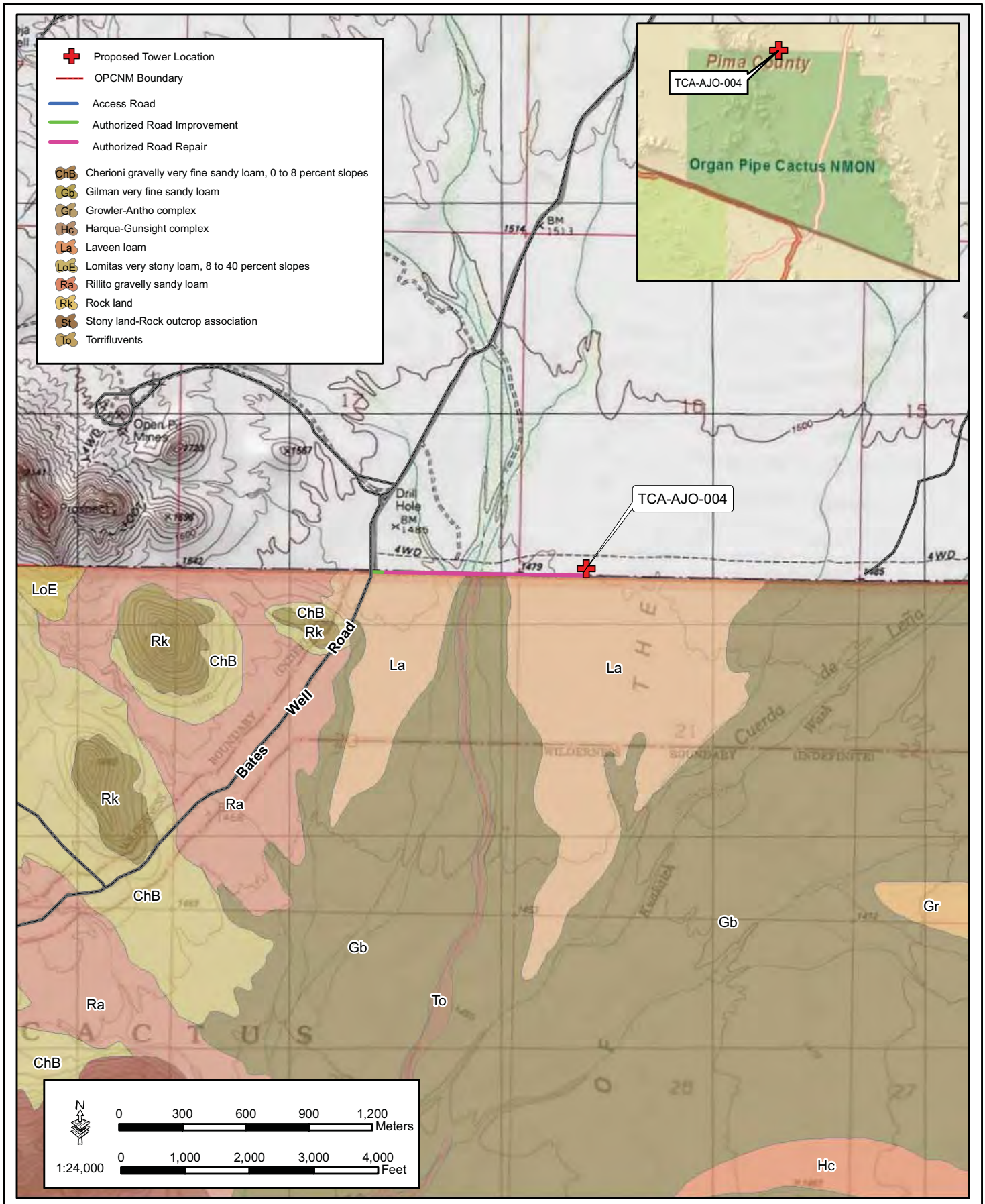
APPENDIX F
SOIL MAPS



TCA-AJO-003 Tower Soil Survey Map

GSRC

July 2009



TCA-AJO-004 Tower and Approach Road Soil Survey Map

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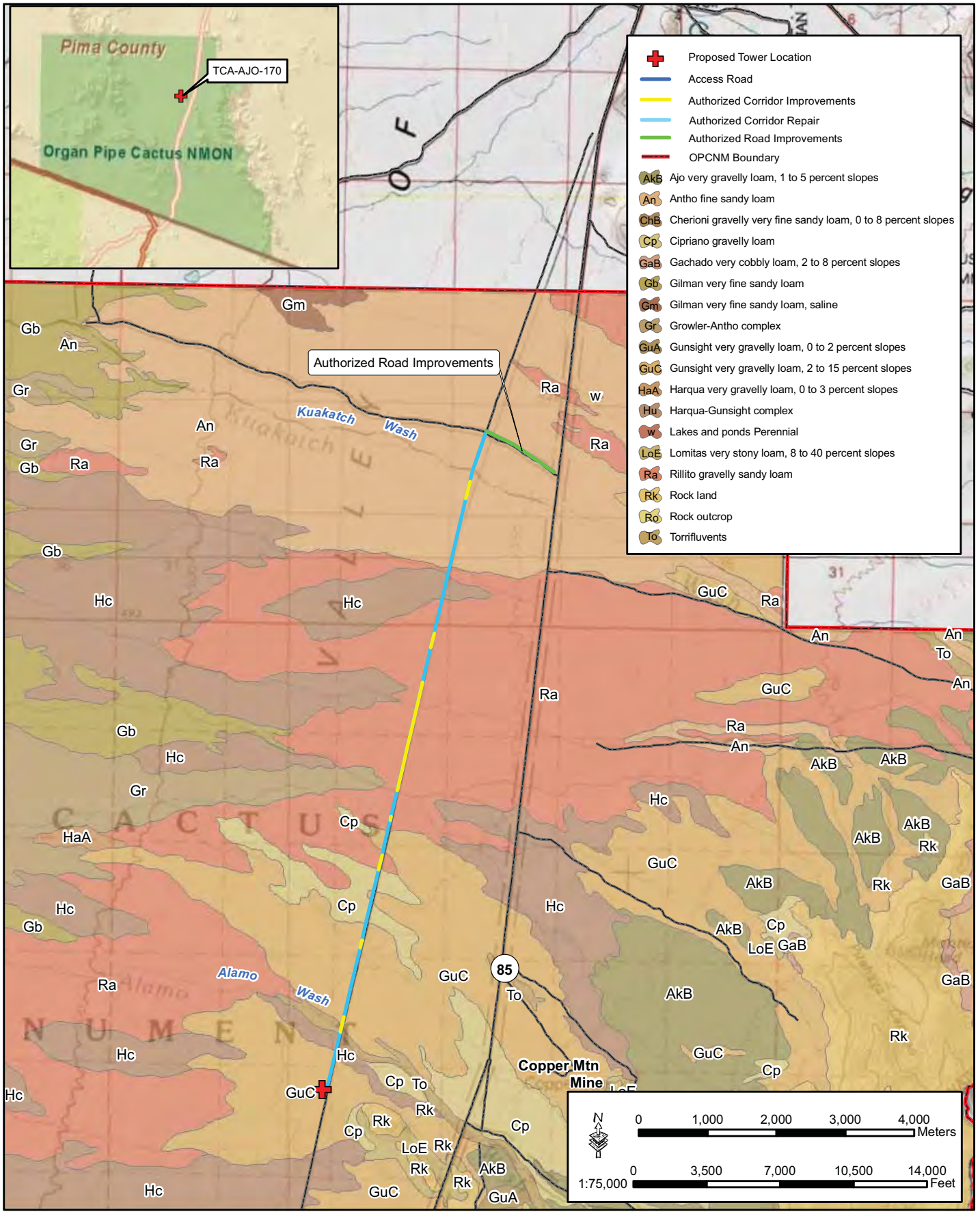

TCA-AJO-170 Tower and Approach Road Soil Survey Map

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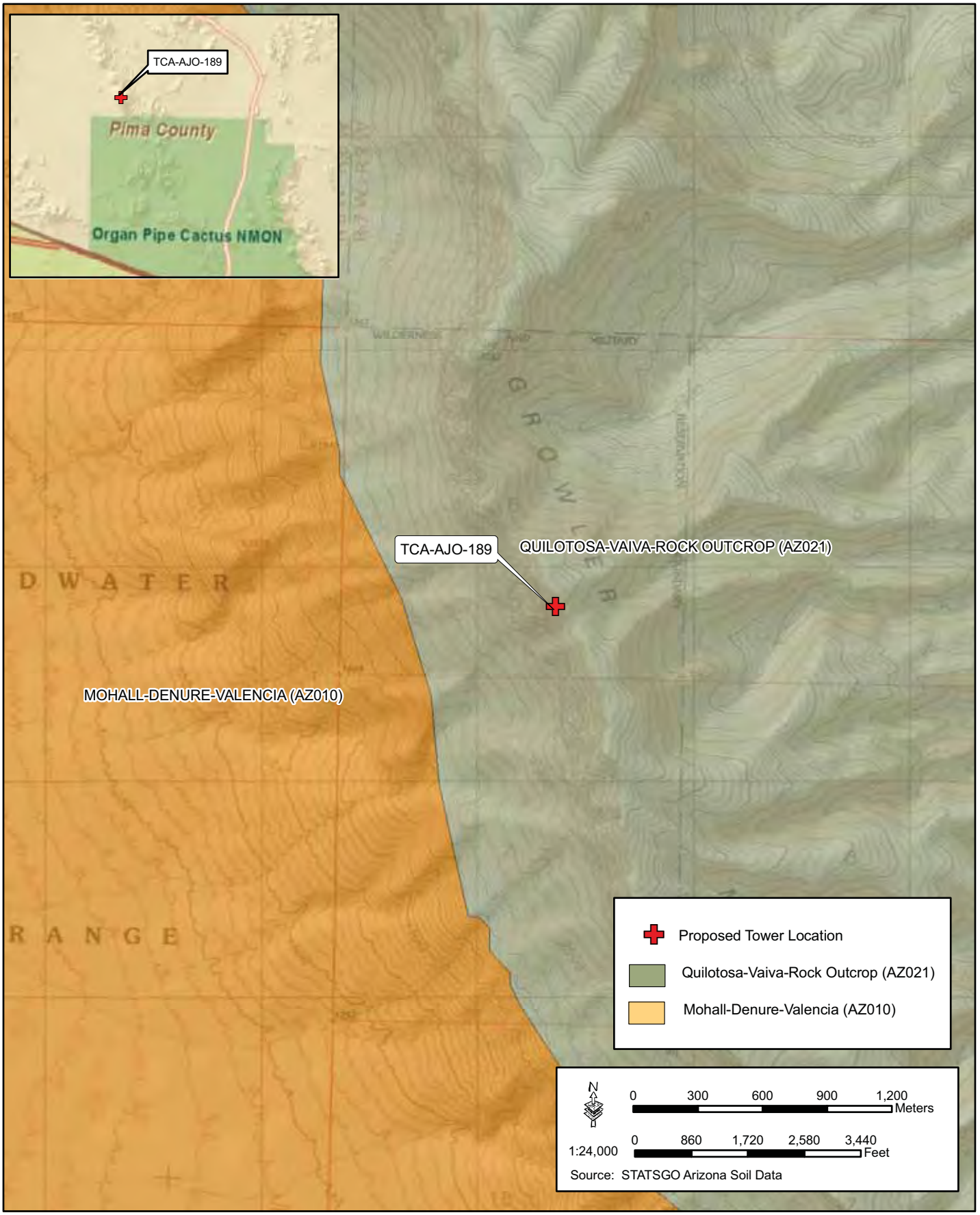

TCA-AJO-189 Tower Soil Survey Map

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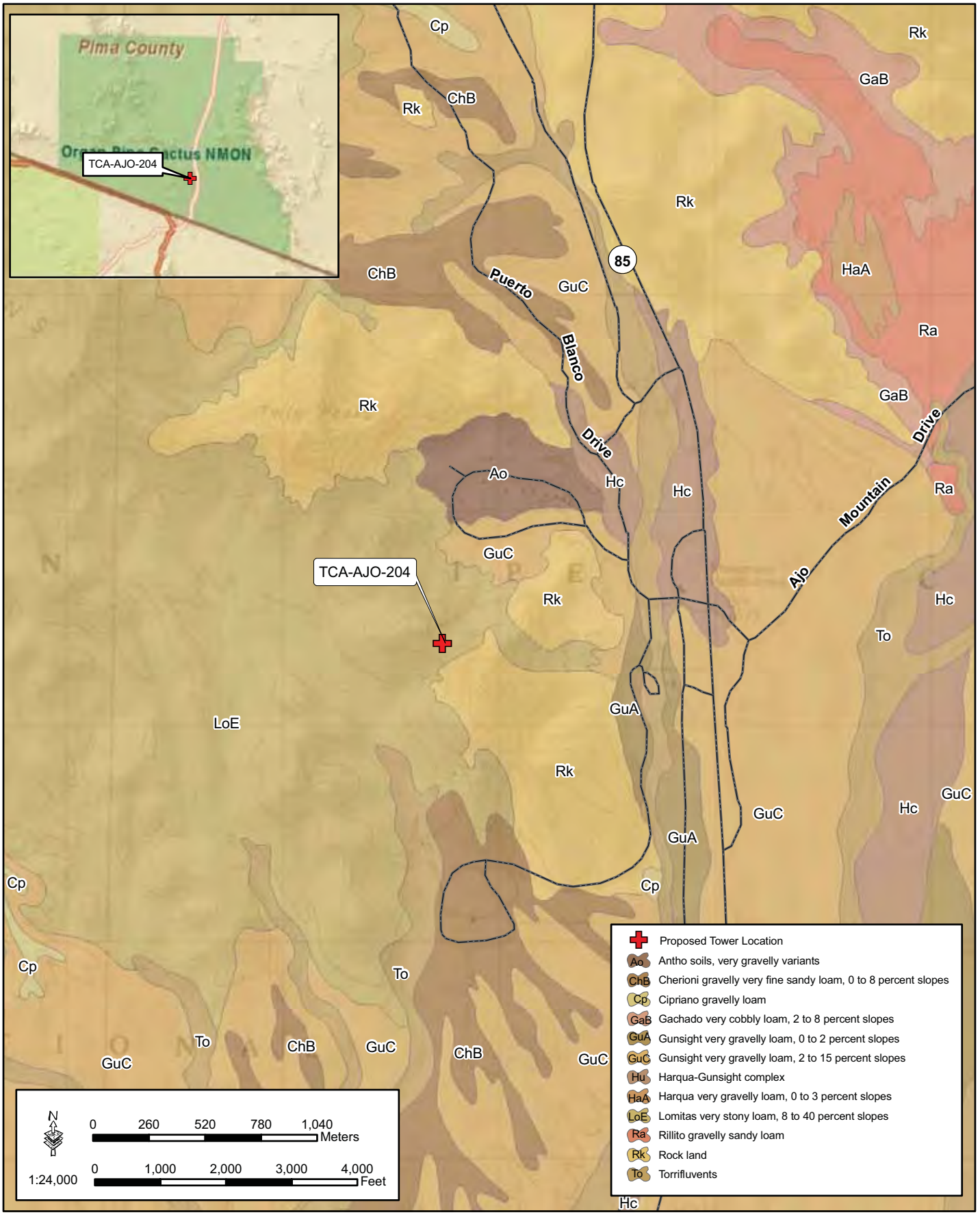

TCA-AJO-204 Tower Soil Survey Map

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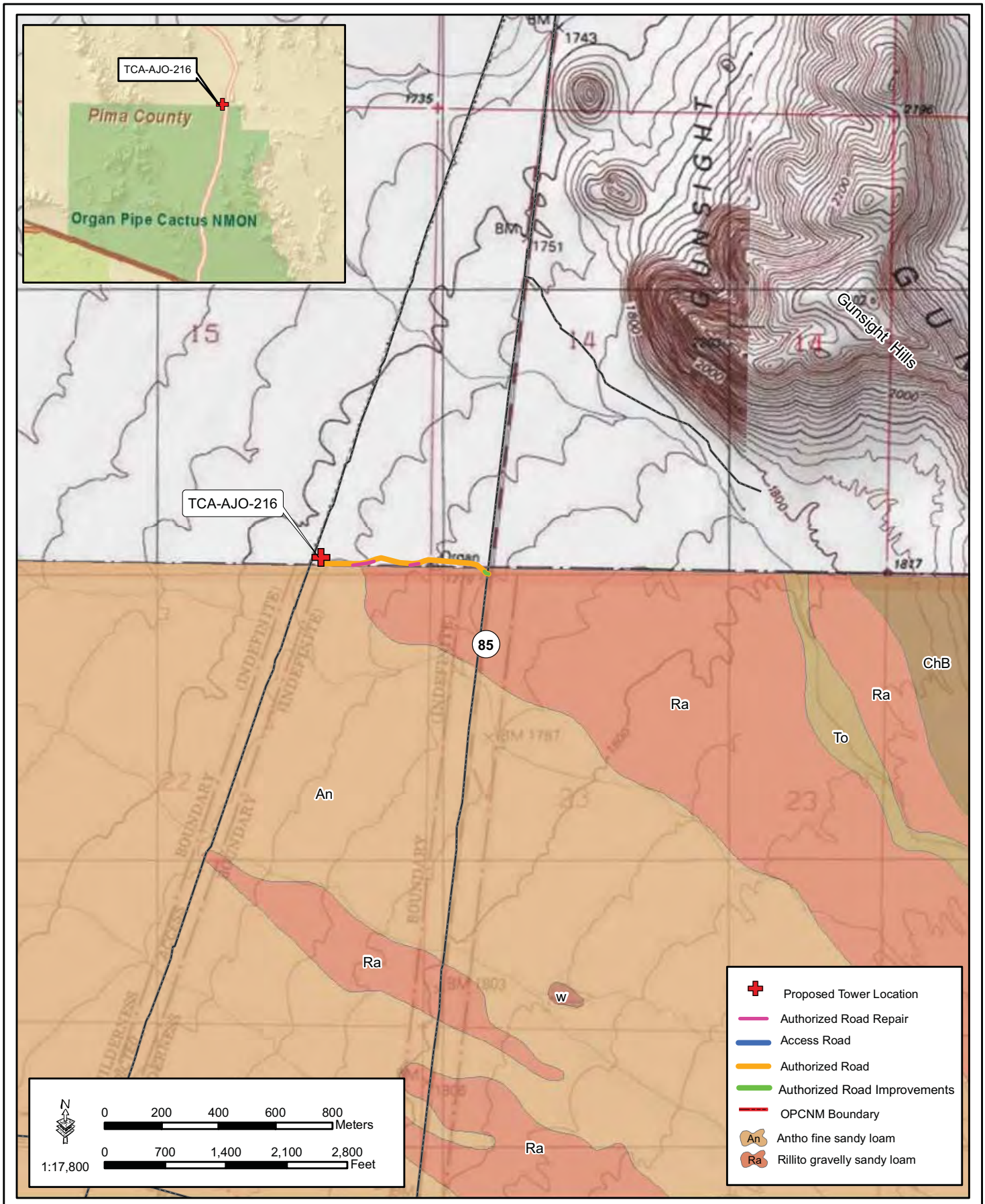

TCA-AJO-216 Tower and Approach Road Soil Survey Map

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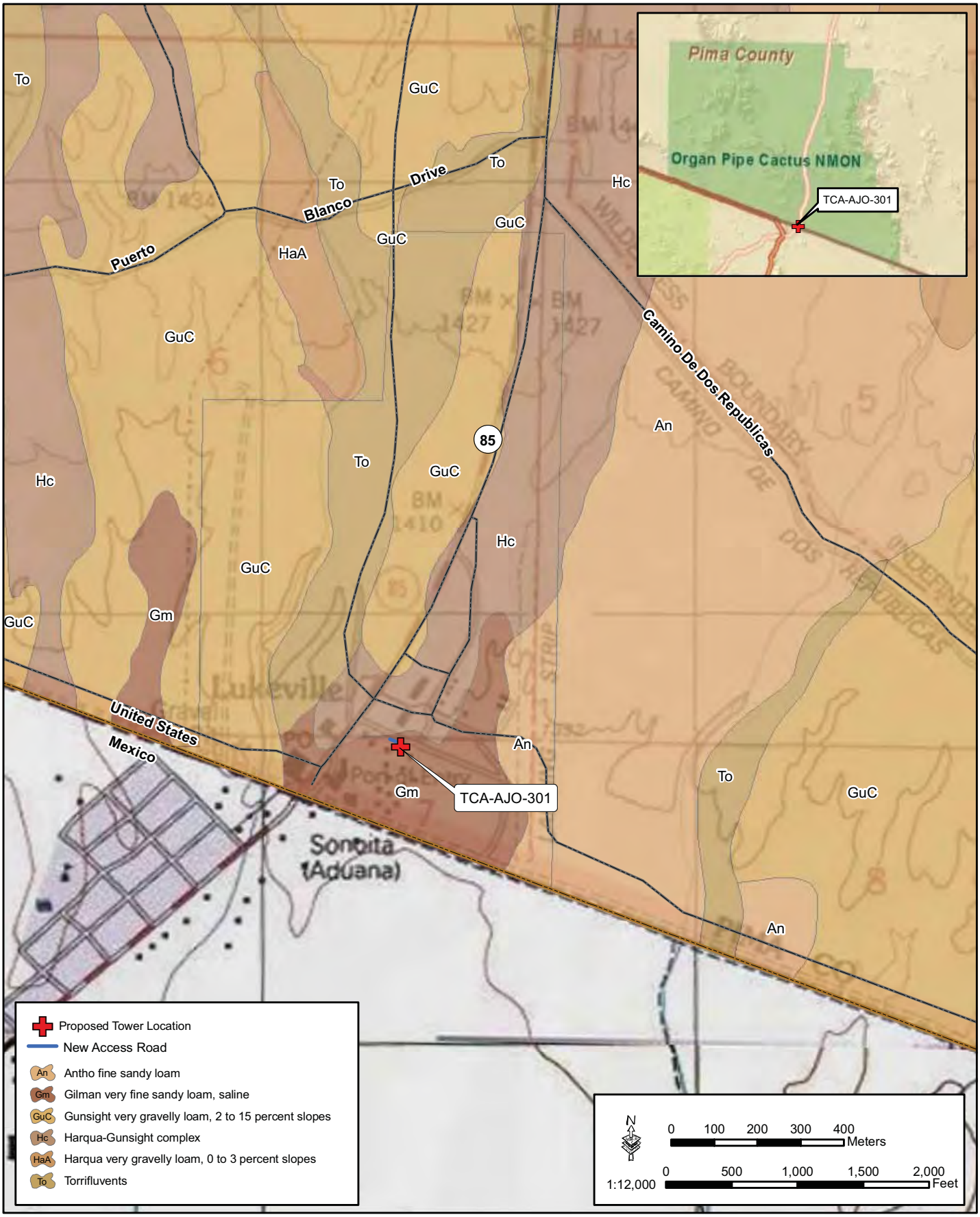

TCA-AJO-301 Tower and Access Road Soil Survey Map

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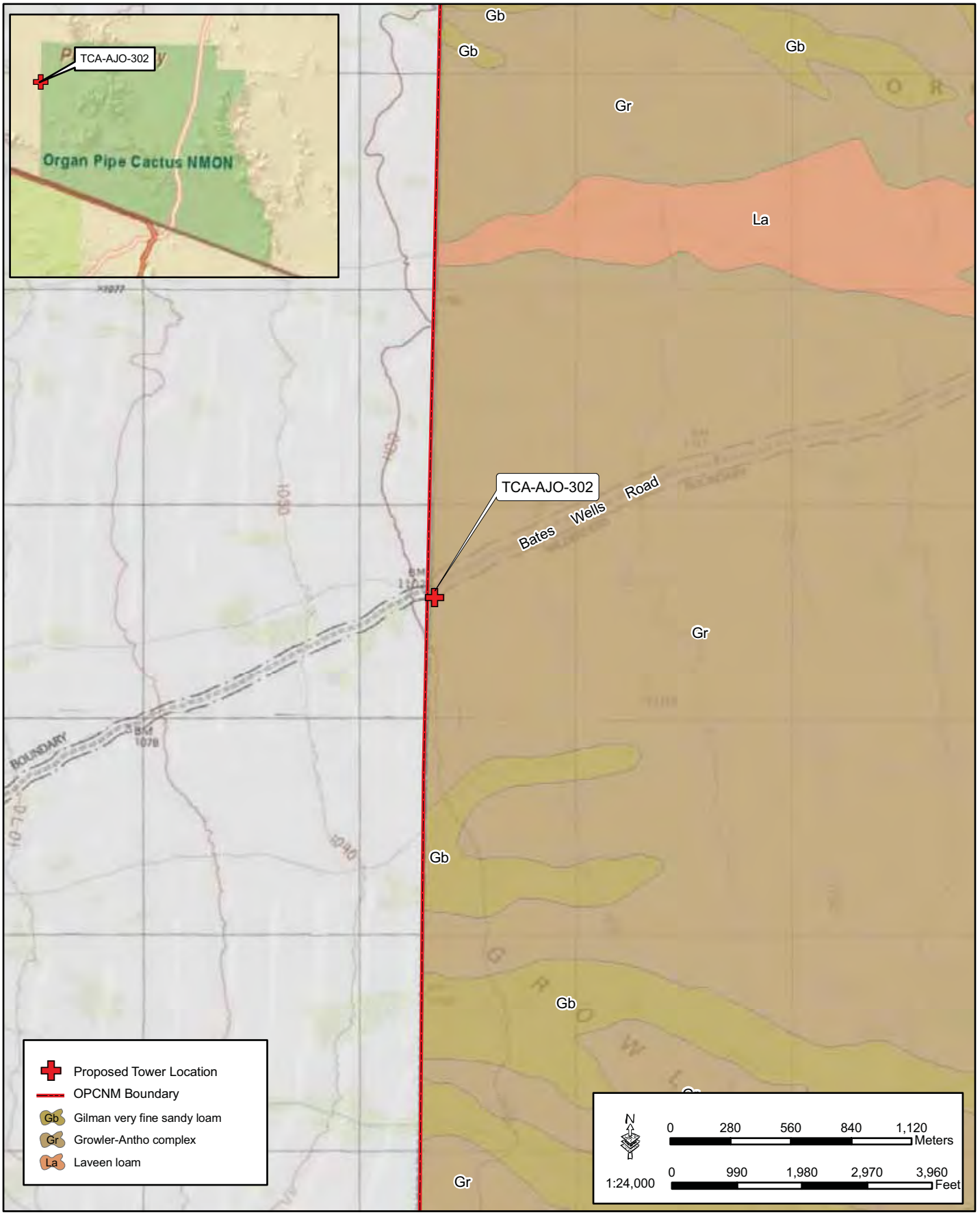
August 2009



TCA-AJO-302 Tower Soil Survey Map

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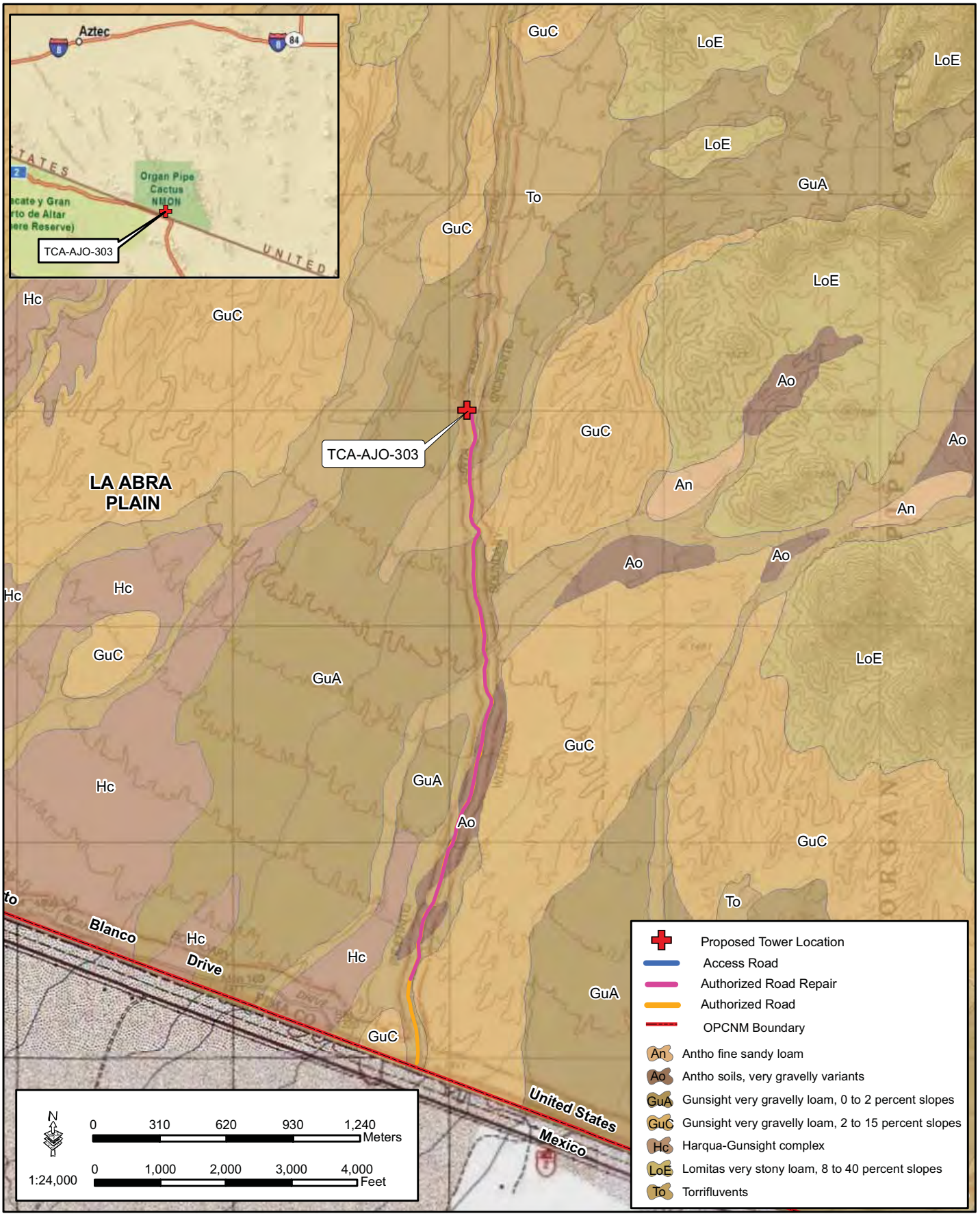
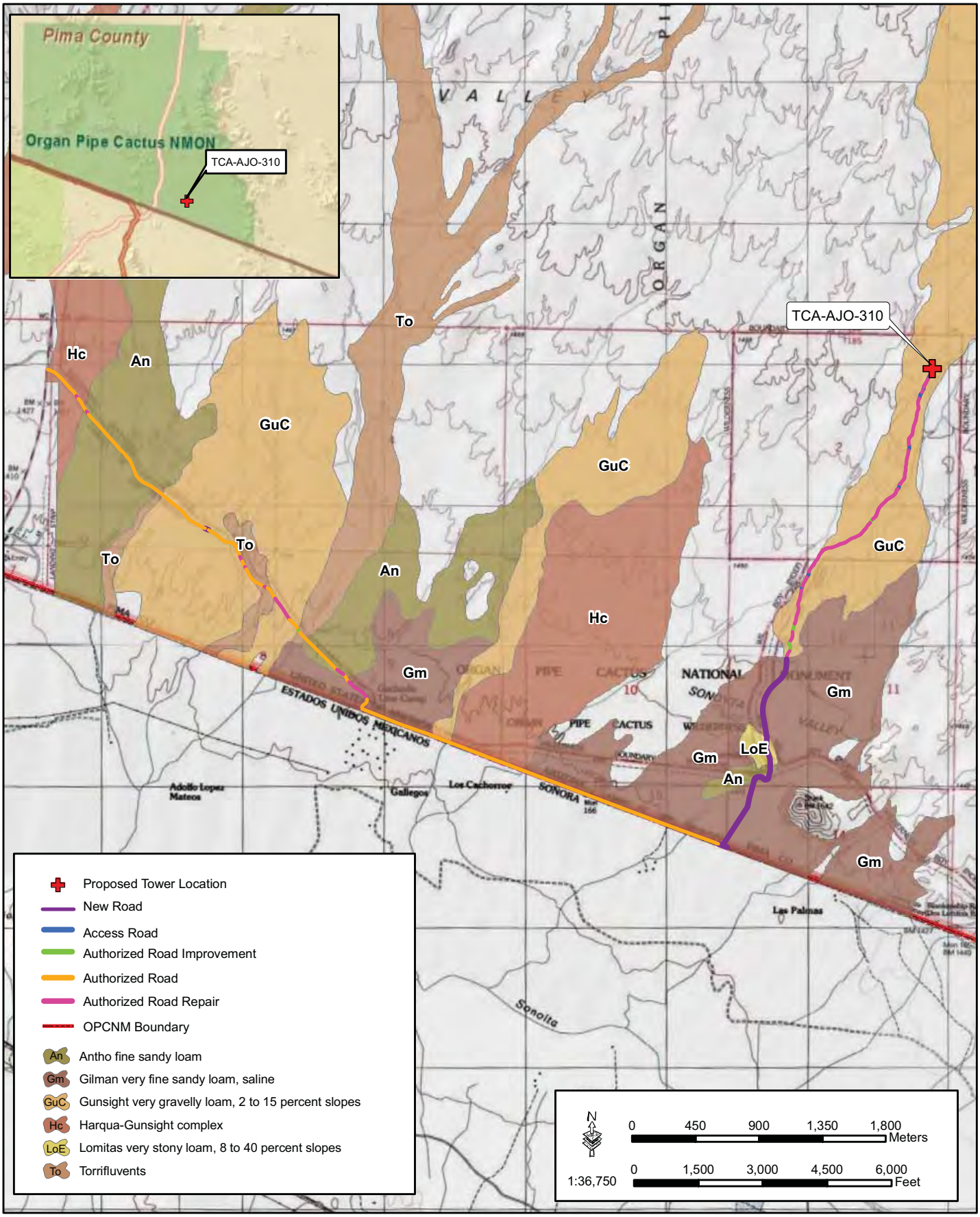
July 2009



TCA-AJO-303 Tower and Approach Road Soil Survey Map

GSRC

September 2009



TCA-AJO-310 Tower and Access Road Soil Survey Map

GSRC

August 2009

APPENDIX G
WATERS OF THE U.S.

Waters of the U.S. Associated with the Proposed Tower Sites and Approach and Access Roads						
Tower ID	**Drainage Type**	**Periodicity**	**Width of Channel (ft)**	**Width of Road (feet)**	**Proposed Action**	**Impact (acre)**
TCA-AJO-004	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	54	16	Grading	0.020
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	75	16	Grading	0.028
TCA-AJO-004	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-004	Wash	Ephemeral	21	16	Grading	0.008
TCA-AJO-004	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-004	Wash	Ephemeral	9	16	Grading	0.003
TCA-AJO-004	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-004	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	20	16	Grading	0.007
TCA-AJO-004	Wash	Ephemeral	45	16	Grading	0.017
TCA-AJO-004	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-004	Wash	Ephemeral	30	16	Grading	0.011
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	60	16	Grading	0.022
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-170	Wash	Ephemeral	42	16	Grading	0.015
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	9	16	Grading	0.003
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	8	16	Grading	0.003
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-170	Wash	Ephemeral	14	16	Grading	0.005
TCA-AJO-170	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-170	Wash	Ephemeral	2	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-170	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-170	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-301	Wash	Ephemeral	30	16	Grading	0.011
TCA-AJO-301	Wash	Ephemeral	12	16	Grading	0.004
TCA-AJO-301	Wash	Ephemeral	24	16	Grading	0.009
TCA-AJO-301	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-301	Wash	Ephemeral	24	16	Grading	0.009
TCA-AJO-301	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-301	Wash	Ephemeral	18	16	Grading	0.007
TCA-AJO-301	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-301	Wash	Ephemeral	6	16	Grading	0.002
TCA-AJO-301	Wash	Ephemeral	15	16	Grading	0.006
TCA-AJO-301	Wash	Ephemeral	10	16	Grading	0.004
TCA-AJO-204	Wash	Ephemeral	10	16	Grading	0.004
TCA-AJO-204	Wash	Ephemeral	1	16	Grading	0.000
TCA-AJO-204	Wash	Ephemeral	3	16	Grading	0.001
TCA-AJO-204	Wash	Ephemeral	4	16	Grading	0.001
TCA-AJO-305	Wash	Ephemeral	3	16	Grading	0.001

APPENDIX H
FEDERAL AND STATE PROTECTED SPECIES LISTS

Pima County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Large, adults have white head and tail. Height 28-38 inches; wingspan 66-96 inches. Dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache, Cochise, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Endangered	Small (Approx. 7inches), diurnal owl reddish brown overall with cream-colored belly streaked with reddish brown. Some individuals are grayish brown.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	<4000 ft	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub.	Historical distribution in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Species has been proposed for delisting (70 FR 44547) but still receives full protection under the ESA.
California Brown pelican	*Pelecanus occidentalis californicus*	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Coastal land and islands; species found around many Arizona lakes and rivers.	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.
Chiricahua leopard frog	*Rana chiricahuensis*	Threatened	Cream colored tubercules (spots) on a dark background on the rear of the thigh, dorsolateral folds that are interrupted and deflected medially, and a call given out of water distinguish this spotted frog from other leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3300-8900 ft	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs.	Require permanent or nearly permanent water sources. Populations north of the Gila River may be a closely-related, but distinct, undescribed species. A special rule allows take of frogs due to operation and maintenance of livestock tanks on State and private lands.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Desert pupfish	*Cyprinodon macularius*	Endangered	Small (2 inches) smoothly rounded body shape with narrow vertical bars on the sides. Breeding males blue on head and sides with yellow on tail. Females and juveniles tan to olive colored back and silvery sides.	Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 5,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. Two subspeices are recognized: Desert Pupfish (C.m.macularis) and Quitobaquito Pupfish (C.m.eremus).
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	2,000 - 5,500 ft	Pools, springs, cienegas, and streams.	Found on multiple private lands, including the Nature Conservancy, the Audubon Society, and others. Also occurs on Federal and state lands and in Sonora, Mexico. Critical habitat occurs in Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz and Yavapai counties.
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Huachuca water umbel	*Lilaeopsis schaffneriana ssp. recurva*	Endangered	Herbaceous, semi-aquatic perennial in the parsley family (Umbelliferae) with slender erect, hollow, leaves that grow from the nodes of creeping rhizomes. Flower: 3 to 10 flowered umbels arise from root nodes.	Cochise, Pima, Santa Cruz	3500-6500 ft	Cienegas, perennial low gradient streams, wetlands.	Species also occurs in adjacent Sonora, Mexico, west of the continental divide. Critical habitat in Cochise and Santa Cruz counties (64 FR 37441, July 12, 1999).
Jaguar	*Panthera onca*	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short, massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 40-135 kg (90-300 lbs).	Cochise, Santa Cruz, Pima	1,600 - >9,000 ft	Found in Sonoran desertscrub up through subalpine conifer forest.	Also occurs in New Mexico. A Jaguar conservation team is being formed that is being led by Arizona and New Mexico state entities along with private organizations.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Kearney blue star	*Amsonia kearneyana*	Endangered	A herbaceous perennial about 2 feet tall in the dogbane family (Apocynaceae). Thickened woody root and many pubescent (hairy) stems that rarely branch. Flowers: white terminal inflorescence in April and May.	Pima	3600-3800 ft	West-facing drainages in the Baboquivari Mountains.	Plants grow in stable, partially shaded, coarse alluvium along a dry wash in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	Elongated muzzle, small leaf nose, and long tongue. Yellowish brown or gray above and cinnamon brown below. Tail minute and appears to be lacking. Easily disturbed.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Maricopa, Santa Cruz	< 6000 ft	Desert scrub habitat with agave and columnar cacti present as food plants.	Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. This species is migratory and is present in Arizona usually from April to September and south of the border the remainder of the year.
Masked bobwhite	*Colinus virginianus ridgewayi*	Endangered	Males brick-red breast and black head and throat. Females are generally nondescript but resemble other races such as the Texas bobwhite.	Pima	1000-4000 ft	Desert grasslands with diversity of dense native grasses, forbs, and brush.	Species is closely associated with Acacia angustissima. Formerly occurred in Altar and Santa Cruz valleys, as well as Sonora, Mexico. Presently only known from reintroduced populations on Buenos Aires NWR.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4100-9000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182). Critical habitat in Arizona occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one downward short; 2 spines upward and red or vasally gray. Flower: pink fruit: woolly white.	Pima, Pinal	2400-4100 ft	Sonoran desertscrub.	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Ocelot	*Leopardus (=Felis) pardalis*	Endangered	Medium-sized spotted cat whose tail is about 1/2 the length of head and body. Yellowish with black streaks and stripes running from front to back. Tail is spotted and face is less heavily streaked than the back and sides.	Cochise, Pima, Santa Cruz	< 8000 ft	Humid tropical and sub-tropical forests, savannahs, and semi-arid thornscrub.	May persist in partly-cleared forests, second-growth woodland, and abandoned cultivated areas reverted to brush. Universal component is presence of dense cover. Unconfirmed reports of individuals in the southern part of the State continue to be received.
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	Endangered	Hemispherical stems 4-7 inches tall 3-4 inches diameter. Central spine 1 inch long straw colored hooked surrounded by 6-15 radial spines. Flower: yellow, salmon, or rarely white narrow floral tube..	Pima, Santa Cruz	2300-5000 ft	Sonoran desertscrub or semi-desert grassland communities.	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils. This species can be confused with juvenile barrel cactus (Ferocactus). However, the spines of the later are flattened, in contrast with the round cross-section of the Coryphanta spines. 80-90% of individuals on state or private land.
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Buff on back and white below, hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Maricopa, Pima, Yuma	500 - 2,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historical range was probably larger than exists today. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian-obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was finalized on October 19, 2005 (50 CFR 60886) and can be viewed at http://arizonaes.fws.gov. In Arizona there are critical habitat segments in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	Candidate	<12 inches high; spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Flowers pink to purple.	Pima, Pinal	1300-2000 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Immature plants distinctly different from mature plants. They are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Radial spines are dirty white with maroon tips.
Sonoyta mud turtle	*Kinosternon sonoriense longifemorale*	Candidate	Primarily a pond turtle, prefers mud or sandy bottoms. Body 3 1/2 to 6 1/2 inches. Head and neck mottled with contrasting light and dark markings. Found in Quitobaquito Springs.	Pima	1,100 ft	Ponds and streams.	Species also found in Rio Sonoyta, Sonora, Mexico.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparain woodlands (cottonwood, willow, or tamarisk galleries).	Listing was found warranted, but precluded as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.
Gooddings onion	*Allium gooddingii*	Conservation Agreement	Herbaceous perenial plant; broad, flat, rather blunt leaves; flowering stalk 14-17 inches tall, flattened, and narrowly winged toward apex; fruit is broader than long; seeds are short and thick.	Apache, Greenlee, Pima	> 7,500 ft	Forested drainage bottoms and on moist north facing slopes of mixed conifer and spruce fir forests.	Conservation agreement between the Service and the Forest Service signed in February 1998. In New Mexico on the Lincoln and Gila National Forests.
San Xavier talussnail	*Sonorella eremita*	Conservation Agreement	Land snail, less than one inch in diameter (about .75 inches), 4.5 whorls, round shell, white to pinkish tint.	Pima	3,850-3,920 ft	Deep, limestone rockslide with outcrops of limestone and decomposed granite.	Conservation agreement signed by the Service, Arizona Game and Fish Department, El Paso Natural Gas Company, and Arizona Electric Power Cooperative, Inc. in September 1998.

Yuma County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Large, adults have white head and tail. Height 28-38 inches; wingspan 66-96 inches. Dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache, Cochise, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Endangered	Small (Approx. 7inches), diurnal owl reddish brown overall with cream-colored belly streaked with reddish brown. Some individuals are grayish brown.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	<4000 ft	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub.	Historical distribution in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Species has been proposed for delisting (70 FR 44547) but still receives full protection under the ESA.
California Brown pelican	*Pelecanus occidentalis californicus*	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Varies	Coastal land and islands; species found around many Arizona lakes and rivers.	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Razorback sucker	*Xyrauchen texanus*	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Species is also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizon/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake.
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Buff on back and white below, hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Maricopa, Pima, Yuma	500 - 2,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historical range was probably larger than exists today. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian-obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was finalized on October 19, 2005 (50 CFR 60886) and can be viewed at http://arizonaes.fws.gov. In Arizona there are critical habitat segments in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties.
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Water bird with long legs and short tail. Long, slender decurved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	< 4,500 ft	Fresh water and brackish marshes.	Species is associated with dense emergent riparian vegetation. Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Channelization and marsh destruction are primary sources of habitat loss.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Flat-tailed horned lizard	*Phrynosoma mcallii*	Proposed	Typical flattened body shape of horned lizards; dark vertebral stripe; lacks external ear openings; color is cryptic ranging from pale gray to light rust brown; has two rows of fringed scales on each side of body.	Yuma	500 ft	Sandy flats or areas with fine, windblown sand; creosote-white bursage series of Sonoran Desert.	Proposed rule reinstated on August 30, 2005 (Tucson Herpetological Society v. Norton, 04-75 PHX NVW, D. Ariz). Conservation Agreement finalized in May 1997. Species also found in portions of San Diego County, central Riverside County, and Imperial County, California; also Sonora and Baja California, Mexico.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparain woodlands (cottonwood, willow, or tamarisk galleries).	Listing was found warranted, but precluded as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.

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Navajo	FISH	Catostomus sp. 3	Little Colorado Sucker	SC	S	S	WSC
Navajo	FISH	Gila robusta	Roundtail Chub	SC		S	WSC
Navajo	FISH	Lepidomeda vittata	Little Colorado Spinedace	LT		S	WSC
Navajo	FISH	Rhinichthys osculus	Speckled Dace	SC	S		
Navajo	INVERTEBRATE	Anodonta californiensis	California Floater	SC		S	
Navajo	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC	S	S	
Navajo	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Navajo	MAMMAL	Idionycteris phyllotis	Allen's Big-eared Bat	SC	S		
Navajo	MAMMAL	Microtus mexicanus navaho	Navajo Mexican Vole	SC		S	WSC
Navajo	MAMMAL	Myotis evotis	Long-eared Myotis	SC	S		
Navajo	MAMMAL	Myotis occultus	Arizona Myotis	SC	S		
Navajo	MAMMAL	Myotis thysanodes	Fringed Myotis	SC	S		
Navajo	MAMMAL	Myotis volans	Long-legged Myotis	SC	S		
Navajo	MAMMAL	Panthera onca	Jaguar	LE		S	WSC
Navajo	MAMMAL	Perognathus flavus goodpasteri	Springerville Pocket Mouse	SC		S	
Navajo	PLANT	Amsonia peeblesii	Peebles Blue Star		S		
Navajo	PLANT	Asclepias welshii	Welsh's Milkweed	LT			HS
Navajo	PLANT	Astragalus xiphoides	Gladiator Milk Vetch	SC			SR
Navajo	PLANT	Carex specuicola	Navajo Sedge	LT			HS
Navajo	PLANT	Chrysothamnus molestus	Tusayan Rabbitbrush	SC		S	
Navajo	PLANT	Errazurizia rotundata	Roundleaf Errazurizia		S		SR
Navajo	PLANT	Pediocactus papyracanthus	Paper-spined Cactus	SC			SR
Navajo	PLANT	Pediocactus peeblesianus var. peeblesianus	Peebles Navajo Cactus	LE			HS
Navajo	PLANT	Penstemon nudiflorus	Flagstaff Beardtongue			S	
Navajo	PLANT	Platanthera zothecina	Alcove Bog-orchid	SC			
Navajo	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Navajo	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC		S	WSC
Pima	AMPHIBIAN	Eleutherodactylus augusti cactorum	Western Barking Frog			S	WSC
Pima	AMPHIBIAN	Gastrophryne olivacea	Great Plains Narrow-mouthed Toad				WSC
Pima	AMPHIBIAN	Pternohyla fodiens	Lowland Burrowing Treefrog				WSC
Pima	AMPHIBIAN	Rana chiricahuensis	Chiricahua Leopard Frog	LT		S	WSC
Pima	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC		S	WSC
Pima	BIRD	Accipiter gentilis	Northern Goshawk	SC		S	WSC
Pima	BIRD	Ammodramus bairdii	Baird's Sparrow	SC			WSC
Pima	BIRD	Asturina nitida maxima	Northern Gray Hawk	SC	S	S	WSC
Pima	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		
Pima	BIRD	Buteogallus anthracinus	Common Black-Hawk			S	WSC

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Pima	BIRD	Caracara cheriway	Crested Caracara				WSC
Pima	BIRD	Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	C		S	WSC
Pima	BIRD	Colinus virginianus ridgwayi	Masked Bobwhite	LE			WSC
Pima	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
Pima	BIRD	Dendrocygna bicolor	Fulvous Whistling-Duck	SC	S		
Pima	BIRD	Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher	SC			WSC
Pima	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		S	WSC
Pima	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC		S	WSC
Pima	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LE			WSC
Pima	BIRD	Pachyramphus aglaiae	Rose-throated Becard				WSC
Pima	BIRD	Pandion haliaetus	Osprey				WSC
Pima	BIRD	Polioptila nigriceps	Black-capped Gnatcatcher				WSC
Pima	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
Pima	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		S	WSC
Pima	BIRD	Trogon elegans	Elegant Trogon				WSC
Pima	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				WSC
Pima	BIRD	Tyrannus melancholicus	Tropical Kingbird				WSC
Pima	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		
Pima	FISH	Catostomus clarki	Desert Sucker	SC	S		
Pima	FISH	Cyprinodon eremus	Quitobaquito Desert Pupfish	LE			WSC
Pima	FISH	Cyprinodon macularius	Desert Pupfish	LE			WSC
Pima	FISH	Gila intermedia	Gila Chub	LE		S	WSC
Pima	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC
Pima	INVERTEBRATE	Agathymus aryxna	Arizona Giant Skipper			S	
Pima	INVERTEBRATE	Agathymus polingi	Poling's Giant Skipper			S	
Pima	INVERTEBRATE	Anthocharis cethura	Felder's Orange Tip			S	
Pima	INVERTEBRATE	Argia sabino	Sabino Canyon Damselfly	SC		S	
Pima	INVERTEBRATE	Calephelis rawsoni arizonensis	Arizona Metalmark			S	
Pima	INVERTEBRATE	Limenitis archippus obsoleta	Obsolete Viceroy Butterfly			S	
Pima	INVERTEBRATE	Neophasia terlooii	Chiricahua Pine White			S	
Pima	INVERTEBRATE	Sonorella eremita	San Xavier Talussnail	SC			
Pima	INVERTEBRATE	Tryonia quitobaquitae	Quitobaquito Tryonia	SC		S	
Pima	MAMMAL	Antilocapra americana sonoriensis	Sonoran Pronghorn	LE		S	WSC
Pima	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		WSC
Pima	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Pima	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC			
Pima	MAMMAL	Eumops underwoodi	Underwood's Bonneted Bat	SC	S		

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Pima	MAMMAL	Lasiurus blossevillii	Western Red Bat				WSC
Pima	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				WSC
Pima	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE		S	WSC
Pima	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		WSC
Pima	MAMMAL	Myotis occultus	Arizona Myotis	SC	S		
Pima	MAMMAL	Myotis velifer	Cave Myotis	SC	S		
Pima	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat		S		
Pima	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC	S		
Pima	MAMMAL	Panthera onca	Jaguar	LE		S	WSC
Pima	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			
Pima	PLANT	Abutilon parishii	Pima Indian Mallow	SC		S	SR
Pima	PLANT	Abutilon thurberi	Thurber Indian Mallow				SR
Pima	PLANT	Acacia farnesiana	Sweet Acacia			S	
Pima	PLANT	Agave parviflora ssp. parviflora	Santa Cruz Striped Agave	SC	S	S	HS
Pima	PLANT	Agave schottii var. treleasei	Trelease Agave	SC		S	HS
Pima	PLANT	Allium gooddingii	Goodding Onion	SC		S	HS
Pima	PLANT	Allium plummerae	Plummer Onion				SR
Pima	PLANT	Amoreuxia gonzalezii	Saiya	SC		S	HS
Pima	PLANT	Amsonia grandiflora	Large-flowered Blue Star	SC		S	
Pima	PLANT	Amsonia kearneyana	Kearney's Blue Star	LE			HS
Pima	PLANT	Asclepias lemmonii	Lemmon Milkweed			S	
Pima	PLANT	Asplenium dalhousiae	Dalhouse Spleenwort		S		
Pima	PLANT	Berberis harrisoniana	Kofa Barberry		S		
Pima	PLANT	Boerhavia megaptera	Tucson Mountain Spiderling			S	
Pima	PLANT	Capsicum annuum var. glabriusculum	Chiltepin			S	
Pima	PLANT	Cardiospermum corindum	Balloon Vine		S		
Pima	PLANT	Carex chihuahuensis	A Sedge			S	
Pima	PLANT	Carex ultra	Arizona Giant Sedge		S	S	
Pima	PLANT	Cathestecum erectum	False Grama		S		
Pima	PLANT	Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE			HS
Pima	PLANT	Dalea tentaculoides	Gentry Indigo Bush	SC	S	S	HS
Pima	PLANT	Desmanthus covillei	Coville Bundleflower			S	
Pima	PLANT	Echinocactus horizonthalonius var. nicholii	Nichol Turk's Head Cactus	LE			HS
Pima	PLANT	Echinocereus fasciculatus	Magenta-flower Hedgehog-cactus				SR
Pima	PLANT	Echinomastus erectocentrus var. acunensis	Acuna Cactus	C			HS
Pima	PLANT	Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC		S	SR
Pima	PLANT	Erigeron arisolius				S	

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Pima	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC			SR
Pima	PLANT	Eriogonum ericifolium var. ericifolium	Heathleaf Wild-buckwheat			S	
Pima	PLANT	Euphorbia gracillima	Mexican Broomspurge			S	
Pima	PLANT	Ferocactus cylindraceus var. eastwoodiae	Golden Barrel Cactus				SR
Pima	PLANT	Ferocactus emoryi	Emory's Barrel-cactus				SR
Pima	PLANT	Graptopetalum bartramii	Bartram Stonecrop	SC	S	S	SR
Pima	PLANT	Hackelia ursina	Chihuahuan Stickseed			S	
Pima	PLANT	Hedeoma dentatum	Mock-pennyroyal			S	
Pima	PLANT	Hermannia pauciflora	Sparseleaf Hermannia			S	
Pima	PLANT	Heterotheca rutteri	Huachuca Golden Aster	SC	S	S	
Pima	PLANT	Hexalectris revoluta	Chisos Coral-root		S	S	SR
Pima	PLANT	Hexalectris spicata	Crested Coral Root				SR
Pima	PLANT	Hieracium pringlei	Pringle Hawkweed	SC		S	
Pima	PLANT	Ibervillea tenuisecta	Texas Globe Berry		S		
Pima	PLANT	Lilaeopsis schaffneriana var. recurva	Huachuca Water Umbel	LE			HS
Pima	PLANT	Lilium parryi	Lemmon Lily	SC		S	SR
Pima	PLANT	Listera convallarioides	Broadleaf Twayblade				SR
Pima	PLANT	Lophocereus schottii	Senita				SR
Pima	PLANT	Lupinus huachucanus	Huachuca Mountain Lupine			S	
Pima	PLANT	Lysiloma watsonii	Littleleaf False Tamarind				SR
Pima	PLANT	Malaxis tenuis	Slender Adders Mouth				SR
Pima	PLANT	Mammillaria mainiae	Counter Clockwise Fishhook Cactus			S	SR
Pima	PLANT	Mammillaria thornberi	Thornber Fishhook Cactus				SR
Pima	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus				SR
Pima	PLANT	Manihot davisiae	Arizona Manihot			S	
Pima	PLANT	Matelea cordifolia	Sonoran Milkweed Vine			S	
Pima	PLANT	Metastelma mexicanum	Wiggins Milkweed Vine	SC		S	
Pima	PLANT	Muhlenbergia dubioides	Box Canyon Muhly			S	
Pima	PLANT	Muhlenbergia xerophila	Weeping Muhly			S	
Pima	PLANT	Notholaena lemmonii	Lemmon Cloak Fern	SC			
Pima	PLANT	Opuntia engelmannii var. flavispina					SR
Pima	PLANT	Opuntia versicolor	Stag-horn Cholla				SR
Pima	PLANT	Opuntia x kelvinensis	Kelvin Cholla				SR
Pima	PLANT	Passiflora foetida	Foetid Passionflower			S	
Pima	PLANT	Pectis imberbis	Beardless Chinch Weed	SC		S	
Pima	PLANT	Peniocereus greggii var. transmontanus	Desert Night-blooming Cereus				SR
Pima	PLANT	Peniocereus striatus	Dahlia Rooted Cereus				SR

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Pima	PLANT	Penstemon discolor	Catalina Beardtongue			S	HS
Pima	PLANT	Penstemon superbus	Superb Beardtongue			S	
Pima	PLANT	Perityle ajoensis	Ajo Rock Daisy				SR
Pima	PLANT	Petalonyx linearis	Longleaf Sandpaper Plant		S		
Pima	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry			S	
Pima	PLANT	Platanthera limosa	Thurber's Bog Orchid				SR
Pima	PLANT	Psilotum nudum	Whisk Fern				HS
Pima	PLANT	Samolus vagans	Chiricahua Mountain Brookweed			S	
Pima	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses				SR
Pima	PLANT	Senecio carlomasonii	Seemann Groundsel			S	
Pima	PLANT	Senecio neomexicanus var. toumeyi	Toumey Groundsel			S	
Pima	PLANT	Sisyrinchium cernuum	Nodding Blue-eyed Grass			S	
Pima	PLANT	Solanum lumholtzianum	Lumholtz Nightshade			S	
Pima	PLANT	Stenocereus thurberi	Organ Pipe Cactus		S		SR
Pima	PLANT	Stevia lemmonii	Lemmon's Stevia			S	
Pima	PLANT	Tephrosia thurberi	Thurber Hoary Pea			S	
Pima	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Wood Fern		S		
Pima	PLANT	Tragia laciniata	Sonoran Noseburn			S	
Pima	PLANT	Triteleiopsis palmeri	Blue Sand Lily		S		SR
Pima	PLANT	Tumamoca macdougalii	Tumamoc Globeberry		S	S	SR
Pima	PLANT	Vauquelinia californica ssp. sonorensis	A Arizona Rosewood		S		
Pima	PLANT	Viola umbraticola	Shade Violet			S	
Pima	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S	S	
Pima	REPTILE	Aspidoscelis burti xanthonota	Red-back Whiptail	SC	S	S	
Pima	REPTILE	Charina trivirgata gracia	Desert Rosy Boa	SC	S	S	
Pima	REPTILE	Charina trivirgata trivirgata	Mexican Rosy Boa	SC	S		
Pima	REPTILE	Chionactis palarostris organica	Organ Pipe Shovel-nosed Snake			S	
Pima	REPTILE	Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC			WSC
Pima	REPTILE	Kinosternon sonoriense longifemorale	Sonoyta Mud Turtle	C		S	
Pima	REPTILE	Masticophis bilineatus lineolatus	Ajo Mountain Whipsnake			S	
Pima	REPTILE	Oxybelis aeneus	Brown Vinesnake				WSC
Pima	REPTILE	Phrynosoma cornutum	Texas Horned Lizard	SC	S		
Pima	REPTILE	Phyllorhynchus browni lucidus	Maricopa Leaf-nosed Snake			S	
Pima	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Pima	REPTILE	Uma rufopunctata	Yuman Desert Fringe-toed Lizard	SC	S	S	WSC
Pinal	AMPHIBIAN	Gastrophryne olivacea	Great Plains Narrow-mouthed Toad				WSC
Pinal	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC		S	WSC

Special Status Species in the Arizona HDMS, listed alphabetically by county, by taxon, by scientific name.

Updated April 2006

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	USFS	STATE
Yavapai	PLANT	Carex ultra	Arizona Giant Sedge		S	S	
Yavapai	PLANT	Cymopterus megacephalus	Cameron Water-parsley	SC		S	
Yavapai	PLANT	Erigeron saxatilis	Rock Fleabane			S	
Yavapai	PLANT	Eriogonum apachense	Apache Wild-buckwheat	SC			SR
Yavapai	PLANT	Eriogonum ericifolium var. ericifolium	Heathleaf Wild-buckwheat			S	
Yavapai	PLANT	Eriogonum ripleyi	Ripley Wild-buckwheat	SC		S	SR
Yavapai	PLANT	Escobaria vivipara var. rosea	Viviparous Foxtail Cactus				SR
Yavapai	PLANT	Ferocactus cylindraceus var. eastwoodiae	Golden Barrel Cactus				SR
Yavapai	PLANT	Fremontodendron californicum	Flannel Bush		S		SR
Yavapai	PLANT	Hedeoma diffusum	Flagstaff Pennyroyal			S	SR
Yavapai	PLANT	Heuchera eastwoodiae	Eastwood Alum Root			S	
Yavapai	PLANT	Hexalectris spicata	Crested Coral Root				SR
Yavapai	PLANT	Lupinus latifolius ssp. leucanthus	Broadleaf Lupine			S	
Yavapai	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus				SR
Yavapai	PLANT	Penstemon nudiflorus	Flagstaff Beardtongue			S	
Yavapai	PLANT	Phlox amabilis	Arizona Phlox			S	
Yavapai	PLANT	Polygala rusbyi	Hualapai Milkwort			S	
Yavapai	PLANT	Puccinellia parishii	Parish Alkali Grass	SC			HS
Yavapai	PLANT	Purshia subintegra	Arizona Cliff Rose	LE			HS
Yavapai	PLANT	Salvia dorrii ssp. mearnsii	Verde Valley Sage	SC		S	SR
Yavapai	PLANT	Talinum validulum	Tusayan Flame Flower	SC			SR
Yavapai	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Wood Fern		S		
Yavapai	PLANT	Triteleia lemmoniae	Mazatzal Triteleia				SR
Yavapai	PLANT	Washingtonia filifera	California Fan Palm				SR
Yavapai	REPTILE	Charina trivirgata gracia	Desert Rosy Boa	SC	S	S	
Yavapai	REPTILE	Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC			WSC
Yavapai	REPTILE	Heloderma suspectum cinctum	Banded Gila Monster	SC	P		
Yavapai	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	SC		S	WSC
Yavapai	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC		S	WSC
Yavapai	REPTILE	Xantusia arizonae	Arizona Night Lizard			S	
Yuma	BIRD	Ardea alba	Great Egret				WSC
Yuma	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		
Yuma	BIRD	Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	C		S	WSC
Yuma	BIRD	Egretta thula	Snowy Egret				WSC
Yuma	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		S	WSC
Yuma	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LE			WSC
Yuma	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle	LT,PDL		S	WSC

Special Status Species in the Arizona HDMS, listed alphabetically by county, by taxon, by scientific name.

Updated April 2006

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	USFS	STATE
Yuma	BIRD	Ixobrychus exilis	Least Bittern				WSC
Yuma	BIRD	Lanius ludovicianus	Loggerhead Shrike	SC	S		
Yuma	BIRD	Laterallus jamaicensis coturniculus	California Black Rail	SC		S	WSC
Yuma	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
Yuma	FISH	Xyrauchen texanus	Razorback Sucker	LE		S	WSC
Yuma	MAMMAL	Antilocapra americana sonoriensis	Sonoran Pronghorn	LE		S	WSC
Yuma	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Yuma	MAMMAL	Euderma maculatum	Spotted Bat	SC	S		WSC
Yuma	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC			
Yuma	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				WSC
Yuma	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		WSC
Yuma	MAMMAL	Myotis yumanensis	Yuma Myotis	SC			
Yuma	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat		S		
Yuma	MAMMAL	Sigmodon hispidus eremicus	Yuma Hispid Cotton Rat	SC			
Yuma	PLANT	Allium parishii	Parish Onion		S		SR
Yuma	PLANT	Berberis harrisoniana	Kofa Barberry		S		
Yuma	PLANT	Cryptantha ganderi	Gander's Cryptantha	SC			

APPENDIX I
AIR QUALITY CALCULATIONS

CALCULATION SHEET-COMBUSTIBLE EMISSIONS

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	40	32000
Diesel Dump Truck	1	300	8	90	216000
Diesel Excavator	1	300	8	90	216000
Diesel Hole Trenchers	1	175	8	90	126000
Diesel Bore/Drill Rigs	1	300	8	90	216000
Diesel Cement & Mortar Mixers	1	300	8	90	216000
Diesel Cranes	2	175	8	90	252000
Diesel Graders	1	300	8	90	216000
Diesel Tractors/Loaders/Backhoes	1	100	8	180	144000
Diesel Bull Dozers	1	300	8	40	96000
Diesel Front End Loaders	1	300	8	40	96000
Diesel Fork Lifts	2	100	8	40	64000
Diesel Generator Set	6	40	8	40	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTIBLE EMISSIONS

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.013	0.052	0.173	0.012	0.012	0.026	18.909
Diesel Dump Truck	0.105	0.493	1.307	0.098	0.095	0.176	127.585
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Hole Cleaners\Trenchers	0.071	0.339	0.807	0.064	0.061	0.103	74.397
Diesel Bore/Drill Rigs	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Diesel Cement & Mortar Mixers	0.145	0.552	1.733	0.114	0.112	0.174	126.086
Diesel Cranes	0.122	0.361	1.588	0.094	0.092	0.203	147.239
Diesel Graders	0.083	0.324	1.126	0.079	0.076	0.176	127.657
Diesel Tractors/Loaders/Backhoes	0.294	1.303	1.146	0.217	0.211	0.151	109.669
Diesel Bull Dozers	0.038	0.146	0.504	0.035	0.034	0.078	56.736
Diesel Front End Loaders	0.040	0.164	0.529	0.037	0.036	0.078	56.726
Diesel Aerial Lifts	0.140	0.547	0.604	0.098	0.095	0.067	48.721
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**1.656**	**6.767**	**16.302**	**1.365**	**1.328**	**2.120**	**1537.398**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	15	15	0.32	0.38	0.71
CO	12.4	15.7	60	240	15	15	2.95	3.74	6.69
NOx	0.95	1.22	60	240	15	15	0.23	0.29	0.52
PM-10	0.0052	0.0065	60	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	15	15	0.00	0.00	0.00

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Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02

Daily Commute New Residents									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	15	240	126	127	0.68	0.81	1.49
CO	12.4	15.7	15	240	126	127	6.20	7.91	14.11
NOx	0.95	1.22	15	240	126	127	0.47	0.61	1.09
PM-10	0.0052	0.0065	15	240	126	127	0.00	0.00	0.01
PM 2.5	0.0049	0.006	15	240	126	127	0.00	0.00	0.01

Truck Emission Factor Source: USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway vehicle emission factor model.

ONGOING EMISSIONS FROM PROPANE GENERATOR

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Propane Generator Set	8	40	4	365	467200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Propane Generator Set	2.03	31.91	9.93	0.06	0.06	0.01	653.9

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Propane Generator Set	1.047	16.432	5.111	0.029	0.029	0.007	336.640
Total Emissions	**1.047**	**16.432**	**5.111**	**0.029**	**0.029**	**0.007**	**336.640**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-FUGITIVE DUST

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor		Units	Source
General Construction Activities	0.19	ton PM10/acre-month		MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month		MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions				
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)		EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)		EPA 2001; EPA 2006

Project Assumptions

Road Upgrade and General Construction Area (0.19 ton PM10/acre-month)

			Conversion Factors	
Duration of Construction Project	12	months	0.000022957	acres per feet
Length	0	miles	5280	feet per mile
Length (converted)	0	feet		
Width	0	feet		
Area	16.00	acres		

New Roads (0.42 ton PM/acre-month)

Duration of Construction Project	3	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.26	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Road Upgrade and General Construc	36.48	18.24	3.65	1.82
New Roads (0.42 ton PM/acre-month	0.33	0.16	0.03	0.02
Total	**36.81**	**18.40**	**3.68**	**1.84**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS

Proposed Action Construction Emissions for Criteria Pollutants (tons per year)						
Emission source	VOC	CO	NOx	PM-10	PM-2.5	SO2
Combustible Emissions	1.66	6.77	16.30	1.37	1.33	2.12
Construction Site-fugitive PM-10	NA	NA	NA	18.40	1.84	NA
Construction Workers Commuter & Trucking	0.73	6.83	1.07	0.02	0.02	NA
Total emissions	**2.39**	**13.60**	**17.38**	**19.79**	**3.19**	**2.12**
De minimis threshold (1)	NA	100.00	NA	100.00	NA	100.00
Annual Auto Emissions from bi-monthly maintenance	1.49	14.11	1.09	0.01	0.01	NA
Propane Generator-power source for towers	1.05	16.43	5.11	0.03	0.03	0.01
Total Ongoing Emission/yr	2.54	30.54	6.20	0.03	0.03	0.01

1. De-minimis thresholds for County.