National Telecommunications
and Information Administration

Environmental Assessment

Pima County (04-40-MM588), NEPA ID EAXX-006-60-3D-1754666976

Pima County Regional Middle Mile

Pima County, Arizona

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List of Acronyms

ACA	Arizona Commerce Authority
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
AGS	Arizona Geological Survey
APE	Area of Potential Effect
ASM	Arizona State Museum
AZPDES	Arizona Pollutant Discharge Elimination System
AOGCC	Arizona Oil and Gas Conservation Commission
BEAD	Broadband Equity, Access, and Deployment (Program)
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BOR	Bureau of Reclamation
CAA	Clean Air Act
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CWA	Clean Water Act
EA	environmental assessment
ECOS	Environmental Conservation Online System
E.O.	Executive Order
ESA	Endangered Species Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FirstNet Authority	First Responder Network Authority
FTTH	Fiber to the Home
GAP	gap analysis project
HPTP	Historic Properties Treatment Plan
IBA	important bird area
ITA	Indian Trust Assets
ITS	Intelligent Transportation Systems
IPaC	Information for Planning and Consultation
LUST	leaking underground storage tank
MBTA	Migratory Bird Treaty Act
MDP	Monitoring and Discovery Plan
MM	Middle Mile (Broadband Infrastructure Program)
MSCP	Multi-Species Conservation Plan
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPSBN	Nationwide Public Safety Broadband Network
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
OERT	Online Environmental Review Tool
PA	Programmatic Agreement
PC	Program Comment for Federal Telecommunications Projects
PCDOT	Pima County Department of Transportation
PEIS	programmatic environmental impact statement
PM_{10}	Particulate matter 10 micrometers or less
PPC	Pima pineapple cactus
Project	Pima County Regional Middle Mile Project
ROW	right-of-way
RTA	Regional Transportation Authority
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SR	State Route
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
TBCP	Tribal Broadband Connectivity Program
TI	traffic interchange
TSCA	Toxic Substances Control Act
UPRR	Union Pacific Railroad
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCS	Wetlands Classification Standard
WOTUS	Waters of the U.S.

1 Introduction

The Consolidated Appropriations Act of 2021 and the Infrastructure Investment and Jobs Act of 2021 appropriated $49.8 billion for the National Telecommunications and Information Administration (NTIA) to bring broadband service to unserved and underserved locations across the United States through its broadband grant programs, which include the Broadband Equity, Access, and Deployment (BEAD) Program, the Enabling Middle Mile Broadband Infrastructure Grant Program (MM), and the Tribal Broadband Connectivity Program (TBCP). These grant programs will expand access to high-speed internet by funding infrastructure deployment in all 50 states, five territories, and the District of Columbia.

Pima County is proposing to construct a 134.61-mile open access fiber middle mile ring around the County's urban core as the recipient of a grant from NTIA under the Middle Mile Grant Program, as part of award number 04-40-MM588. The Pima County Regional Middle Mile Project or "Project" would be located within the unincorporated portions of Pima County, spanning from Oro Valley to Marana on the north side, south to Drexel Heights; east covering the entire Drexel Heights area; south to Sahuarita; east from Sahuarita through Corona de Tucson; and north through Vail along the County's eastern portion to the Catalina Foothills; culminating back at Oro Valley.

NTIA is the lead federal agency responsible for evaluating the Project under the National Environmental Policy Act (NEPA).

In 2024, NTIA adopted the five Regional Programmatic Environmental Impact Statements (PEISs) that the First Responder Network Authority (FirstNet Authority) issued in 2017 under NEPA for broadband deployments associated with the National Public Safety Broadband Network (NPSBN).[1] The PEISs contain detailed environmental analyses of the potential environmental effects of various telecommunications deployment methods in all states and territories, including:

- Collocation of network equipment on existing towers, poles, and structures;
- New construction of towers, poles, and associated structures (including generators, equipment sheds, fencing, and concrete pads);
- Use of existing fiber facilities, including lighting up dark fiber and installation of new fiber on new and existing poles in existing conduit;
- Installation of new conduit and fiber using trenching (including vibratory plowing) or directional boring (including horizontal directional drilling (HDD));
- Satellite deployments;
- Installation of microwave facilities for cell-site backhaul communication; and
- Utilization of deployable technologies.

In its Records of Decision adopting the PEISs, NTIA confirmed that the PEISs remain valid and

[1] *See* FirstNet Authority, Regional PEISs, https://www.firstnet.gov/network/environmental- compliance/projects/regional-programmatic-environmental-impact-statements.

provide relevant and adequate assessments of the potential environmental effects and benefits NTIA's grant funded broadband projects.

This site-specific environmental assessment (EA) tiers off of the Western Region PEIS by summarizing and incorporating by reference the analyses from the PEIS where appropriate. The EA states NTIA's purpose and need for proposed action below. Section 2 of the EA describes the Project and alternatives to the Project. Section 3 of the EA analyzes the affected environment and the environmental consequences of the Project and the alternatives. Section 4 evaluates potential cumulative effects. Section 5 lists relevant laws, regulations, and permits required for Pima County to implement the Proposed Action.

In accordance with the Western Region PEIS and based on site-specific analysis, the EA concludes that the effects of the Project would be less than significant; Pima County would incorporate best management practices (BMPs) and mitigation measures to further reduce impacts, where appropriate.

1.1 Purpose and Need

NTIA's broadband grant programs are part of a nationwide effort to make high-speed internet service available to all Americans, including by: 1) connecting students to high quality education and training; 2) enabling businesses to more readily connect to consumers, increasing sales and creating jobs; 3) increasing accessibility to telehealth services; 4) connecting the public to services, first responders, elected officials, and their communities; and 5) increasing workers' access to job opportunities and skills development.

The Enabling Middle Mile Broadband Infrastructure Grant Program provides funding for the expansion and extension of middle mile infrastructure across U.S. states and territories. In total, the program allocated $980 million to fund projects for the construction, improvement, or acquisition of middle mile infrastructure covering more than 370 counties across 40 states and Puerto Rico in Summer 2023. The ultimate purpose of this funding is to expand and strengthen U.S. high-speed internet networks by reducing the cost of connecting unserved or underserved areas to the internet backbone.

Access to broadband internet is fundamental to meaningful participation in today's society and is a necessity for all Pima County residents, regardless of age, race, income, the neighborhood where they live, the languages they speak, and the resources they have at their disposal. In Pima County, the current broadband offerings do not provide reliable and affordable service to the most unserved and underserved residents of the community. NTIA's Indicators of Broadband Need Map shows over 118,000 households in 24 census tracts in the proposed service areas are without internet. Ten of these census tracts show over 30% of the households with no internet and one census tract in particular shows over 40% of households with no internet. Twenty-three of the twenty-four census tracts show speeds of less than 100/10 Mbps. In addition, more than 75% of these census areas are 20% or more below the federal poverty level.

To address the need for reliable and affordable broadband service in currently unserved or underserved areas, Pima County proposes to create a 134.61-mile open access fiber middle mile ring around the County's urban core. The Project would create a fully diverse redundant fiber infrastructure path that all carriers can utilize. A dependable, redundant Broadband feed in the rural areas would provide the infrastructure needed to bring Fiber to the Home (FTTH) to

all communities within a 25-mile radius, including the City of Tucson, South Tucson, Oro Valley, Tortolita, Catalina Foothills, Tanque Verde, Vail, Corona De Tucson, Sahuarita, Three Points, Picture Rocks, Avra Valley, and Marana. It would also provide resources to large corporations, small businesses and data centers and encourage job creation and economic development in the region. The middle mile network would bring resources to smaller communities and expand resources available to the City of Tucson alike.

The Project has three objectives:

1. Provide a carrier neutral open access network that can be made available to any viable carrier at a reasonable price to build rural communities last mile FTTH networks.

2. Provide an opportunity for existing carriers to swap excess dark fiber in one region for dark fiber in another that would allow them to expand their customer base and build new communities with FTTH significantly reducing cost and build time.

3. Provide public expansion of resources such as public Wi-Fi, Smart Cities, Government services, public safety, traffic control, and shared resources between communities to reduce administrative cost.

This Project would advance the goals of the Middle Mile Broadband Infrastructure Grant Program being administered by the NTIA and would meet the NTIA's objectives of "encouraging the expansion and extension of middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the backbone of the internet" and/or "promote broadband connection resiliency through the creation of alternative network connection paths that can be designed to prevent single points of failure on a broadband network."

1.1.1 Federal Agency Purpose and Need

Bureau of Reclamation

The Bureau of Reclamation (BOR) owns in fee land for the Central Arizona Project (CAP) canal and for its Tucson Mitigation Corridor, a 2,514-acre property acquired as mitigation for the construction of the CAP canal, along Sandario Rd (Section 27, Township 12 South, Range 11 East), Valencia Road (Section 11, Township 15 South, Range 13 East), and West Tangerine Road (Section 31, Township 11 South, Range 12 East) in the proposed project area. BOR's proposed action would be to review and approve any actions proposed by Pima County on BOR's fee land and/or the CAP canal in response to any permit application request made by Pima County to the Central Arizona Water Conservation District (CAWCD) and associated with the Project.

Bureau of Land Management

The purpose of the proposed action is for the Bureau of Land Management (BLM) to issue an temporary construction right-of-way (ROW) for the installation of the fiber optic line and a 30-year ROW grant for the fiber optic line for Pima County for use, maintenance, etc. for any actions proposed by Pima County on BLM lands.

The National Park Service (NPS), Saguaro National Park (Park)

The purpose of the proposed action is for the National Park Service (NPS) to respond to an

application from the Project proponent requesting authorization to install, operate, and maintain a buried fiber-optic communication conduit across NPS-managed lands. To enable the proposed work, the NPS must determine whether to issue a Right-of-Way (ROW) permit for long-term occupancy and a Special Use Permit (SUP) for temporary construction access and installation activities. The purpose of evaluating this request is to ensure that any authorized use protects park resources and values, maintains visitor experience, and complies with all applicable laws, regulations, and policies.

Although the County, as the Applicant, either holds valid ROW easements across portions of the existing roads or asserts that those roads were established as public highways prior to NPS ownership, these rights are limited to install, construct and maintain the easement for highway purposes only. Therefore, installation of fiber within these areas cannot proceed without NPS authorization. An NPS ROW permit and a SUP must be issued, as appropriate, before the Project can be finalized.

The need for action arises because the applicant cannot construct or maintain utility infrastructure on NPS lands without federal authorization. The NPS must make a decision on the ROW and SUP applications, requiring an analysis of potential environmental impacts and a determination of whether the proposed use is consistent with the NPS Organic Act, enabling legislation, park management plans, and other applicable requirements. The NPS also needs to identify appropriate avoidance, minimization, or mitigation measures to protect natural, cultural, and scenic resources; evaluate the effects of construction and long-term operation of the fiber line.

1.2 Agency Participation

NTIA prepared this EA to identify and assess the reasonably foreseeable environmental effects of the Project and alternatives, facilitate public involvement and informed agency decision-making, and recommend appropriate mitigation measures.

Cooperating agencies that are participating in the NEPA process of this Project include the BLM, BOR, and NPS. BLM, BOR, and NPS are underlying landowners of portions of the proposed alignment within the Project.

Consulting parties for Section 106 of the National Historic Preservation Act (NHPA) include Advisory Council on Historic Preservation (ACHP), BLM, BOR, NPS, NTIA, U.S. Army Corps of Engineers (USACE), Arizona Department of Transportation (ADOT), State Historic Preservation Office (SHPO), Arizona State Museum (ASM), Arizona State Land Department (ASLD), City of Tucson, City of South Tucson, Pima County, Town of Marana, Town of Sahuarita, Town of Oro Valley, Ak-Chin Indian Community, Fort Sill Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pasqua Yaqui Tribe, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, Tonto Apache Tribe, and Yavapai-Apache Nation.

Coordination with agencies that have underlying ownership in the Project will include ASLD, BLM, NPS, Union Pacific Railroad (UPRR), BOR, Pima County Flood Control District, City of Tucson, Town of Marana, and Town of Oro Valley.

The EA provides a basis for coordinated federal, state, and local input, review, and decision-making in a single document.

2 Proposed Action and Alternatives

2.1 Proposed Action

The Project would create a 134.61-mile contiguous open access fiber ring network (**Figure 1. State Map**). The fiber ring network surrounds Pima County's urban core and adjacent rural communities. The proposed open-access fiber optic ring path runs within the unincorporated portions of Pima County, spanning from Oro Valley to Marana on the north side, south to Drexel Heights; east covering the entire Drexel Heights area; south to Sahuarita; east from Sahuarita through Corona de Tucson; and north through Vail along the County's eastern portion to the Catalina Foothills; culminating back at Oro Valley. The government-owned infrastructure would ensure affordable, reliable and accessible high-speed broadband services can be provided to as many communities, county and local facilities, anchor institutions and recreational areas as possible. The Project would provide redundant pathways, and in some cases replace primary pathways, to increase resiliency of the broadband infrastructure for the communities that would be served. Various alternatives have been analyzed based on opportunities and constraints regarding environmental resources, constructability, cost, and schedule.

2.1.1 Construction

The Project consists of 14 segments:

- Segment 1 (North Segment) - Magee Road/State Route (SR) 77 to La Canada Drive/Tangerine Road
- Segment 2 (ADOT) – Ina Road to Magee Road
- Segment 3 (Northeast Segment) - Freeman Road/Speedway Boulevard to Ina Road/SR 77
- Segment 4 (East Segment) - I-10/Colossal Cave Road Traffic Interchange (TI) to Freeman Road/Speedway Boulevard
- Segment 5 (ADOT) – I-10 – SR 83 to Colossal Cave Road
- Segment 6 (ADOT) – Sahuarita Road to I-10
- Segment 7 (Sahuarita Segment) – Wilmot Road to SR 83 (along Sahuarita Road)
- Segment 8 (South Segment) – Valencia Road/I-10 to Sahuarita Road (along Wilmot Road)
- Segment 9 (Valencia Segment) - SR 86 to Alvernon Way (along Valencia Road)
- Segment 10 (ADOT) – I-19/Valencia Road TI Crossing
- Segment 11 (ADOT) – SR 86 – Sandario Road to Valencia Road
- Segment 12 (West Segment) - Marana HS to SR 86 (along Sandario Road)
- Segment 13 (Marana Segment) – Sandario Road/Sanders Road to La Canada Drive (along Tangerine Road)
- Segment 14 (ADOT) – I-10/Tangerine Road TI Crossing

BLM land is located within Segments 7, 8, 9, 11, 12, and 13. BOR land is located in Segments 9, 10, 12, and 13. NPS land is located in Segments 4 and 12.

Construction Methodology and Phasing

Construction of the Project would involve construction preparation, construction, and construction footprint restoration. Each phase of construction is outlined below.

Construction Preparation

Staging activities would consist of equipment and/or material being staged on or near the Project site during construction. The staging areas have not yet been determined and would be the responsibility of the contractor. Staging on federal lands is not proposed.

Spring or rigid stand signs would be utilized for traffic control. Ground disturbance and vegetation removal would not be required.

Project Construction

Conduit Installation

All construction is limited to existing roadway alignments and County/City/Town property to minimize impacts to the environment (**see Figure 2. Vicinity Map**). The construction footprint would be cleared of vegetation with a bushhog or similar mowing equipment. Installation of the conduit would occur via horizontal directional drilling, trenching, shallow trenching, micro-trenching within pavement, attaching to existing bridges, rocksaw, and plowing.

Horizontal Directional Drill

Installation of conduit via horizontal directional drilling uses a surface-launched drilling rig to bore into the substrate below along a predetermined horizontal path. The drilling rig used for directional boring is typically hydraulically powered and equipped with a drill bit, or hydraulic cutting jet nozzle for softer soils. Directional boring involves digging an entrance pit with earth moving equipment and drilling a pilot hole. The pilot hole is then re-drilled with a wider-diameter drill once or multiple times to enlarge the boring to the diameter of the conduit. The minimum cover to top of conduit is approximately 40 inches; however, if the 40-inch minimum can't be achieved due to depth of existing utilities, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry).

Photo 1. Example of Horizontal Directional Drill Installation

Trenching

Installation of conduit via trenching would require a backhoe or small excavator. Excavated material is typically cast to the side of the trench as it is being excavated. Once conduit has been placed in the trench, native material would be backfilled. Any excess excavated material would be disposed of offsite per technical specifications. Shallow trenching would be utilized over existing drainage structures or where minimum depth cannot be obtained. Shallow trench depths vary based on utility conflicts, however the minimum cover to top of conduit is approximately 18 inches. The shallow trench would be backfilled with a minimum of 15 inches of two sacks of sand slurry per cubic yard.

Photo 2: Example of Trenching Installation

Plowing

Installation of conduit via plowing would require a small trackhoe with a plow attachment on the back end and a conduit spool on the front end. Plow depths vary based on utility conflicts; however, the minimum cover to top of conduit is approximately 40 inches. If the minimum 40 inches can't be achieved, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry). Plowing would be compacted the same day utilizing a track wheel.

Photo 3: Example of Plowing Installation

Micro-Trench

Installation of conduit via micro-trenching would require a ride-on trencher that has a vacuum excavator with a cutting wheel that creates a narrow cut into existing pavement. The width of the trench is approximately 4-inches with a depth varying between 16 to 24 inches. Trench would be backfilled with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry) with a 2.5-inch by 2-foot asphalt 'T' Patch.

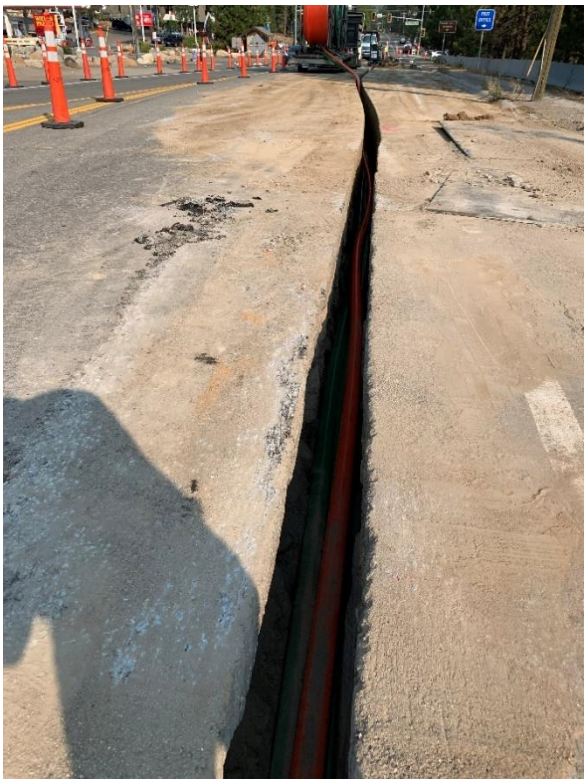

Photo 4: Example of Micro-Trench Installation

Rigid Metal Conduit

Rigid metal conduit would be attached to existing bridge structures using hand tools. The conduit would be attached to the bridge barrier or hung below the bridge deck using minimum ½ inch diameter mechanical expansion anchors. Where rigid metal conduit is installed below grade, the conduit would be wrapped using approved PVC Tape. Anchors would be placed approximately three inches away from the edge of deck. The conduit would be attached to the concrete barrier via C-Channel Struts with Strut Clamps or hung below the bridge deck via hangar assembly.

Photo 5: Example of Rigid Metal Conduit Installation

Rocksaw

Installation of fiber conduit using a rocksaw trencher involves a machine equipped with a rock-cutting wheel and a conduit spool system. This method is effective for cutting through hard surfaces like asphalt, concrete, and compacted soil. Trench depths vary depending on existing utility conflicts. Trenches are typically backfilled and compacted the same day using the machine's integrated compaction wheel or track system.

Pull Box and Vault

Communication pull boxes would be placed approximately every 3,000 feet and splice vaults would be placed approximately every 25,000 feet. Fiber splice enclosures would be installed only in the vault locations. The excavation area for communication pull boxes would be approximately 4 feet wide by 6 feet long and the excavation area for splice vaults would be approximately 5 feet wide by 7 feet long. Each excavation area would then be backfilled with select excavated backfill material and compacted to top of grade.

Photo 6: Example of Pull Box and Vault Installation

Construction Footprint Restoration

The construction footprint would be restored to preconstruction conditions to the extent practicable. Trenches, bore holes, etc. would be backfilled when construction in the area is completed. Seeding is anticipated due to the length of the Project. Construction is anticipated to begin in summer of 2026 and the construction duration is anticipated to be approximately 24 months.

Maintenance

Maintenance would be conducted as needed throughout the life of the fiber cable. Any ground disturbance from maintenance activities would take place within the construction footprint.

2.1.2 Construction on Federal Lands

Bureau of Reclamation

Approximately 2.25 miles of conduit would be installed via horizontal directional drilling (~9,750 feet), trenching (~850 feet), and plowing (~1,260 feet) on BOR lands. Approximately 5 pull boxes and vaults would also be installed on BOR lands. Trenches, bore holes, etc. would be backfilled when construction in the area is completed. All installation would require a land use license from the CAWCD.

Bureau of Land Management

Installation of approximately 3.85 miles of conduit would be installed via horizontal directional drilling (~2,230 feet), trenching (~4,720 feet), and plowing (~13,390 feet) on BLM lands. Approximately 8 pull boxes and vaults would also be installed on BLM lands. Trenches, bore holes, etc. would be backfilled when construction in the area is completed. All installation would require land use authorization from BLM.

National Park Service

Installation of approximately 2.85 miles of conduit would be installed via horizontal directional

drilling (~630 feet), trenching (~1,830 feet), and plowing (~12,050 feet) on NPS lands. Approximately 7 pull boxes and vaults would also be installed on NPS lands. Trenches, bore holes, etc. would be backfilled when construction in the area is completed. All installation would require land use authorization from NPS.

2.2 Alternatives Considered but Eliminated

NTIA may consider an alternative but eliminate it from further analysis under NEPA if it would not be technically or economically feasible or if it would not meet NTIA's purpose and need.

NTIA's review identified the Proposed Action as the only alternative that would be technically or economically feasible and meet the purpose and need because it meets costs needs, avoids environmentally sensitive areas and tribal lands. Therefore, the EA only evaluates the Proposed Action and the No Action Alternative.

After consideration of the additional alternatives, field investigations, and coordination with Pima County and the contractor, the following were eliminated from further analysis during final design (**See Appendix A – Alternatives Map**).

Alvernon Way to Aerospace Parkway to Nogales Highway to Sahuarita Road to Wilmot Road

This alternative was eliminated due to the significant known culturally sensitive sites along this route. The initial design included micro-trenching in the paved shoulder to avoid sites. After conducting additional research regarding the existing pavement section and roadway prism, it was determined that micro-trenching was not feasible due to the shallow depth of the pavement/prism. The remaining alternatives of trench or plow would have impacts to numerous culturally resources sites. Therefore, this alternative was eliminated from further consideration.

Sunrise Drive; Skyline Drive to Swan Road

The Sunrise Drive alternative was eliminated due to construction costs. The number of utilities, traffic and control, landscaping restoration, and rock risk along Sunrise Road would add additional costs to the conduit and pull box installation. Due to the unavoidable rock risk and added costs, this alternative was eliminated from further consideration.

Santa Cruz West Branch Wash; Drexel Road to Valencia Road

The Santa Cruz West Branch Wash was eliminated due to the known culturally sensitive sites along this route. Impacts to these culturally sensitive sites would not be avoidable. These impacts would require cultural monitoring during the installation of conduit and pull boxes, which would add additional costs to the conduit and pull box installation. In addition to the added cost, the cultural monitoring slows down construction production rates adding even further costs to the Project. Due to the unavoidable impacts to culturally sensitive sites and the added costs, this alternative was eliminated from further consideration.

Oak Tree Drive; Drexel Road to Valencia Road

The Oak Tree Drive alternative was eliminated from consideration for multiple reasons including limited ROW available to install the infrastructure, increased costs, and maintenance challenges. The installation would be limited to within the roadway or under the sidewalk. The

pull boxes would be installed within the pedestrian walking path or within the roadway. Both would increase costs for installation and pose difficulties when future maintenance is needed. This alternative was eliminated from further consideration due to the issues described above.

Freeman Road; Tanque Verde Road to Speedway Road

The Freeman Road alternative was eliminated from consideration due to significant known culturally sensitive sites in this area and it is located within privately-owned land which would require additional ROW acquisition.

Tanque Verde Road; Houghton Road to Freeman Road

The Tanque Verde Road alternative was eliminated from consideration due to significant known culturally sensitive sites in this area and due to the elimination of the Freeman Road alternative.

Kolb Road; Sunrise Drive to Sabino Canyon Road

The Kolb Road alternative offers a shorter route when compared to the Sabino Canyon Road alternative. After conducting a field investigation, this proposed alternative was eliminated from further analysis as a hard dig would be required for trenching and would increase costs significantly for this alternative. When moving to micro-trench methodology was contemplated it was determined that the County would not allow impacts to the pavement since it has been paved in the last five years and would be protected under their "no-cut pavement moratorium."

The following alternatives were eliminated from further analysis prior to the preparation of this EA and final design.

Valencia Road; Cardinal Avenue to Oak Tree Drive

The Valencia Road, between Cardinal Avenue and Oak Tree Drive alternative was eliminated due to being located on Tribally-owned lands. The proposed alternative allows for service to adjacent tribal areas and improves the Project's construction schedule by utilizing currently accessible rights-of way rather than crossing tribal lands.

Old Nogales Highway; Valencia Road and Aerospace Parkway

The Old Nogales Highway, between Valencia Road and Aerospace Parkway alternative was eliminated due to being located on Tribally-owned lands. The proposed alternative allows for service to adjacent tribal areas and improves the Project's construction schedule by utilizing currently accessible rights-of way rather than crossing tribal lands.

Colossal Cave Road; Pistol Hill Road to Old Spanish Trail

The Colossal Cave Road to Pistol Hill Road to Old Spanish Trail (around Colossal Cave Mountain) alternative was eliminated due to the high construction cost of installing conduit along a rugged terrain and the lack of residential development, i.e. no community to serve.

NPS Lands (Old Spanish Trail and Sandario Road)

Along Old Spanish Trail, alternative routes were considered to avoid NPS lands at the intersection of Irvington Road and Old Spanish Trail, which is an area that is 80% unserved (Pima County 2026). The alternative of moving the route west along Valencia Road to Houghton Road to Escalante Road was considered but would not meet the project purpose of serving unserved/underserved in the rural

communities. Old Spanish Trail was selected to serve the unserved/underserved areas east of Old Spanish Trail and south of NPS lands. NPS lands were avoided to the extent practicable with the design route being shifted to the west side of the roadway along Old Spanish Trail /Freeman Road to avoid NPS lands.

There is a high density of unserved/underserved communities along Sandario Road, which is 100% unserved (Pima County 2026). Alternative routes west of Sandario Road were considered to avoid NPS lands including Orange Grove Road to River Rock Lane to Avra View Road to Manville Road. These potential routes introduced other federal and state lands as well as areas without existing right-of-way that would be available for utility installation. These areas also contained culturally sensitive areas that lacked inventory. There is no continuous north/south route in this area that avoids NPS lands and connects back to the southern portion of the project area along Sandario Road. Moving the route east of NPS lands would not meet the project purpose due to the proximity of the unserved/underserved communities west of NPS lands along Sandario Road. The alignment adjacent to the existing roadway was selected to minimize impacts to the environment as construction, operation, and maintenance would occur in previously disturbed areas.

2.3 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and the environmental effects described in Section 3 would not occur.

The No Action Alternative would not meet the purpose and need because not constructing the Project would preclude the expansion of high-speed internet access to unserved/underserved communities in Pima County. Existing broadband infrastructure would remain in place and a fully diverse redundant fiber infrastructure path that all carriers can utilize would not be constructed. The No Action Alternative would result in adverse effects on infrastructure and socioeconomics because existing deficiencies in essential infrastructure would continue and the socioeconomic benefits identified in Section 3 would not be realized.

3 Affected Environment and Environmental Effects

This section analyzes the affected environment and the potential environmental effects of the Proposed Action and No Action Alternatives. The Western Region PEIS identified potential environmental effects on the natural and human environment that would result from the implementation of broadband deployment, as well as specific BMPs and mitigation measures that would avoid or minimize such effects. NTIA and Pima County have reviewed the Western Region PEIS and determined that the PEIS includes detailed analyses for all applicable environmental areas of concern (resource areas) for projects in Arizona. Pima County has also reviewed, and commits to adhere to, the resource area-specific BMPs identified in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs).

The EA evaluates the Proposed Action and No Action alternatives for two categories of potential effects:

- Less than significant effects with incorporation of and adherence to the relevant Western Region PEIS BMPs; or
- Less than significant effects with incorporation of and adherence to the relevant Western Region PEIS BMPs plus additional site-specific BMPs and mitigation measures.[2]

Table 3-1 analyzes the potential environmental effects of the Proposed Action under all relevant resource areas. The Affected Environment column summarizes the resource areas discussed in the state-specific PEIS applicable to the Project, supplemented as appropriate with site-specific information and data. The Environmental Effects column includes a statement of potential effects for each resource area, accounting for incorporation of the PEIS BMPs and any additional BMPs or mitigation measures where appropriate (See Appendix J for Project specific BMPs).

[2] *See* FirstNet Authority, Western Region PEISs, https://www.firstnet.gov/network/environmental- compliance/projects/regional-programmatic-environmental-impact-statements.

Table 3- 1 Affected Environment and Environmental Effects of the Proposed Action

Resource Area	Affected Environment	Environmental Effects
Infrastructure	The Project would cross or be immediately adjacent to the following infrastructure categories: surface transportation routes, airports, railroads, aerial utilities, buried utilities, utility towers, and Central Arizona Project facilities, as generally described in the Arizona PEIS chapter (Appendix B - Infrastructure Map). <u>Bureau of Reclamation</u> On BOR lands, the Project would cross or be adjacent to transmission lines along Valencia Road and Sandario Road, and Central Arizona Project facilities along Sandario Road and Tangerine Road. The Project would tie-in with existing conduit on Tangerine Road. Surface transportation routes on BOR lands include portions of Valencia Road, Sandario Road, and Tangerine Road. <u>Bureau of Land Management</u> On BLM lands, the Project would cross or be adjacent to transmission lines along Valencia Road and Wilmot Road. Surface transportation routes on BLM lands include portions of SR 86, Valencia Road, Sahuarita Road, Sandario Road, and Wilmot Road. <u>National Park Service (Saguaro National Park)</u> Surface transportation routes on NPS lands include portions of Old Spanish Trail, Freeman Road, and Sandario Road.	Consistent with Section 3.1.1 and Table 3.1.1-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on infrastructure through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Installation of fiber optic cable would enhance the availability of essential telecommunications infrastructure. Furthermore, it would not adversely affect access to or the function of existing surface transportation routes, airports, railroads, aerial utilities, buried utilities, utility towers, and Central Arizona Project facilities. Construction activities would be temporary and of short duration. Roads would be crossed via bore, with no surface impact to the road. Impacts to traffic would be minimized in maintenance of traffic plans. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would not adversely affect surface transportation routes, airports, railroads, aerial utilities, buried utilities, utility towers, and Central Arizona Project facilities. <u>Bureau of Reclamation</u> Installation of fiber optic cable would not adversely affect access to or the function of existing surface transportation routes, aerial utilities, buried utilities, and Central Arizona Project facilities. Construction activities would be temporary and of short duration. Roads would be crossed via bore, with no surface impact to the road. Impacts to traffic would be minimized in maintenance of traffic plans. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would not adversely affect surface transportation routes, airports, aerial utilities, buried utilities, and Central Arizona Project facilities on BOR lands. Therefore, adverse effects to

Resource Area	Affected Environment	Environmental Effects
		infrastructure would be short-term and negligible. <u>Bureau of Land Management</u> Installation of fiber optic cable would not adversely affect access or the function of existing surface transportation routes, aerial utilities, and buried utilities. Construction activities would be temporary and of short duration. Roads would be crossed via bore, with no surface impact to the road. Impacts to traffic would be minimized in maintenance of traffic plans. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would not adversely affect surface transportation routes, airports, aerial utilities, and buried utilities on BLM lands. <u>National Park Service (Saguaro National Park)</u> Installation of fiber optic cable would not adversely affect access or the function of existing surface transportation routes. Construction activities would be temporary and of short duration. Roads would be crossed via bore, with no surface impact to the road. Impacts to traffic would be minimized in maintenance of traffic plans. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would not adversely affect surface transportation routes on NPS lands.

Resource Area	Affected Environment	Environmental Effects
Soils	Based on review of the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the Project would cross 42 different soils series (NRCS 2025) (Appendix C - Custom Soil Resource Report). Construction activities such as horizontal directional drilling, trenching, plowing, and pull box and vault installation would require vegetation removal and excavation and drilling into the substate. The use of heavy machinery and vegetation removal may cause soil compaction, topsoil mixing, and erosion. The Project area consists of the existing road ROW. The construction footprint is the area where deployment of conduit and equipment maneuvering are expected to occur within the existing road ROW. Three classifications of prime or unique farmlands are in the Project area, which includes the existing roadway alignment (NRCS 2025) (Appendix C – Prime and Unique Farmlands Map). The farmland classifications are identified via NRCS spatial data and no active farmlands are present within the Project area. • Prime farmland if irrigated, • Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season. • Farmland of unique importance. <u>Bureau of Reclamation</u> On BOR lands, approximately 1.2 acres of prime farmland occurs along Valencia Road, ~6.5 acres	Consistent with Section 3.1.2 and Table 3.1.2-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on soils through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region (See Appendix J for Project specific BMPs). There would be minimal adverse effects on soils due to erosion, topsoil mixing, or soil compaction. Any adverse effects on soils within the construction footprint would be temporary. The construction footprint would be restored to preconstruction conditions to the extent practicable after the conduit and pull boxes are installed. The plow, trench, shallow trench, and bore pits would be backfilled with selected excavated native backfill, compacted and returned to existing grade. Construction activities would take place adjacent to the existing roadway alignments within previously disturbed areas and would not impact or convert areas of prime or unique farmland. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would be accessed via existing roads and occur adjacent to the existing roadway alignment within disturbed shoulders. Operation activities would not impact or convert areas of prime or unique farmland. <u>Bureau of Reclamation</u> The plow, trench, and bore pits would be backfilled with selected excavated native backfill, compacted and returned to existing grade. The construction footprint would be restored to preconstruction conditions to the extent practicable after the conduit and pull boxes are installed. Construction and operation activities would take place adjacent to the existing roadway alignment within disturbed shoulders and would not impact or convert prime or unique farmland on BOR land. Adverse effects on soils within the construction footprint would be short-term and minimal. Additionally, BOR's proposed action would not convert existing prime or unique farmland.

Resource Area	Affected Environment	Environmental Effects
	along Sandario Road, and 1.7 acres along Tangerine Road. Approximately 0.4 acres of farmland of unique importance occurs along Tangerine Road. <u>Bureau of Land Management</u> On BLM lands, approximately 0.7 acres of prime farmland occurs along Wilmot Road. <u>National Park Service (Saguaro National Park)</u> No prime or unique farmland intersects the Project on NPS lands.	<u>Bureau of Land Management</u> The plow, trench, and bore pits would be backfilled with selected excavated native backfill, compacted and returned to existing grade. The construction footprint would be restored to preconstruction conditions to the extent practicable after the conduit and pull boxes are installed. Construction and operation activities would take place adjacent to the existing roadway alignment within disturbed shoulders and would not impact or convert prime or unique farmland on BLM land. Any adverse effects on soils within the construction footprint would be temporary. <u>National Park Service (Saguaro National Park)</u> The plow, trench, and bore pits would be backfilled with selected excavated native backfill, compacted and returned to existing grade. The construction footprint would be restored to preconstruction conditions to the extent practicable after the conduit and pull boxes are installed. Construction and operation activities would take place adjacent to the existing roadway alignment within disturbed shoulders. Any adverse effects on soils within the construction footprint would be temporary.
Geology	The Project would be in the Basin and Range Physiographic Province of the Intermontane Plateau Physiographic Region (NPS 2017). The Project area is characterized by Cretaceous to Late Jurassic sedimentary rocks with minor volcanic rocks, Early Pleistocene to late Miocene basin deposits, Early Pleistocene to latest Pliocene surficial deposits, Early Tertiary to Late Cretaceous volcanic rocks, Holocene river alluvium, Middle Miocene to Oligocene sedimentary rocks, Middle Proterozoic granitic rocks, Middle Proterozoic sedimentary rocks, Pliocene to middle Miocene deposits, Quaternary surficial deposits, undivided, and Tertiary to Early Proterozoic gneissic rocks (Horton	Consistent with Section 3.1.3 and Table 3.1.3-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on geology through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). The construction footprint of the buried fiber would be adjacent to the existing roadway alignment within disturbed shoulders, and would not affect, or be affected by, areas with geologic hazards as construction activities would remain in the roadway prism. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would be accessed via existing roads and adjacent to the

Resource Area	Affected Environment	Environmental Effects
	2017). Based on data from U.S. Geological Survey (USGS), a potential karst area is located along Old Spanish Trail from Escalante Road to Calle Javelina (Weary and Doctor 2014). No recent data has been presented on the presence or absence of the potential karst in this area. The Project is not in the vicinity of known sites with extensive fossils within the state (Paleobiology Database 2026). Based on data from Arizona Oil and Gas Conservation Commission (AOGCC), there was one Oil and Gas exploration well ~450 feet from the Project area. This well was used for stratigraphic testing and then converted to a water well (AOGCC 2025). The Santa Rita Fault Zone crosses the Project along Sahuarita Road, approximately 1.2 miles west of Wentworth Road (AGS 2025). <u>Bureau of Reclamation</u> No sensitive geologic features or geologic hazards appear to be present on BOR lands. <u>Bureau of Land Management</u> No sensitive geologic features or geologic hazards appear to be present on BLM lands. <u>National Park Service (Saguaro National Park)</u> On NPS land, a potential karst area is located along Old Spanish Trail from Escalante Road to Calle Javelina, based on data from U.S. Geological Survey (USGS) (Weary and Doctor 2014). No recent data has been presented on the presence or absence of the	existing roadway alignment within disturbed shoulders. Operational activities would not affect or be affected by areas with geologic hazards. Within the area of the potential karst, trenching and directional drill methodologies would be used to install the fiber. Trenching and directional drilling would occur at maximum depths of approximately 40 inches and adjacent to the existing roadway alignment within disturbed shoulders. Lack of recent data on the potential karst and shallow deployment depth would not require any protective measures throughout this area. <u>Bureau of Reclamation</u> No sensitive geologic features or geologic hazards appear to be present on BOR lands. Construction and operational activities would be within the adjacent to the existing roadway alignment within disturbed shoulders and would not affect or be affected by any geological hazards on BOR lands. Adverse effects to geological resources would be short-term and negligible. <u>Bureau of Land Management</u> No sensitive geologic features or geologic hazards appear to be present on BOR lands. Construction and operational activities would be within the adjacent to the existing roadway alignment within disturbed shoulders and would not affect or be affected by any geological hazards on BLM lands. <u>National Park Service (Saguaro National Park)</u> No work would occur within the potential karst area on NPS lands; therefore, geological hazards would not affect or be affected on NPS lands.

Resource Area	Affected Environment	Environmental Effects
	potential karst in this area.	
Water Resources	Based on review of the USGS National Hydrography Dataset (NHD) (USGS 2025), the Project is within the Rillito, Brawley Wash, Upper Santa Cruz and Lower Santa Cruz watersheds and would be within or immediately adjacent to water resources, including streams, rivers, canals, ditches, floodplains, and aquifers. Jurisdictional Waters of the U.S. (WOTUS) that occur within the Project include the Santa Cruz River, Pantano Wash, Tanque Verde Creek, and Canada del Oro (Appendix D – Clean Water Act Section 404/401 Compliance Review). The Project would cross A, AE, AH, AO, D, and X flood hazard zones (FEMA 2025) (Appendix D-Floodplain Map). The Santa Cruz River is impaired for E.coli where it crosses the Project at 32.434872°, -111.233931°. No Outstanding Arizona Water or Wild and Scenic Rivers cross the Project (ADEQ 2025a). The Project would cross the Upper Santa Cruz and Avra Basin sole source aquifer (EPA 2025a) (Appendix D – Sole Source Aquifers and Impaired Waters Map). <u>Bureau of Reclamation</u> On BOR lands, the Project would cross A, AE, AO, and X flood hazard zones (FEMA 2025). <u>Bureau of Land Management</u> On BLM lands, the Project would cross A, AO, and X flood hazard zones (FEMA 2025).	Consistent with Section 3.1.4 and Table 3.1.4-1 of the Arizona chapter of the Western Region PEIS, there would be no effects on water resources through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS or with BMPs and mitigation measures (See Appendix J for Project specific BMPs). Work at jurisdictional WOTUS includes conduit installation via bridge attachment only. The conduit would be installed from the bridge deck by bucket truck or similar. No work would occur under the bridge; therefore, no impacts to potential WOTUS would occur and Section 404/401 permitting is not required. Although work would occur within the 100- or 500- year floodplain, new permanent impacts would be minimal because construction would take place adjacent to the existing roadway alignment within disturbed shoulders and would not redirect water flow or prevent water infiltration. Construction activities would not change overland flow or groundwater recharge. The Project would result in disturbance of 1 or more acres of land; therefore, a Stormwater Pollution Prevention Plan (SWPPP) and an Arizona Pollutant Discharge Elimination System (AZPDES) permit would be required (ADEQ 2025b and ADEQ 2025c). During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would be accessed via existing roads and occur adjacent to the existing roadway alignment within disturbed shoulders. Operational activities would not occur within water resources; therefore, would not impact any water resources. <u>Bureau of Reclamation</u> Although work would occur within the 100- or 500- year floodplain, new permanent impacts would be minimal because construction would take place adjacent to the existing roadway alignment

Resource Area	Affected Environment	Environmental Effects
	National Park Service (Saguaro National Park) On NPS lands, the Project would cross D and X flood hazard zones (FEMA 2025).	within disturbed shoulders and would not redirect water flow or prevent water infiltration. Construction activities would not change overland flow or groundwater recharge on BOR lands. Operational activities would occur adjacent to the existing roadway alignment within disturbed shoulders and have limited ground disturbance (if any) and would not take place within water resources. Therefore, no impacts to water resources would occur. Bureau of Land Management Work would occur within the 100- or 500- year floodplain, new permanent impacts would be minimal because construction would take place adjacent to the existing roadway alignment within disturbed shoulders and would not redirect water flow or prevent water infiltration. Construction activities would not change overland flow or groundwater recharge on BLM lands. Operational activities would occur adjacent to the existing roadway alignment within disturbed shoulders and have limited ground disturbance (if any) and would not take place within water resources. Therefore, no impacts to water resources would occur as a result of operational activities. National Park Service (Saguaro National Park) Work would occur within the 100- or 500- year floodplain, new permanent impacts would be minimal because construction would take place adjacent to the existing roadway alignment within disturbed shoulders and would not redirect water flow or prevent water infiltration. Construction activities would not change overland flow or groundwater recharge on NPS lands. Operational activities would occur within adjacent to the existing roadway alignment within disturbed shoulders and have limited ground disturbance (if any) and would not take place within water resources. Therefore, no impacts to water resources would occur as a result of operational activities.

Resource Area	Affected Environment	Environmental Effects
Wetlands	Based on review of the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), the Project would be located in, or adjacent to, wetlands classified under the national Wetlands Classification Standard (WCS) as riverine, lacustrine, and palustrine wetlands (USFWS 2025). Based on field reconnaissance, no lacustrine or palustrine wetlands are located within the Project (Appendix D – Clean Water Act Section 404/401 Compliance Review). <u>Bureau of Reclamation</u> On BOR land, the Project would be located in or adjacent to wetlands classified under the national WCS as riverine (USFWS 2025). Approximately 0.48 acres are located along Sandario Road (including ~0.16 acres along the CAP), ~0.01 acres along Valencia Road, and ~0.04 acres along Tangerine Road. <u>Bureau of Land Management</u> On BOR land, the Project would be located in or adjacent to wetlands classified under the national WCS as riverine (USFWS 2025). Approximately 0.15 acres are located along Valencia Road and ~ 0.09 acres along Sahuarita Road. <u>National Park Service (Saguaro National Park)</u> On NPS land, the Project would be located in or adjacent to wetlands classified under the national WCS as riverine (USFWS 2025). Approximately 0.58 acres are located along Sandario Road, ~ 0.06 along Old Spanish Trail, and ~ 0.07 along Freeman Road	Consistent with Section 3.1.5 and Table 3.1.5-1 of the Arizona chapter of the Western Region PEIS, there would be no effects on wetlands through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Work near jurisdictional WOTUS classified as riverine wetlands includes conduit installation via bridge attachment only. The conduit would be installed from the bridge deck by bucket truck or similar or by boring under WOTUS. No work would occur under the bridge; therefore, no impacts to riverine wetlands would occur and Section 404/401 permitting is not required. During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and would be accessed via existing roads and from the bridge deck. Operation activities would not impact any wetlands. <u>Bureau of Reclamation</u> On BOR lands, work near riverine wetlands includes conduit installation via bridge attachment. The proposed action on BOR land would not impact jurisdictional wetlands or Waters of the U.S. and Section 404/401 permitting is not required. <u>Bureau of Land Management</u> On BLM lands, work near riverine wetlands includes conduit installation via bridge attachment only. No work would occur in the wetlands; therefore, no impacts to riverine wetlands would occur and Section 404/401 permitting is not required. <u>National Park Service (Saguaro National Park)</u> On NPS lands, work near riverine wetlands includes conduit installation via bridge attachment. No work would occur in the wetlands; therefore, no impacts to riverine wetlands would occur and Section 404/401 permitting is not required.

Resource Area	Affected Environment	Environmental Effects
Biological Resources	Biological resources include terrestrial vegetation, terrestrial and aquatic habitat, wildlife, threatened and endangered species, and species of conservation concern. Vegetation The Project occurs within the Environmental Protection Agency (EPA) Mazdrean Archipelago and Sonoran Basin and Range Level III ecoregions (EPA 2025b). The dominant vegetation observed within the construction footprint consists of creosote (*Larrea tridentata*), brittlebush (*Encelia farinosa*), buffelgrass (*Pennisetum ciliare*), and Bermuda grass (*Cynodon dactylon*). Vegetation density within the proposed construction footprint ranges from 0 to 40% canopy cover, 0-80% shrub cover, and 0-100% groundcover. Approximately 34 acres of vegetation, including trees, shrubs, cacti, and groundcover, would be removed during construction of the Project. The Arizona Game and Fish (AGFD) Online Environmental Review Tool (OERT) identified Pima pineapple cactus (*Coryphantha scheeri var. robustispina)* as occurring within 3 miles of the Project area. Pima pineapple cactus (PPC) surveys were conducted for areas outside of the Pima County Section 10 permit area[3] (Appendix F – Section 10 Permit Area Map). Six individual PPC were found as a result of these surveys; however mitigation measures are included to prevent impacts to observed PPC (Appendix E – Biological Evaluation).	Consistent with Section 3.1.6 and Table 3.1.6-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on vegetation, wildlife, or fisheries through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs) and with BMPs and mitigation measures discussed below. Additionally, any impacts to species covered under Pima County's Multi-Species Conservation Plan (MSCP),will be mitigated according to the Section 10 permit terms.[4] The contractor would also implement the following mitigation measures to prevent the spread of noxious and invasive species and prevent impacts to PPC, migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants.[5] *Pima County Responsibilities:* • The Pima County Project Manager will review and approve the resumes of the qualified biologist(s) employed by the contractor. • Pima County shall employ a qualified biologist to complete pre-construction protocol surveys for Pima pineapple cactus within 14 days of construction in all suitable habitat that will be disturbed beyond the Pima County Section 10 Permit Area. Upon completion of the surveys, the qualified biologist shall provide the Pima County Project Manager survey results. *Contractor Responsibilities:* • If vegetation clearing will occur during the migratory bird breeding season (March 1 - August 31), the

[3] *See* Biological Evaluation (Section 1.1) in Appendix E for detailed description on Pima County's Section 10 Permit and survey methods.
[4] *See* Pima County's Multi-Species Conservation Plan Section 10 Permit, https://content.civicplus.com/api/assets/0f5f9380-c666-4acf-8be5-c4e1f610ae00
[5] *See* Biological Evaluation in Appendix E for mitigation measures and associated attachments.

Resource Area	Affected Environment	Environmental Effects

	The following noxious and/or invasive plants were observed within the construction footprint and surrounding area: tamarisk (*Tamarix spp.*), Palmer's amaranth (*Amaranthus palmeri*), buffelgrass (*Pennisetum ciliare*), cheeseweed (*Malva parviflora*), fountain grass (*Pennisetum setaceum*), Bermuda grass (*Cynodon dactylon*), Russian thistle (*Salsola tragus*), Johnsongrass (*Sorghum halepense*), red brome (*Bromus rubens*), and cheatgrass (*Bromus tectorum*).
	
	<u>Wildlife</u>
	General wildlife observed within the Project area included coyote (*Lepus californicus*), javelina (*Tayassu tajacu*), desert cottontail (*Sylvilagus audubonii*), round-tail ground squirrel (*Xerospermophilus tereticaudus*), Clark's spiny lizard (*Sceloporus clarkii*), western whiptail (*Aspidoscelis tigris*), European starling (*Sturnus vulgaris*), Gila woodpecker (*Melanerpes uropygialis*), verdin (*Auriparus flaviceps*), cliff swallow (*Petrochelidon pyrrhonota*), black gnatcatcher (*Polioptila melanura*), white-winged dove (*Zenaida asiatica*), red-tailed hawk (*Buteo jamaicensis*), northern cardinal (*Cardinalis cardinalis*), common raven (*Corvus corax*), red-winged blackbird (*Agelaius phoeniceus*), yellow warbler (*Setophaga petechia*), blue grosbeak (*Passerina caerulea*), Bell's vireo (*Vireo bellii*), lesser nighthawk (*Chordeiles acutipennis*), Anna's hummingbird (*Calypte anna*), vermilion flycatcher (*Pyrocephalus rubinus*), pyrrhuloxia (*Cardinalis sinuatus*), green heron (*Butorides virescens*), mourning dove (*Zenaida macroura*), great-tailed grackle (*Quiscalus mexicanus*), dark-eyed junco (*Junco hyemalis*), and
		contractor shall avoid any active bird nests. If the active nests cannot be avoided, the contractor shall notify the Project Manager to evaluate the situation. During the non-breeding season (September 1 - February 28) vegetation removal is not subject to this restriction.
		• The contractor shall develop a Noxious and Invasive Plant Species Treatment and Control Plan in accordance with the requirements in the contract documents.
		  ○ Plants to be controlled shall include those listed in the state and federal noxious weed and the state invasive species lists in accordance with state and federal laws and executive orders.
		  ○ The plan and associated treatments shall include all areas within the project right-of-way and easements as shown on the project plans.
		  ○ The treatment and control plan shall be submitted to the Pima County Project Design & Construction Department Project Manager for review and approval prior to implementation by the contractor.
		  ○ Control of noxious and invasive species in the project area shall be performed prior to the start of ground-disturbing activities, throughout the duration of construction, and any landscape establishment period.
		• To prevent the introduction of invasive species seeds, all earthmoving and hauling equipment shall be washed prior to entering the construction site and the contractor shall inspect all construction equipment and remove all attached debris, including plant parts, soil and mud, prior to the equipment entering the

Resource Area	Affected Environment	Environmental Effects
	Rufous-winged sparrow (*Peucaea carpalis*). Important bird areas (IBA) that cross the Project include: Tanque Verde Wash/Sabino Canyon IBA, Tucson Mountains IBA, Tucson Sky Islands and Sonoran Uplands IBA (National Audubon Society 2025). According to the AGFD OERT (Appendix E – OERT), the Project intersects 17 Pima County Wildlife Movement Areas and 2 Pima County Wildlife Crossing Areas, and 4 AGFD Conservation Opportunity Areas. The Information for Planning and Consultation (IPaC) tool (Appendix E – IPaC) includes a list of migratory birds of concern in the Project area and indicates that bald and/or golden eagles may be present within the Project area. Review of the Southwestern Bald Eagle Management Committee (SWBEMC) eagle nesting locations shows that no bald eagle nests are located within the Project area (SWBEMC 2025). General habitat for migratory birds covered under the Migratory Bird Treaty Act (MBTA) including trees and suitable ground- nesting habitat are present within the construction footprint. <u>Threatened and Endangered Species and Critical Habitat</u> See Appendix E - Table E-1 for species that may be located within the Project area based on review of the USFWS IPaC and AGFD OERT. Critical habitat for federally listed species is not present in or immediately adjacent to the Project area. <u>Bureau of Reclamation</u> Federal lands, including BOR, are not covered under Pima County's Section 10 Permit. PPC surveys were conducted within the proposed	construction site. • To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction and hauling equipment and remove all debris, including plant parts, soil and mud, prior to leaving the construction site. • Protected native plants within the project limits will be impacted by this project; therefore, the contractor will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the contractor will send the notification at least 60 (sixty) calendar days prior to the start of construction. • The contractor shall employ a qualified biologist(s) to fence off known Pima pineapple cactus locations. The qualified biologist(s) shall have sufficient Pima pineapple cactus experience to carry out these duties. • Within 14 days of construction, the contractor shall submit the resumes of the qualified biologist(s) to the Pima County Project Manager for approval. • Within 14 days of construction, the qualified biologist(s) shall fence off an avoidance area around all known Pima pineapple cactus locations in the project limits using T-posts and orange plastic mesh construction fencing. There shall be a (minimum) 10-meter buffer between any Pima pineapple cactus and the fencing material. The contractor shall furnish the fencing materials. • The contractor shall avoid all fenced and otherwise designated sensitive resource areas within or adjacent to the project area. • The contractor will contact the Pima County Project Manager at least ten (10) working days prior to the commencement of work to ensure compliance with

Resource Area	Affected Environment	Environmental Effects
	construction footprint on BOR lands. No PPC were observed during these surveys on BOR lands. Noxious and/or invasive species were observed within and adjacent to the construction footprint on BOR lands. Trees, shrubs, and groundcover suitable for nesting are present within the construction footprint. Critical habitat for federally listed species is not present in or immediately adjacent to BOR lands within the Project area. <u>Bureau of Land Management</u> Federal lands, including BLM, are not covered under Pima County's Section 10 Permit. PPC surveys were conducted within the construction footprint on BLM lands. No PPC were observed during these surveys on BLM lands. Noxious and/or invasive species were observed within and adjacent to the construction footprint on BLM lands. Trees, shrubs, and groundcover suitable for nesting are present within the construction footprint. Critical habitat for federally listed species is not present in or immediately adjacent to BLM lands within the Project area. <u>National Park Service (Saguaro National Park)</u> Federal lands, including NPS, are not covered under Pima County's Section 10 Permit. PPC surveys were conducted within the construction footprint on NPS lands. No PPC were observed during these surveys on NPS lands. Noxious and/or invasive species were observed within and adjacent to the construction footprint on	avoidance areas. • The contractor shall restrict all construction activities and vehicle use to areas as identified in the design plans. • If any damage to a Pima pineapple cactus occurs, or if previously unidentified Pima pineapple cacti are encountered during any activity related to construction, the contractor shall stop work immediately at that location and shall take all reasonable steps to protect the cactus in place. The Contractor shall notify the qualified biologist (if onsite) and contact the Pima County Project Manager immediately to make arrangements for proper treatment of the cactus. • Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, contractors' employees, supervisors, inspectors, and subcontractors, shall review the attached "Western Burrowing Owl Awareness" flyer. • If any burrowing owls or active burrows are identified, the contractor shall notify the Project Manager to evaluate the situation immediately. No construction activities shall take place within 100 feet of any active burrow. • If the Owner, in cooperation with the biologist, determines that burrowing owls cannot be avoided, the contractor shall employ a qualified biologist holding a permit from the U.S. Fish and Wildlife Service to relocate burrowing owls from the project area, as appropriate. • If any Sonoran Desert tortoises are encountered during construction, the contractor shall adhere to the AGFD "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects," revised September 22, 2014.

Resource Area	Affected Environment	Environmental Effects
	NPS lands. Trees, shrubs, and groundcover suitable for nesting are present within the construction footprint. Critical habitat for federally listed species is not present in or immediately adjacent to NPS lands within the Project area.	Consistent with Section 3.1.6 and Table 3.1.6-1 of the Arizona chapter of the Western Region PEIS, the Project would have no effect on the Pima pineapple cactus, would not jeopardize the Monarch butterfly, and any impacts to the yellow billed cuckoo would be mitigated according to the Pima County's Section 10 Permit terms (see Table E-1). During the operation of the network, ground disturbance during routine maintenance would typically be minor if it occurred at all and maintenance activities would be of short and temporary duration. Operational activities are not anticipated to impact biological resources. <u>Bureau of Reclamation</u> On BOR land, the proposed action would result in negligible, short-term adverse effects to vegetation from construction of project features. BMPs would be implemented to avoid the spread of invasive plant species. The proposed action would have minor, adverse, short-term effects to general wildlife due to noise and other activities related to construction. Adverse effects to migratory birds, western burrowing owls, and Sonoran desert tortoise would be negligible with the implementation of BMPs. The proposed action would not adversely affect bald or golden eagles or species listed or proposed to be listed under the Endangered Species Act or designated or proposed critical habitat. <u>Bureau of Land Management</u> The County and contractor would also implement the mitigation measures above to prevent the spread of noxious and invasive species and prevent impact to migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants. A Pesticide Use Permit will be required for the control of noxious and invasive species on BLM lands. Operation activities

Resource Area	Affected Environment	Environmental Effects
		would have minor ground disturbance (if any) and are not anticipated to impact biological resources on BLM lands. <u>National Park Service (Saguaro National Park)</u> The County and contractor would also implement the mitigation measures above to prevent the spread of noxious and invasive species and prevent impacts to migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants. Additionally, the contractor would implement the following mitigation measure when working on NPS lands: <u>*Contractor Responsibility:*</u> • NPS shall inspect all equipment before work begins and equipment must be free of soil and organic material before being off loaded or work begins. Operation activities would have minor ground disturbance (if any) and are not anticipated to impact biological resources on NPS lands.
Land Use, Recreation, and Airspace	Based on review of USGS Land Cover Data (Gap Analysis Project (GAP)), the Project crosses land classified as developed, shrub/scrub, and agricultural (USGS 2011). The Project would result in approximately 228 acres of temporary ground disturbance; specific types of vegetation impacts are discussed above, in vegetation. The Project would not result in the permanent conversion of land to a new land use category. The Project would cross federally owned and state-owned land including BLM, BOR, NPS and ASLD (see Appendix A – Figure 1. Vicinity Map). See Appendix F Table F-1 for impacts on state and federally owned land. See discussion below for impacts on federally owned land.	Consistent with Section 3.1.7 and Table 3.1.7-1 of the Arizona chapter of the Western Region PEIS, there would be no effects on land use, recreation, or airspace through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Changes in the existing land use would be minimal during the construction phase because the proposed action would install conduit adjacent to the existing roadway alignment within disturbed shoulders, and construction would be temporary and of short duration. Project effects on recreation would be less than significant because they would not result in access restrictions or visitation reductions, and construction would occur adjacent to the existing roadway alignment within disturbed shoulders. Operation and maintenance activities would be implemented

Resource Area	Affected Environment	Environmental Effects
	Bureau of Reclamation See Appendix F - Table F-1 for impacts BOR land. Bureau of Land Management See Table F-1 for impacts BLM land. National Park Service (Saguaro National Park) See Appendix F - Table F-1 for impacts NPS land. The Project would cross or be directly adjacent to the following recreation areas: Saguaro National Park. Saguaro National Park preserves fragile wildlife habitat, Saguaro National Park is open to public use for camping/lodging, hiking, and driving (NPS 2025a).	over the life of the Project. The utility owner would be required to apply for, obtain, and maintain an encroachment permit from lead agency to operate and maintain the telecommunications facilities within the agency's ROW. Bureau of Reclamation BOR's proposed action would not adversely affect existing land uses, recreation, or airspace in the Project area. Bureau of Land Management Changes to existing land use would be minimal as the construction activities would involve installing conduit adjacent to the existing roadway alignment within disturbed shoulders on BLM lands. Land use authorization will be required for conduit installation on BLM lands. National Park Service (Saguaro National Park) Changes to existing land use would be minimal as the construction activities would involve installing, operating and maintaining the conduit underground on NPS lands. Construction, operation and maintenance activities would not result in access restrictions or visitation reduction on Saguaro National Park; therefore, no impacts to recreation are anticipated.
Visual Resources	Landscape characteristics at and around the Project area are discussed above under Land Use. The Project would cross or be adjacent to the following visual resources: historic properties and cultural resources (which are described further below), the Patagonia- Sonoita Scenic Road along SR 83 from Sahuarita Road to I-10 (ADOT 2025), and Saguaro National Park (Tucson and Rincon Mountain Districts) along Sandario Road and Old Spanish Trail. The Patagonia- Sonoita Scenic Road was designated by ADOT in 1985 and intersects several points of interest including Patagonia-Sonoita Creek Preserve,	Consistent with Section 3.1.8 and Table 3.1.8-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on visual resources through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Changes in the existing viewshed would be isolated during the construction and deployment phases and the areas would be restored to preconstruction conditions after construction. Fiber utility markers will be utilized where the conduit is installed between 6 to 12 inches due to existing infrastructure obstructions and at each communication pull box/splice vault location. Fiber utility markers are approximately 3 inches wide and approximately

Resource Area	Affected Environment	Environmental Effects
	Empire-Cienega Resource Conservation Area, Patagonia Lake State Park, Imperial Alta Historical Society Museum, and Kentucky Camp Historic Site (ADOT 2025). <u>Bureau of Reclamation</u> No historic or scenic routes are located within or adjacent to BOR lands. <u>Bureau of Land Management</u> No historic or scenic routes are located within or adjacent to BLM lands. <u>National Park Service (Saguaro National Park)</u> What is now Saguaro National Park was established as a National Monument in 1933 to protect the saguaro cactus. By 1994, it was designated as a National Park (NPS 2025b). Saguaro National Park (Tucson and Rincon Mountain Districts) is located adjacent to the Project area along Sandario Road and Old Spanish Trail.	72 inches long with approximately 48 inches being above ground. Fiber utility markers would be located adjacent to the existing roadway alignment and would not adversely affect visual resources. <u>Bureau of Reclamation</u> Adverse effects to visual resources would be long-term, but negligible resulting from fiber utility markers located adjacent to the existing roadway alignment on BOR land. <u>Bureau of Land Management</u> Changes to the existing viewshed would be isolated during the construction and deployment activities. The fiber utility markers would be located adjacent to the existing roadway alignment on BLM lands and are of such small scale that they would not adversely affect visual resources. <u>National Park Service (Saguaro National Park)</u> Changes to the existing viewshed would be isolated during the construction and deployment activities. The fiber utility markers would be located within adjacent to the existing roadway alignment on NPS lands and are of such small scale that they would not adversely affect visual resources on Saguaro National Park.
Socioeconomics	The Project occurs in Pima County, Arizona. All work would be adjacent to the existing roadway alignment. The Arizona chapter of the Western Region PEIS provides the socioeconomic conditions present in the state based on information available at the time of publication. While the current demographics and conditions within the Project area may vary from those in the PEIS, the general effects of broadband fiber deployment would be the same as those described in the PEIS. Therefore, the conditions	Consistent with Section 3.1.9 and Table 3.1.9-1 of the Arizona chapter of the Western Region PEIS, there would be no socioeconomic effects through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Because the Project would be located adjacent to the existing roadway alignment, the Project would result in negligible adverse changes to economic conditions, including property values and/or rental fees, jobs and unemployment rates, and population changes. Any adverse effects would be locationally

Resource Area	Affected Environment	Environmental Effects
	presented in the PEIS are a good representation of the general existing socioeconomic conditions.	isolated and limited in duration. The Project may also result in direct and indirect beneficial effects associated with increased access to broadband services. Bureau of Reclamation BOR's proposed action would be located adjacent to the existing roadway alignment, and would result in short-term, negligible adverse changes to economic conditions, including property values and/or rental fees, jobs and unemployment rates, and population changes. Bureau of Land Management Because the Project would be located adjacent to the existing roadway alignment, the Project would result in negligible adverse changes to economic conditions, including property values and/or rental fees, jobs and unemployment rates, and population changes. Any adverse effects would be locationally isolated and limited in duration. National Park Service (Saguaro National Park) Because the Project would be adjacent to the existing roadway alignment, the Project would result in negligible adverse changes to economic conditions, including property values and/or rental fees, jobs and unemployment rates, and population changes. Any adverse effects would be locationally isolated and limited in duration.
Historic and Cultural Resources	For the Project, the Area of Potential Effects (APE) encompasses approximately 134.61 miles of existing road rights-of-way of varying widths, totaling about 2,736 acres. The APE includes lands owned or managed by the ADOT, ASLD, U.S. Department of the Interior's BLM, BOR, and NPS, as well as the City of Tucson, Pima County, Town of Marana, and Town of Oro Valley. The APE includes all areas where direct or	Consistent with Section 3.1.11 and Table 3.1.11-1 of the Arizona chapter of the Western Region PEIS, potential adverse effects on historic properties and cultural resources resulting from the Project would be avoided, minimized, or mitigated through adherence to the BMPs and mitigation measures identified in Chapter 9 of the PEIS (See Appendix J for Project specific BMPs), as well as through implementation of measures specified in the PA executed for the Project.

Resource Area	Affected Environment	Environmental Effects
	indirect impacts may occur as a result of the Project, such as physical disturbance, visual changes, or other potential effects to historic properties. Cultural Resources Overview To evaluate the potential for the Project to affect cultural resources, Pima County conducted a records check of the APE (Russell and Langan 2024) and recently completed a Class III cultural resources survey (Langan et al., 2025). Based on current records, 50 previously recorded archaeological sites intersect the preliminary APE. Of these, 33 are Ancestral Native American, 12 are historic-era, 4 are multicomponent, and 1 is undated. Among the Ancestral Native American sites, 25 are artifact scatters (including eight with suspected or confirmed features), and eight are residential in nature. The historic-era sites include four artifact scatters (one with features), three habitations, one business, one feature complex, two roads, and one utility line. The four multicomponent sites consist of three historic residences containing Ancestral Native American artifacts and one artifact scatter with both prehistoric and historic materials. Of the 50 sites, 14 have been determined eligible for listing in the National Register of Historic Places (NRHP), 12 have been determined ineligible, and 24 remain unevaluated. In addition, background research identified 25 historic-era in-use structures within or intersecting the preliminary APE, including 13 roads, four residential districts, three utility lines, one shrine, one canal, two railroads, and one post office. Of these, 10 structures	The Project traverses a culturally and archaeologically sensitive landscape, as documented in the Affected Environment section and further substantiated by the Programmatic Agreement between the NTIA and the SHPO (November 2025). Because the effects on historic properties cannot be fully determined prior to project approval, NTIA has determined that the execution of a Programmatic Agreement pursuant to 36 CFR § 800.14(b)(1)(ii) is the most appropriate and legally sufficient method for addressing potential effects in a phased manner. Under the PA, Pima County—in coordination with NTIA, SHPO, federally recognized Tribes, and other consulting parties—will implement a phased approach to the identification, evaluation, and treatment of historic properties. As part of this process, Pima County will prepare a HPTP, which will define specific measures to avoid, minimize, or mitigate adverse effects on historic properties and cultural resources within the APE. The HPTP will incorporate a MDP to ensure proper management of previously unidentified or buried resources that may be encountered during construction. If complete avoidance of historic properties is not feasible, minimization and mitigation measures will be implemented consistent with the HPTP. These may include, but are not limited to: • Archaeological data recovery or targeted excavation; • Documentation and recordation in accordance with the Secretary of the Interior's Standards; • Tribal coordination and treatment of properties of traditional religious or cultural significance; • Public interpretation or educational efforts to enhance understanding of regional cultural heritage; and • Other site-specific treatments developed in consultation with NTIA, SHPO, Tribes, and other consulting parties. Through adherence to the Western Region PEIS BMPs, combined with the detailed procedures and consultation framework

Resource Area	Affected Environment	Environmental Effects
	are NRHP-eligible, two are ineligible, and 13 have not yet been evaluated. <u>Cultural Sensitivity and Justification for a Programmatic Approach</u> The APE traverses the Sonoran Desert cultural landscape, an area with a high density and diversity of known and potential historic properties spanning thousands of years of human occupation. This landscape includes Ancestral Native American habitation areas, agricultural features, historic transportation corridors, and properties of traditional religious and cultural significance to Tribes. Geomorphological investigations indicate a high potential for buried or obscured archaeological deposits, particularly in alluvial zones and near major drainages where repeated flooding and sedimentation have obscured older land surfaces. Given this high archaeological sensitivity and the complex, multi-jurisdictional nature of the undertaking—crossing federal, state, county, and municipal lands—the NTIA determined that potential effects to historic properties could not be fully identified prior to Project approval. Accordingly, NTIA, in consultation with the Arizona State Historic Preservation Office (SHPO), federally recognized Tribes, and other stakeholders, executed a Programmatic Agreement (PA) (March 2026) pursuant to 36 CFR § 800.14(b)(1)(ii). The PA establishes a phased process for the identification, evaluation, and treatment of historic properties within the APE, ensuring that project implementation proceeds in compliance with Section 106 of the NHPA. It requires preparation of an	established in the Programmatic Agreement, the Project is expected to have no unmitigated adverse effect on historic properties or cultural resources. The PA and its implementing plans ensure that cultural resource protection will be integrated into all phases of project design and construction, providing both regulatory compliance and stewardship of the region's cultural heritage. <u>Bureau of Reclamation</u> Pima County has been delegated authority as the lead agency for cultural compliance on behalf of the National Telecommunications and Information Administration and BOR for the proposed action. BOR's compliance responsibilities under the National Historic Preservation Act, as amended, are fulfilled for this undertaking per the *Programmatic Agreement Between the National Telecommunications and Information Administration and the Arizona State Historic Preservation Officer Pursuant to 36 CFR Part 800 Regarding the Pima County Regional Middle Mile Fiber Optic Ring, Pima County, Arizona*, executed in 2026. Implementation of the Project on BOR-administered lands would occur within existing road rights-of-way; however, ground-disturbing activities have the potential to affect known NRHP-eligible archaeological resources as well as currently unidentified or unevaluated cultural resources. Because the precise locations and characteristics of all cultural resources within the APE are not fully known, the nature and extent of effects cannot be determined in advance. Potential effects may include physical disturbance to archaeological deposits or indirect effects to the setting of historic properties. All effects determinations and resolution of potential adverse effects will be carried out in accordance with the Programmatic Agreement (PA), including phased identification, evaluation, consultation, and implementation of avoidance, minimization, or mitigation measures, as appropriate.

Resource Area	Affected Environment	Environmental Effects
	Inventory Report, a Historic Properties Treatment Plan (HPTP), and a Monitoring and Discovery Plan (MDP) to guide ongoing consultation, archaeological monitoring, and treatment of any unanticipated discoveries during construction. This programmatic approach is warranted and appropriate due to: • The broad geographic extent of the APE across varied land jurisdictions; • The high potential for encountering previously unidentified buried resources; • The presence of multiple NRHP-eligible and unevaluated properties; and • The importance of ongoing consultation with Tribes regarding properties of cultural and religious significance. In summary, the Project is situated within a culturally rich and archaeologically sensitive environment. Implementation of the Programmatic Agreement ensures that historic properties and traditional cultural places are identified, considered, and appropriately treated through coordinated efforts among NTIA, Pima County, SHPO, Tribes, and other consulting parties. The phased framework established by the PA provides a clear and enforceable process for avoiding, minimizing, or mitigating adverse effects to cultural resources throughout the life of the Project. <u>Bureau of Reclamation</u> Portions of the APE occur on lands administered by the Bureau of Reclamation, entirely within existing road rights-of-way. These areas are located within the broader Sonoran Desert cultural landscape,	<u>Bureau of Land Management</u> On BLM-administered lands, the Project would be implemented within existing transportation corridors. Although one NRHP-eligible historic resource has been identified within the APE, construction activities are expected to remain within previously disturbed areas. Nevertheless, the potential exists for effects to known or unidentified cultural resources. Any effects to historic properties will be evaluated and resolved through the procedures established in the PA, including coordination with the BLM and consulting parties. <u>National Park Service (Saguaro National Park)</u> The Project on NPS-administered lands would be adjacent to the existing roadway alignment adjacent to Saguaro National Park. While these corridors have experienced prior disturbance, several previously recorded archaeological sites within the APE remain unevaluated for NRHP eligibility, and additional subsurface cultural resources may be present. As a result, the potential exists for effects to historic properties that cannot be fully characterized in advance. Effects determinations and any necessary treatment measures will be addressed through the PA's phased identification and consultation process in coordination with the National Park Service and consulting parties. <u>Summary Statement for Effects on Federal Lands</u> Through implementation of the Programmatic Agreement, anticipated to be executed in February 2026, potential effects to historic properties and cultural resources on federal lands will be appropriately identified, evaluated, and resolved in compliance with Section 106 of the National Historic Preservation Act. The PA provides a consistent framework for addressing cultural resources across all federal land jurisdictions within the APE, including lands administered by the

Resource Area	Affected Environment	Environmental Effects
	which has a high potential for Ancestral Native American and historic-period cultural resources, including archaeological sites and historic linear features. Records review and survey efforts identified several archaeological sites within the APE on BOR-administered lands. These include sites that have been determined eligible for listing in the National Register of Historic Places (NRHP) as well as areas with the potential for additional, unidentified cultural resources. The identified resources reflect the long history of Indigenous occupation and land use within the region. <u>Bureau of Land Management</u> BLM-administered lands within the APE occur completely within existing road-rights-of-way. As with the broader APE, these lands are situated within a culturally sensitive landscape with a long history of human occupation. Known archaeological sites, historic-period resources, and areas with the potential for buried cultural materials are present or may be present within the APE on BLM lands. One NRHP-eligible historic resource has been identified within the APE on BLM lands. In addition, the broader landscape retains the potential for previously unidentified cultural resources, particularly archaeological deposits that may be present beneath existing ground surfaces. <u>National Park Service (Saguaro National Park)</u> NPS-administered lands within the APE are confined to existing roadway alignment and disturbed corridors adjacent to Saguaro National Park. Cultural resource investigations identified several previously recorded archaeological sites within	Bureau of Reclamation, Bureau of Land Management, and National Park Service.

Resource Area	Affected Environment	Environmental Effects
	these areas. While none of the identified sites on NPS lands have been formally listed in or determined eligible for the NRHP, several remain unevaluated, and the surrounding landscape is recognized as culturally sensitive with the potential for additional subsurface cultural resources.	
Air Quality	Portions of Pima County (Ajo and Rillito areas) are designated as in nonattainment with the National Ambient Air Quality Standards (NAAQS) for particulate matter 10 micrometers of less (PM_{10}) (Pima County 2025a). Three areas within Pima County are designated as maintenance for either sulfur dioxide or carbon monoxide. The majority of the Project is located within a carbon monoxide maintenance area and overlaps with the PM_{10} nonattainment area near Marana (ADEQ 2025) (Appendix G- Air Quality Attainment/Nonattainment Map). Because operational emissions would be restricted to construction equipment, such as pick-up trucks, drill rigs, track hoes, and other earth moving equipment, no major operational emissions would occur as part of the Project and no Title V permit is required. <u>Bureau of Reclamation</u> On BOR lands, the Project intersects a carbon monoxide maintenance area along portions of Valencia Road and Sandario Road, and a PM_{10} non-attainment area along Sandario Road and Tangerine Road. <u>Bureau of Land Management</u> On BLM lands, the Project intersects a carbon monoxide maintenance area along portions of SR 86, Sandario Road, Valencia Road, and Wilmot Road and a	Consistent with Section 3.1.12 and Table 3.1.12-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant effects on air quality through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Negligible emissions would occur for any criteria pollutants within a nonattainment area through the use of construction equipment, but would not cause a NAAQS exceedance because the emissions would be temporary and of short duration. Operation and maintenance activities would be implemented over the life of the Project. Routine maintenance activities would include marking the location of the permitted infrastructure as required, which would include opening pull boxes to access the locate system. Negligible emissions would occur for any criteria pollutants within a nonattainment area through the use of maintenance equipment but would not cause a NAAQS exceedance because the emissions would be temporary and of short duration. <u>Bureau of Reclamation</u> BOR's proposed action would result in negligible emissions for any criteria pollutants within a nonattainment area through the use of construction and maintenance equipment, and would not cause a NAAQS exceedance. Adverse effects from emissions would be temporary and of short duration. <u>Bureau of Land Management</u> Negligible emissions would occur for any criteria pollutants within a nonattainment area through the use of construction and

Resource Area	Affected Environment	Environmental Effects
	PM_{10} non-attainment area along Sandario Road. National Park Service (Saguaro National Park) Adjacent to NPS lands, the Project intersects a carbon monoxide maintenance area along portions of Old Spanish Trail and Sandario Road. Both the Tucson Mountain District and Rincon Mountain District of Saguaro National Park are located within Class I airsheds (NPS 2025c).	maintenance equipment, but would not cause a NAAQS exceedance because the emissions would be temporary and of short duration on BLM lands. National Park Service (Saguaro National Park) Negligible emissions would occur for any criteria pollutants within a nonattainment area through the use of construction and maintenance equipment, but would not cause a NAAQS exceedance because the emissions would be temporary and of short duration on NPS lands.
Noise and Vibration	The land surrounding the Project area includes agricultural land, native and disturbed desert, and residential, commercial, industrial, and institutional development. There are noise-sensitive receptors in proximity to the Project that could be susceptible to increased noise levels during construction or operation. Noise sensitive receptors located immediately adjacent to the Project include residences, schools, churches, playgrounds, and parks. Noise ordinances from Pima County, City of Tucson, Town of Oro Valley and Town of Marana would be applicable to the Project (Appendix H -Table H-1). Bureau of Reclamation Noise sensitive receptors located immediately adjacent to BOR land within the Project area include residences along Sandario Road. Bureau of Land Management Noise sensitive receptors located immediately adjacent to BLM land within the Project area include residences along Sahuarita Road and Sandario Road.	Consistent with Section 3.1.13 and Table 3.1.13-1 of the Arizona chapter of the Western Region PEIS, there would be less than significant noise or vibration effects through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). Noise and vibration levels resulting from Project activities would exceed natural sounds but would not exceed typical levels from construction equipment or generators. Noise-producing activities during construction would occur during working hours based on County, City, and Town ordinances. Noise impacts on wildlife were analyzed in the Biological Evaluation (Appendix E). Operation and maintenance activities would be implemented over the life of the Project. Routine maintenance activities would include marking the location of the permitted infrastructure as required, which would include opening pull boxes to access the locate system. Noise levels from maintenance activities would be temporary and short in duration. Bureau of Reclamation Noise and vibration levels resulting from Project activities on BOR land would exceed natural sounds but would not exceed typical levels from construction/maintenance equipment or generators. Noise-producing activities during construction would occur during

Resource Area	Affected Environment	Environmental Effects
	National Park Service (Saguaro National Park) Noise sensitive receptors located immediately adjacent to NPS land within the Project area include residences along Old Spanish Trail and Sandario Road.	working hours based on County, City, and Town ordinances. Therefore, adverse effects would be short-term and minimal. Bureau of Land Management Noise and vibration levels resulting from Project activities on BLM land would exceed natural sounds but would not exceed typical levels from construction/maintenance equipment or generators. Noise-producing activities during construction would occur during working hours based on County, City, and Town ordinances. Adverse effects from noise levels from construction/maintenance activities would be temporary and short in duration. National Park Service (Saguaro National Park) Noise and vibration levels resulting from Project activities on NPS land would exceed natural sounds but would not exceed typical levels from construction/maintenance equipment or generators. Noise-producing activities during construction would occur during working hours based on County, City, and Town ordinances. Noise levels from construction/maintenance activities would be temporary and short in duration.
Human Health and Safety	Pima County would ensure that safe work conditions are provided and enforced during construction and operation of the Project. Several leaking underground storage tank (LUST) cases were documented adjacent to the site; however, they have been closed and met risk-based corrective action (RBCA) Tier 1, 2, or 3 standards. (Appendix I – Leaking Underground Storage Tank Map). Bureau of Reclamation No LUST cases were identified within or immediately adjacent to BOR lands.	Consistent with Section 3.1.15 and Table 3.1.15-1 of the Arizona chapter of the Western Region PEIS, there would be no effects on human health and safety through adherence to the standard BMPs and mitigation measures in Chapter 9 of the Western Region PEIS (See Appendix J for Project specific BMPs). All LUST cases adjacent to the site are closed and meet RBCA Tier 1, 2, or 3 standards and do not pose an environmental risk for the Project. Construction of the Project would not expose workers to hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Although manmade disasters cannot be predicted, Pima County confirms it would monitor for natural disasters and ensure that safety plans and evacuation routes are

Resource Area	Affected Environment	Environmental Effects
	Bureau of Land Management No LUST cases were identified within or immediately adjacent to BLM lands. National Park Service (Saguaro National Park) No LUST cases were identified within or immediately adjacent to NPS lands.	communicated to workers. Operation and maintenance activities would be implemented over the life of the Project. Routine maintenance would not expose workers hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Bureau of Reclamation Construction of the Project would not expose workers to hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Although manmade disasters cannot be predicted, Pima County confirms it would monitor for natural disasters and ensure that safety plans and evacuation routes are communicated to workers. Operation and maintenance activities would be implemented over the life of the Project. Routine maintenance would not expose workers hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Therefore BOR's proposed action would not have adverse effects on health and safety. Bureau of Land Management Construction of the Project would not expose workers to hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Although manmade disasters cannot be predicted, Pima County confirms it would monitor for natural disasters and ensure that safety plans and evacuation routes are communicated to workers. Operation and maintenance activities would be implemented over

Resource Area	Affected Environment	Environmental Effects
		the life of the Project. Routine maintenance would not expose workers hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. <u>National Park Service (Saguaro National Park)</u> Construction of the Project would not expose workers to hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations. Although manmade disasters cannot be predicted, Pima County confirms it would monitor for natural disasters and ensure that safety plans and evacuation routes are communicated to workers. Operation and maintenance activities would be implemented over the life of the Project. Routine maintenance would not expose workers hazardous chemicals, and contaminated sites are not known to exist in the Project area, but any discovered during construction and deployment would be handled in accordance with applicable regulations.
Indian Trust Assets	Indian Trust Assets (ITAs) are legal interests in assets held in trust by the United States for the benefit of Federally recognized Indian Tribes or individual Tribal members. The Secretary of the Interior's duty is to protect and maintain ITAs reserved by or granted to Indian Tribes or individuals by treaties, statutes, and Executive orders. ITAs may include legal interest in land, Federally reserved water rights, minerals, hunting and fishing rights, money, or claims.	No ITAs are located within the Project area and no impacts to ITAs is expected to occur from the proposed action; therefore, this resource was dismissed from further analysis.

4 Effects of Reasonably Foreseeable Future Actions

This section evaluates the cumulative effects of the Project and the No Action Alternative (see Section 2.2) on the environment resulting from the incremental effects of the Project when added to the effects of other present and reasonably foreseeable future actions (including projects other than the Project that is the subject of this EA), regardless of what agency (federal or non-federal) or person undertakes such other actions. Section 3 considered past actions as part of evaluating the affected environment (baseline conditions).

Table 4-1 identifies present and reasonably foreseeable future actions within range of the proposed Project area. This EA concludes that although these actions together have the potential to result in minor cumulative effects on infrastructure, soil, biological resources, cultural resources, and noise, the incremental effects of the proposed Project, when added to those cumulative effects, would not be significant.

Table 4-1. Present and Reasonably Foreseeable Future Actions

Action Name	Location	Sponsor or Proponent	Brief Description	Anticipated Timing
Esperero Wash at Sunrise Culvert Replacement	Located near the intersection of Sunrise Drive and Esperero Wash in the Catalina Foothills within the Project area.	Pima County Department of Transportation (PCDOT) and Arizona Department of Forestry and Fire Mitigation	The purpose of the project is to replace the existing corrugated metal pipes on Sunrise Drive at Esperero Wash with larger box culverts, increasing the hydraulic capacity and reducing the frequency of overtopping Sunrise Drive during rain events.	Construction is anticipated to start fall 2025 and be completed in summer 2026.
Valencia Road Safety Improvements	Located along Valencia Road from I-19 to Alvernon Way within the Project area	City of Tucson Department of Transportation and Mobility and Regional Transportation Authority (RTA)	Multimodal safety and accessibility improvements	Construction is anticipated to start in fiscal year 2026 and be completed in fiscal year 2027.
Tangerine Rd TI Improvements	Located at Tangerine Rd and I-10 TI within the Project area.	Town of Marana and RTA	This project will include the construction of two additional lanes of traffic that will be constructed on the outside of the support columns.	This project is currently in the design phase. Construction is anticipated to start in winter 2026. The construction completion date has not been

Action Name	Location	Sponsor or Proponent	Brief Description	Anticipated Timing
				determined.
Tangerine Rd Widening, Phase 2A	Located along Tangerine Rd, from I-10 to west of Breakers Road within the Project area.	Town of Marana and RTA	This project will include construction of a 4-lane road with drainage improvements, sidewalks, Americans with Disabilities Act (ADA) facilities, multi-use path, ROW acquisitions, utility relocations, Marana Water line extensions, and sewer modifications and additions.	This project is currently under construction and expected to be completed in fall 2026.
Drexel Road Bridge	Located along Drexel Road from Midvale Park Road to Calle Santa Cruz. This project overlaps the Project area at the Drexel Road/Midvale Park Road intersection.	City of Tucson Department of Transportation and Mobility	This project will include construction of a two-lane bridge over the Santa Cruz River extending Drexel Road from Midvale Park Road to Calle Santa Cruz. The project will also include new sidewalks, bicycle lanes, and street lighting.	This project is currently in final design and construction is anticipated to begin in fall 2026 (dependent on construction funding).
La Canada Dr @ W Canyon Shadows Ln	Located along North La Canada Drive, North of West Canyon Shadows Lane.	Wyyerd Fiber	Install UG Fiber Optic along N La Canada Dr, North of W Canyon Shadows Ln	This project is currently under construction.
Pima County and ADOT Joint Build	This project will be a joint build within the Project area along Wilmot Road and Valencia Road.	Pima County	The purpose of this project is for ADOT participation to add an additional 7-way micro duct within the Project area along Wilmot Road and Valencia Road.	This project is anticipated to be completed in winter 2027/2028.

References:

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5 Relevant Laws, Regulations, and Permits

Table 5-1 lists relevant laws, regulations, and permits for the Project and describes the compliance status for each, including the status of any applicable consultations. Pima County confirms that it is consulting with SHPO, cooperating with BLM, BOR, and NPS, and coordinating with ASLD, ADOT, CAP, UPRR, City of Tucson, Town of Marana, Town of Oro Valley, and Town of Sahuarita regarding proposed Project construction and will comply with all applicable laws and regulations.

Table 5-1. Relevant Laws, Regulations, and Permits

Laws, Regulations, and Permits	Status
General	
• National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 *et seq.*)	The Project is expected to have no significant effect to the human environment, therefore the preparation of an environmental impact statement is not necessary.
Vegetation, Wildlife, and Fish	
<u>Federal</u> • Endangered Species Act (ESA) (16 U.S.C. § 1531 *et seq.*) • Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703-712) • E.O. 13186, Responsibilities to Federal Agencies to Protect Migratory Birds • Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668d) • Fish and Wildlife Conservation Act (16 U.S.C. §§ 2901-2911] • Fish and Wildlife Coordination Act (16 U.S.C. § 661 *et seq.*) • Federal Noxious Weed Act (7 USC 2801 and 2814) • BLM Pesticide Use Permit (Federal Land Policy and Management Act of 1976 (43 USC 1701-1712), The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (PL 92-516)) • Sensitive Species - BLM Sensitive Species BLM Manual 6840.006 <u>State</u> • Arizona Noxious Weed Law §3-201 et seq. ARS and Arizona Noxious Seed Law §3-231 et seq. ARS	No impacts to ESA listed species are anticipated. Any impacts to species covered under Pima County's Section 10 permit will be mitigated according to the Section 10 Permit terms. Mitigation measures are included to prevent the spread of noxious and invasive species and prevent impacts to Pima pineapple cactus, migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants. A BLM Pesticides Use Permit would be required for the control of noxious and invasive species on BLM lands.

Laws, Regulations, and Permits	Status
• Taking and Handling of Wildlife (ARS §17-268, §17-296, §17-314)	
Waters, Wetlands, and Floodplain Protection	
Federal • Clean Water Act (CWA) (33 U.S.C. § 1251 *et seq.*) • E.O. 11988, Floodplain Management • E.O. 11990, Protection of Wetlands State • Arizona Pollutant Discharge Elimination System (AZPDES) Program	Work near jurisdictional WOTUS includes conduit installation via bridge attachment only. The conduit would be installed from the bridge deck by bucket truck or similar. No work would occur under the bridge; therefore, no impacts to potential WOTUS would occur and Section 404/401 permitting is not required. Construction would require a SWPPP or AZPDES permit due to disturbance of 1 or more acres of land.
Air Quality	
Federal • Clean Air Act (CAA) (42 U.S.C. § 7401 *et seq.*) Local • Pima County Code Title 17- Air Quality	Nonattainment areas are not located within or adjacent to the Project area. No major operational emissions would occur as part of the Project and no Title V permit is required.
Historic and Cultural Resources	
Federal • Antiquities Act (54 U.S.C. §§ 320301-320303 (Monuments, Ruins, Sites, and Objects of Antiquity) and 18 U.S.C. § 1866(b) (Historic, Archeologic, or Prehistoric Items and Antiquities) • National Historic Preservation Act (NHPA) (54 U.S.C. § 300101 *et seq.*) and NHPA Section 106 regulations (36 C.F.R. Part 800) • Archaeological Resources Protection Act (16 U.S.C. § 470aa) • Arizona Antiquities Act (A.R.S. 15-1631 and 41-841 *et seq.*)	NTIA has determined that execution of a PA is appropriate because effects on historic properties cannot be fully determined prior to approval of the Project. To ensure protection during construction, Pima County will develop a MDP as part of the HPTP. If avoidance is not feasible, the County shall minimize or mitigate adverse effects through the development and implementation of the HPTP. Mitigation measures may include, but are not limited to, additional documentation, data recovery, interpretive efforts, or other treatments developed in consultation with the SHPO, NTIA, and Consulting Parties.

Laws, Regulations, and Permits	Status
State • Arizona State Historic Preservation Act (A.R.S. 41-861 *et seq.)* • A.R.S. § 41-512 et seq., Establishment of Parkways and Historical and Scenic Roadways Local • Protection of Cultural Resources (Pima County Board of Supervisors Policy C3.17)	
Noise, Public Health, and Safety	
Federal • Noise Control Act (42 U.S.C. § 4901 *et seq.*) • Toxic Substances Control Act (TSCA) (15 U.S.C. 2601 *et seq.*) State • A.R.S. § 9-500.52 Construction; Summertime Hours; Prohibition on Restriction Local • County, City and Town Noise Ordinances (see Appendix H)	Noise-producing activities during construction would occur during working hours based on State, County, City, and Town ordinances.
Permits	
Federal • BLM Right-of-Way Permit (Federal Land Policy and Management Act of 1976 (Public Law [PL] 94-579; 43 USC 1761–1771; 43 CFR 2800) • BLM Pesticide Use Permit (Federal Land Policy and Management Act of 1976 (43 USC 1701-1712), The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (PL 92-516)) • BLM Fieldwork Authorizations (Sec. 302(b) of PL 94-579, October 21, 1976, 43 USC 1732 Sec. 4 of PL 96-95, October 31, 1979, 16 USC, 470cc) • NPS Right-of-Way Permit -(54 U.S.C. § 100902, NPS Organic Act (54 U.S.C. 100101 *et seq.*), Saguaro National Park Establishment Act of 1994 (P.L. 103-364, 108 Stat. 3467) & 36 CFR 14) • NPS Right-of-Way Permit - Authorizes Operation and	NPS: Pima County applied for SF-299 application for the ROW permit in May 2025. The application included information to support the use or occupancy of NPS-administered lands within the Park to operate and maintain fiber optic cables within a buried conduit. In addition to the ROW, an SUP will be required for the installation of the fiber optic cable. Additionally, ROW permits may only be issued when there is no practicable alternative to the use of lands and waters within a System unit. Alternative locations for the fiber optic cable were evaluated in the SF 299 ROW application and Plan of Operation and Development.

Laws, Regulations, and Permits	Status
Maintenance • Special Use Permit –Authorizes Construction associated with ROW <u>State</u> • ADOT – Encroachment Permit • ASLD – Right-of-Way Permit <u>Local</u> • CAP – Land-Use License • UPRR – Encroachment/Excavation Permit	
<u>STATE, COUNTY, AND LOCAL PLAN CONSISTENCY</u>	
• Arizona Broadband Statewide Middle-Mile Strategic Plan • Connect Pima Action Plan	The proposed action would comply with state and county plans by expanding middle-mile connectivity to unserved and underserved communities to allow access to affordable and reliable high speed broadband internet (ACA 2022 and Pima County 2025).

6 List of Preparers

Table 6-1 lists the individuals involved in preparing this EA.

Table 6-1. List of Preparers

Name	Organization	Title/Role	Qualifications
Jennifer Simpkins	Kimley-Horn	Senior Environmental Scientist	24 years in NEPA/ Environmental Sciences
Avery Pritchard	Kimley-Horn	Environmental Scientist	3 years in NEPA/ Environmental Sciences
Thomas McCullough	Kimley-Horn	Project Manager	21 years in Civil Engineering
Gabrielle Amado	Kimley-Horn	Civil Engineer	11 years in Civil Engineering
Sarah Montogomery	Kimley-Horn	Civil Engineer	7 years in Civil Engineering
Michelle Simon	Pima County	Director - Office of Digital Inclusion	Authorized grant representative for Pima County. 16 years public administration
Kris Gade	Pima County	Director – Conservation Lands & Resources	26 years in NEPA/Environmental Sciences/Ecology
Jenny Neeley	Pima County	Program Manager-Conservation Lands & Resources	20 years in NEPA/environmental policy
Ian Milliken	Pima County	Historic Preservation Officer	19 years in NHPA/Historic Preservation
Amanda Pereira	National Telecommunications and Information Administration	Environmental Program Officer	24 years in NEPA/Environmental Sciences
Suzanne Derrick	National Telecommunications and Information Administration	Environmental Program Officer	26 years in NHPA

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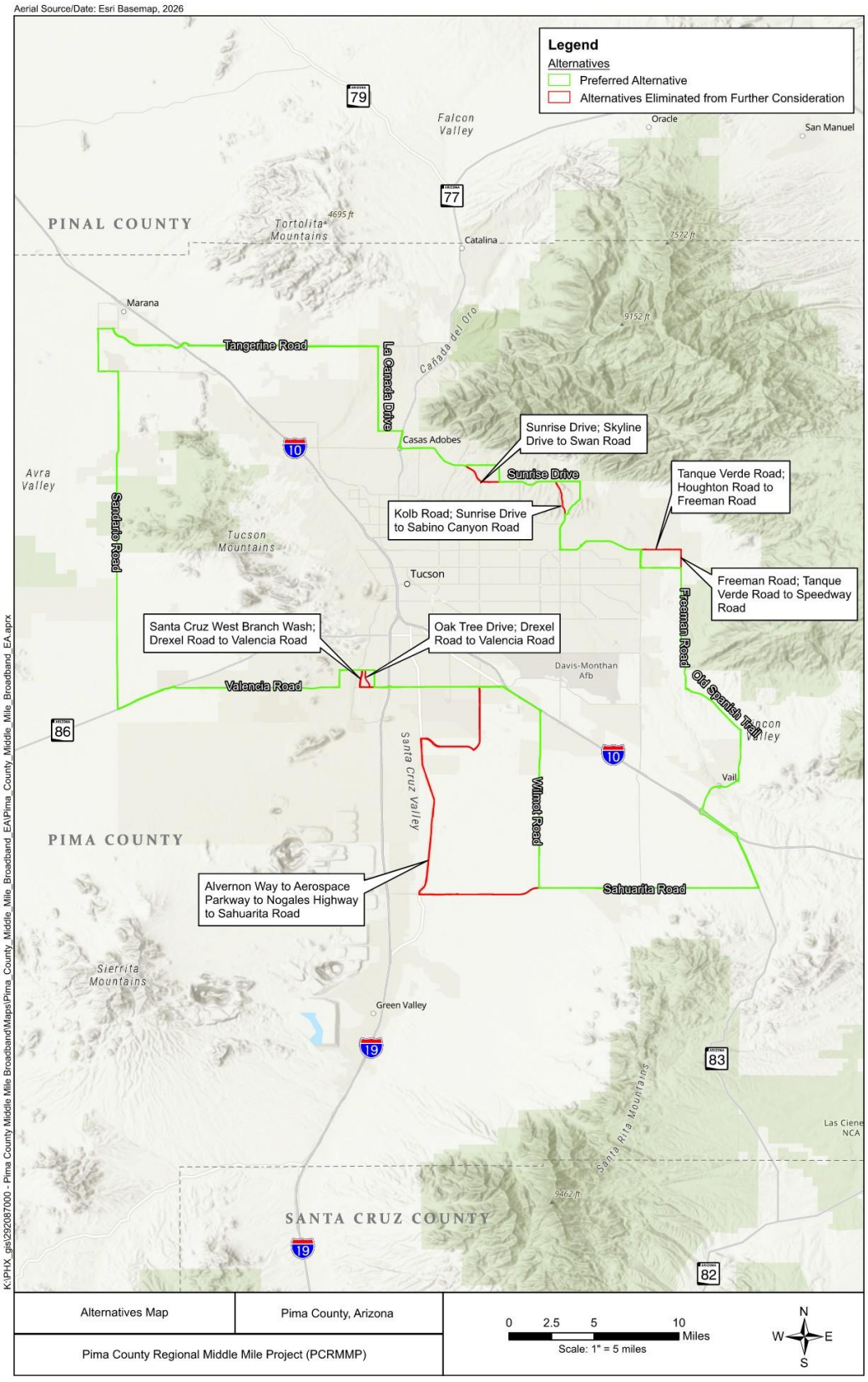
APPENDIX A: FIGURES

Alternatives Map



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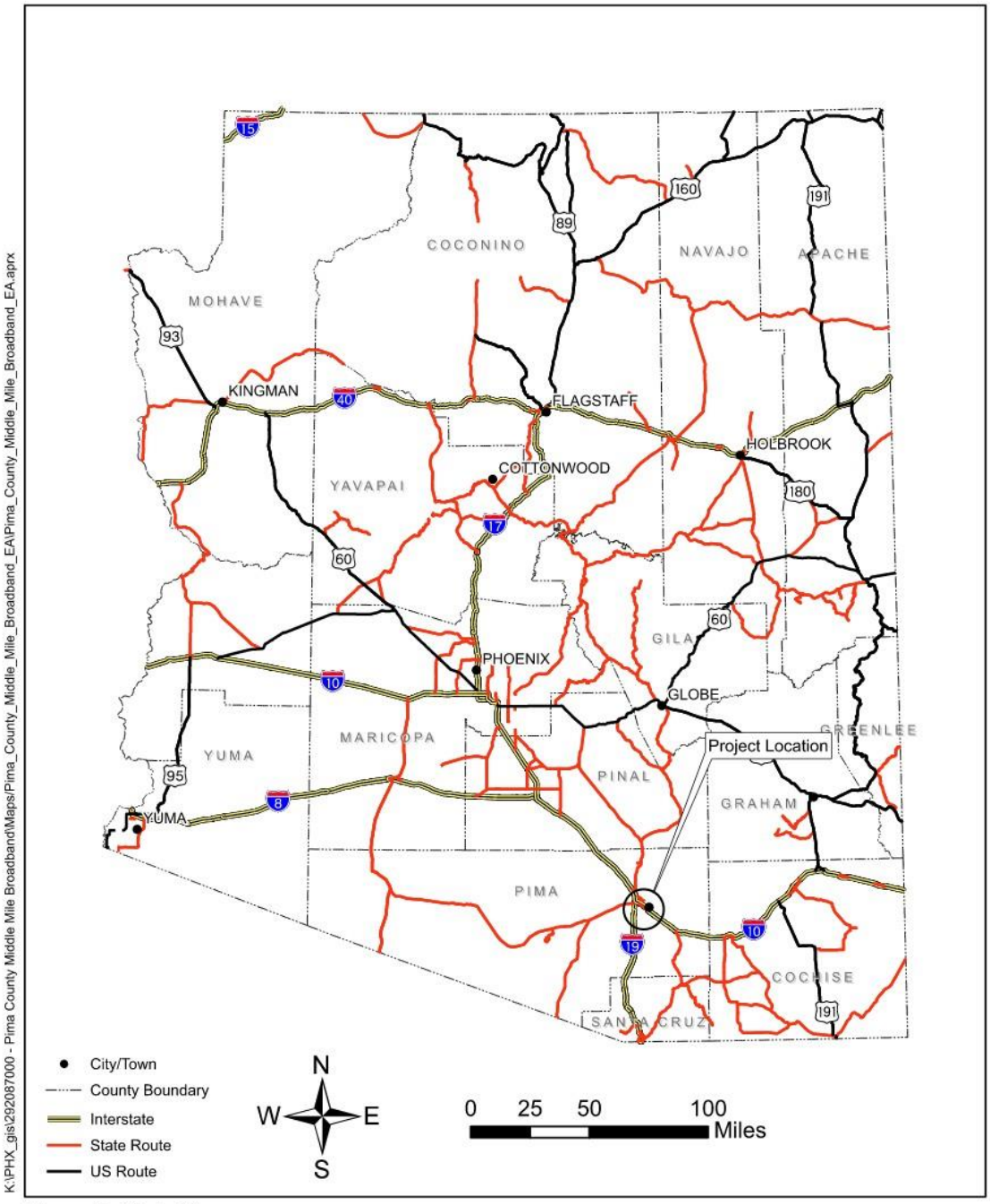


Figure 1. State Map
Pima County Regional Middle Mile Project (PCRMMP)

Figure 2. Vicinity Map- Key Map

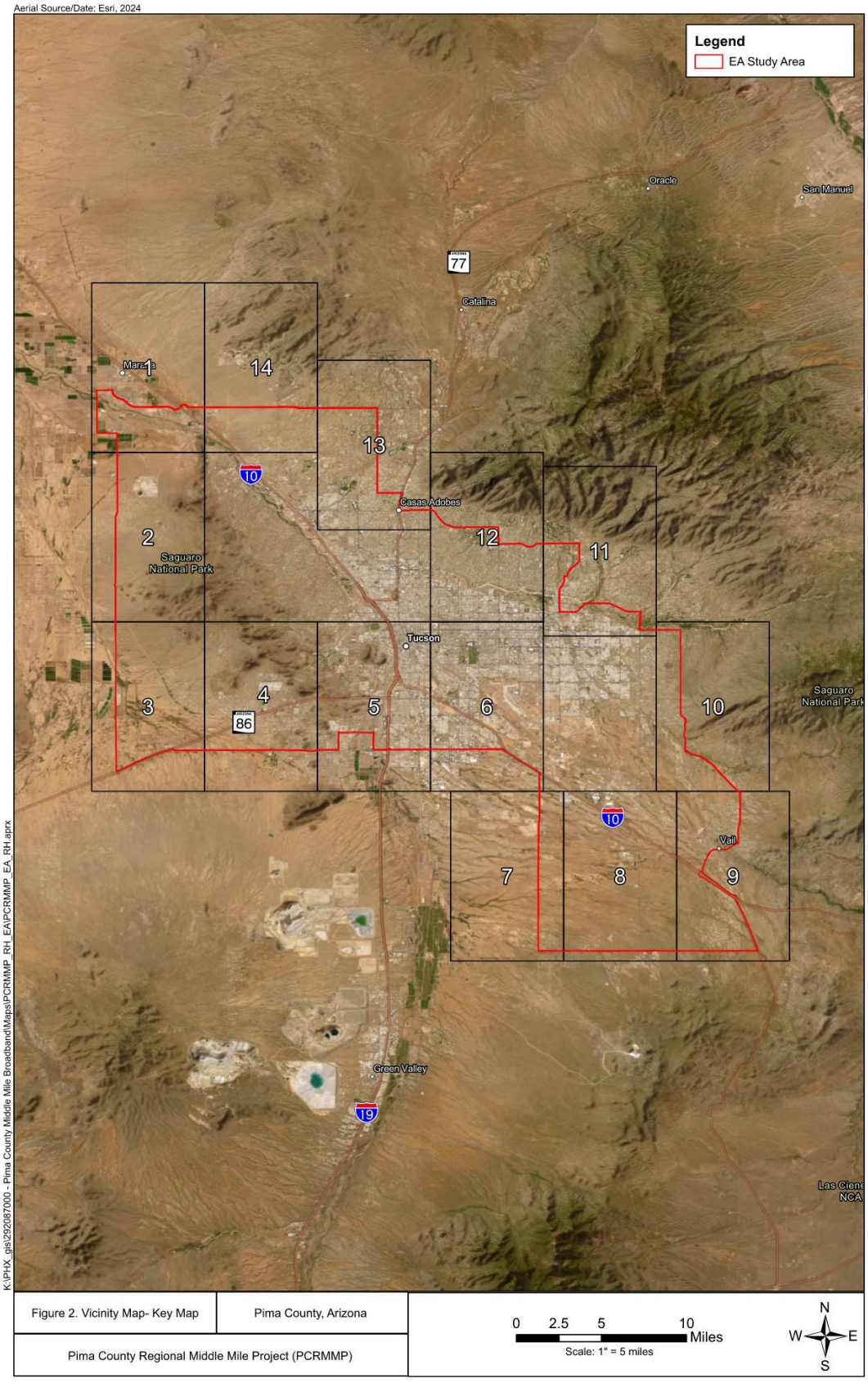
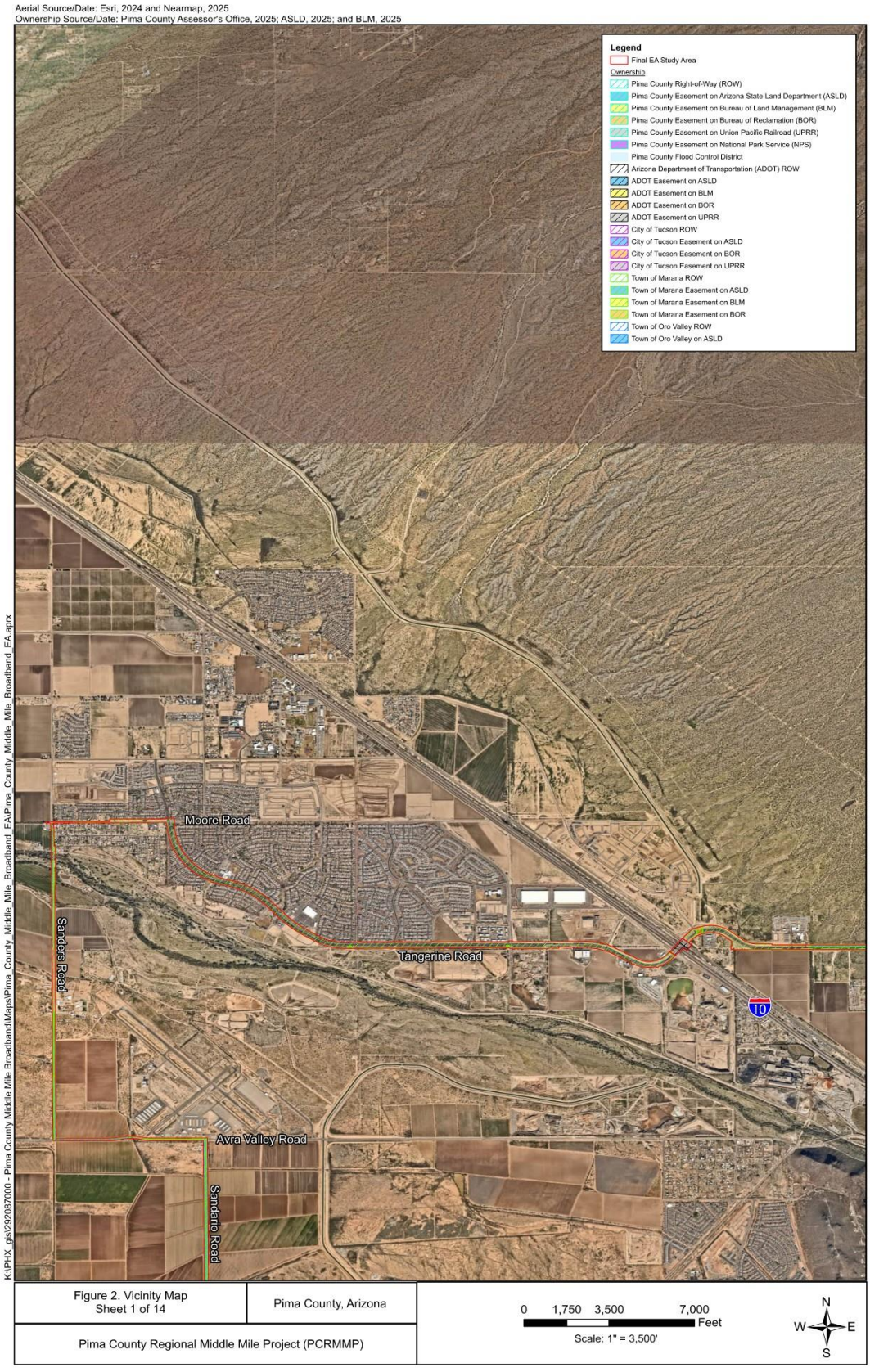


Figure 2. Vicinity Map – Sheet 1



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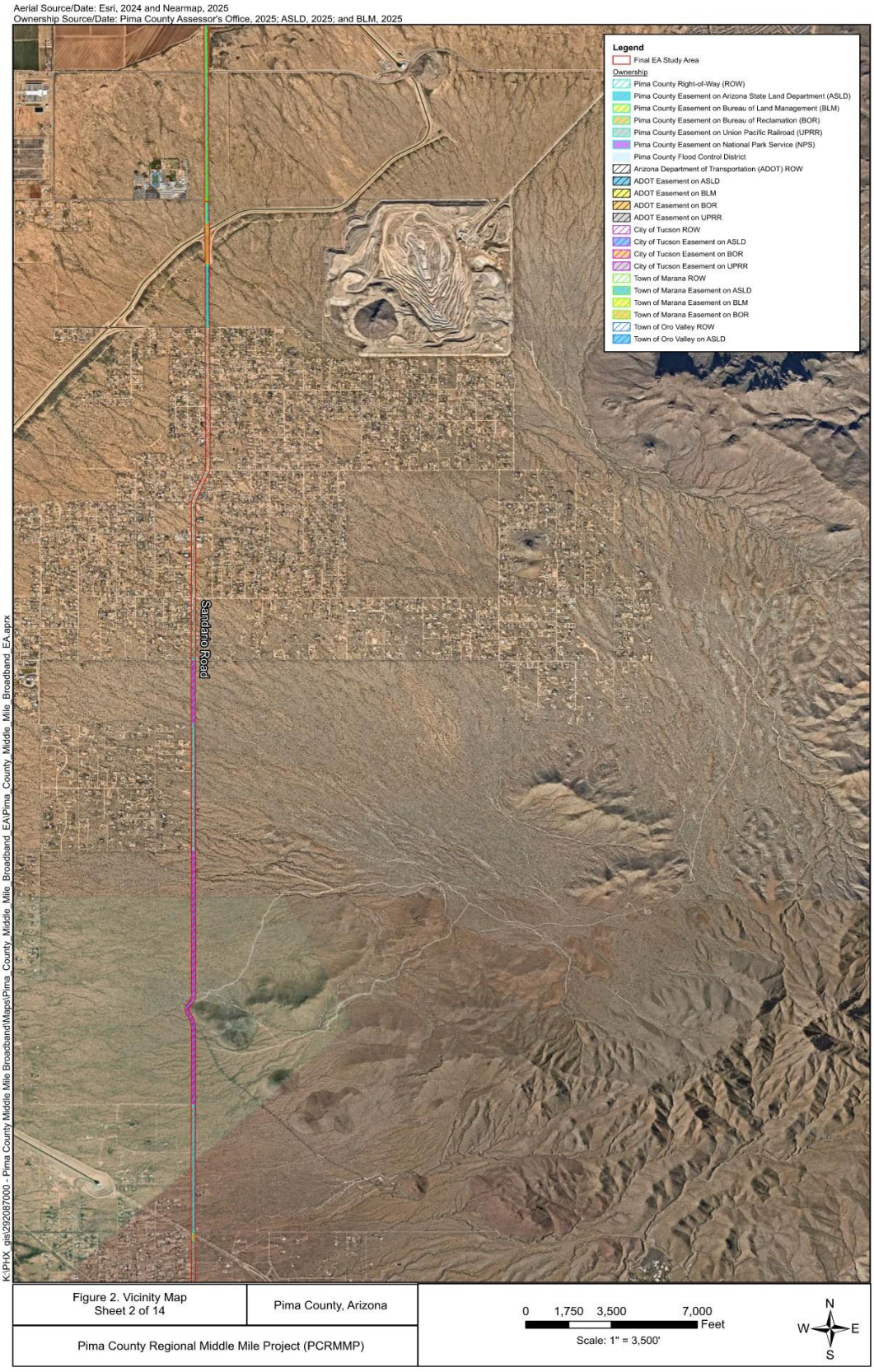

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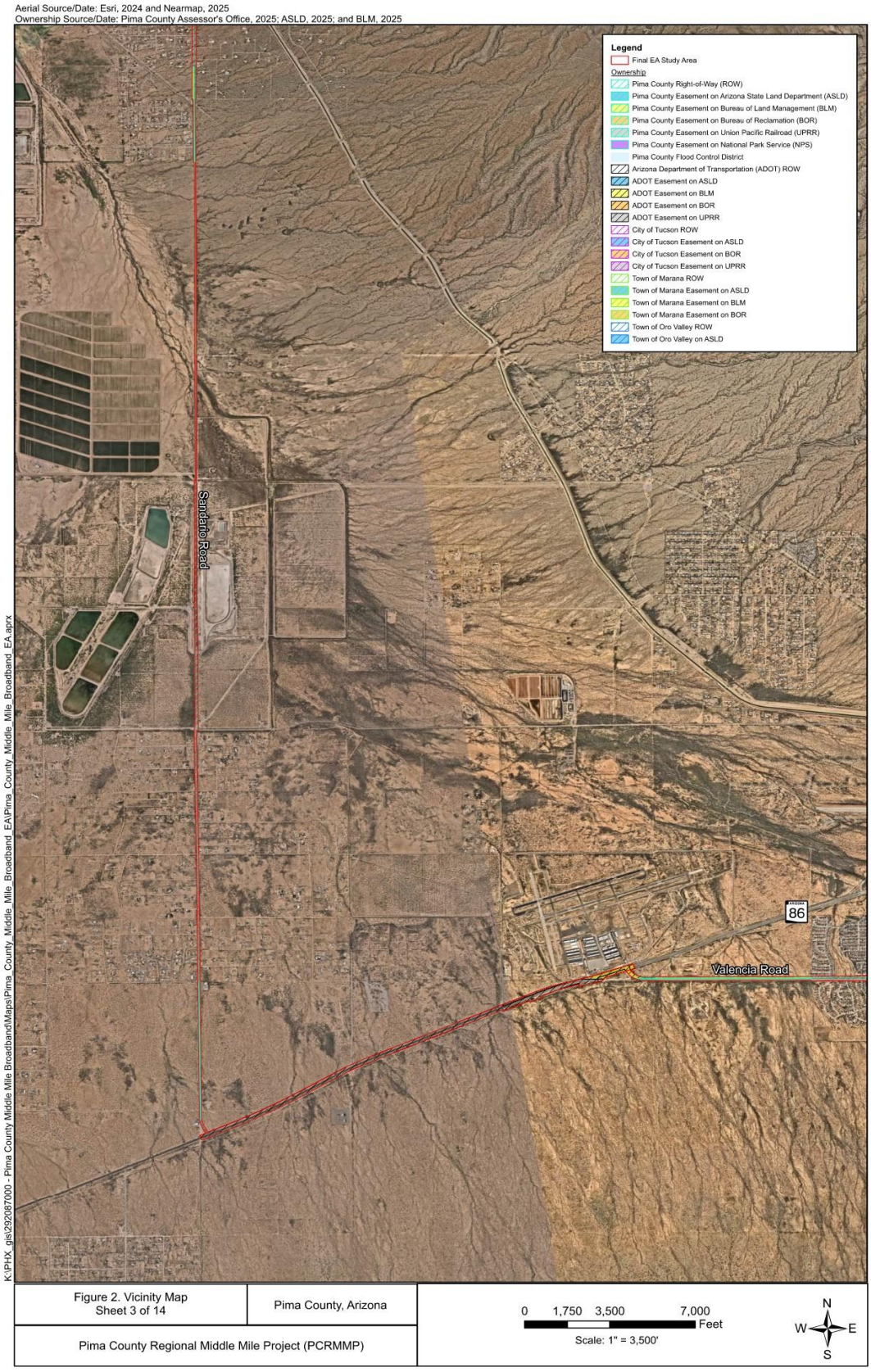

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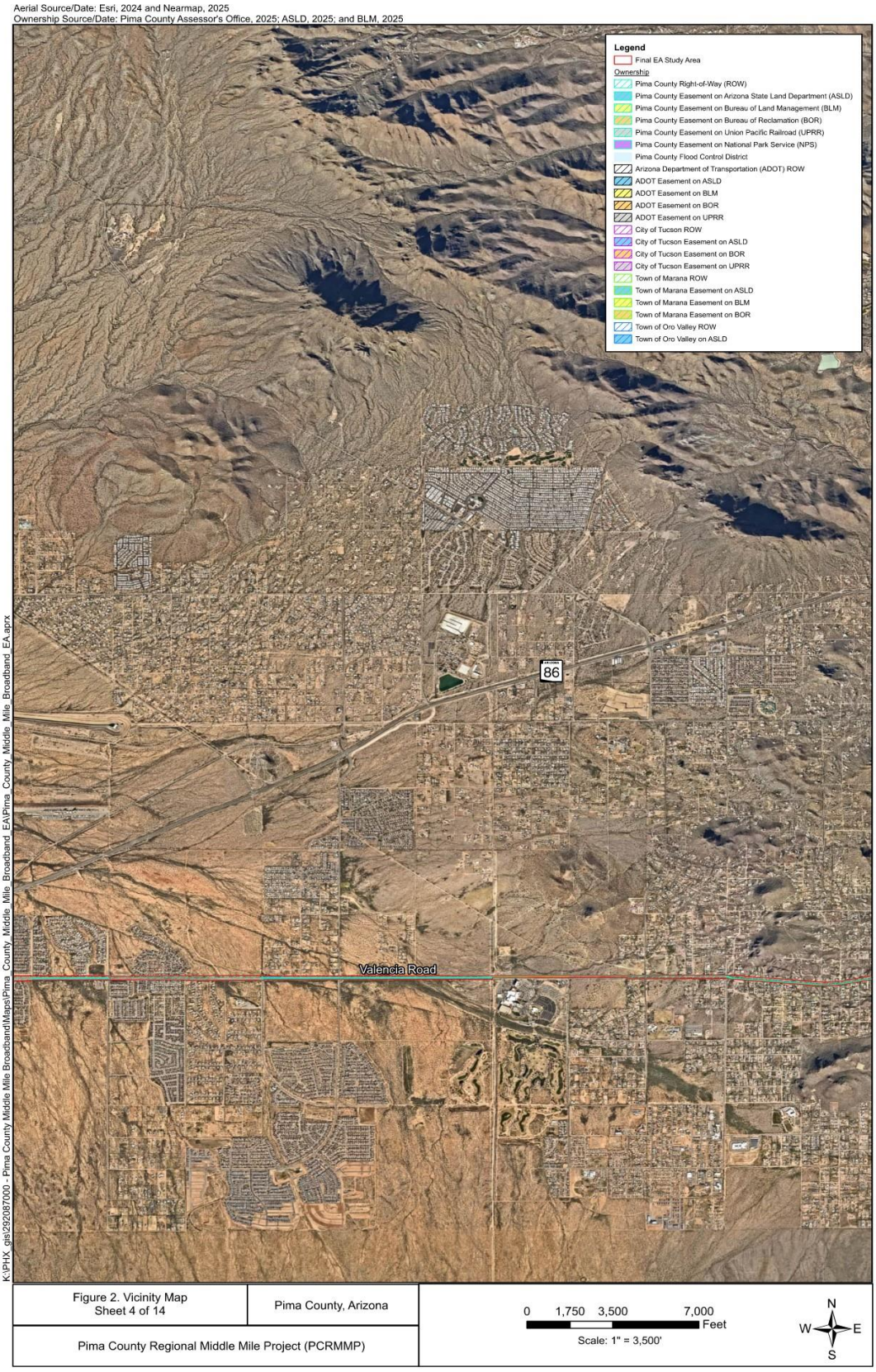

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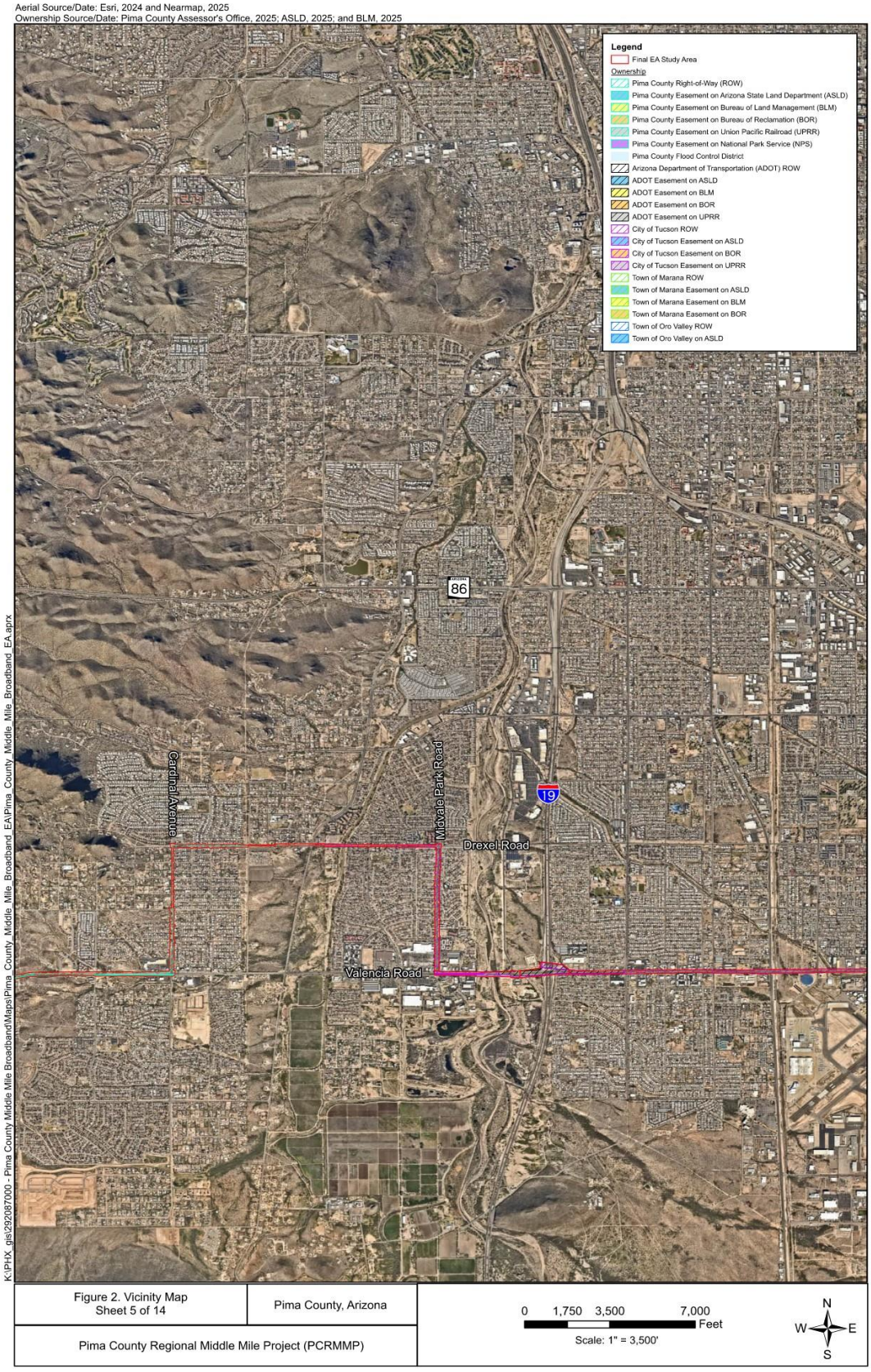

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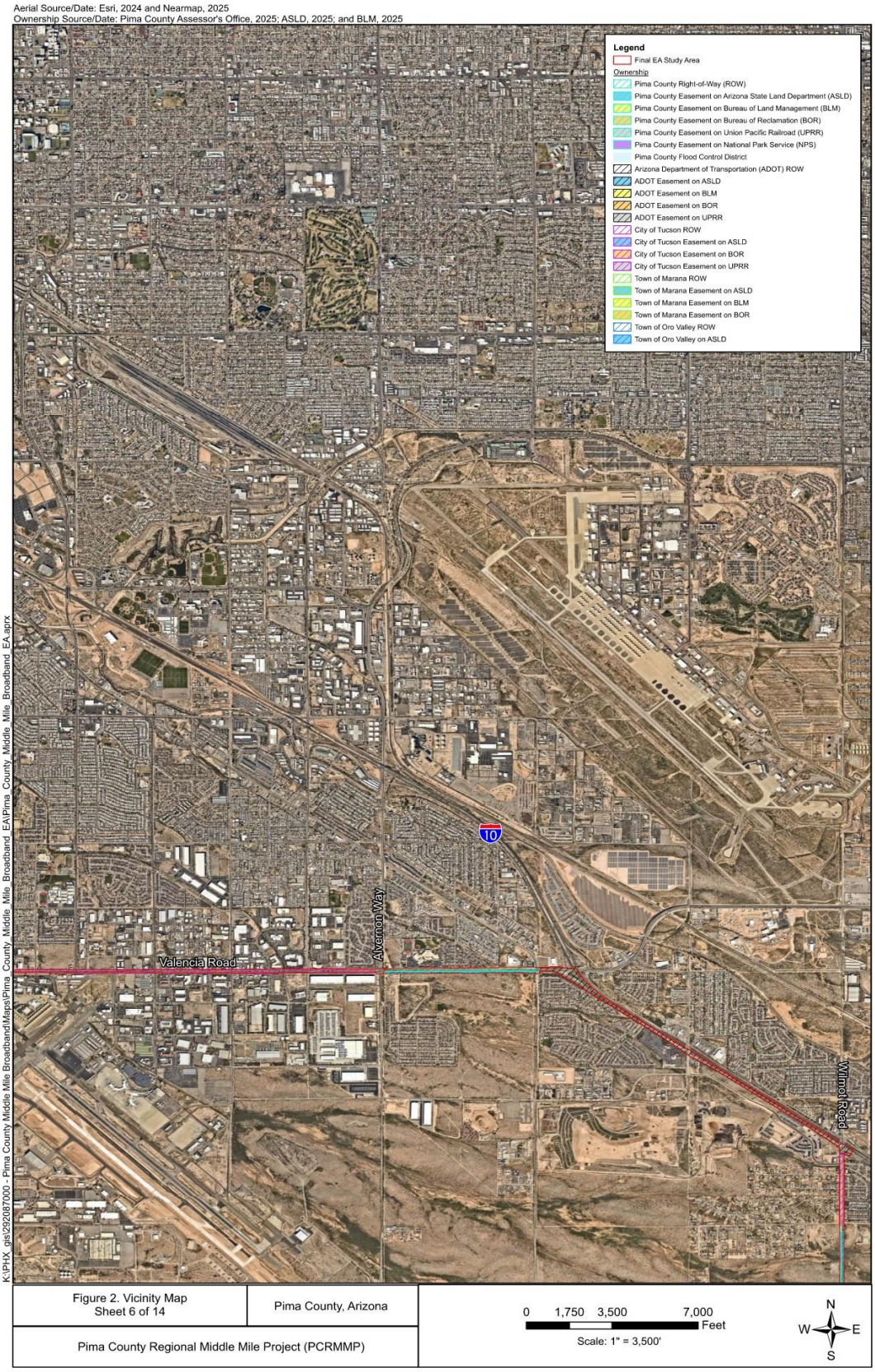

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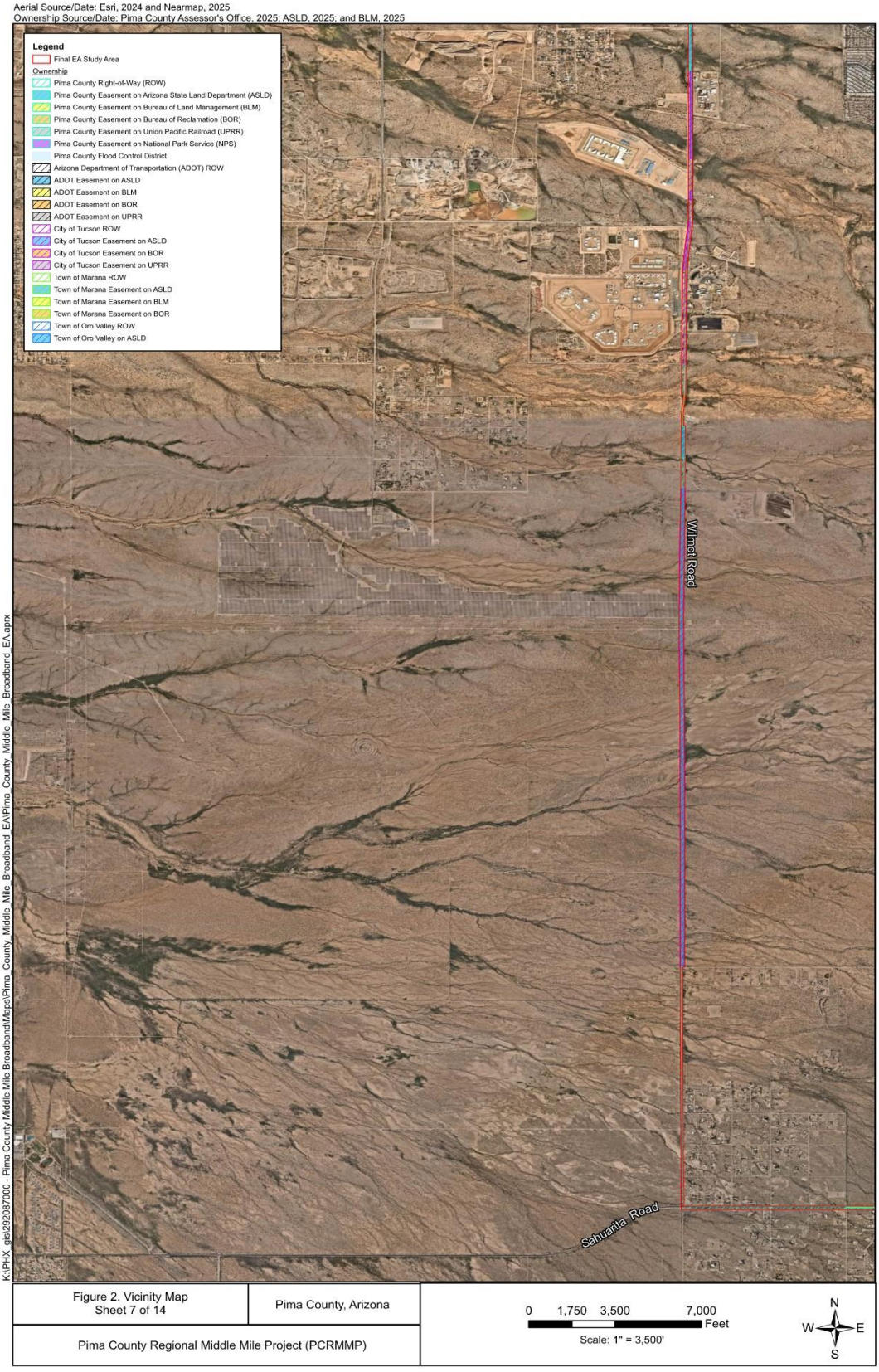

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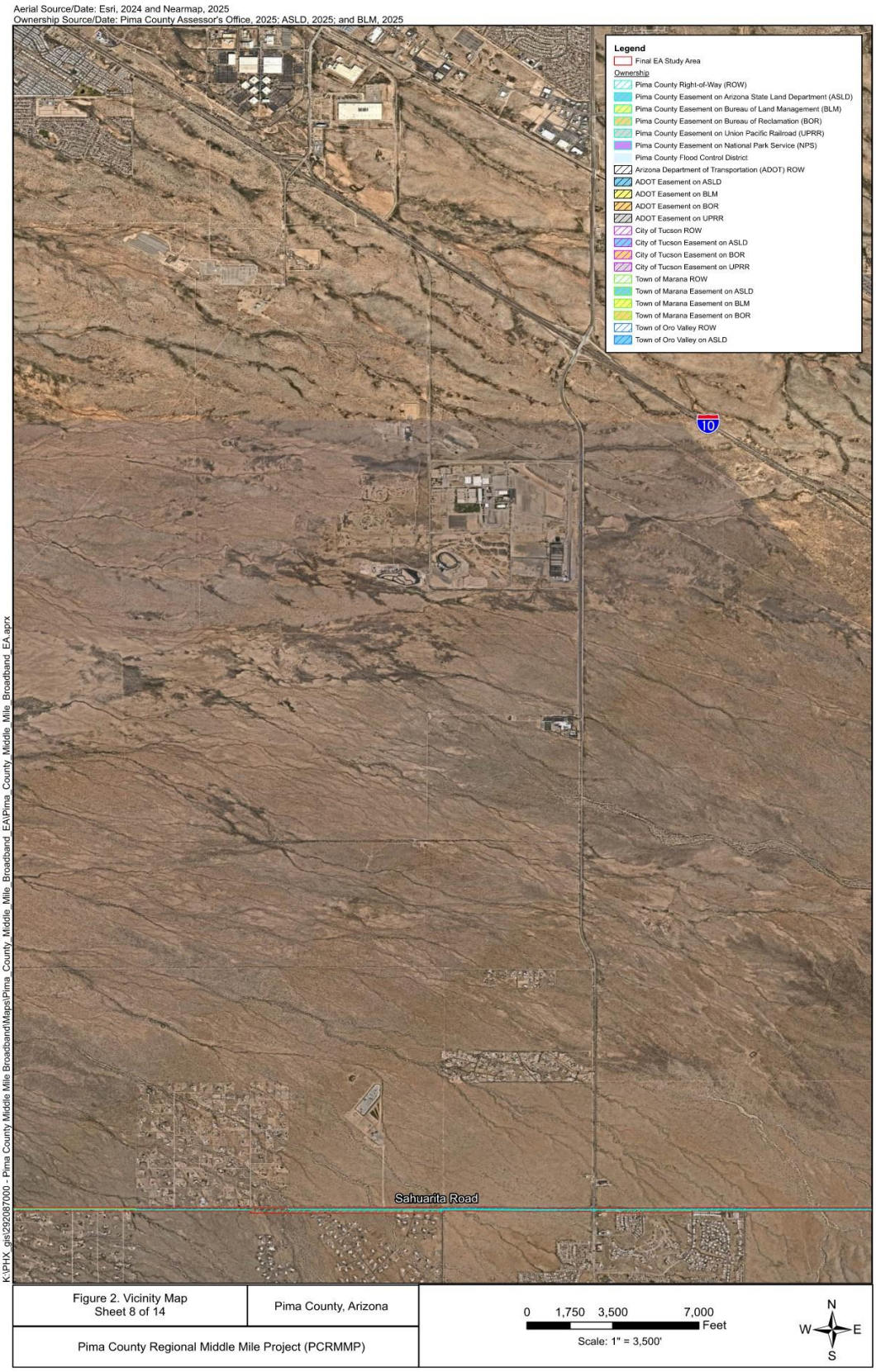

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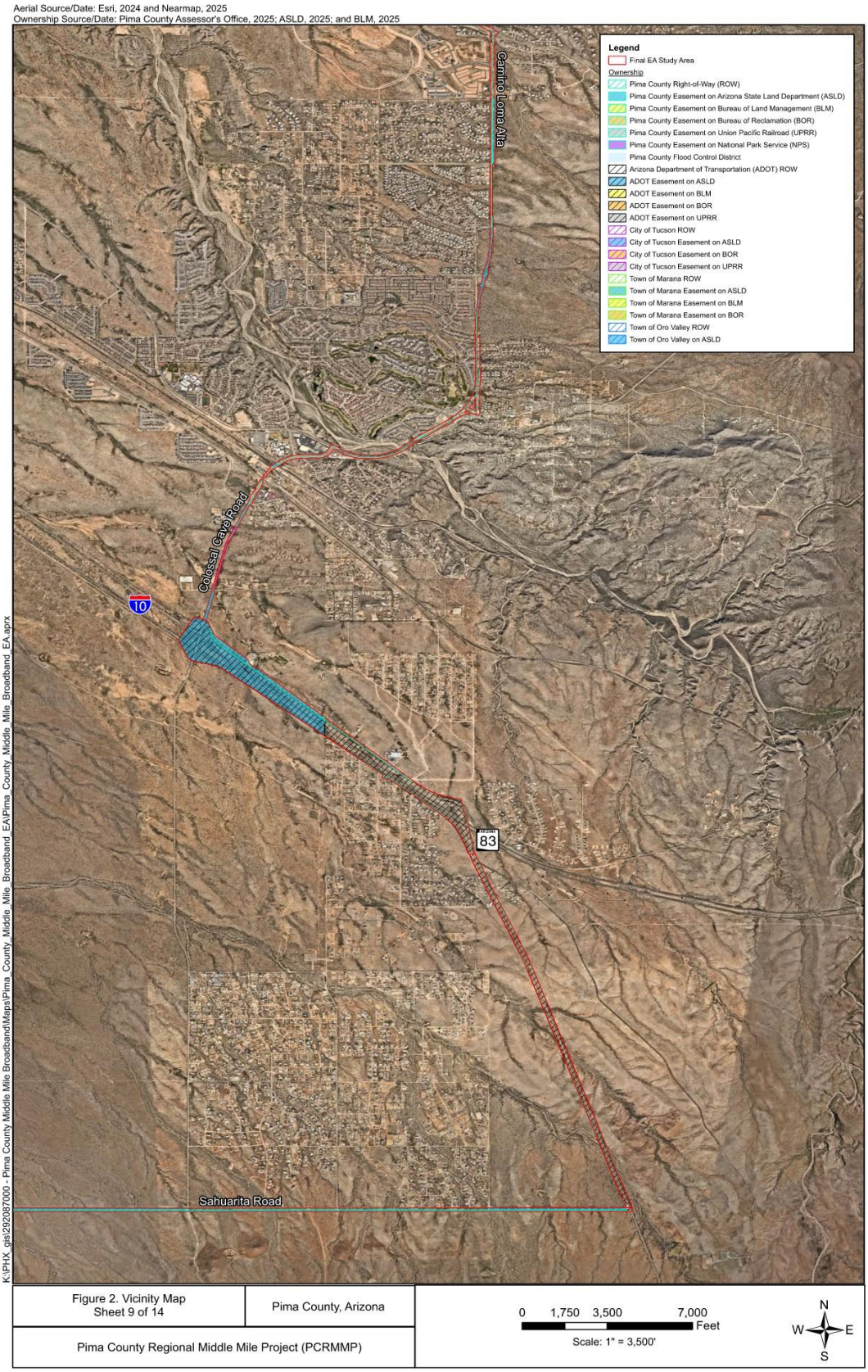

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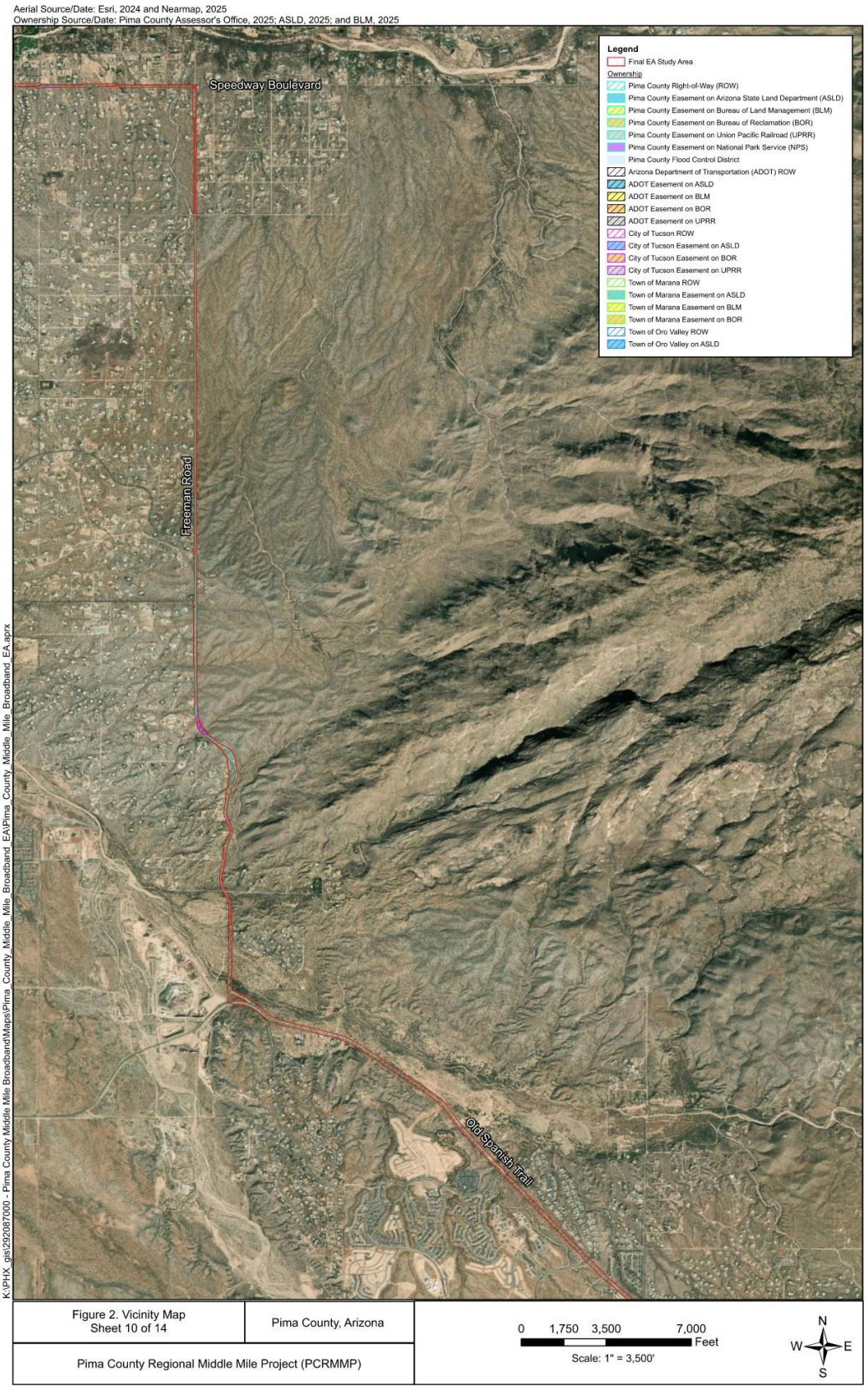

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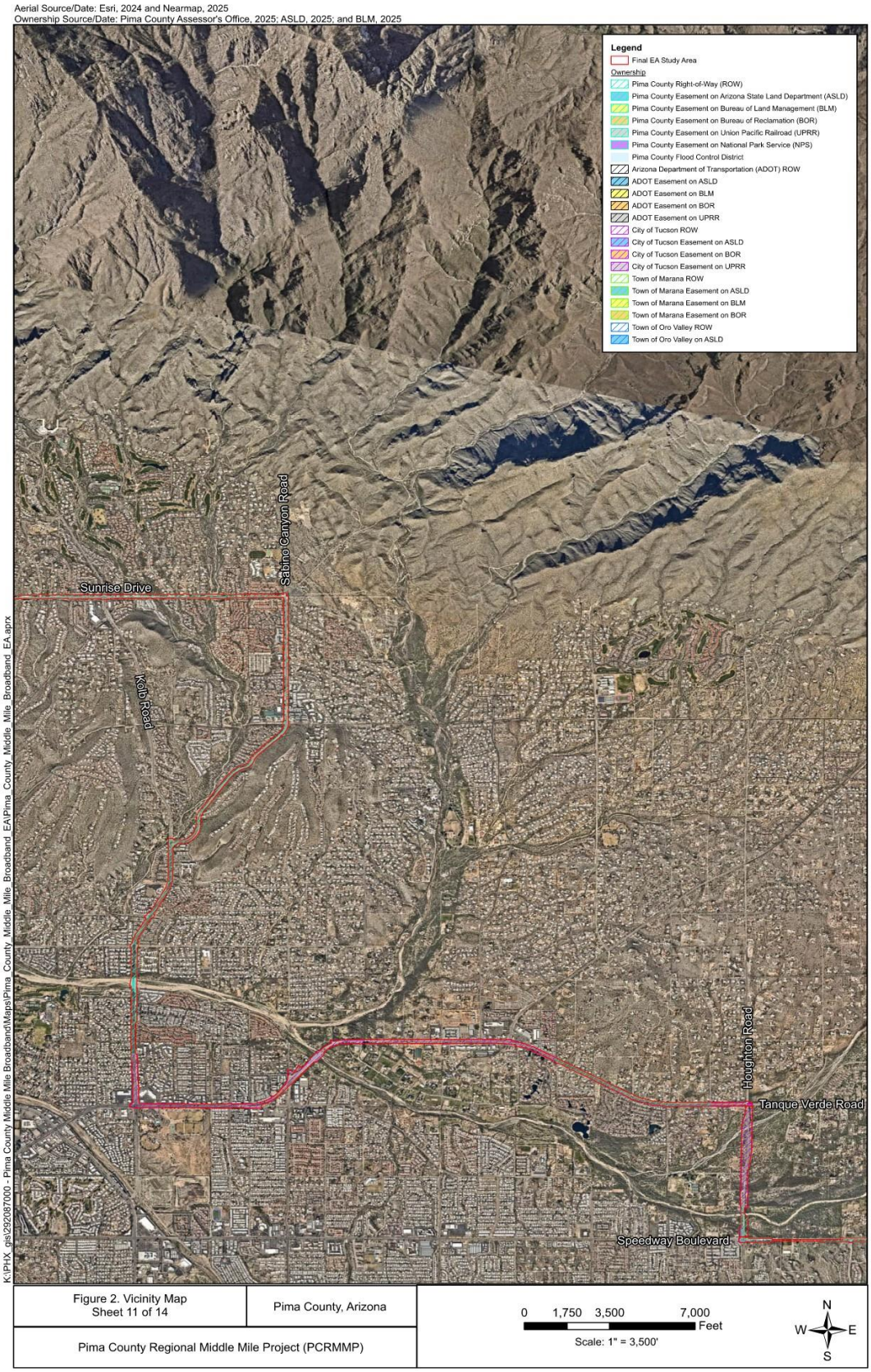

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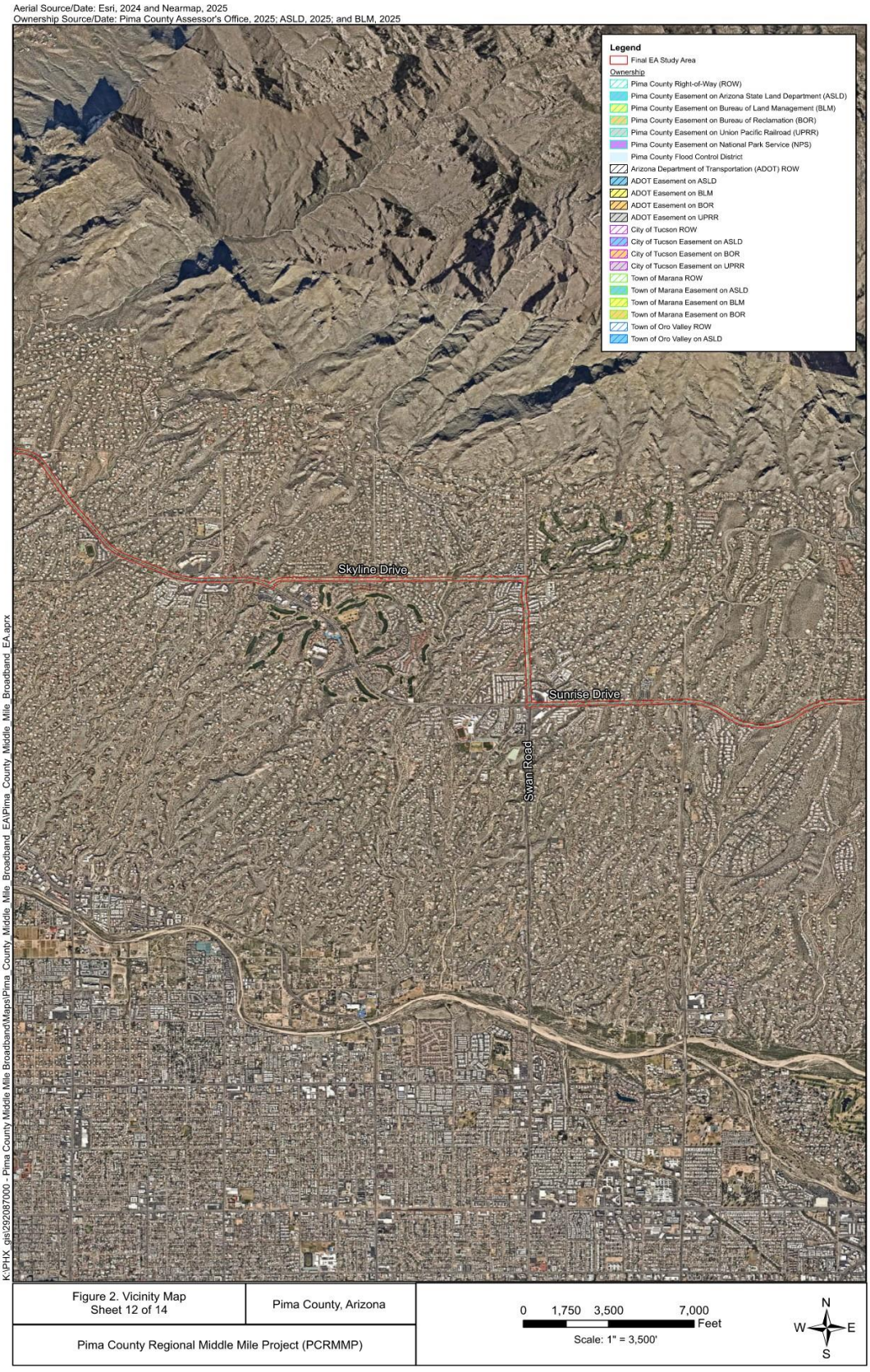

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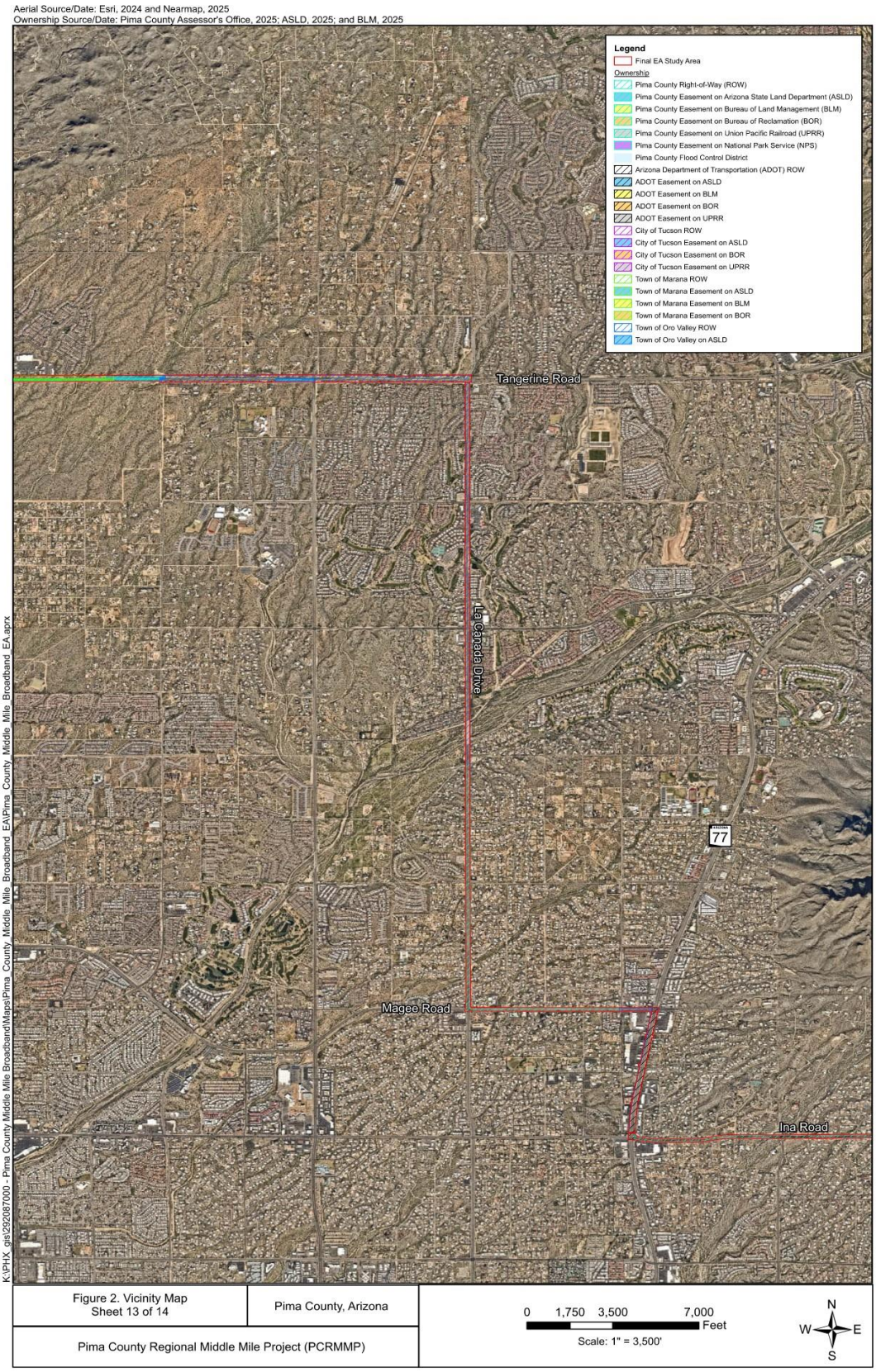

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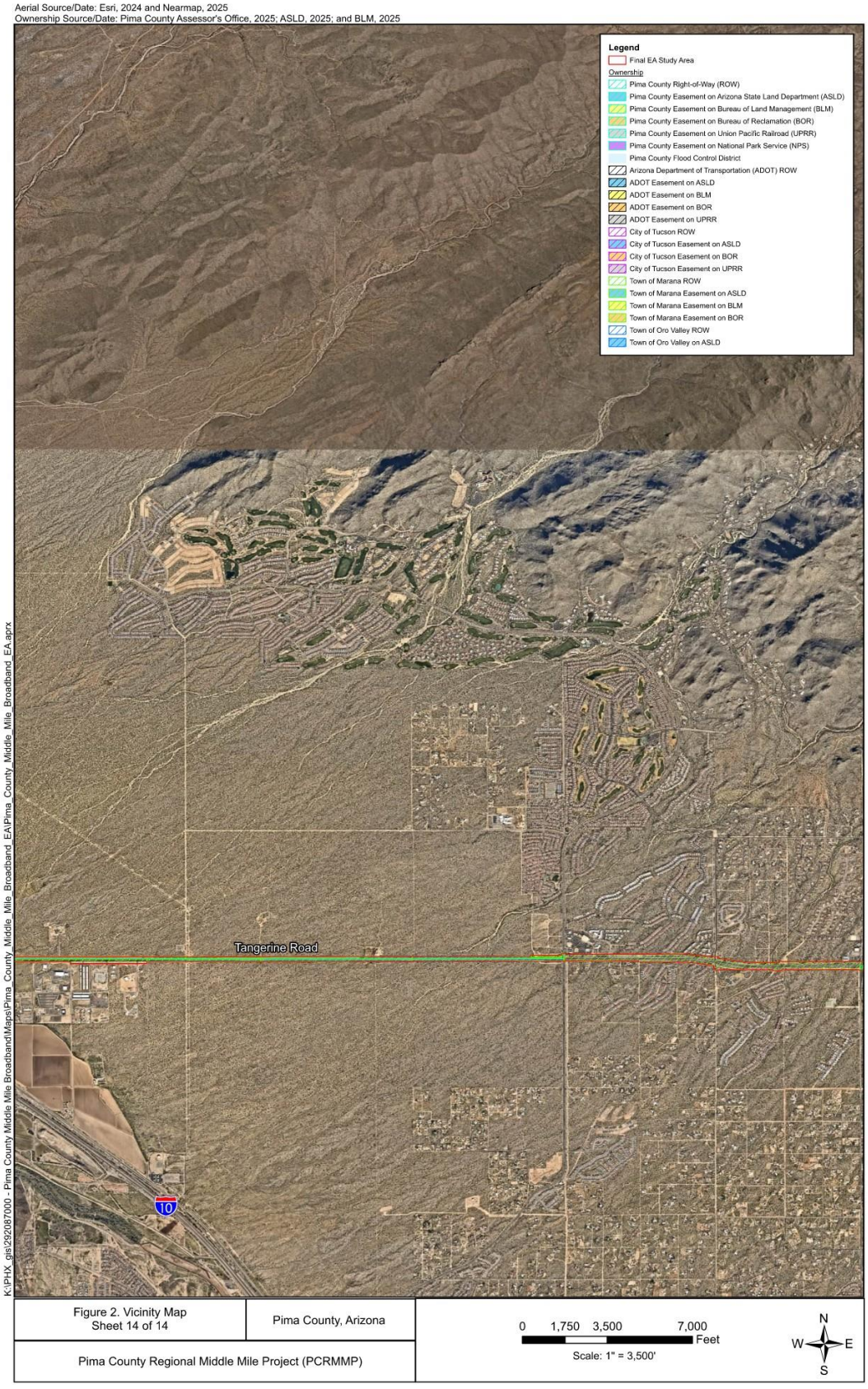
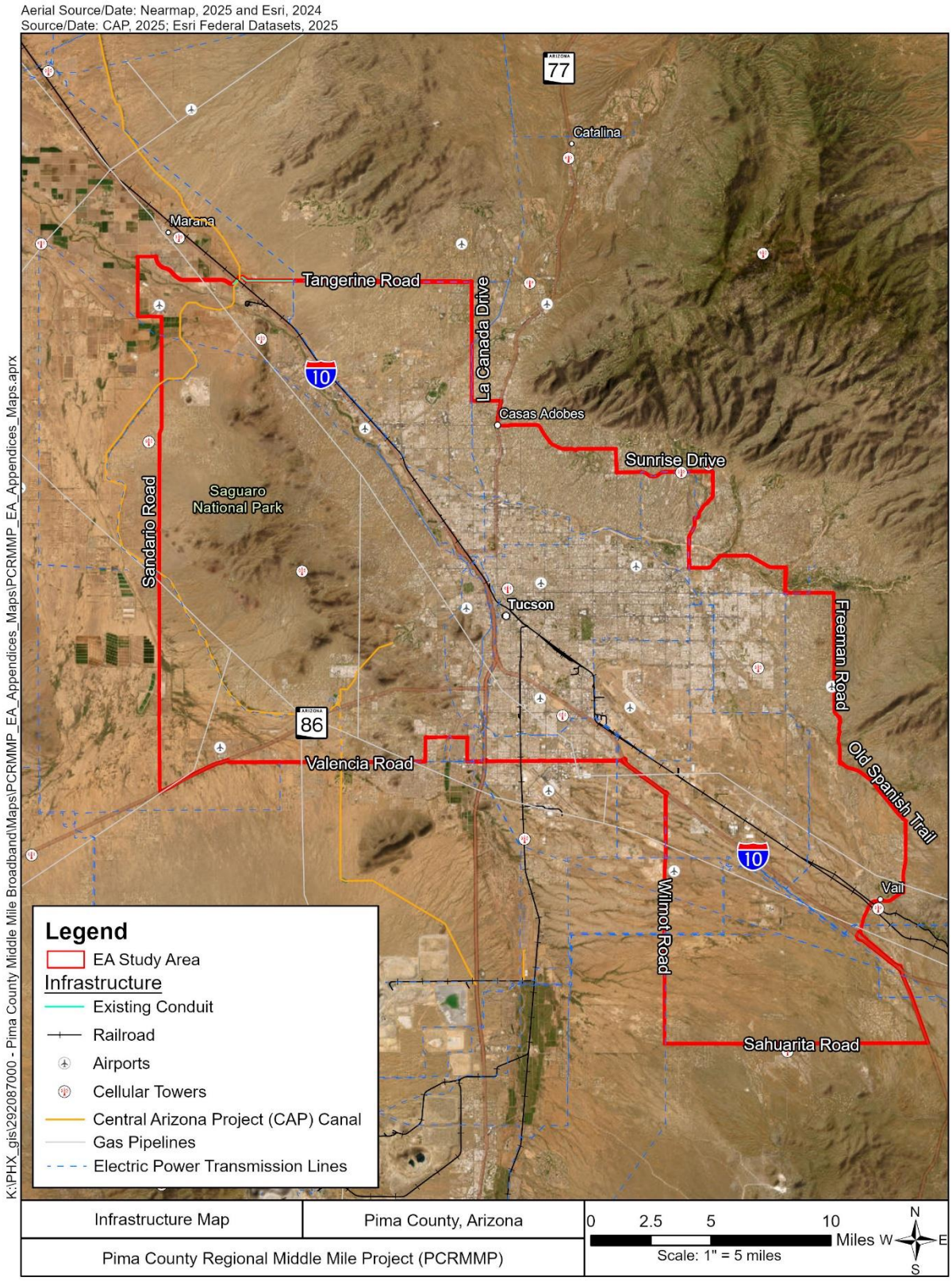


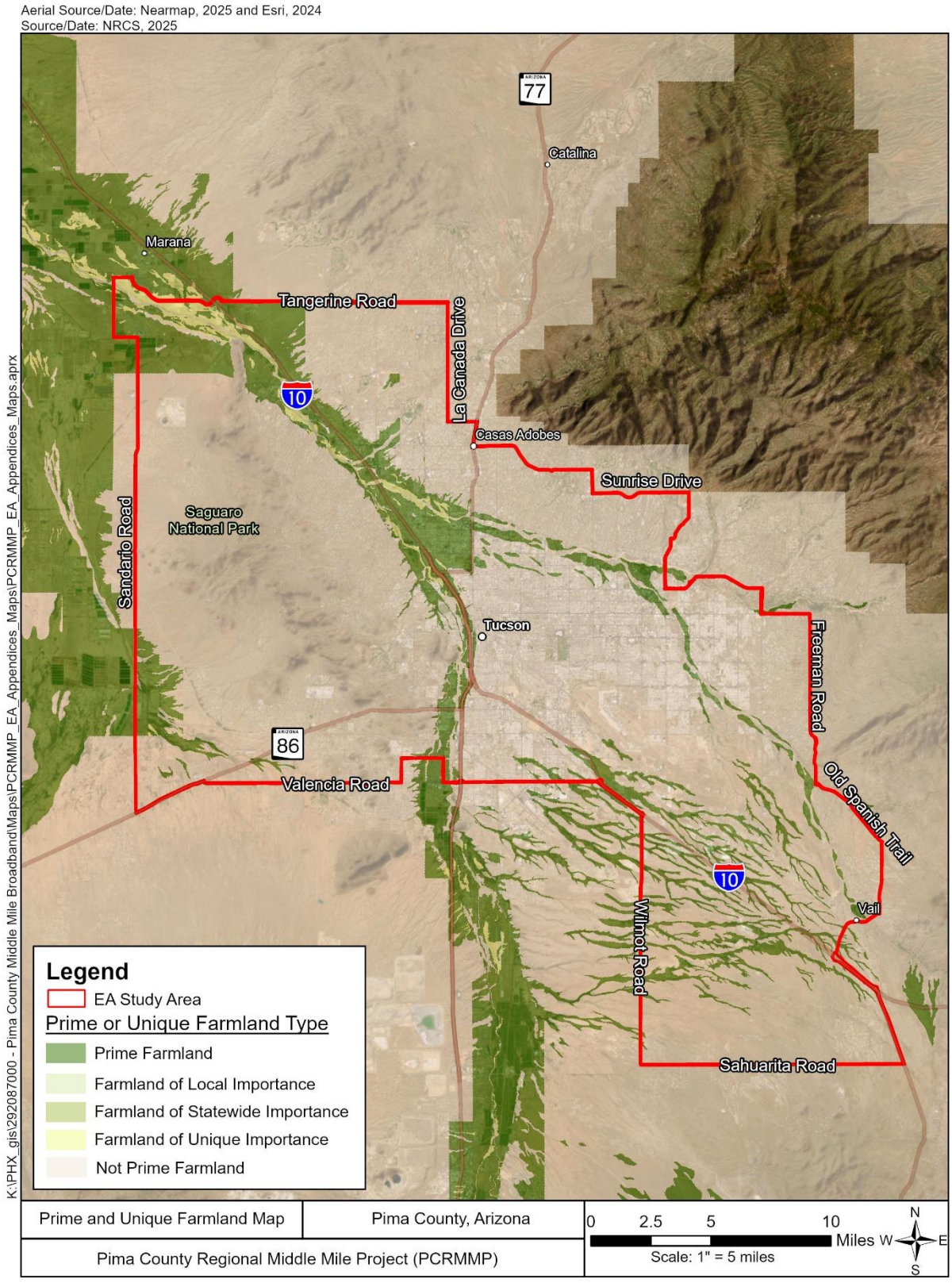
APPENDIX B: INFRASTRUCTURE

Infrastructure Map



APPENDIX C: SOIL

Prime and Unique Farmlands



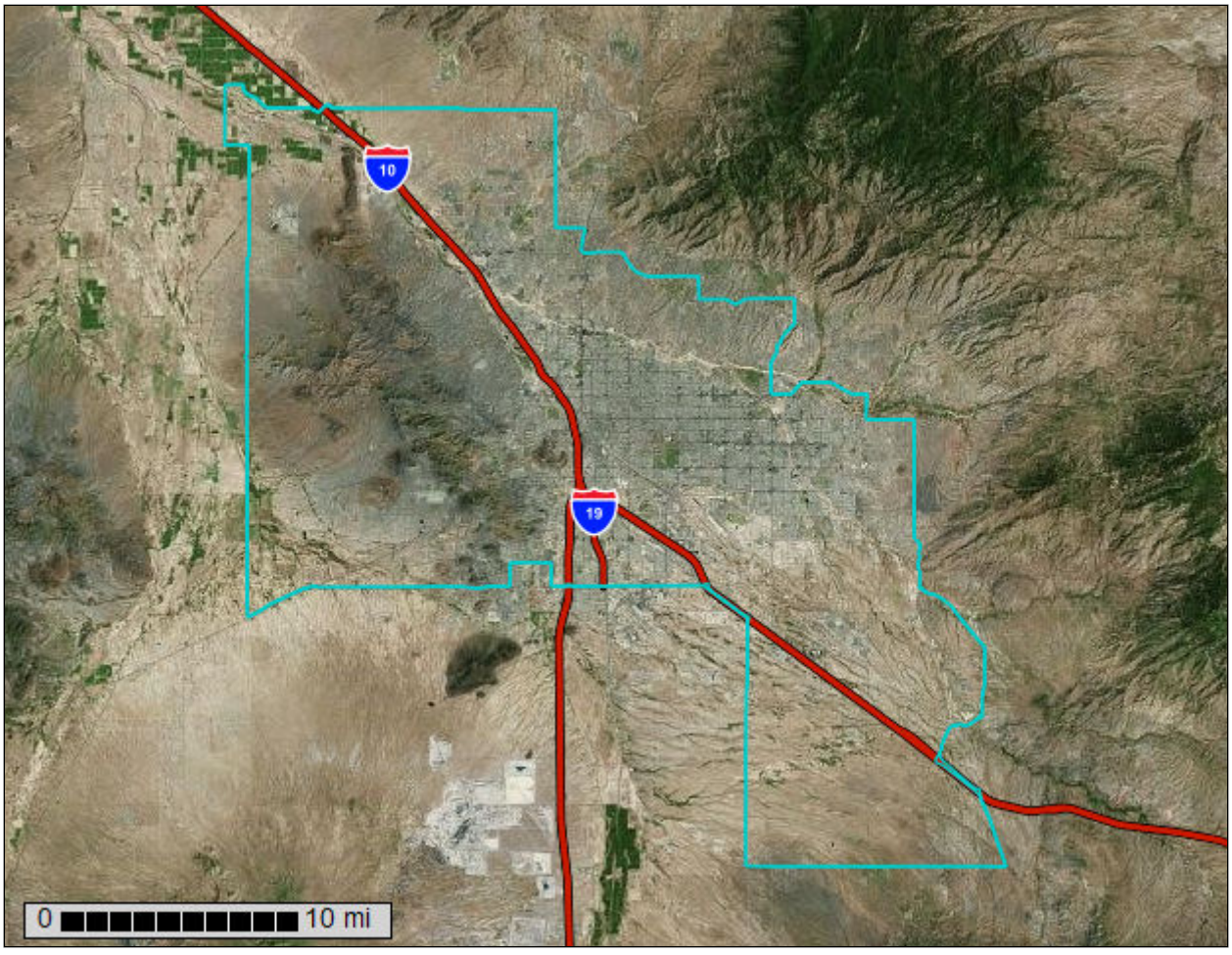
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties; Pima County, Arizona, Eastern Part; Tohono O'Odham Nation, Arizona, Parts of Maricopa, Pima and Pinal Counties; and Tucson-Avra Valley Area, Arizona



December 5, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

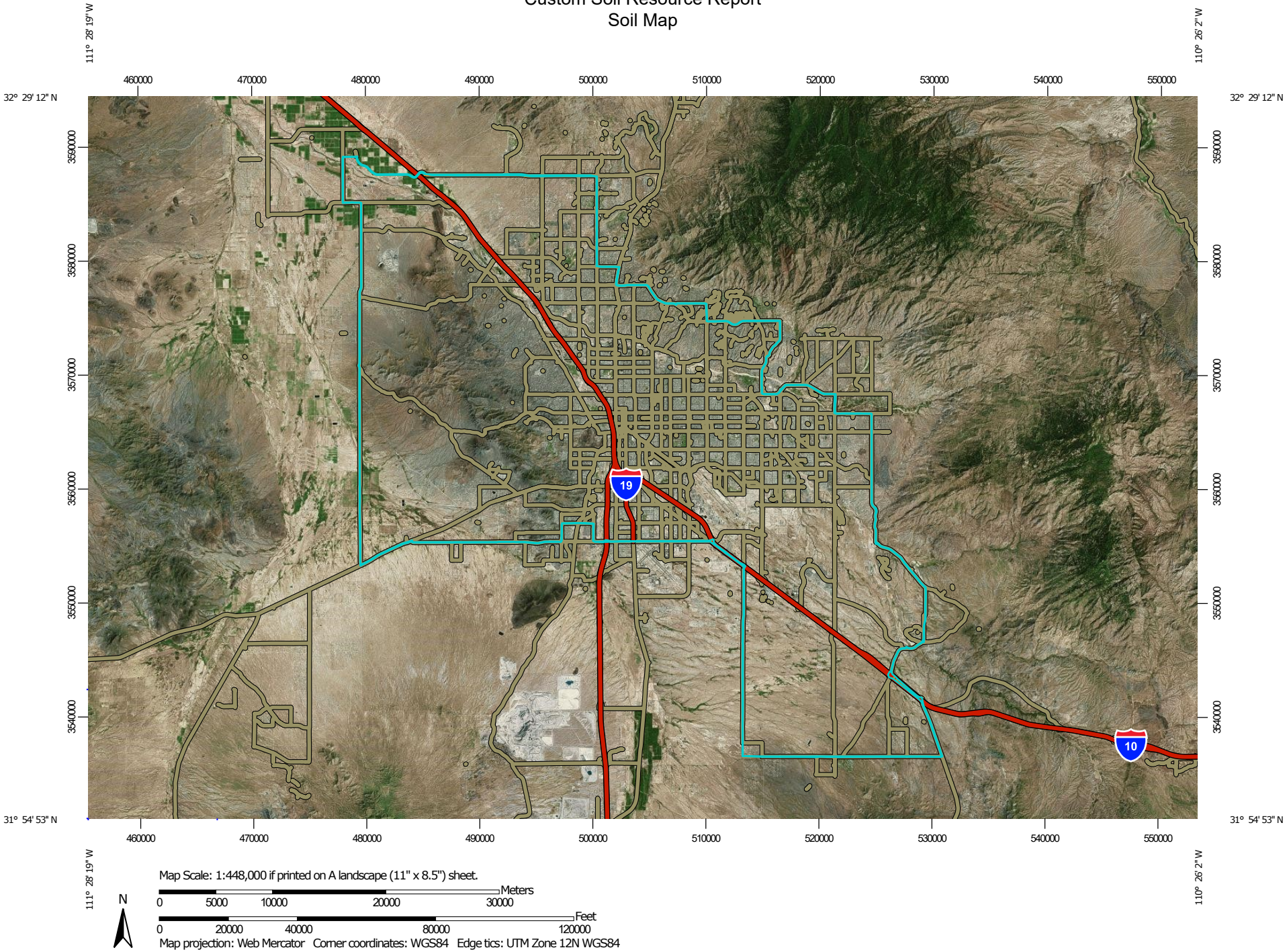
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:250,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties
Survey Area Data: Version 12, Aug 27, 2025

Soil Survey Area: Pima County, Arizona, Eastern Part
Survey Area Data: Version 24, Aug 27, 2025

Soil Survey Area: Tohono O'Odham Nation, Arizona, Parts of Maricopa, Pima and Pinal Counties
Survey Area Data: Version 20, Aug 27, 2025

Soil Survey Area: Tucson-Avra Valley Area, Arizona
Survey Area Data: Version 18, Aug 27, 2025

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
202	Ustic Haplargids, Ustic Torrifluvents, rarely flooded, and Ustic Haplocambids; warm thermic aridic hills and fans	0.0	0.0%
Subtotals for Soil Survey Area		**0.0**	**0.0%**
Totals for Area of Interest		**2,783.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Anthony fine sandy loam, 0 to 3 percent slopes	102.9	3.7%
5	Arizo-Riverwash complex, 0 to 3 percent slopes	65.1	2.3%
8	Bucklebar-Sahuarita complex, 0 to 3 percent slopes	85.3	3.1%
11	Cave soils and urban land, 0 to 8 percent slopes	43.6	1.6%
16	Chimenea very gravelly fine sandy loam, 5 to 15 percent slopes	21.5	0.8%
19	Comoro sandy loam, 0 to 2 percent slopes	2.9	0.1%
22	Delnorte-Stagecoach complex, 1 to 20 percent slopes	10.3	0.4%
23	Deloro-Andrada complex, 5 to 35 percent slopes	12.7	0.5%
30	Glendale silt loam, 0 to 3 percent slopes	26.0	0.9%
33	Guest fine sandy loam, 0 to 1 percent slopes	6.9	0.2%
34	Hantz loam, 0 to 1 percent slopes	177.5	6.4%
35	Hayhook sandy loam, 1 to 5 percent slopes	163.9	5.9%
36	Hayhook-Sahuarita complex, 1 to 5 percent slopes	89.4	3.2%
47	Mohave soils and urban land, 1 to 8 percent slopes	45.4	1.6%
51	Nolam-Tombstone complex, 8 to 30 percent slopes	22.9	0.8%
54	Palos Verdes-Jaynes complex, 2 to 8 percent slopes	205.8	7.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
55	Palos Verdes-Sahuarita complex, 2 to 8 percent slopes	116.2	4.2%
58	Pantano-Granolite complex, 5 to 25 percent slopes	58.1	2.1%
60	Pinaleno-Stagecoach complex, 5 to 16 percent slopes	172.6	6.2%
61	Pinaleno-Stagecoach-Palos Verdes complex, 10 to 35 percent slopes	96.7	3.5%
62	Pinaleno very cobbly sandy loam, 1 to 8 percent slopes	57.3	2.1%
71	Saguaro-Rock outcrop complex, 15 to 45 percent slopes	1.1	0.0%
72	Sahuarita soils, mohave soils and urban land, 1 to 5 percent slopes	199.0	7.2%
73	Sasabe-Caralampi complex, 1 to 15 percent slopes	49.6	1.8%
78	Stagecoach-Sahuarita association, 1 to 8 percent slopes	210.9	7.6%
79	Tombstone very gravelly loam, 15 to 50 percent slopes	22.5	0.8%
81	Tubac gravelly loam, 1 to 8 percent slopes	133.2	4.8%
82	Tubac sandy loam, 0 to 2 percent slopes	149.9	5.4%
86	Yaqui fine sandy loam, 1 to 3 percent slopes	39.2	1.4%
Subtotals for Soil Survey Area		**2,388.2**	**85.8%**
Totals for Area of Interest		**2,783.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
47	Pajarito-Sahuarita complex, 1 to 3 percent slopes	0.1	0.0%
Subtotals for Soil Survey Area		**0.1**	**0.0%**
Totals for Area of Interest		**2,783.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ag	Agua very fine sandy loam	13.7	0.5%
AhA	Anthony sandy loam, 0 to 1 percent slopes	2.1	0.1%
AhB	Anthony sandy loam, 1 to 3 percent slopes	6.4	0.2%
AnB	Anthony gravelly sandy loam,1 to 3 percent slopes	38.4	1.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ao	Anthony loam	12.8	0.5%
ApB	Anthony soils, 0 to 3 percent slopes	0.6	0.0%
Az	Arizo gravelly sandy loam	0.3	0.0%
Br	Brazito loamy sand	14.8	0.5%
Bt	Brazito sandy loam	5.7	0.2%
ClC	Cave-Rillito complex, 0 to 8 percent slopes	11.7	0.4%
Cm	Comoro sandy loam	1.0	0.0%
Co	Comoro loam	1.1	0.0%
Ga	Gila sandy loam	7.9	0.3%
GbA	Gila loam, 0 to 1 percent slopes	37.5	1.3%
Gh	Grabe loam	28.1	1.0%
Gm	Grabe silty clay loam	25.4	0.9%
Gr	Gravelly alluvial land	21.9	0.8%
Gu	Gullied land	4.1	0.1%
LeA	Laveen loam, 0 to 1 percent slopes	8.4	0.3%
LeB	Laveen loam, 1 to 3 percent slopes	1.2	0.0%
LrB	Laveen-Rillito complex, 0 to 3 percent slopes	6.9	0.2%
MdA	Mohave sandy loam, 0 to 1 percent slopes	11.2	0.4%
MhA	Mohave loam, 0 to 1 percent slopes	4.1	0.1%
MhB	Mohave loam, 1 to 3 percent slopes	5.5	0.2%
Mo	Mohave clay loam	4.0	0.1%
RdB	Rillito sandy loam, 1 to 3 percent slopes	0.2	0.0%
ReC	Rillito gravelly sandy loam, 0 to 8 percent slopes	7.7	0.3%
Ru	Riverwash	3.7	0.1%
SmA	Sonoita sandy loam, 0 to 1 percent slopes	14.5	0.5%
So	Sonoita sandy clay loam	5.1	0.2%
Ts3	Trix-Estrella complex, severely eroded	2.3	0.1%
TtA	Tubac sandy loam, 0 to 1 percent slopes	4.4	0.2%
TuA	Tubac sandy clay loam, 0 to 1 percent slopes	7.5	0.3%
Tv2	Tubac clay, eroded	9.0	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
VaA	Valencia sandy loam, 0 to 1 percent slopes	3.0	0.1%
VaB	Valencia sandy loam, 1 to 3 percent slopes	2.7	0.1%
VgB	Valencia-Gravelly alluvial land complex, 1 to 5 percent slopes	0.9	0.0%
Vo	Vekol silty clay loam	3.5	0.1%
VsA	Vinton loamy sand, 0 to 1 percent slopes	5.2	0.2%
Vu	Vinton-anthony sandy loams	48.6	1.7%
Subtotals for Soil Survey Area		**392.9**	**14.1%**
Totals for Area of Interest		**2,783.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties

202—Ustic Haplargids, Ustic Torrifluvents, rarely flooded, and Ustic Haplocambids; warm thermic aridic hills and fans

Map Unit Setting

National map unit symbol: 31rdj
Elevation: 2,430 to 3,970 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 61 to 68 degrees F
Frost-free period: 225 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Ustic haplargids and similar soils: 41 percent
Ustic torrifluvents and similar soils: 39 percent
Ustic haplocambids and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ustic Haplargids

Setting

Landform: Hills, fan remnants
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fan alluvium derived from igneous, metamorphic and sedimentary rock and/or slope alluvium derived from granite and/or volcanic rock

Typical profile

A - 0 to 1 inches: extremely gravelly sandy loam
Bt1 - 1 to 7 inches: very gravelly sandy clay loam
Bt2 - 7 to 18 inches: very gravelly sandy clay loam
C - 18 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 10 to 60 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Description of Ustic Torrifluvents

Setting

Landform: Alluvial fans, flood plains

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fan alluvium and/or stream alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

C1 - 0 to 7 inches: very stony fine sandy loam
C2 - 7 to 34 inches: stratified extremely cobbly loamy sand to extremely cobbly sandy loam
C3 - 34 to 60 inches: stratified extremely cobbly coarse sand to extremely cobbly sandy loam

Properties and qualities

Slope: 0 to 5 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Description of Ustic Haplocambids

Setting

Landform: Alluvial fans, fan remnants
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium derived from granite and/or schist

Typical profile

A - 0 to 2 inches: gravelly sandy loam
Bw - 2 to 17 inches: very gravelly sandy clay loam
BC - 17 to 39 inches: extremely cobbly sandy loam
C - 39 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Pima County, Arizona, Eastern Part

3—Anthony fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1szp
Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Anthony and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 5 inches: fine sandy loam
AC - 5 to 16 inches: stratified loamy sand to very fine sandy loam
C - 16 to 23 inches: gravelly loamy sand
Ck - 23 to 51 inches: sandy loam
C - 51 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

5—Arizo-Riverwash complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1t0x
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Arizo and similar soils: 50 percent
Riverwash: 20 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arizo

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A/C - 0 to 18 inches: gravelly loamy sand
C - 18 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Description of Riverwash

Properties and qualities

Drainage class: Excessively drained
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 30 percent
Hydric soil rating: No

8—Bucklebar-Sahuarita complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1t2k
Elevation: 2,200 to 3,300 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Bucklebar and similar soils: 45 percent
Sahuarita and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bucklebar

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bt - 0 to 9 inches: sandy loam
Bt - 9 to 37 inches: sandy clay loam
Btk - 37 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk - 3 to 28 inches: fine sandy loam
2Btkb - 28 to 45 inches: sandy clay loam
2Btkb - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

11—Cave soils and urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1sxl
Elevation: 2,300 to 3,250 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Cave and similar soils: 41 percent
Urban land: 40 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cave

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bk - 0 to 7 inches: gravelly fine sandy loam
2Bkm - 7 to 20 inches: cemented material
C - 20 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 4 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA111AZ - Limy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 19 percent
Hydric soil rating: No

16—Chimenea very gravelly fine sandy loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1sy0
Elevation: 2,200 to 3,800 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Chimenea and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chimenea

Setting

Landform: Pediments
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from granite and/or colluvium derived from granite

Typical profile

A - 0 to 2 inches: very gravelly fine sandy loam
Bt - 2 to 15 inches: gravelly sandy clay loam
2Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 6 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA121AZ - Granitic Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

19—Comoro sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1sy5
Elevation: 2,600 to 3,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 to 66 degrees F

Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Comoro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comoro

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A1 - 0 to 4 inches: sandy loam
A2 - 4 to 18 inches: sandy loam
C1 - 18 to 37 inches: sandy loam
C2 - 37 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R041XC316AZ - Sandy Wash 12-16" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

22—Delnorte-Stagecoach complex, 1 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2tdt9
Elevation: 2,000 to 3,600 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 62 to 70 degrees F
Frost-free period: 190 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Delnorte and similar soils: 45 percent
Stagecoach and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delnorte

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 1 inches: very gravelly loam
Bkk - 1 to 11 inches: very gravelly loam
Bkkm - 11 to 60 inches: cemented material

Properties and qualities

Slope: 1 to 10 percent
Depth to restrictive feature: 5 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: D
Ecological site: R040XA111AZ - Limy Upland 10"-13" p.z.

Hydric soil rating: No

Description of Stagecoach

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 1 inches: very gravelly sandy loam
Bw - 1 to 10 inches: gravelly sandy loam
Bkk1 - 10 to 24 inches: gravelly sandy loam
Bkk2 - 24 to 32 inches: very gravelly sandy loam
Bkk3 - 32 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 3 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA106AZ - Limy Upland, Deep 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

23—Deloro-Andrada complex, 5 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2t2ds
Elevation: 3,500 to 5,000 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 60 to 67 degrees F
Frost-free period: 180 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Deloro and similar soils: 40 percent
Andrada and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deloro

Setting

Landform: Mountains, hills, pediments
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Alluvium and/or colluvium over residuum weathered from metamorphic rock

Typical profile

A - 0 to 2 inches: extremely channery loam
Bt - 2 to 11 inches: extremely channery clay
2Crt - 11 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Surface area covered with cobbles, stones or boulders: 45.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: D
Ecological site: R041XC330AZ - Volcanic Hills 12-16" p.z. Clayey
Hydric soil rating: No

Description of Andrada

Setting

Landform: Mountains, pediments, hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Alluvium and/or colluvium over residuum weathered from metamorphic rock

Typical profile

A - 0 to 8 inches: very gravelly loam
Bk - 8 to 11 inches: extremely gravelly loam
2Crk - 11 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 6 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: D
Ecological site: R041XC308AZ - Limy Slopes 12-16" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 30 percent
Hydric soil rating: No

30—Glendale silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1szq
Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Glendale and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glendale

Setting

Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 4 inches: silt loam
C - 4 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.

Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

33—Guest fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1szw
Elevation: 3,000 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Guest and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guest

Setting

Landform: Flood plains, drainageways, swales
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 4 inches: fine sandy loam
C1 - 4 to 18 inches: clay
C2 - 18 to 42 inches: clay
Btkb - 42 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C
Ecological site: R041XC302AZ - Clayey Swale 12-16" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

34—Hantz loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1t00
Elevation: 2,400 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Hantz and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hantz

Setting

Landform: Flood plains, alluvial fans, swales
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A1 - 0 to 5 inches: loam
A2 - 5 to 12 inches: clay loam
C1 - 12 to 45 inches: clay
C2 - 45 to 60 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 4 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: R040XA102AZ - Clayey Swale 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

35—Hayhook sandy loam, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2whwy
Elevation: 2,000 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 62 to 70 degrees F
Frost-free period: 190 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Hayhook and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hayhook

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 5 inches: sandy loam
Bw - 5 to 24 inches: sandy loam
C - 24 to 38 inches: gravelly sandy loam
2C - 38 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA117AZ - Sandy Loam Upland, Deep 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

36—Hayhook-Sahuarita complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1t04
Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Hayhook and similar soils: 45 percent
Sahuarita and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hayhook

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 5 inches: sandy loam
Bw - 5 to 24 inches: sandy loam
C - 24 to 38 inches: gravelly sandy loam
2C - 38 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R040XA117AZ - Sandy Loam Upland, Deep 10"-13" p.z.
Hydric soil rating: No

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk - 3 to 28 inches: fine sandy loam
2Btkb - 28 to 45 inches: sandy clay loam
2Btb - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils
Percent of map unit: 25 percent
Hydric soil rating: No

47—Mohave soils and urban land, 1 to 8 percent slopes

Map Unit Setting
National map unit symbol: 1t0q
Elevation: 2,200 to 3,300 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition
Mohave and similar soils: 51 percent
Urban land: 49 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohave

Setting
Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: loam
BA - 3 to 6 inches: sandy loam
Btk - 6 to 40 inches: sandy clay loam
2C - 40 to 60 inches: loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

51—Nolam-Tombstone complex, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1t0z
Elevation: 3,500 to 5,000 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Nolam and similar soils: 45 percent
Tombstone and similar soils: 40 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolam

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 1 inches: extremely gravelly fine sandy loam
Btk - 1 to 19 inches: very gravelly sandy clay loam
Bk - 19 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R041XC313AZ - Loamy Upland 12"-16" p.z.
Hydric soil rating: No

Description of Tombstone

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous gravelly alluvium

Typical profile

A1 - 0 to 1 inches: very gravelly loam
A2 - 1 to 13 inches: very gravelly loam
Bk - 13 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: R041XC308AZ - Limy Slopes 12-16" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

54—Palos Verdes-Jaynes complex, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1t16
Elevation: 2,200 to 3,200 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Palos verdes and similar soils: 40 percent
Jaynes and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palos Verdes

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bt - 0 to 3 inches: gravelly sandy loam
Bt - 3 to 15 inches: gravelly sandy clay loam
Btk - 15 to 19 inches: gravelly sandy loam
2Cd1 - 19 to 38 inches: sandy loam
2Cd2 - 38 to 64 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 8 to 20 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Jaynes

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from schist and/or alluvium derived from gneiss

Typical profile

A - 0 to 5 inches: gravelly sandy loam
Bw - 5 to 10 inches: gravelly sandy loam
2Cd - 10 to 60 inches: loamy fine sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 4 to 16 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA111AZ - Limy Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

55—Palos Verdes-Sahuarita complex, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1t18
Elevation: 2,600 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Palos verdes and similar soils: 41 percent
Sahuarita and similar soils: 40 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palos Verdes

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bt - 0 to 3 inches: gravelly sandy loam
Bt - 3 to 15 inches: gravelly sandy clay loam
Btk - 15 to 19 inches: gravelly sandy loam
2Cd1 - 19 to 38 inches: sandy loam
2Cd2 - 38 to 64 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 8 to 20 inches to densic material

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk - 3 to 28 inches: fine sandy loam
2Btkb - 28 to 45 inches: loam
2Btb - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 19 percent
Hydric soil rating: No

58—Pantano-Granolite complex, 5 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1t1g
Elevation: 2,400 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pantano and similar soils: 40 percent
Granolite and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pantano

Setting

Landform: Pediments
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium and/or mixed colluvium

Typical profile

A - 0 to 1 inches: extremely gravelly loam
Bw - 1 to 10 inches: very gravelly loam
Bk - 10 to 16 inches: extremely gravelly loam
2Crk - 16 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent

Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA111AZ - Limy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Granolite

Setting

Landform: Pediments
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium and/or residuum weathered from rhyolite

Typical profile

A - 0 to 2 inches: extremely gravelly sandy loam
Bt - 2 to 16 inches: extremely gravelly sandy clay
2Crtk - 16 to 24 inches: bedrock
2R - 24 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: 10 to 30 inches to paralithic bedrock; 20 to 30 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA121AZ - Granitic Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

60—Pinaleno-Stagecoach complex, 5 to 16 percent slopes

Map Unit Setting

National map unit symbol: 1t1l
Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pinaleno and similar soils: 40 percent
Stagecoach and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pinaleno

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 2 inches: very cobbly sandy loam
Bt - 2 to 30 inches: extremely cobbly sandy clay loam
Bk - 30 to 60 inches: extremely gravelly sandy clay loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C

Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Stagecoach

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly mixed alluvium

Typical profile

A/Bw - 0 to 10 inches: very gravelly sandy loam
Bk1 - 10 to 19 inches: very gravelly loam
Bk2 - 19 to 40 inches: extremely gravelly loam
2C - 40 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 5 to 16 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA106AZ - Limy Upland, Deep 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

61—Pinaleno-Stagecoach-Palos Verdes complex, 10 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1t1m
Elevation: 2,400 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pinaleno and similar soils: 36 percent
Stagecoach and similar soils: 35 percent
Palos verdes and similar soils: 15 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pinaleno

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 2 inches: very cobbly sandy loam
Bt - 2 to 30 inches: extremely cobbly sandy clay loam
Bk - 30 to 60 inches: extremely gravelly sandy clay loam

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA113AZ - Loamy Slopes 10"-13" p.z.
Hydric soil rating: No

Description of Stagecoach

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bw - 0 to 10 inches: very gravelly sandy loam
Bk1 - 10 to 19 inches: very gravelly loam
Bk2 - 19 to 40 inches: extremely gravelly loam
2C - 40 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 20 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA110AZ - Limy Slopes 10"-13" p.z.
Hydric soil rating: No

Description of Palos Verdes

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: gravelly sandy loam
Bt - 3 to 15 inches: gravelly sandy clay loam
Btk - 15 to 19 inches: gravelly sandy loam
2Cd1 - 19 to 38 inches: sandy loam
2Cd2 - 38 to 64 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 10 to 15 percent
Depth to restrictive feature: 8 to 20 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 14 percent
Hydric soil rating: No

62—Pinaleno very cobbly sandy loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1t1n
Elevation: 2,200 to 3,450 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pinaleno and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pinaleno

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 2 inches: very cobbly sandy loam
Bt - 2 to 30 inches: extremely cobbly sandy clay loam
Bk - 30 to 60 inches: extremely gravelly sandy clay loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

71—Saguaro-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 1t25
Elevation: 2,000 to 3,800 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F

Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Saguaro and similar soils: 45 percent
Rock outcrop: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saguaro

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and/or colluvium derived from limestone

Typical profile

A - 0 to 1 inches: extremely gravelly fine sandy loam
C - 1 to 4 inches: extremely gravelly fine sandy loam
R - 4 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 4 to 19 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 60 percent
Gypsum, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 0.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R040XA107AZ - Limestone Hills 10"-13" p.z.
Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

72—Sahuarita soils, mohave soils and urban land, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1t27
Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Sahuarita and similar soils: 34 percent
Mohave and similar soils: 33 percent
Urban land: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk - 3 to 28 inches: fine sandy loam
2Btkb - 28 to 45 inches: sandy clay loam
2Btb - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Description of Mohave

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: loam
BA - 3 to 6 inches: sandy loam
Btk - 6 to 40 inches: clay loam
C - 40 to 60 inches: loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

73—Sasabe-Caralampi complex, 1 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1t28
Elevation: 3,100 to 3,700 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Sasabe and similar soils: 45 percent
Caralampi and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sasabe

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 5 inches: sandy loam
Bt1 - 5 to 22 inches: clay
Bt2 - 22 to 31 inches: gravelly clay loam
Bt3 - 31 to 41 inches: gravelly sandy clay loam
Btk - 41 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C
Ecological site: R041XC313AZ - Loamy Upland 12"-16" p.z.
Hydric soil rating: No

Description of Caralampi

Setting

Landform: Hills, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 1 inches: extremely gravelly sandy loam
Bt1 - 1 to 8 inches: very gravelly clay loam
Bt2 - 8 to 28 inches: extremely gravelly sandy clay loam
2C - 28 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R041XC313AZ - Loamy Upland 12"-16" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

78—Stagecoach-Sahuarita association, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1t2f
Elevation: 2,200 to 3,200 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Stagecoach and similar soils: 50 percent
Sahuarita and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stagecoach

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A/Bw - 0 to 10 inches: very gravelly sandy loam
Bk1 - 10 to 19 inches: very gravelly loam
Bk2 - 19 to 40 inches: extremely gravelly loam
2C - 40 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA106AZ - Limy Upland, Deep 10"-13" p.z.
Hydric soil rating: No

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk - 3 to 28 inches: fine sandy loam
2Btkb - 28 to 45 inches: sandy clay loam
2Btb - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

79—Tombstone very gravelly loam, 15 to 50 percent slopes

Map Unit Setting

National map unit symbol: 1t2g
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Tombstone and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tombstone

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous gravelly alluvium

Typical profile

A1 - 0 to 1 inches: very gravelly loam
A2 - 1 to 13 inches: very gravelly loam
Bk - 13 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R041XC308AZ - Limy Slopes 12-16" p.z.

Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

81—Tubac gravelly loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1t2n
Elevation: 2,400 to 3,200 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Tubac and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tubac

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A1 - 0 to 2 inches: gravelly loam
A2 - 2 to 14 inches: loam
Bt - 14 to 31 inches: clay
2Btk - 31 to 60 inches: gravelly sandy clay loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent

Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

82—Tubac sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1t2p
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Tubac and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tubac

Setting

Landform: Basin floors, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 2 inches: sandy loam
A - 2 to 14 inches: loam
Bt - 14 to 31 inches: clay
Btk - 31 to 66 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 25 percent
Hydric soil rating: No

86—Yaqui fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1t2t
Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Yaqui and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yaqui

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

A - 0 to 4 inches: fine sandy loam
Bw - 4 to 31 inches: sandy clay loam
2Btb - 31 to 43 inches: clay loam
2Bkb - 43 to 60 inches: gravelly loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

Tohono O'Odham Nation, Arizona, Parts of Maricopa, Pima and Pinal Counties

47—Pajarito-Sahuarita complex, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tvb
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pajarito and similar soils: 75 percent
Sahuarita and similar soils: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pajarito

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 4 inches: sandy loam
Bw - 4 to 17 inches: fine sandy loam
Bk - 17 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Description of Sahuarita

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A/B - 0 to 18 inches: sandy loam
Bw - 18 to 34 inches: loam
2Btkb - 34 to 60 inches: sandy clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

Tucson-Avra Valley Area, Arizona

Ag—Agua very fine sandy loam

Map Unit Setting

National map unit symbol: 1tmn
Elevation: 1,900 to 2,500 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Agua and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agua

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 29 inches: very fine sandy loam
2C - 29 to 69 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

AhA—Anthony sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tmp
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Anthony and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Alluvial fans, flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

AhB—Anthony sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tmq
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Anthony and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

AnB—Anthony gravelly sandy loam,1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tms
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Anthony and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Flood plains, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Ao—Anthony loam

Map Unit Setting

National map unit symbol: 1tmt
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Anthony and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

ApB—Anthony soils, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tjx
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Anthony and similar soils: 51 percent
Anthony and similar soils: 49 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthony

Setting

Landform: Alluvial fans, flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Description of Anthony

Setting

Landform: Flood plains, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A/C - 0 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Az—Arizo gravelly sandy loam

Map Unit Setting

National map unit symbol: 1tk2
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Arizo and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arizo

Setting

Landform: Flood plains, alluvial fans, drainageways
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A - 0 to 10 inches: gravelly sandy loam
C - 10 to 60 inches: stratified sand to very gravelly loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

Br—Brazito loamy sand

Map Unit Setting

National map unit symbol: 1tk3
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Brazito and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brazito

Setting

Landform: Flood plains

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 15 inches: loamy sand
C - 15 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

Bt—Brazito sandy loam

Map Unit Setting

National map unit symbol: 1tk5
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Brazito and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brazito

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 15 inches: sandy loam
C - 15 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

CIC—Cave-Rillito complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1tk7
Elevation: 2,100 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Cave and similar soils: 60 percent
Rillito and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cave

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Mixed calcareous alluvium

Typical profile

A - 0 to 11 inches: gravelly loam
Bkm - 11 to 42 inches: cemented material
Bk - 42 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 4 to 20 inches to petrocalcic
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XA111AZ - Limy Upland 10"-13" p.z.
Other vegetative classification: Limy Upland 10-13" p.z. (040XA111AZ)
Hydric soil rating: No

Description of Rillito

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed calcareous alluvium

Typical profile

A/Bk - 0 to 54 inches: gravelly loam
2C - 54 to 64 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

Cm—Comoro sandy loam

Map Unit Setting

National map unit symbol: 1tk8
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Comoro and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comoro

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A - 0 to 14 inches: sandy loam
C - 14 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Co—Comoro loam

Map Unit Setting

National map unit symbol: 1tkb
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Comoro and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comoro

Setting

Landform: Flood plains, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A - 0 to 14 inches: loam
C - 14 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

Ga—Gila sandy loam

Map Unit Setting
National map unit symbol: 1tkj
Elevation: 1,860 to 2,400 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Gila and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gila

Setting
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile
A - 0 to 10 inches: sandy loam
C - 10 to 60 inches: stratified sandy loam to loam to silt loam to silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

GbA—Gila loam, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 1tkk
Elevation: 1,860 to 2,400 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Gila and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gila

Setting
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile
A - 0 to 3 inches: loam
C - 3 to 60 inches: stratified loam to silt loam to silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

Gh—Grabe loam

Map Unit Setting

National map unit symbol: 1tks
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Grabe and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grabe

Setting

Landform: Alluvial fans, flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A - 0 to 18 inches: loam
C - 18 to 60 inches: stratified loam to silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

Gm—Grabe silty clay loam

Map Unit Setting

National map unit symbol: 1tkw
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Grabe and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grabe

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A - 0 to 8 inches: silty clay loam
C - 8 to 60 inches: stratified loam to silt loam to silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C

Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

Gr—Gravelly alluvial land

Map Unit Setting

National map unit symbol: 1tky
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Gravelly alluvial land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravelly Alluvial Land

Setting

Landform: Flood plains, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

A/C - 0 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Frequency of flooding: Occasional
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

Gu—Gullied land

Map Unit Setting

National map unit symbol: 1tkz
Elevation: 2,000 to 2,500 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Gullied land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Setting

Landform: Gullies on flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A/C - 0 to 60 inches: stratified loam to silty clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

LeA—Laveen loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tl3
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Laveen and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laveen

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old mixed calcareous alluvium

Typical profile

A - 0 to 5 inches: loam
Bk - 5 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

LeB—Laveen loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tl4
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Laveen and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laveen

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old mixed calcareous alluvium

Typical profile

A - 0 to 5 inches: loam
Bk - 5 to 60 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

LrB—Laveen-Rillito complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tl6
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Rillito and similar soils: 35 percent
Laveen and similar soils: 30 percent
Laveen and similar soils: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rillito

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed calcareous alluvium

Typical profile

A - 0 to 10 inches: sandy loam
Bk - 10 to 54 inches: gravelly loam
2C - 54 to 64 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Description of Laveen

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old mixed calcareous alluvium

Typical profile

A/Bk - 0 to 16 inches: sandy loam
Bk - 16 to 60 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Description of Laveen

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old mixed calcareous alluvium

Typical profile

A - 0 to 5 inches: loam
Bk - 5 to 60 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

MdA—Mohave sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tl8
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohave

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

A - 0 to 5 inches: sandy loam
Btk - 5 to 33 inches: clay loam
Bk - 33 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C

Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

MhA—Mohave loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tlb
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohave

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

A - 0 to 2 inches: loam
Btk - 2 to 33 inches: clay loam
Bk - 33 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

MhB—Mohave loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tlc
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohave

Setting

Landform: Fans, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

A - 0 to 2 inches: loam
Btk - 2 to 33 inches: clay loam
Bk - 33 to 60 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Mo—Mohave clay loam

Map Unit Setting

National map unit symbol: 1tld
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohave

Setting

Landform: Alluvial fans, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

A - 0 to 2 inches: clay loam
Btk - 2 to 33 inches: clay loam
Bk - 33 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA120AZ - Clay Loam Upland 10"-13" p.z.
Other vegetative classification: Clay Loam Upland 10-13" p.z. (040XA120AZ)
Hydric soil rating: No

RdB—Rillito sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tlk
Elevation: 2,100 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rillito and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rillito

Setting

Landform: Alluvial fans, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed calcareous alluvium

Typical profile

A - 0 to 10 inches: sandy loam
Bk - 10 to 54 inches: gravelly loam
2C - 54 to 64 inches: very gravelly sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

ReC—Rillito gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1tll
Elevation: 2,100 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Rillito and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rillito

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed calcareous alluvium

Typical profile

A - 0 to 10 inches: gravelly sandy loam
Bk - 10 to 54 inches: gravelly loam
2C - 54 to 64 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XA108AZ - Limy Fan 10"-13" p.z.
Hydric soil rating: No

Ru—Riverwash

Map Unit Setting

National map unit symbol: 1tln
Elevation: 1,860 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Channels, flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified alluvium

Typical profile

C - 0 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Frequency of flooding: Frequent
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: No

SmA—Sonoita sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tls
Elevation: 2,000 to 3,000 feet

Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sonoita and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sonoita

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile
A - 0 to 4 inches: sandy loam
Bt - 4 to 72 inches: sandy loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Other vegetative classification: Sandy Loam Upland 10-13" p.z. (040XA118AZ)
Hydric soil rating: No

So—Sonoita sandy clay loam

Map Unit Setting
National map unit symbol: 1tlw
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F

Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sonoita and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sonoita

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile
A - 0 to 4 inches: sandy clay loam
Bt - 4 to 72 inches: sandy clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XA114AZ - Loamy Upland 10"-13" p.z.
Hydric soil rating: No

Ts3—Trix-Estrella complex, severely eroded

Map Unit Setting
National map unit symbol: 1tm2
Elevation: 2,000 to 2,400 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Trix and similar soils: 65 percent
Estrella and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Trix

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium over old alluvium

Typical profile

Ap - 0 to 12 inches: silty clay loam
C - 12 to 30 inches: silty clay loam
Btkb - 30 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.02 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

Description of Estrella

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium over valley palin alluvium

Typical profile

A/C - 0 to 28 inches: loam
Btkb - 28 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R040XA112AZ - Loamy Swale 10"-13" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

TtA—Tubac sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tm3
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Tubac and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tubac

Setting

Landform: Swales on terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Old alluvium

Typical profile

A - 0 to 10 inches: sandy loam
Bt - 10 to 25 inches: clay
Btk - 25 to 45 inches: clay loam
Bk - 45 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Other vegetative classification: Sandy Loam Upland 10-13" p.z. (040XA118AZ)
Hydric soil rating: No

TuA—Tubac sandy clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tm5
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Tubac and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tubac

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Old alluvium

Typical profile

A - 0 to 10 inches: sandy clay loam
Bt - 10 to 25 inches: clay
Btk - 25 to 45 inches: clay loam
Bk - 45 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA120AZ - Clay Loam Upland 10"-13" p.z.
Hydric soil rating: No

Tv2—Tubac clay, eroded

Map Unit Setting

National map unit symbol: 1tm7
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Tubac and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tubac

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

A - 0 to 10 inches: clay
Bt - 10 to 25 inches: clay
Btk - 25 to 45 inches: clay loam
Bk - 45 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA104AZ - Clayey Upland 10"-13" p.z.
Hydric soil rating: No

VaA—Valencia sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tmb
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Valencia and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valencia

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A/C - 0 to 24 inches: sandy loam
2Btkb - 24 to 48 inches: sandy clay loam
3C - 48 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Hydric soil rating: No

VaB—Valencia sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1tmc
Elevation: 2,000 to 2,700 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Valencia and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valencia

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A/C - 0 to 24 inches: sandy loam

2Btkb - 24 to 48 inches: sandy clay loam
3C - 48 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Other vegetative classification: Sandy Loam Upland 10-13" p.z. (040XA118AZ)
Hydric soil rating: No

VgB—Valencia-Gravelly alluvial land complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1tmf
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Valencia and similar soils: 45 percent
Gravelly alluvial land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valencia

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A/C - 0 to 24 inches: sandy loam
2Btkb - 24 to 48 inches: sandy clay loam
3C - 48 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA118AZ - Sandy Loam Upland 10"-13" p.z.
Other vegetative classification: Sandy Loam Upland 10-13" p.z. (040XA118AZ)
Hydric soil rating: No

Description of Gravelly Alluvial Land

Setting

Landform: Alluvial fans, drainageways
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

A/C - 0 to 60 inches: stratified very gravelly loamy sand to very gravelly sandy loam to gravelly loam

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Frequency of flooding: Occasional
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)

Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

Vo—Vekol silty clay loam

Map Unit Setting

National map unit symbol: 1tmh
Elevation: 2,000 to 2,400 feet
Mean annual precipitation: 9 to 10 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Vekol and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vekol

Setting

Landform: Swales on plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old alluvium

Typical profile

Ap - 0 to 17 inches: silty clay loam
Bt - 17 to 30 inches: clay
C - 30 to 45 inches: clay loam
2Btkb - 45 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0

Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XA104AZ - Clayey Upland 10"-13" p.z.
Hydric soil rating: No

VsA—Vinton loamy sand, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1tmj
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 11 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Vinton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vinton

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A/C - 0 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

Vu—Vinton-anthony sandy loams

Map Unit Setting

National map unit symbol: 1tmm
Elevation: 1,900 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Vinton and similar soils: 51 percent
Anthony and similar soils: 49 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vinton

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent alluvium

Typical profile

A - 0 to 10 inches: sandy loam
C - 10 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Other vegetative classification: Sandy Bottom 10-13" p.z. (040XA115AZ_2)
Hydric soil rating: No

Description of Anthony

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream alluvium

Typical profile

A/C - 0 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XA115AZ - Sandy Wash 10"-13" p.z.
Hydric soil rating: No

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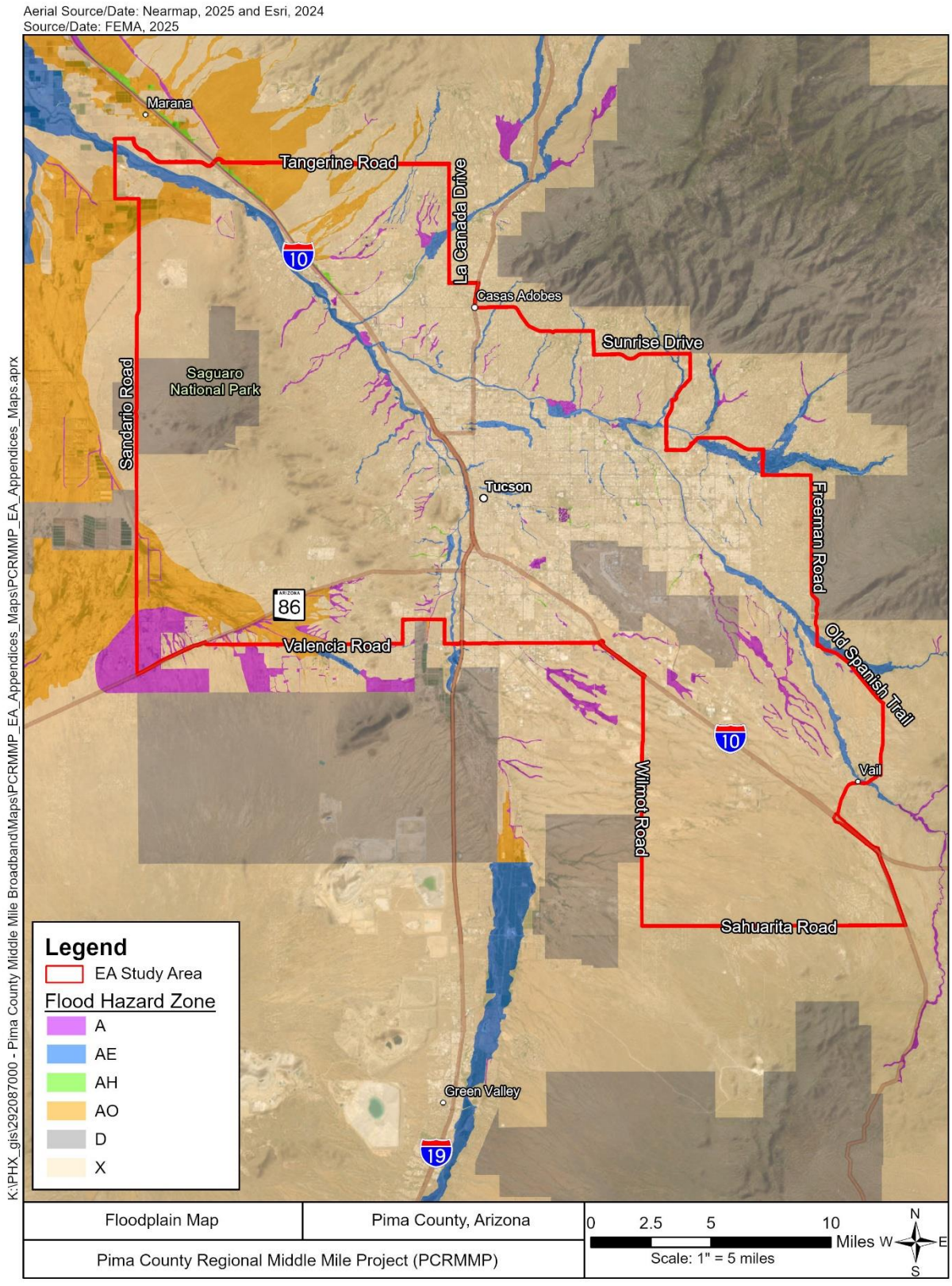
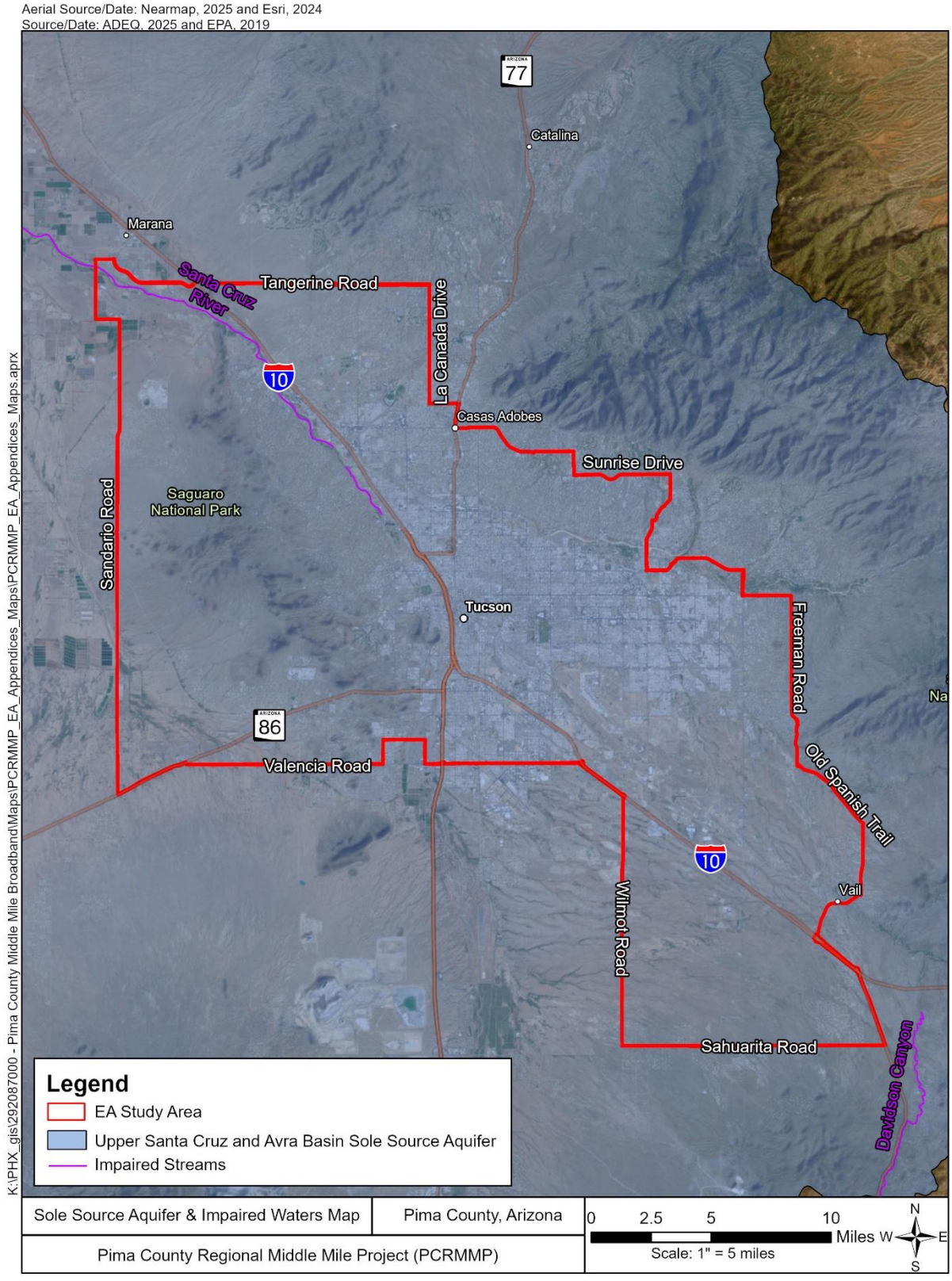
APPENDIX D: WATER RESOURCES/WETLANDS

Floodplain Map



Sole Source Aquifers and Impaired Waters



Kimley»Horn

December 11, 2025

Michelle Simon
Director
Office of Digital Inclusion
Pima County

submitted via email to michelle.simon@pima.gov

Re: ***Clean Water Act Section 404/401 Compliance Review***
Pima County Regional Middle Mile Project
Pima County, Arizona

Dear Ms. Simon:

Kimley-Horn was retained by Pima County to prepare a Clean Water Act (CWA) Section 404/401 Compliance Review for the Pima County Regional Middle Mile Project (PCRMMP) project. The purpose of this review was to determine if potential Waters of the U.S. (WOTUS) are present within the Environmental Assessment (EA) Study Area and to provide compliance documentation for Section 404/401 permitting (as needed).

Project Description
The 134-mile project is located along various roadways including: Magee Road, State Route (SR) 77, La Canada Drive, Tangerine Road, Ina Road, Freeman Road, Speedway Boulevard, Interstate 10 (I-10), Colossal Cave Road, SR 83, Sahuarita Road, Wilmot Road, Valencia Road, Sandario Road, and SR 86in Pima County, Arizona. The cadastral location for the project includes various sections within Township 11 South, Range 11-13 East, Township 12 South, Range 11-14 East; Township 12.5 South, Range 14 East; Township 13 South, Range 11 and 13-15 East; Township 14 South, Range 11 and 15-16 East; Township 15 South, Range 11-16 East; Township 16 South, Range 14-16 East; and Township 17 South, Range 14-16 East of the Gila and Salt River Base Line and Meridian. The project beginning/ending is at 32.4246530, -111.1880077.

Overall Project Construction - Conduit Installation

All construction is limited to existing ROW, easement, and County/City/Town property to minimize impacts to the environment. The construction footprint will be cleared of vegetation with a bushhog or similar mowing equipment. Installation of the conduit will be installed via horizontal directional drilling, trenching, shallow trenching, micro-trenching within pavement, attaching to existing bridges, rocksaw, and plowing.

Horizontal Directional Drilling

Installation of conduit via horizontal directional drilling uses a surface-launched drilling rig to bore into the substrate below along a predetermined horizontal path. The drilling rig used for directional boring is typically hydraulically powered and equipped with a drill bit, or hydraulic cutting jet nozzle for softer soils. Directional boring involves digging an entrance pit with earth moving equipment and drilling a pilot hole. The pilot hole is then re-drilled with a wider-diameter drill once or multiple times to enlarge the boring to the diameter of the conduit. The minimum cover to top of conduit is 40 inches; however, if the 40-inch minimum can't be achieved due to depth of existing utilities, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry).

Trenching

Installation of conduit via trenching would require a backhoe or small excavator. Excavated material is typically cast to the side of the trench as it is being excavated. Once conduit has been placed in the trench, native material would be backfilled. Any excess excavated material would be disposed of offsite

per technical specifications. Shallow trenching would be utilized over existing drainage structures or where minimum depth cannot be obtained. Shallow trench depths vary based on utility conflicts, however the minimum cover to top of conduit is 18 inches. The shallow trench would be backfilled with a minimum of 15 inches of two sacks of sand slurry.

Micro-trenching

Installation of conduit via micro-trenching would require a ride-on trencher that has a vacuum excavator with a cutting wheel that creates a narrow cut into existing pavement. The width of the trench is 4-inches with a depth varying between 16 to 24 inches. Trench would be backfilled with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry) with a 2.5-inch by 2-foot asphalt 'T' Patch.

Rigid Metal Conduit

Rigid metal conduit would be attached to existing bridge structures using hand tools. The conduit would be attached to the bridge barrier or hung below the bridge deck using minimum ½ inch diameter mechanical expansion anchors. Where rigid metal conduit is installed below grade, the conduit would be wrapped using approved PVC Tape. Anchors would be placed approximately three inches away from the edge of deck. The conduit would be attached to the concrete barrier via C-Channel Struts with Strut Clamps or hung below the bridge deck via hangar assembly.

Plowing

Installation of conduit via plowing would require a small trackhoe with a plow attachment on the back end and a conduit spool on the front end. Plow depths vary based on utility conflicts; however, the minimum cover to top of conduit is 40 inches. If the minimum 40 inches can't be achieved, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry). Plowing would be compacted the same day utilizing a track wheel.

Rocksaw

Installation of fiber conduit using a rocksaw trencher involves a machine equipped with a rock-cutting wheel and a conduit spool system. This method is effective for cutting through hard surfaces like asphalt, concrete, and compacted soil. Trench depths vary depending on existing utility conflicts. Trenches are typically backfilled and compacted the same day using the machine's integrated compaction wheel or track system.

Pull Box and Vault

Communication pull boxes will be placed approximately every 3,000 feet and splice vaults will be placed approximately every 25,000 feet. Fiber splice enclosures will be installed only in the vault locations. The excavation area for communication pull boxes would be approximately 4 feet wide by 6 feet long and the excavation area for splice vaults would be approximately 5 feet wide by 7 feet long. Each excavation area will then be backfilled with select excavated backfill material and compacted to top of grade.

Survey Information

The EA Study Area was reviewed for the presence of potential WOTUS by aerial interpretation to the extent practicable. U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) - Strahler Stream Order data was then utilized to focus ground truthing to the aquatic features that could potentially qualify as WOTUS. Only aquatic features (AFs) with Stream Order (SO) 3 – SO 8 recorded in the USGS NHD - Strahler Stream Order were spot checked in the field and ground photographs were limited to these locations. SO 3 and higher aquatic features were chosen due to the potential of qualifying as relatively permanent waters (RPWs) that could have a downstream connection to a Traditional Navigable Water (TNW).

A ground survey to identify potential WOTUS in EA Study Area was completed June 18-20, 2025 and November 18-19, 2025 by Avery Pritchard, Rachel Haughton, and Grace Harwin (Kimley-Horn). The aerial photographs (Nearmap and Environmental Systems Research Institute [Esri]) used during the ground survey were taken in 2025 and 2024 and accurately depict aquatic features within the EA Study Area. Based on the current definition of WOTUS, the aquatic features within the EA Study Area would not qualify as WOTUS as they are non-RPWs (AF 3-36, 38-74, 76-85, 87-93, and 95-106) and (b)(1)-(b)(8) Excluded Features (EFs) (EF 1-84), except for AF 1 (Santa Cruz River), AF 2 (Central Arizona Project [CAP]), AF 37 (Santa Cruz River), AF 75 (Pantano Wash), AF 86 (Tanque Verde Creek), and AF 94 (Canada del Oro Wash) which are potentially jurisdictional WOTUS. Representative ground photographs were taken to illustrate that AF 3-36, 38-74, 76-85, 87-93, and 95-106 and EF 1-84 were non-RPW (ephemeral) or excluded features. Within the EA Study Area, approximately 5.8 acres are proposed as potential WOTUS (RPWs) and approximately 10.2 acres of non-RPWs (AF 3-36, 38-74, 76-85, 87-93, and 95-106) are proposed as non-jurisdictional. Additionally, approximately 24,278 linear feet of waters are proposed as non-jurisdictional waters as they qualify as (b)(3) or (b)(8) EFs (EF 1-84). No wetlands or special aquatic sites were identified in the EA Study Area.

Nearest Traditional Navigable Water (TNW) and Flowpath to the TNW

The nearest downstream TNW is the Santa Cruz River Reach B. The reach of the Santa Cruz River Reach B between Roger Road Waste Water Treatment Plant and the Pima/Pinal County Line is a TNW and crosses the EA Study Area at 32.434872°/-111.233931°. The TNW begins approximately 17.3 miles upstream of this location. All onsite non-RPWs flow to the Santa Cruz River up or downstream of the TNW headwaters. Therefore, onsite flows have a surface connection to the TNW when flows are present.

Geographic Scope and Flow Regime

The USGS NHD depicts one SO 8, two SO 7, one SO 6, five SO 5, and seven SO 4 aquatic features crossing the EA Study Area. The SO 8 aquatic feature flows roughly along the path of the Santa Cruz River (AF 1), which is a TNW. One of the SO 7 aquatic features flows roughly along the Santa Cruz River (AF 37) from the southern EA Study Area for approximately 12 miles until it reaches the SO 8 Santa Cruz River (AF 1, TNW). The second SO 7 aquatic feature flows roughly along Pantano Wash (AF 75) into the Rillito River for approximately 32 miles until it reaches the SO 8 Santa Cruz River. The SO 6 aquatic feature flows roughly along Tanque Verde Creek (AF 86) for approximately 2.1 miles until it reaches the SO 7 Rillito River. Two of the five SO 5 aquatic features are upstream crossings of the SO 6 Tanque Verde Creek (AF 86). The third SO 5 aquatic feature flows roughly along Canada del Oro Wash (AF 94) for approximately 6.5 miles until it reaches the SO 8 Santa Cruz River (TNW). The fourth SO 5 aquatic feature flows roughly along Rincon Creek (AF 79) for approximately 1.2 miles until it reaches the SO 7 Pantano Wash. The final SO5 aquatic feature crosses the EA Study Area as sheetflow and flows for approximately 3.7 miles until it reaches the SO 8 Brawley Wash. The seven SO4 features were determined to be unnamed ephemeral washes or sheetflow during field reconnaissance.

Vegetation observed along non-RPWs included blue paloverde (*Parkinsonia florida*), velvet mesquite (*Prosopis velutina*), desertbroom (*Baccharis sarothroides*), desert ironwood (*Olneya tesota*), and desert hackberry (*Celtis ehrenbergiana*). All species are rated as Facultative-Upland (FAC-UP) or drier on the National Wetland Plant list. These communities are common in the uplands of the Lower Colorado River Subdivision - Sonoran Desert Scrub, Arizona Upland Subdivision – Sonoran Desertscrub, and Semidesert Grassland.[1]

[1] Data Basin. June 27, 2012. Digital Representation of “Brown and Lowe’s Biotic Communities of the Southwest” map (1979). Developed by the Nature Conservancy of Arizona (2004). Accessed: Accessed December 9, 2025. https://databasin.org/maps/new/#datasets=e8e241e869054d7e810894e5e993625e

The following soils occur along Aquatic Features 1-106: Anthony fine sandy loam, 0 to 3 percent slopes; Anthony gravelly sandy loam,1 to 3 percent slopes; Arizo-Riverwash complex, 0 to 3 percent slopes; Bucklebar-Sahuarita complex, 0 to 3 percent slopes; Chimenea very gravelly fine sandy loam, 5 to 15 percent slopes; Comoro sandy loam, 0 to 2 percent slopes; Guest fine sandy loam, 0 to 1 percent slopes; Hantz loam, 0 to 1 percent slopes; Hayhook sandy loam, 1 to 5 percent slopes; Hayhook-Sahuarita complex, 1 to 5 percent slopes; Mohave soils and urban land, 1 to 8 percent slopes; Nolam-Tombstone complex, 8 to 30 percent slopes; Palos Verdes-Jaynes complex, 2 to 8 percent slopes; Palos Verdes-Sahuarita complex, 2 to 8 percent slopes; Pinaleno-Stagecoach complex, 5 to 16 percent slopes; Pinaleno-Stagecoach-Palos Verdes complex, 10 to 35 percent slopes; Pinaleno very cobbly sandy loam, 1 to 8 percent slopes; Sahuarita soils, mohave soils and urban land, 1 to 5 percent slopes; Sasabe-Caralampi complex, 1 to 15 percent slopes; Tubac gravelly loam, 1 to 8 percent slopes; Tubac sandy loam, 0 to 2 percent slopes; Gravelly alluvial land, 0 to 3 percent slopes; Gullied land; Mohave loam, 0 to 1 percent slopes; Riverwash, 0 to 3 percent slopes; Valencia-Gravelly alluvial land complex, 1 to 5 percent slopes.[2] The EA Study Area does not have hydric soils.[3]

Information from the Arizona Department of Water Resources (ADWR) website was reviewed for water wells located within one mile of the site. According to the well registration records, groundwater depth varies greatly within the EA Study Area and exists at depths greater than 40 feet below ground surface.[4]

Streamflow Duration Assessment Method (SDAM) data was collected for AF 88 (Espero Wash, SO 3) and results show that the feature is ephemeral and therefore, non-RPW.[5] Due to the similarity of aquatic features, SDAM data for AF 88 confirms that aquatic features with SO 3 or less (211 NHD features) are ephemeral washes and therefore, non-RPW. During field reconnaissance, antecedent precipitation conditions were wetter than normal with the Palmer Drought Severity Index at “Extreme Drought” based on APT results for that day for June 18-20, 2025. Antecedent precipitation conditions were normal with the Palmer Drought Severity Index at “Mild Drought” based on APT results for that day for November 18-19, 2025.[6]

Under 2023 Rule as amended, tributaries to TNWs, the territorial seas, or interstate waters must be connected to an (a)(1) water and must be a relatively permanent, standing or continuously flowing bodies of water. AF 3-36, 38-74, 76-85, 87-93, and 95-106 were determined to not support a relatively permanent flow of water and do not qualify as (a)(3) tributaries.[7] AF 1 (Santa Cruz River) is a TNW and therefore an (a)(1) water. AF 2 (CAP) was determined to be a non-jurisdictional agricultural canal and does not qualify as an (a)(3) tributary. AF 37 (Santa Cruz River), 75 (Pantano Wash), 86 (Tanque Verde Creek), and 94 (Canada del Oro Wash) were determined to support a relatively permanent flow of water and qualify as (a)(3) tributaries.

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[2] United States Department of Agriculture (USDA). Natural Resource Conservation Service. Custom Soil Resource Report for Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties; Pima County, Arizona, Eastern Part; Tohono O'Odham Nation, Arizona, Parts of Maricopa, Pima and Pinal Counties; and Tucson-Avra Valley Area, Arizona. Accessed: Accessed December 5, 2025.
[3] USDA. Natural Resource Conservation Service. SSURGO. Shapefile. Last Modified 04/30/2024. https://nrcsgeoservices.sc.egov.usda.gov/arcgis/rest/services/soils/ssurgo_for_rsvi/MapServer
[4] Arizona Department of Water Resources (ADWR), Arizona Groundwater Site Inventory (GWSI). Accessed: Accessed July 2025. https://azwatermaps.azwater.gov/gwsi
[5] Environmental Protection Agency (EPS). Regional Streamflow Duration Assessment Methods (SDAMs). Version 2.0.1 Release date: February 2025. https://rconnect-public.epa.gov/SDAMs/ Accessed July 10, 2025.
[6] U.S. Army Corps of Engineers. Antecedent Precipitation Tool. Accessed December 9, 2025.
[7] Revised Definition of ‘Waters of the United States,’” 88 FR 3004 (January 18, 2023) (“2023 Rule”)

Excluded Features
Under 2023 Rule as amended, the following features are considered excluded waters:

- (b)(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water
- (b)(8) Swales and erosional features (e.g. gullies, small washes) characterized by low volume, infrequent, or short duration flow

A total of 24,278 linear feet of (b)(3) and (b)(8) excluded features are proposed within the EA Study Area.

Permitting Requirements
AF 1 and 37 (Santa Cruz River), AF 75 (Pantano Wash), AF 86 (Tanque Verde Creek), and AF 94 (Canada del Oro Wash) were determined to qualify as (a)(1) or (a)(3) waters. Work at these AFs include conduit installation via bridge attachment only. The conduit will be installed from the bridge deck by bucket truck or similar. No work will occur under the bridge; therefore, no impacts to potential WOTUS will occur and Section 404/401 permitting is not required.

Included for your review are the following items:

- Table 1. Aquatic Features within the EA Study Area
- Table 2. Excluded Features within the EA Study Area
- Figure 1. Vicinity Map
- Figure 2. USGS National Map
- Figure 3. Aquatic Feature Delineation Map
- Figure 4. USGS National Hydrography Dataset Strahler Stream Order Map
- Figure 5. Section 404/401 Compliance Map
- Antecedent Precipitation Tool
- Streamflow Duration Assessment Method
- Ground Photographs

Please contact me at (602) 906-1187 or jennifer.simpkins@kimley-horn.com should you have any questions.

Sincerely,

Jennifer Simpkins
Senior Environmental Scientist

Table 1. Aquatic Features within the EA Study Area

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (linear feet and acreage, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Jurisdictional Evaluation	Justification
Aquatic Feature (AF) 1 (Santa Cruz River)	32.434862	-111.233934	0.1	Non-Wetland	Jurisdictional WOTUS	AF 1 is an (a)(1) Traditional Navigable Water (TNW).
AF 2 (Central Arizona Project [CAP])	32.247738	-111.218173	0.2	Non-Wetland	Agricultural Canal; Not jurisdictional	AF 2 – CAP is a concrete irrigation canal designated for agricultural use. CAP receives water from Lake Pleasant and flows are released for delivery at a number of locations before reaching the CAP canal's terminus in Sahuarita. As a result of this highly managed water delivery system, the connection to the TNW is highly manipulated and may not occur for several years at a time. This agricultural canal is not WOTUS.
AF 2 (CAP)	32.36263	-111.216635	0.2	Non-Wetland	Agricultural Canal; Not jurisdictional	AF 2 – See above.
AF 37 (Santa Cruz River)	32.133712	-110.992848	0.2	Non-Wetland	RPW; Potentially Jurisdictional	AF 37 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.
AF 75 (Pantano Wash)	32.049795	-110.697682	0.3	Non-Wetland	RPW; Potentially Jurisdictional	AF 75 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.

Table 1. Aquatic Features within the EA Study Area (continued)

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (linear feet and acreage, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Jurisdictional Evaluation	Justification
AF 86 (Tanque Verde Creek)	32.238203	-110.772647	0.4	Non-Wetland	RPW; Potentially Jurisdictional	AF 86 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.
AF 86 (Tanque Verde Creek)	32.256617	-110.820295	0.5	Non-Wetland	RPW; Potentially Jurisdictional	AF 86 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.
AF 86 (Tanque Verde Creek)	32.264737	-110.8411	1.6	Non-Wetland	RPW; Potentially Jurisdictional	AF 86 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.
AF 94 (Canada del Oro Wash)	32.383473	-110.995734	2.3	Non-Wetland	RPW; Potentially Jurisdictional	AF 94 exhibits an OHWM and shows evidence of continuous flows that are not simply a direct result of precipitation and has a continuous surface connection with an (a)(1) or (a)(3) waters.
Non-RPW AFs	See Attached Form		10.2	Non-Wetland	Non- RPW (Ephemeral); Not jurisdictional	The remaining features are not relatively permanent, standing, or flowing, nor do they have a surface connection with an (a)(1) or (a)(3) waters.
Nearest Traditionally Navigable Water to the EA Study Area:						Santa Cruz River Reach B; Roger Road Wastewater Treatment Plant to the Pima/Pinal County Line; crosses the EA Study Area at 32.434872°, -111.233931°. AF 1, 37, 75, 86, and 94 exhibit a surface connection to the Santa Cruz River.
Nearest Interstate Water to the EA Study Area:						Colorado River; located 210 miles to the west. AF 1-106 do not exhibit a surface connection to the Colorado River.

Table 2. Excluded Features within the EA Study Area

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (linear feet)	Jurisdictional Evaluation
Excluded Feature (EF) 1-84	See Attached Form		24,278 ft	EF 1-84 do not display an OHWM, are excavated wholly in, and drain only dry land or are characterized by low volume, infrequent, or short duration flow; therefore, qualifies under Exclusion (b)(3) or (b)(8), respectively.
Total			**24,278 ft**	

Aerial Source/Date: Esri, 2024

Legend

EA Study Area

Oracle

San Manuel

ARIZONA 77

Catalina

Marana

1

10

6

5

Casas Adobes

Saguaro National Park

Tucson

ARIZONA 86

Saguaro National Park

2

3

10

4

Vail

Green Valley

19

Las Ciene NCA

C:\GIS\PCRMMP\PCRMMP_EA_RH.aprx

Figure 1. Vicinity Map- Key Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 2.5 5 10 Miles

Scale: 1" = 5 miles

N W E S

Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

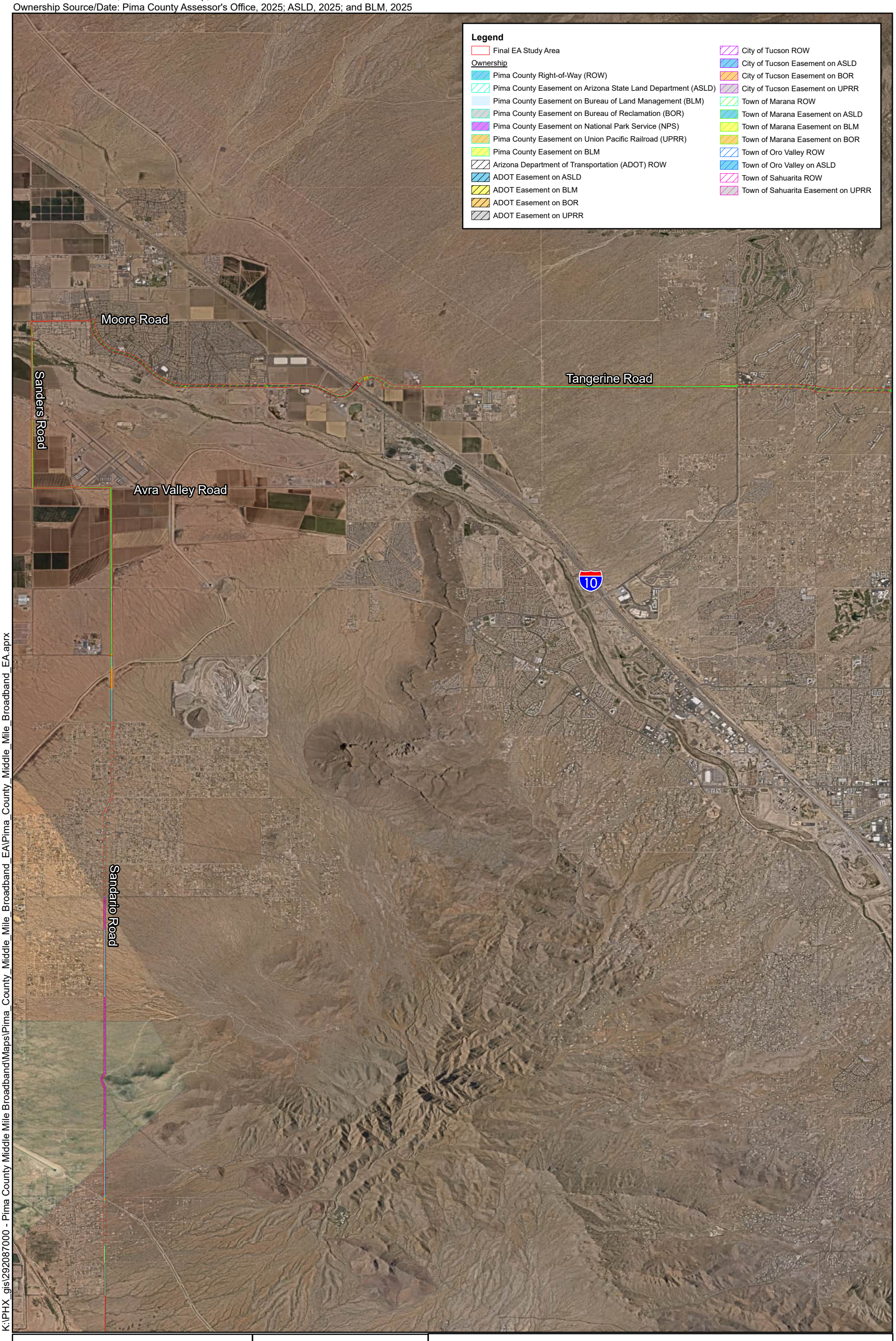

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Figure 1. Vicinity Map Sheet 1 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	0 3,500 7,000 14,000 Feet Scale: 1" = 7,000' N W E S

Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

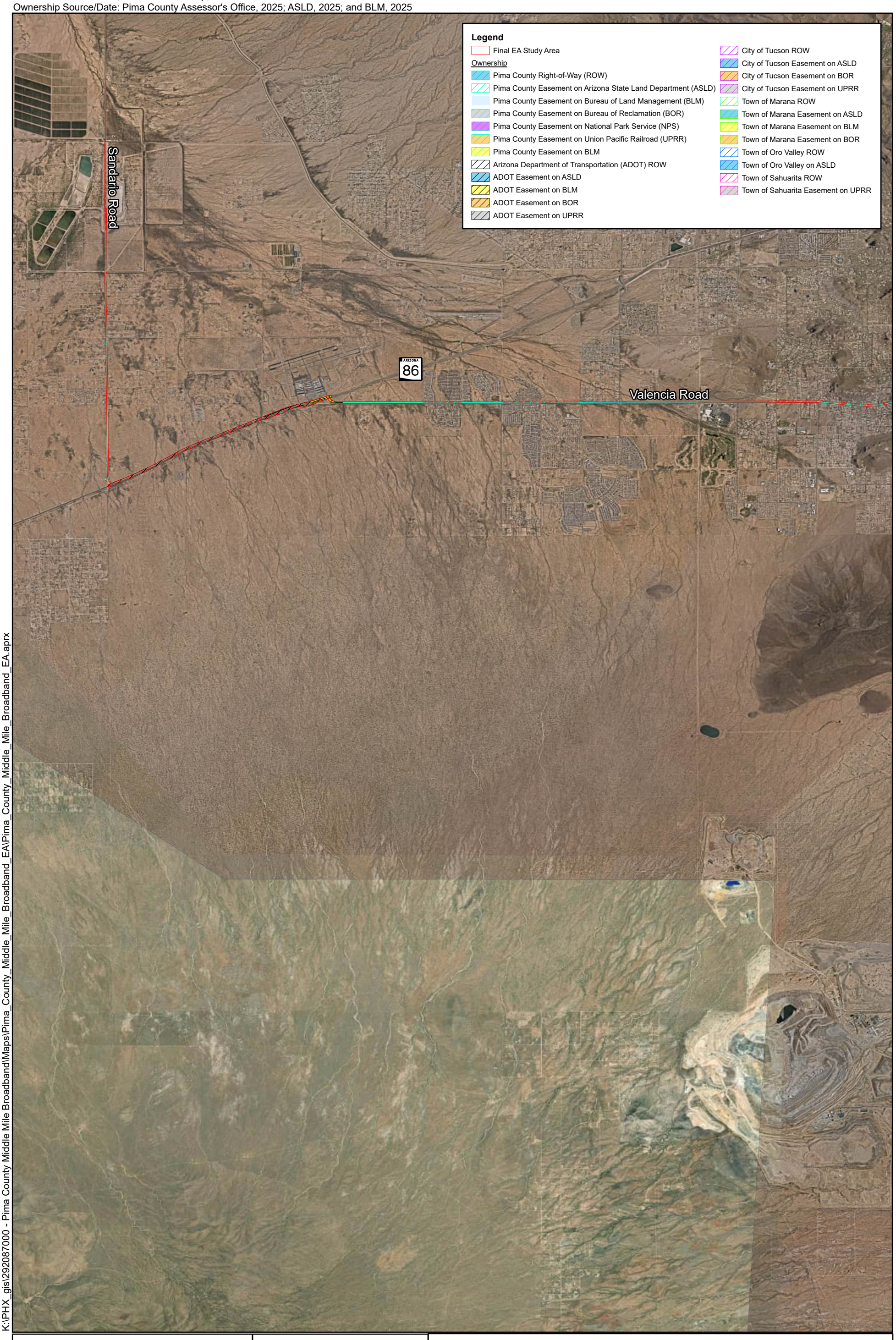

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Figure 1. Vicinity Map Sheet 2 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	0 3,500 7,000 14,000 Feet Scale: 1" = 7,000' N W E S

Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

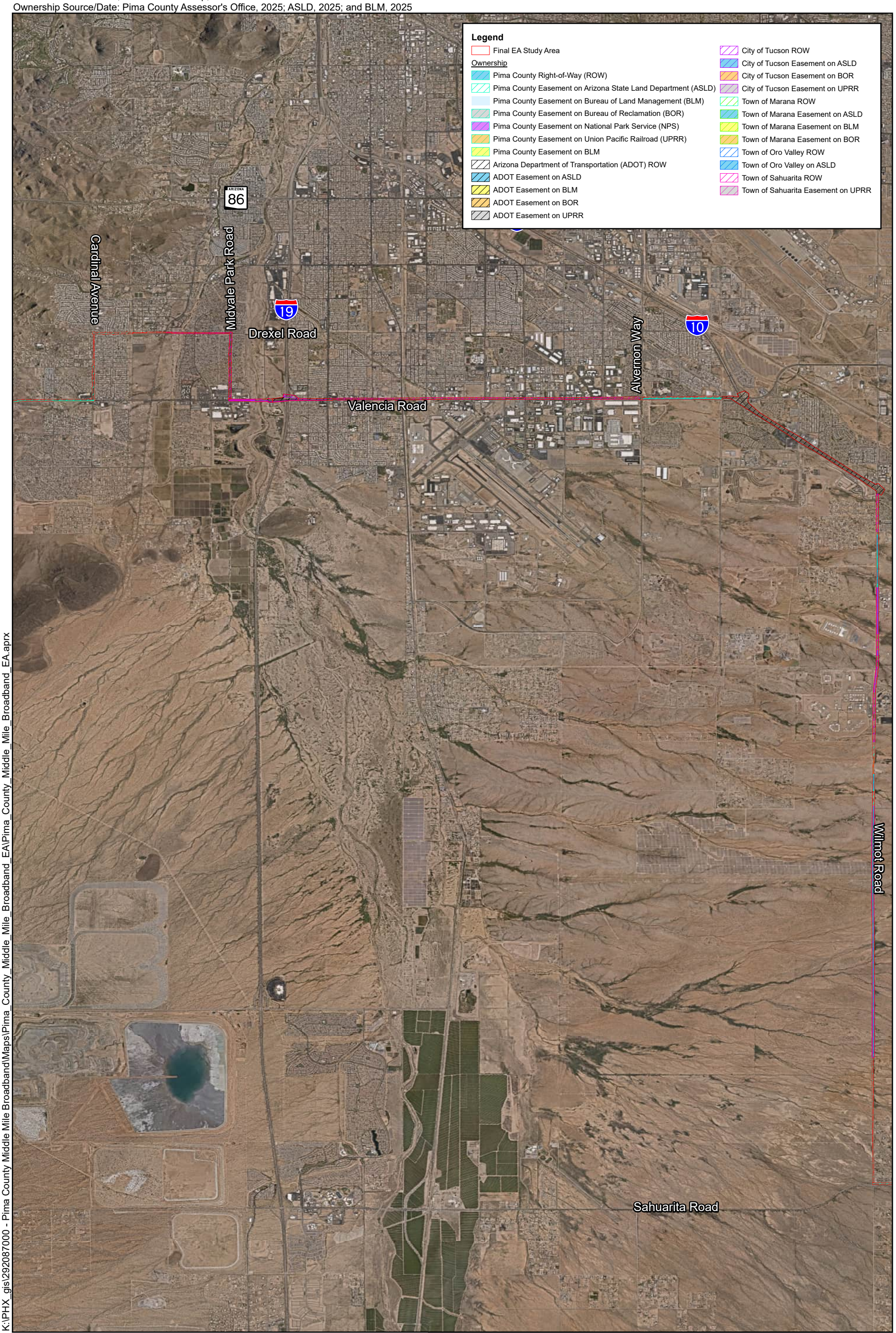

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Figure 1. Vicinity Map Sheet 3 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	0 3,500 7,000 14,000 Feet Scale: 1" = 7,000' N W E S

Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

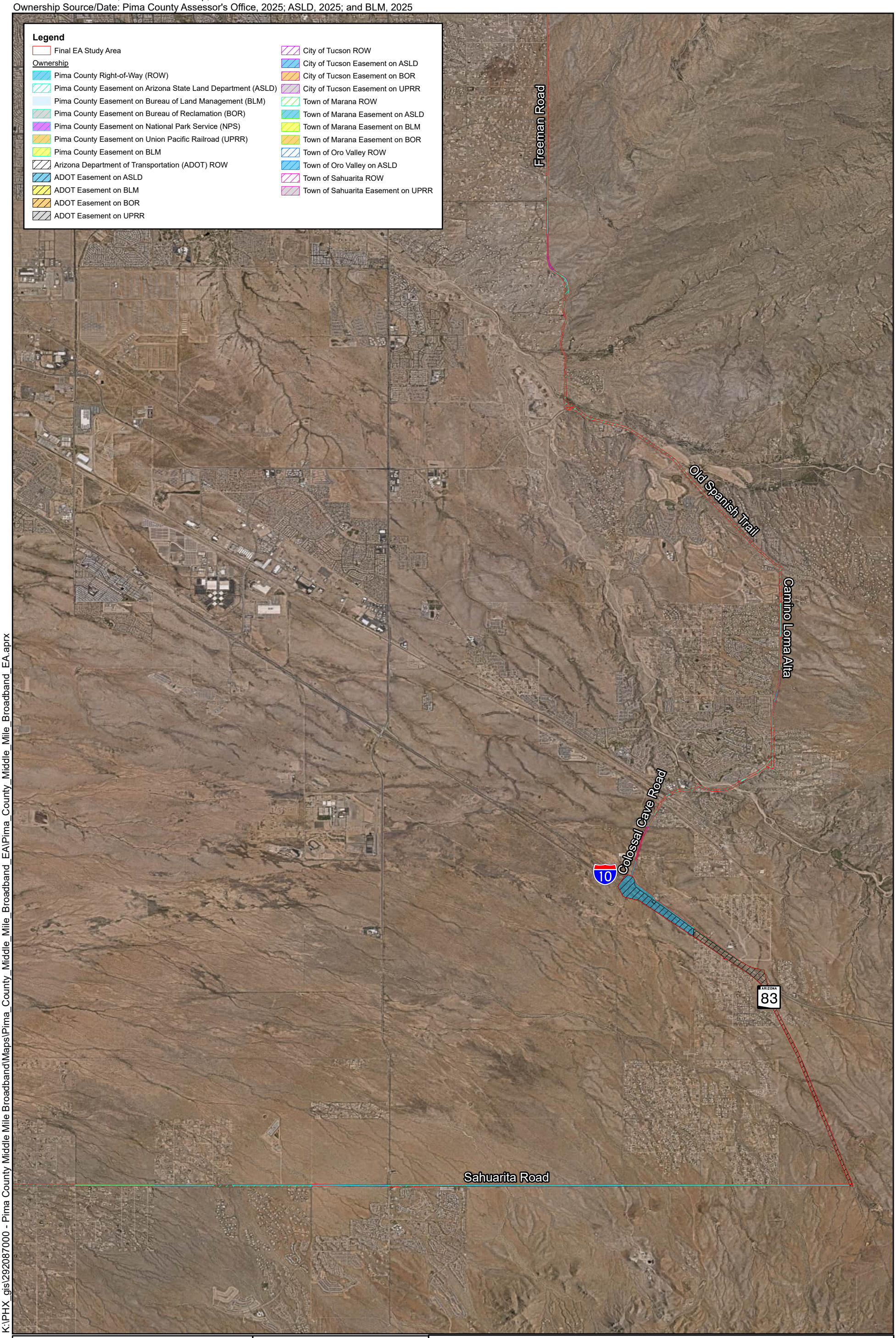

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Figure 1. Vicinity Map Sheet 4 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

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Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

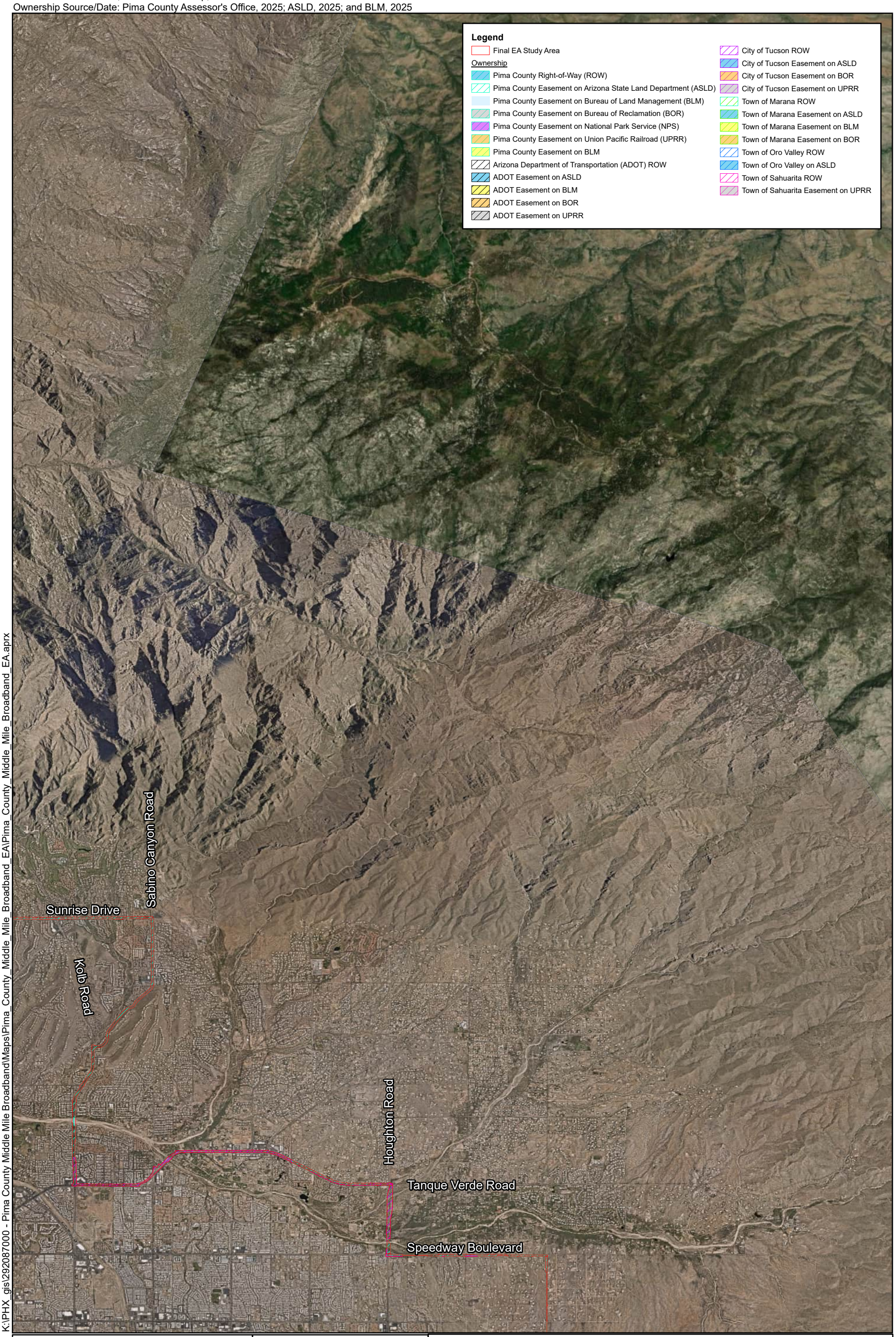

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Figure 1. Vicinity Map Sheet 5 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	0 3,500 7,000 14,000 Feet Scale: 1" = 7,000' N W E S

Aerial Source/Date: Esri, 2024 and Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

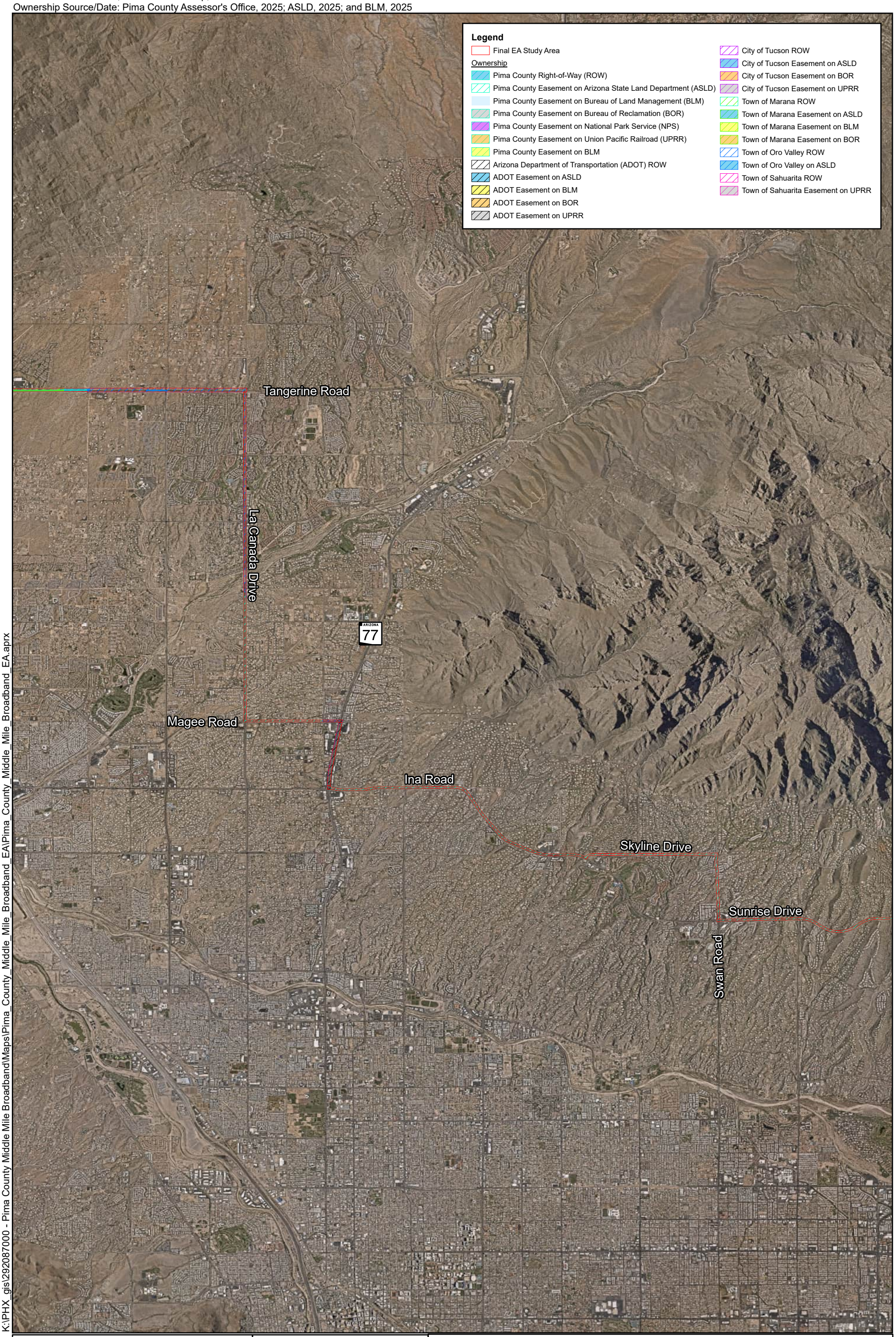

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Figure 1. Vicinity Map Sheet 6 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

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Aerial Source/Date: USGS National Map, 2025

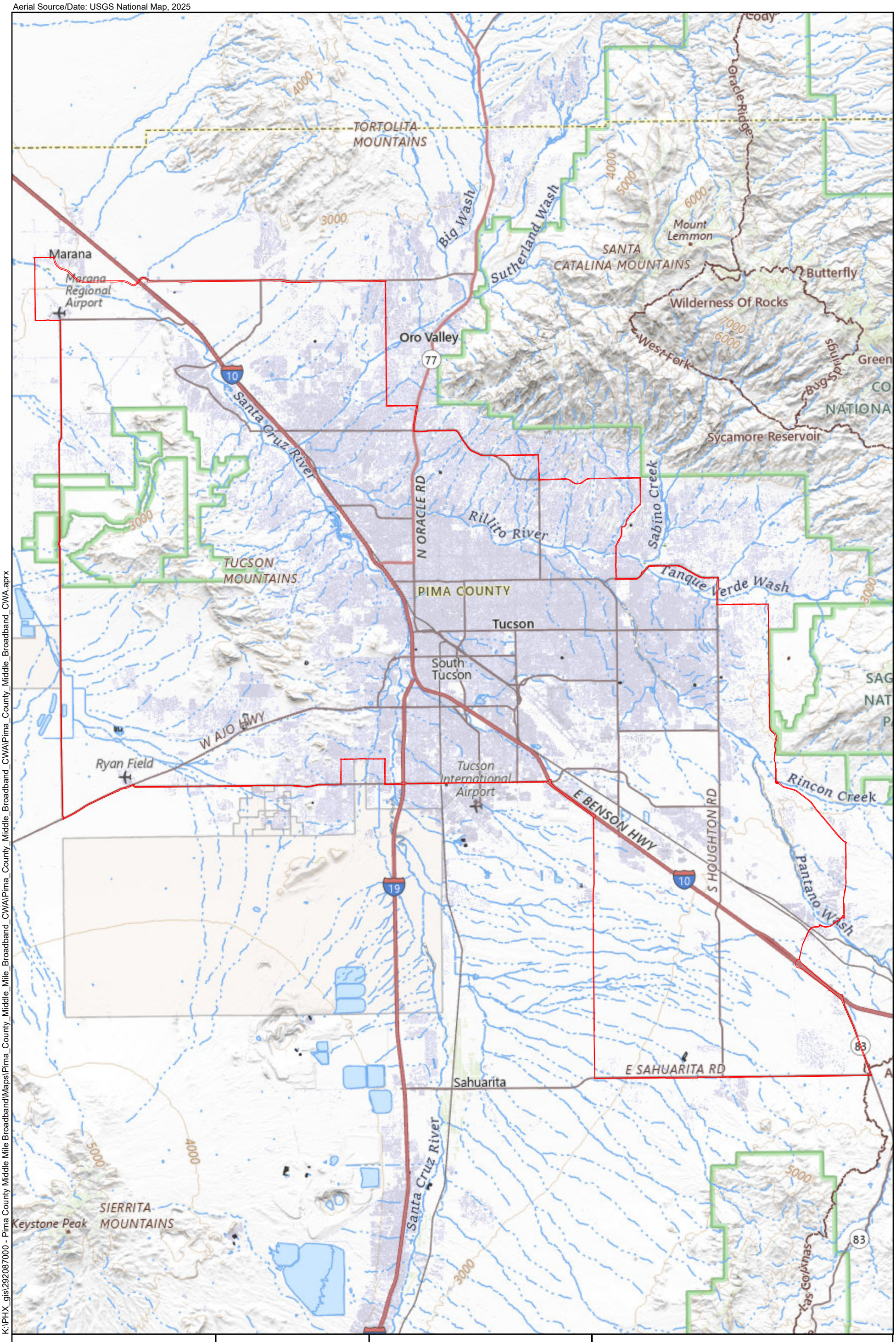

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Figure 2. USGS National Map	Pima County, Arizona	EA Study Area	0 1.75 3.5 7 Miles Scale: 1" = 3.5 miles N W E S
Pima County Regional Middle Mile Project (PCRMMP)			

Aerial Source/Date: Esri, 2025

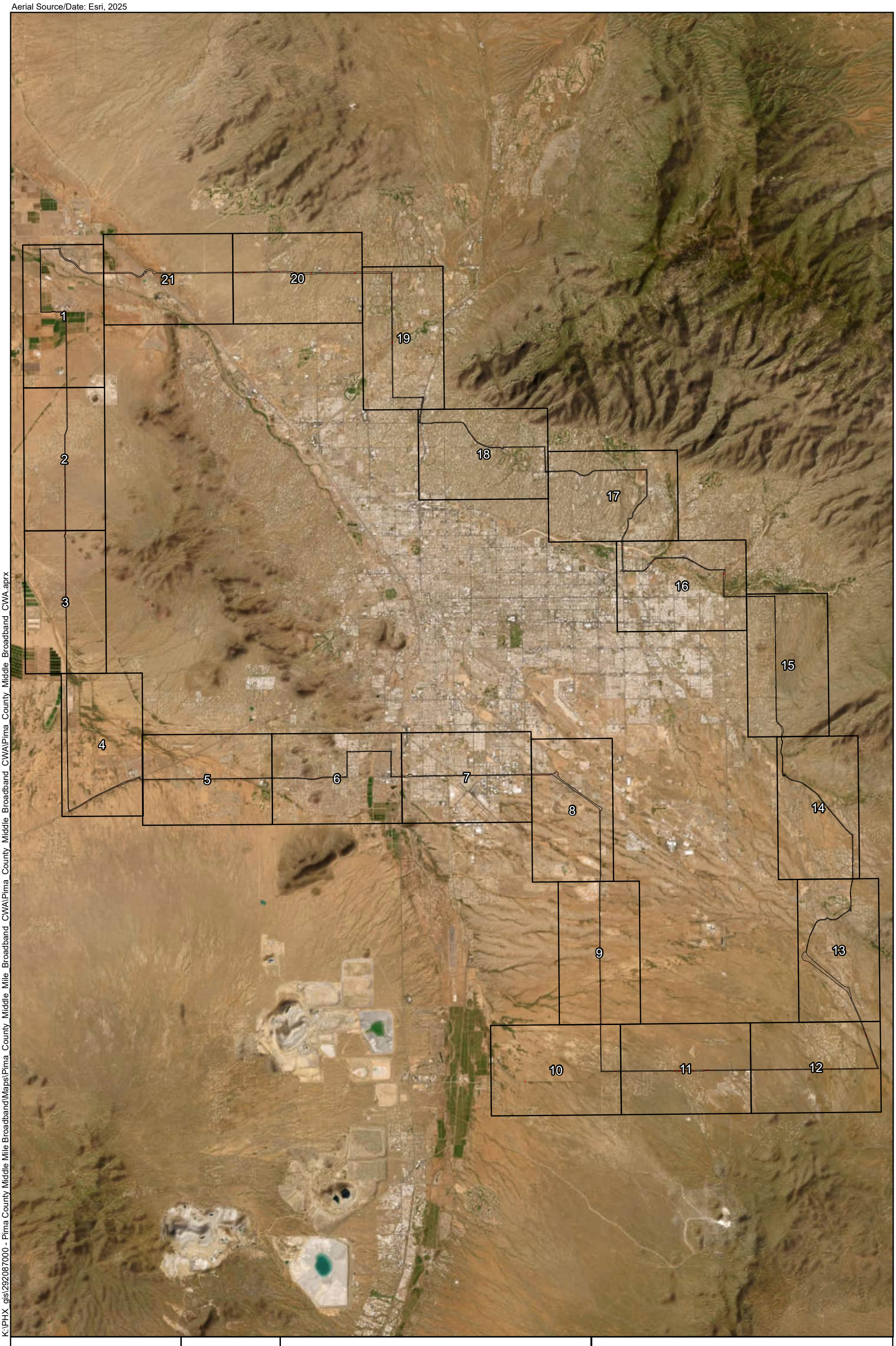

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Figure 3. Aquatic Feature Delineation Map - Key Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1.75 3.5 7 Miles

Scale: 1" = 3.5 miles

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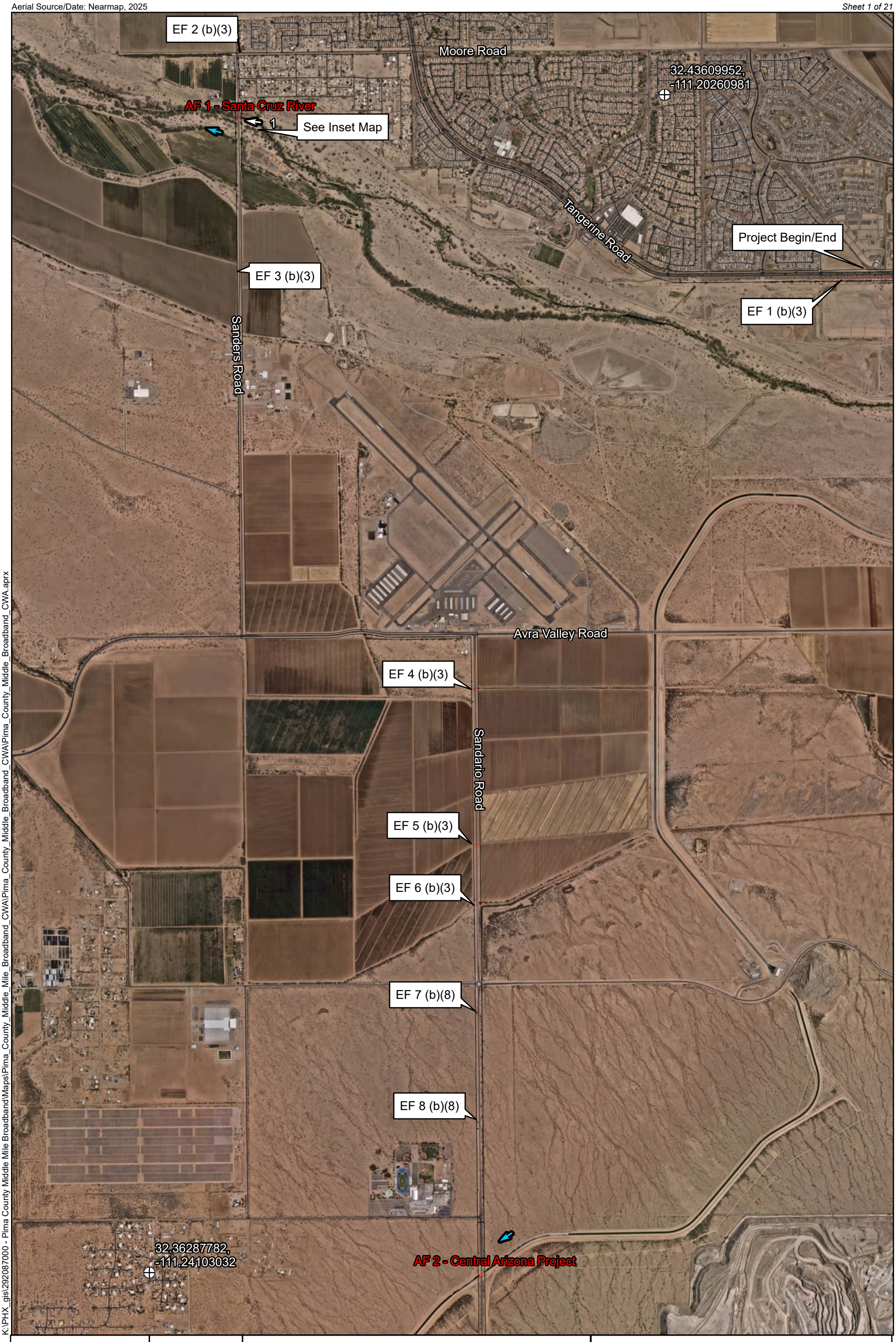

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Figure 3. Aquatic Feature Delineation Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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EF 9 (b)(8)

AF 3

32.35201985,
-111.2023314

EF 10 (b)(8)

EF 11 (b)(8)

EF 12 (b)(8)

EF 13 (b)(8)

EF 14 (b)(8)

Sandario Road

EF 15 (b)(8)

EF 16 (b)(8)

AF 4

AF 5

AF 6

AF 7

EF 17 (b)(8)

AF 8

EF 18 (b)(8)

AF 9

AF 10

EF 19 (b)(8)

AF 11

AF 12

AF 13

EF 20 (b)(8)

EF 21 (b)(8)

EF 22 (b)(8)

32.28074702,
-111.24158715

AF 14

AF 15

AF 16

AF 17

AF 18

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Figure 3. Aquatic Feature Delineation Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

Control Point

Photo Location/Direction

Flow Direction

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Scale: 1" = 2,000 feet

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AF 18
AF 19
2
AF 20
AF 21
32.27016745,
-111.19982572
AF 22
EF 23 (b)(8)
AF 23
AF 24
AF 25
AF 26
AF 27
EF 24 (b)(8)
AF 28
AF 29
AF 2 - Central Arizona Project
AF 30
AF 31
EF 25 (b)(8)
EF 26 (b)(8)
AF 32
AF 33
AF 34
Sandario Road
3
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-111.24158715

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Figure 3. Aquatic Feature Delineation Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

Control Point
Photo Location/Direction
Flow Direction

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Figure 3. Aquatic Feature Delineation Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

Control Point
Photo Location/Direction
Flow Direction

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Scale: 1" = 2,000 feet

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32.15295704,
-111.09208126

ARIZONA 86

EF 32 (b)(8)

EF 33 (b)(8)

EF 34 (b)(8)

EF 35 (b)(8)

Valencia Road

EF 31 (b)(8)

4

EF 36 (b)(8)

32.11036039,
-111.16418932

Figure 3. Aquatic Feature Delineation Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

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Scale: 1" = 2,000'

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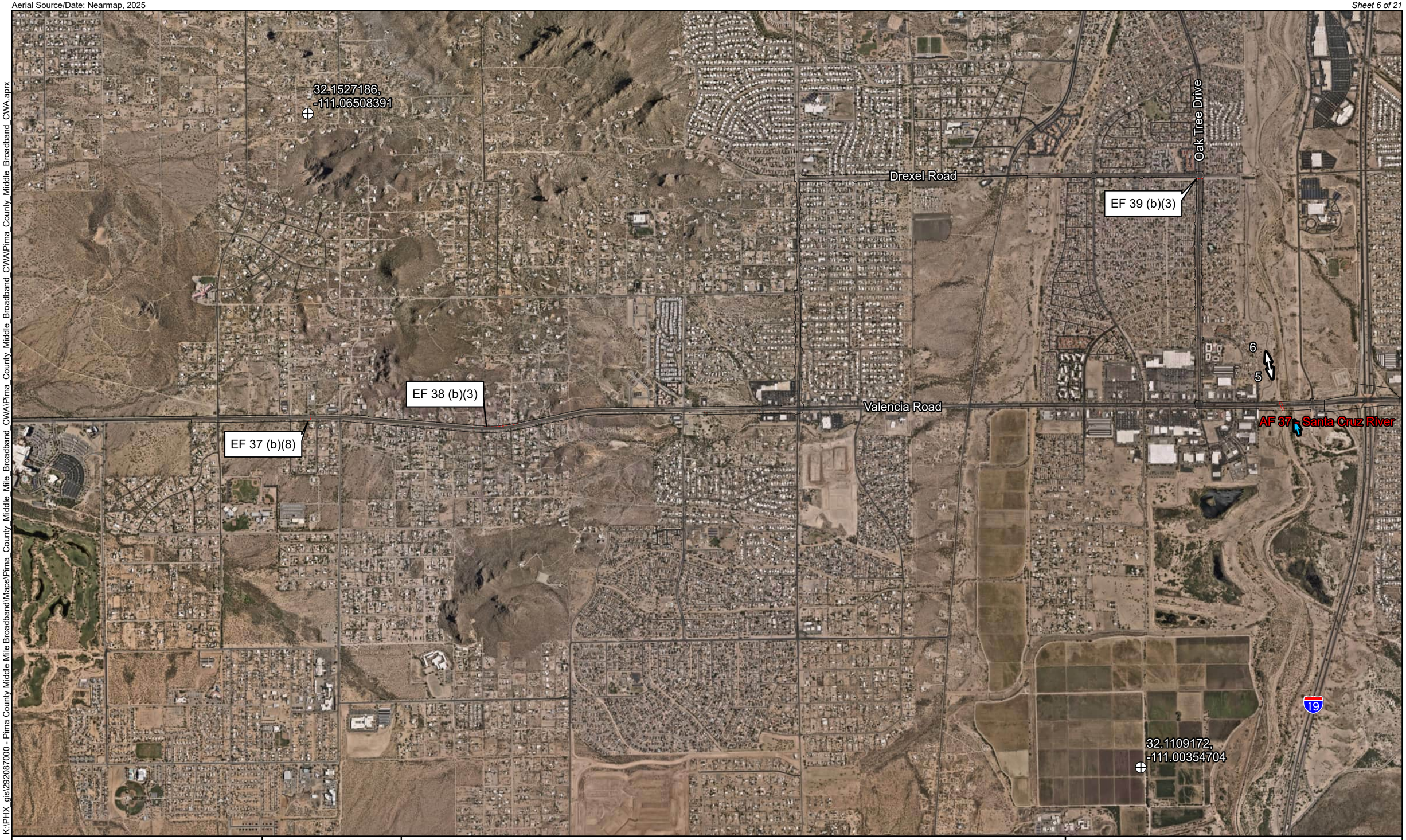

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Figure 3. Aquatic Feature Delineation Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

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Scale: 1" = 2,000'

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

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Scale: 1" = 2,000'

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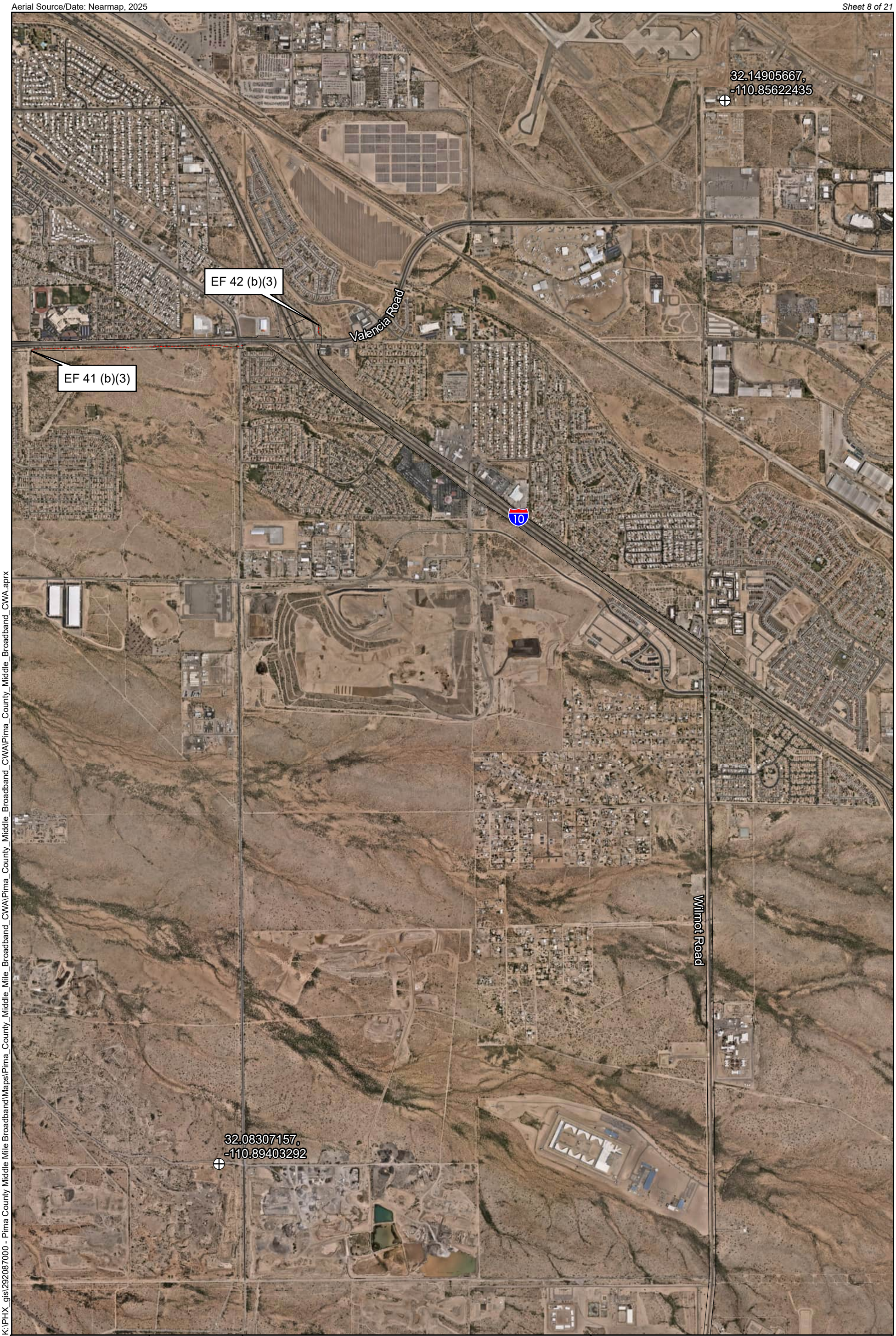

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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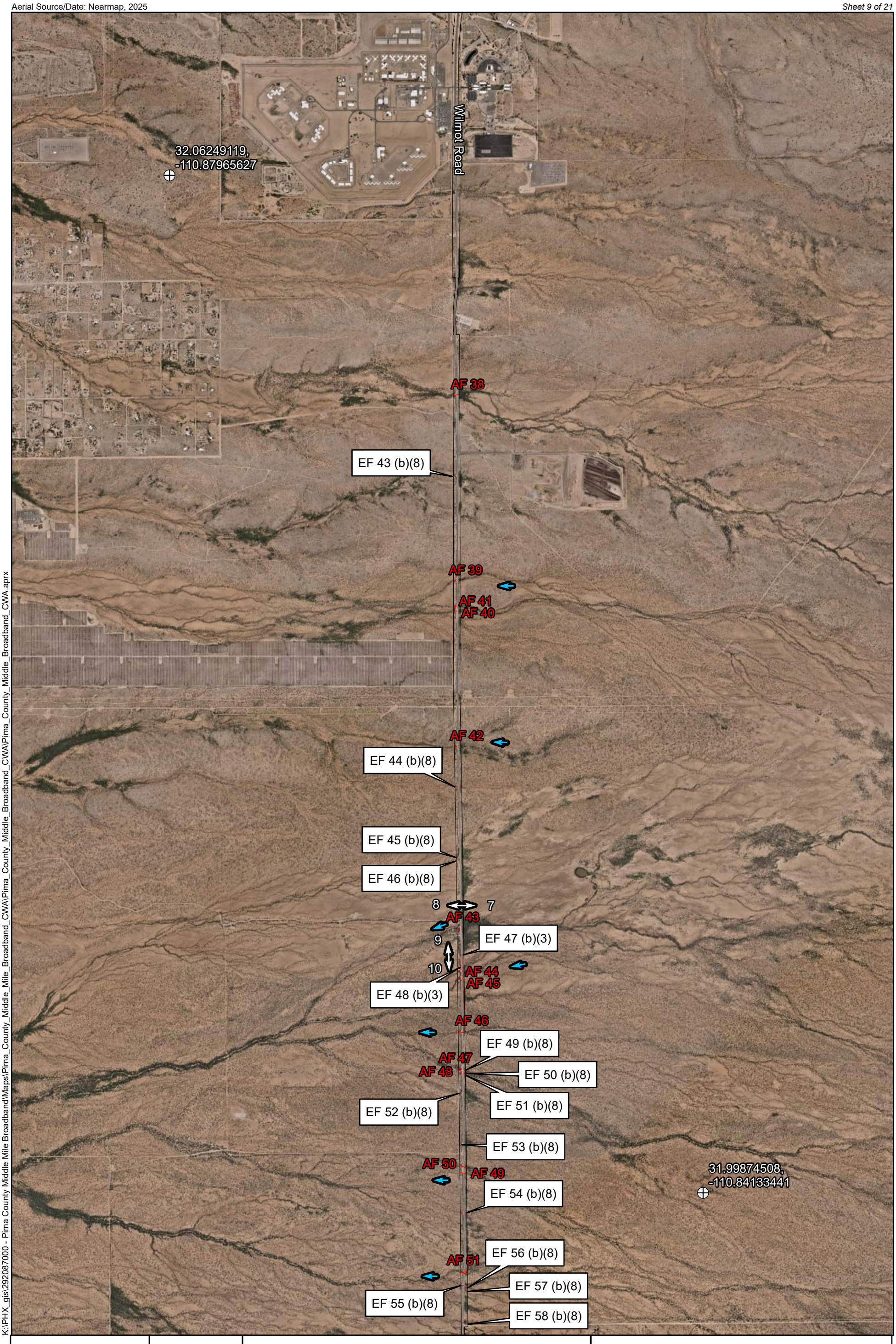

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

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Scale: 1" = 2,000 feet

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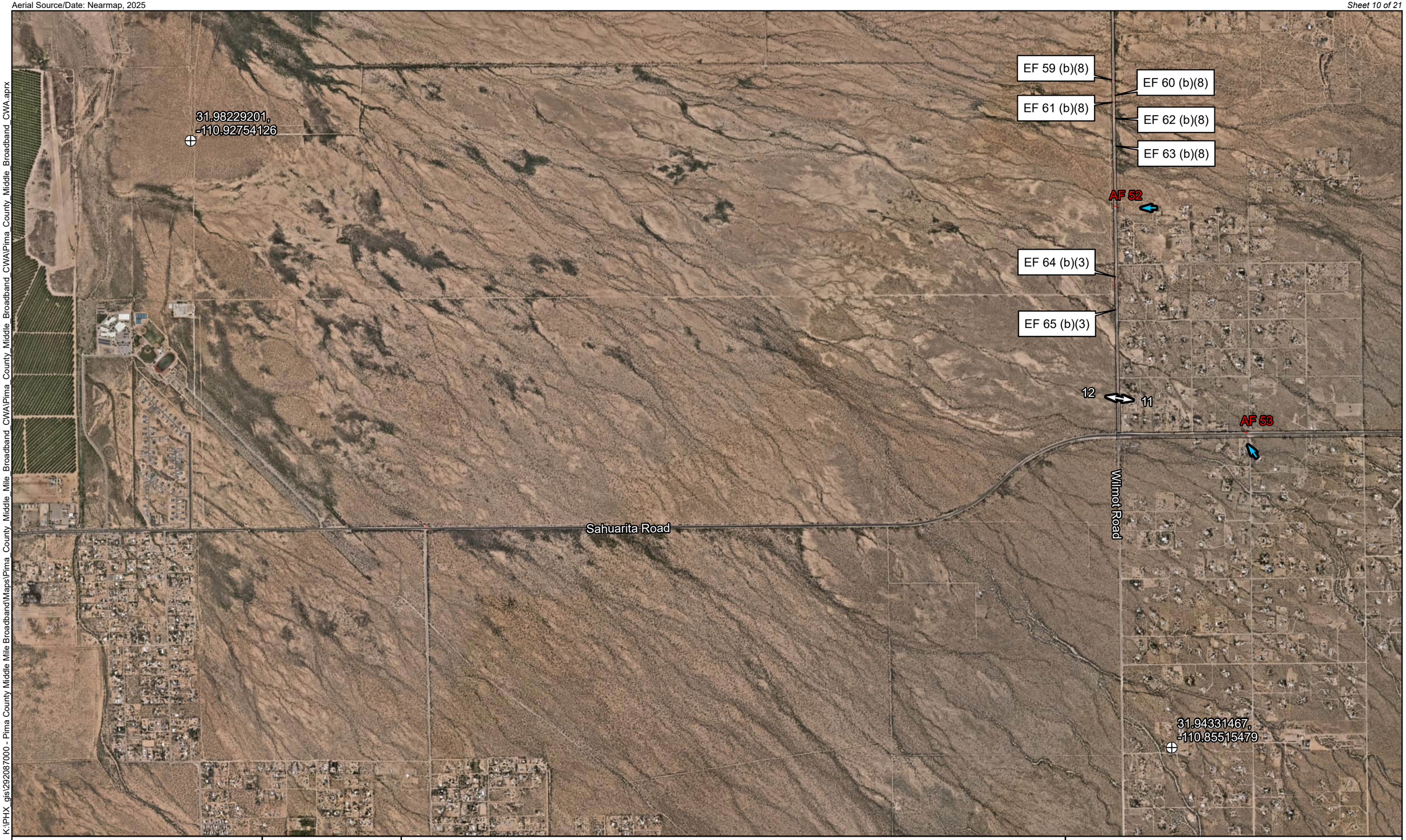

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Figure 3. Aquatic Feature Delineation Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

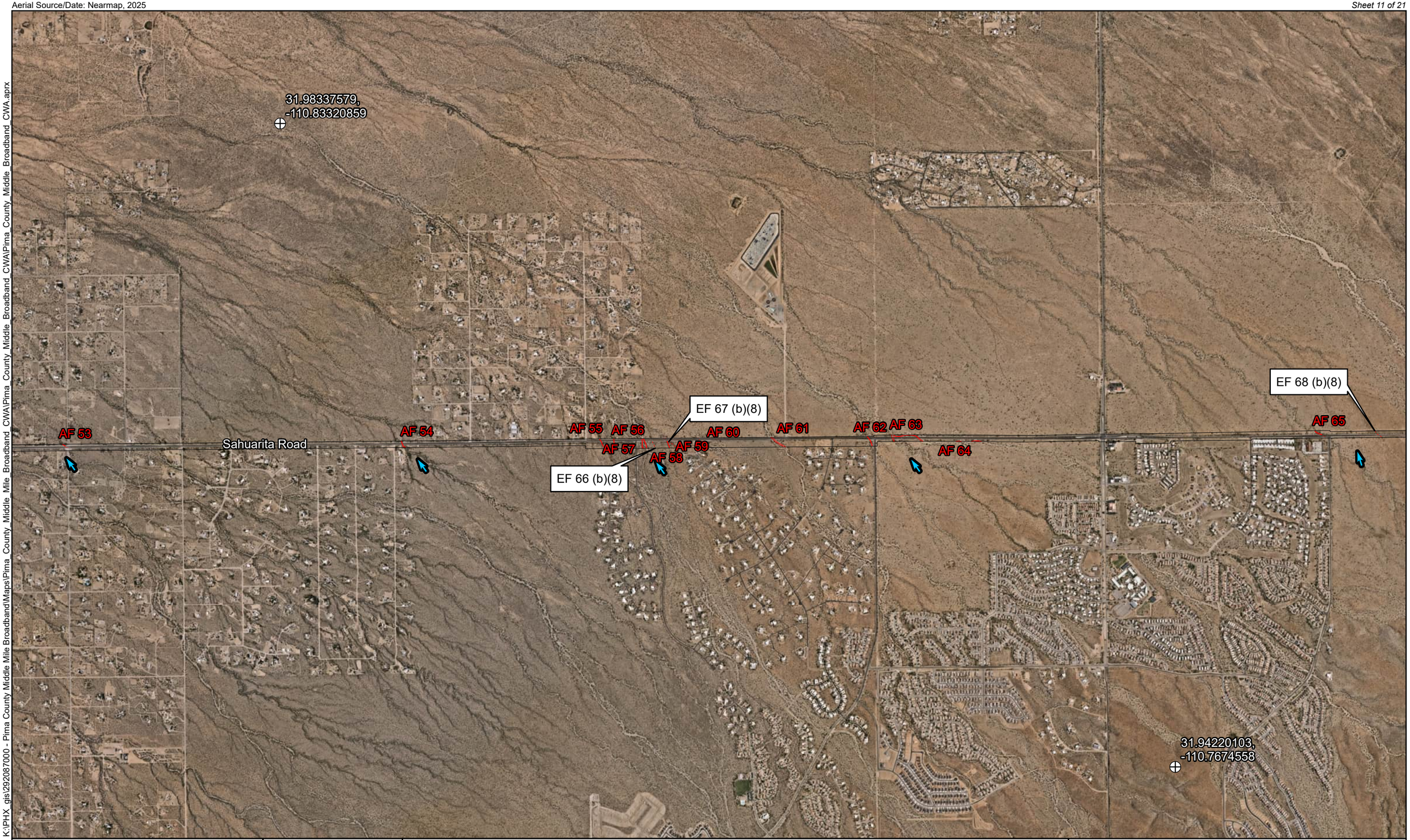

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet
Scale: 1" = 2,000'

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31.98285342,
-110.74391125

AF 74

AF 73

AF 72

EF 68 (b)(8)

EF 69 (b)(8)

EF 70 (b)(8)

EF 73 (b)(8)

EF 74 (b)(8)

AF 65

AF 66

AF 67

AF 68

AF 69

AF 70

AF 71

14

13

Sahuarita Road

EF 71 (b)(8)

EF 72 (b)(8)

EF 75 (b)(8)

83

31.94387148,
-110.67864317

Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet
Scale: 1" = 2,000'

N
W E
S

32.06692849,
-110.68031362

AF 76

EF 76 (b)(8)

See Inset Map

AF 75 - Pantano Wash

Colossal Cave Road

ARIZONA
83

10

31.99509883,
-110.72096141

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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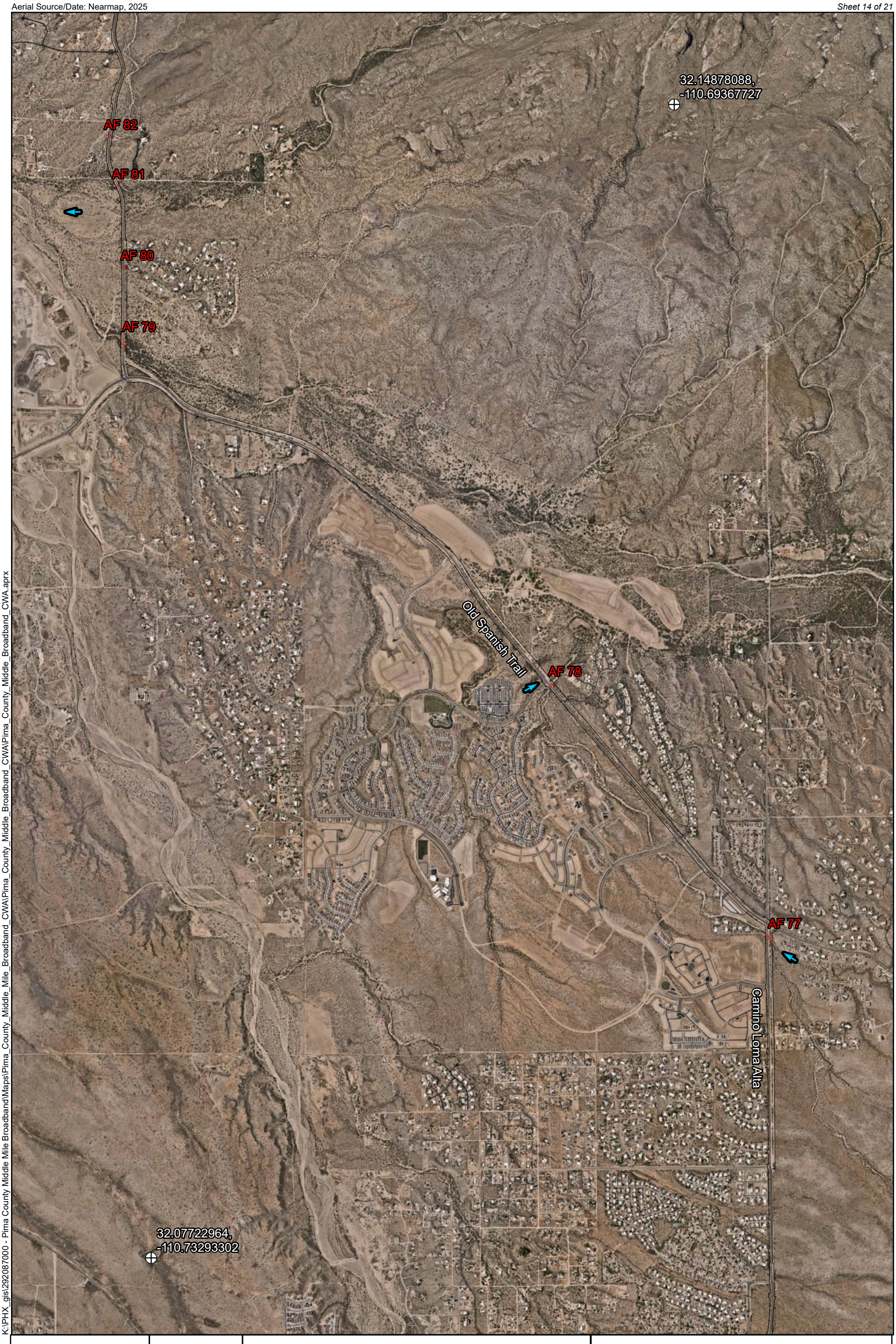

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet
Scale: 1" = 2,000 feet

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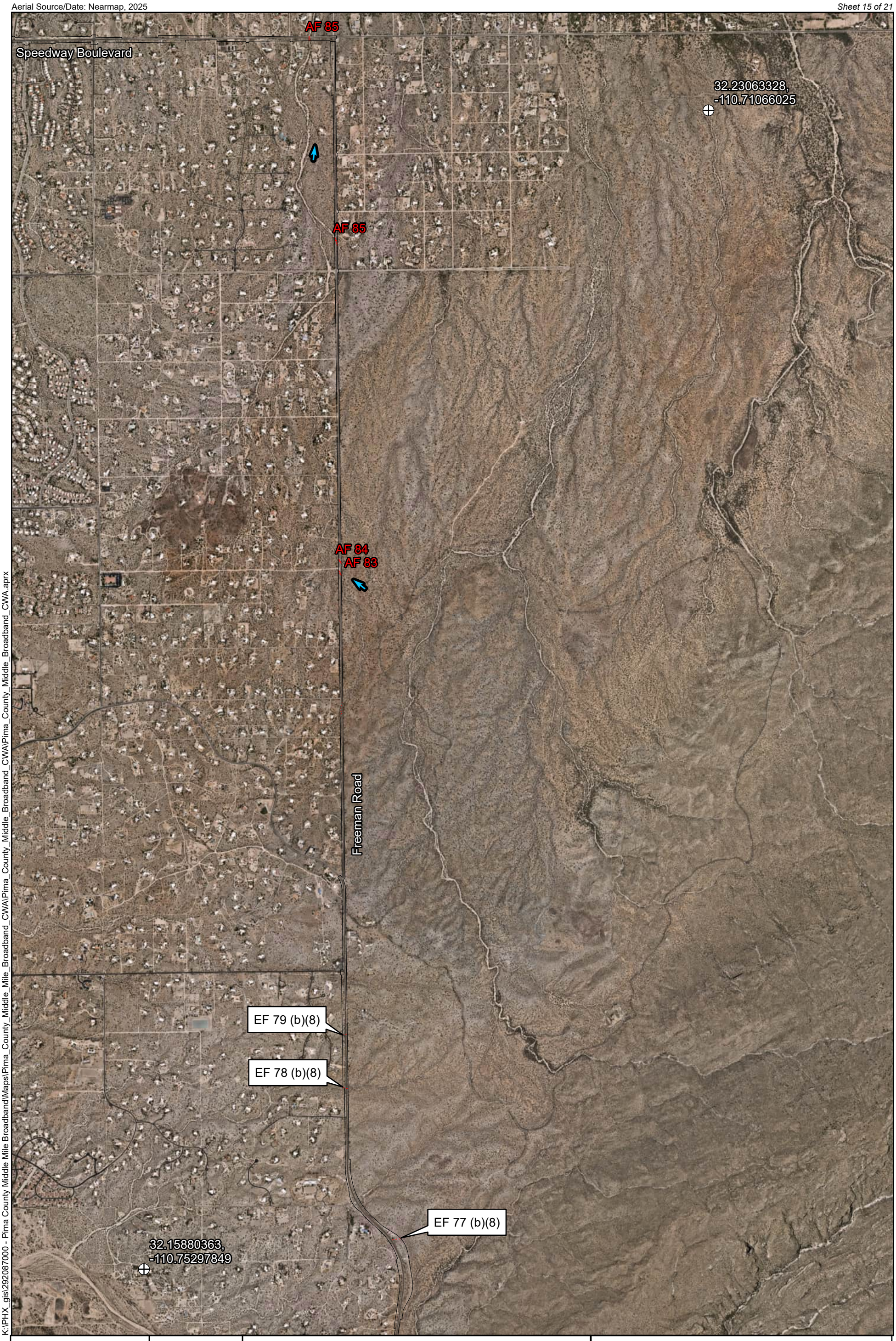

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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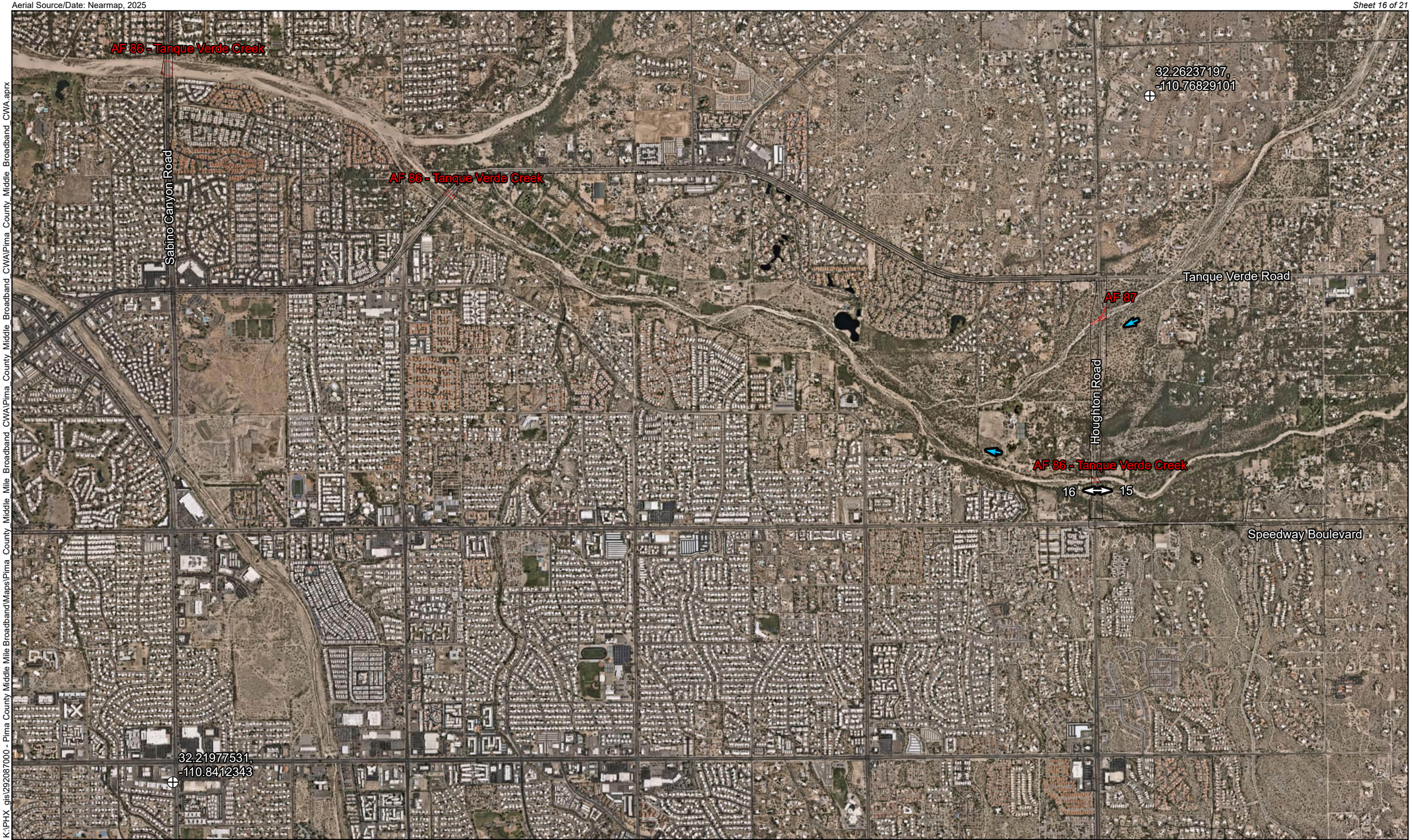

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet
Scale: 1" = 2,000'

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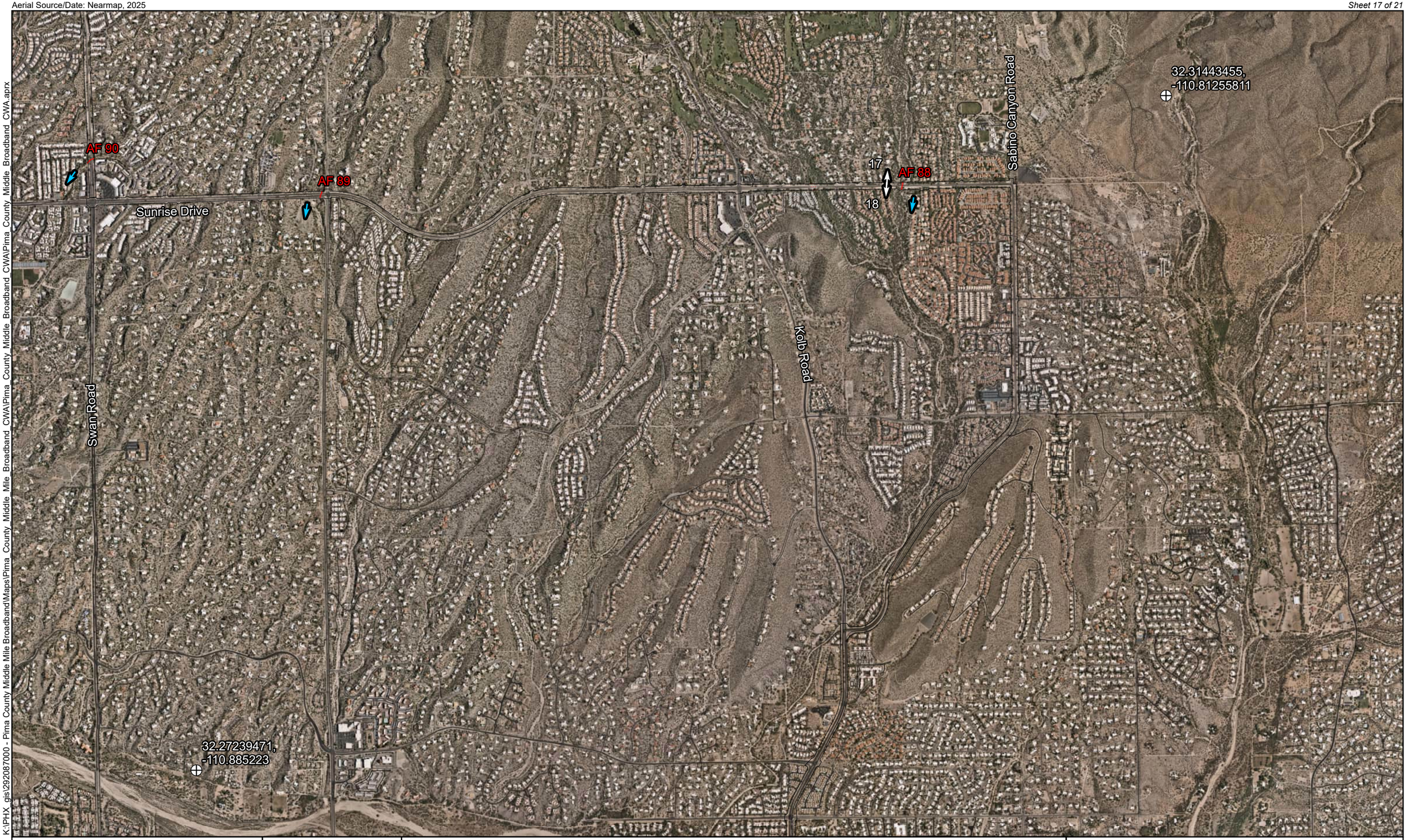

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet
Scale: 1" = 2,000'

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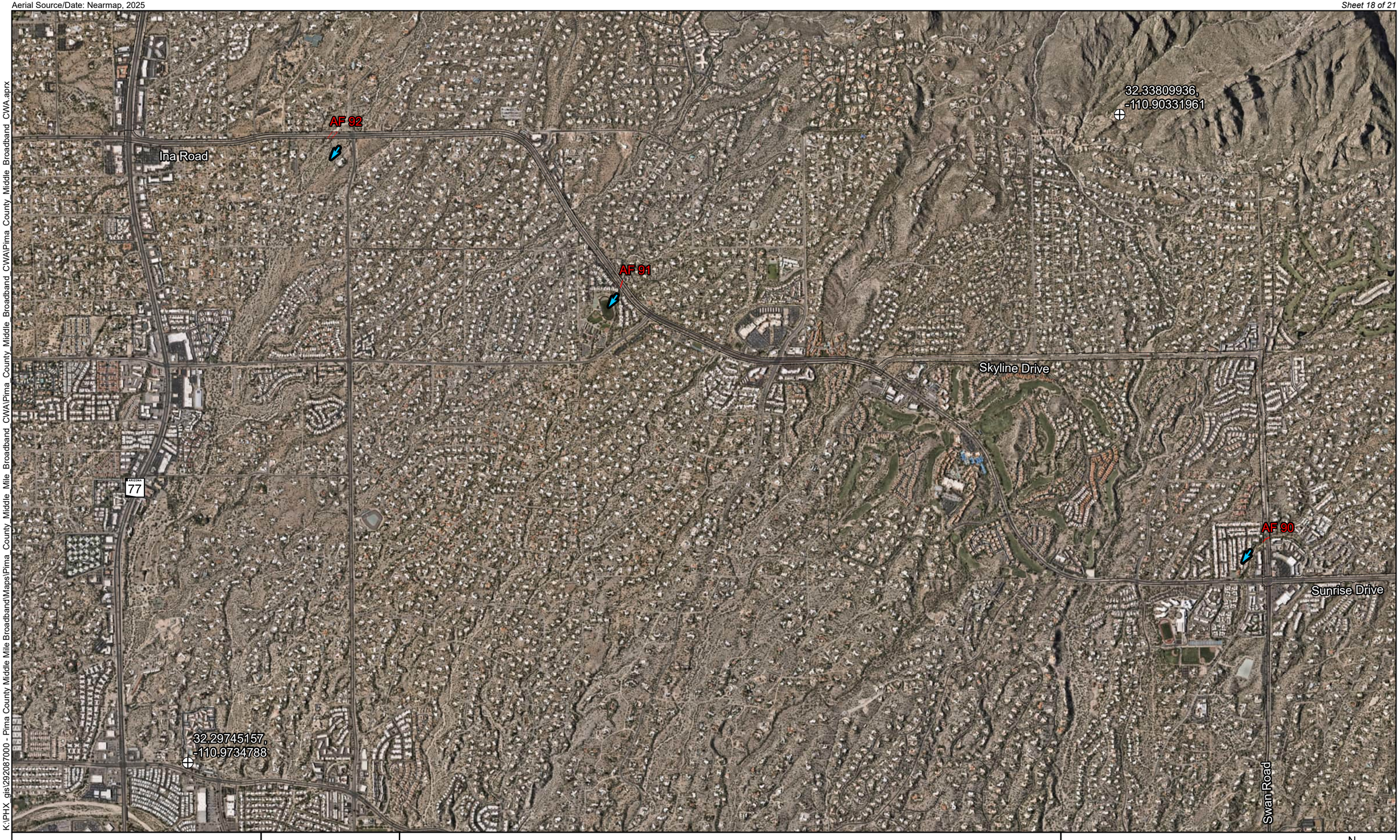

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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Figure 3. Aquatic Feature Delineation Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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32.44194611,
-111.02387091

EF 82 (b)(3)

EF 81 (b)(3)

AF 106

AF 105

AF 104

Tangerine Road

AF 103

AF 102

AF 101

EF 83 (b)(8)

AF 100

AF 99

AF 98

AF 97

EF 80 (b)(8)

AF 96

32.3977291,
-111.09081185

Figure 3. Aquatic Feature Delineation Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

Control Point

Photo Location/Direction

Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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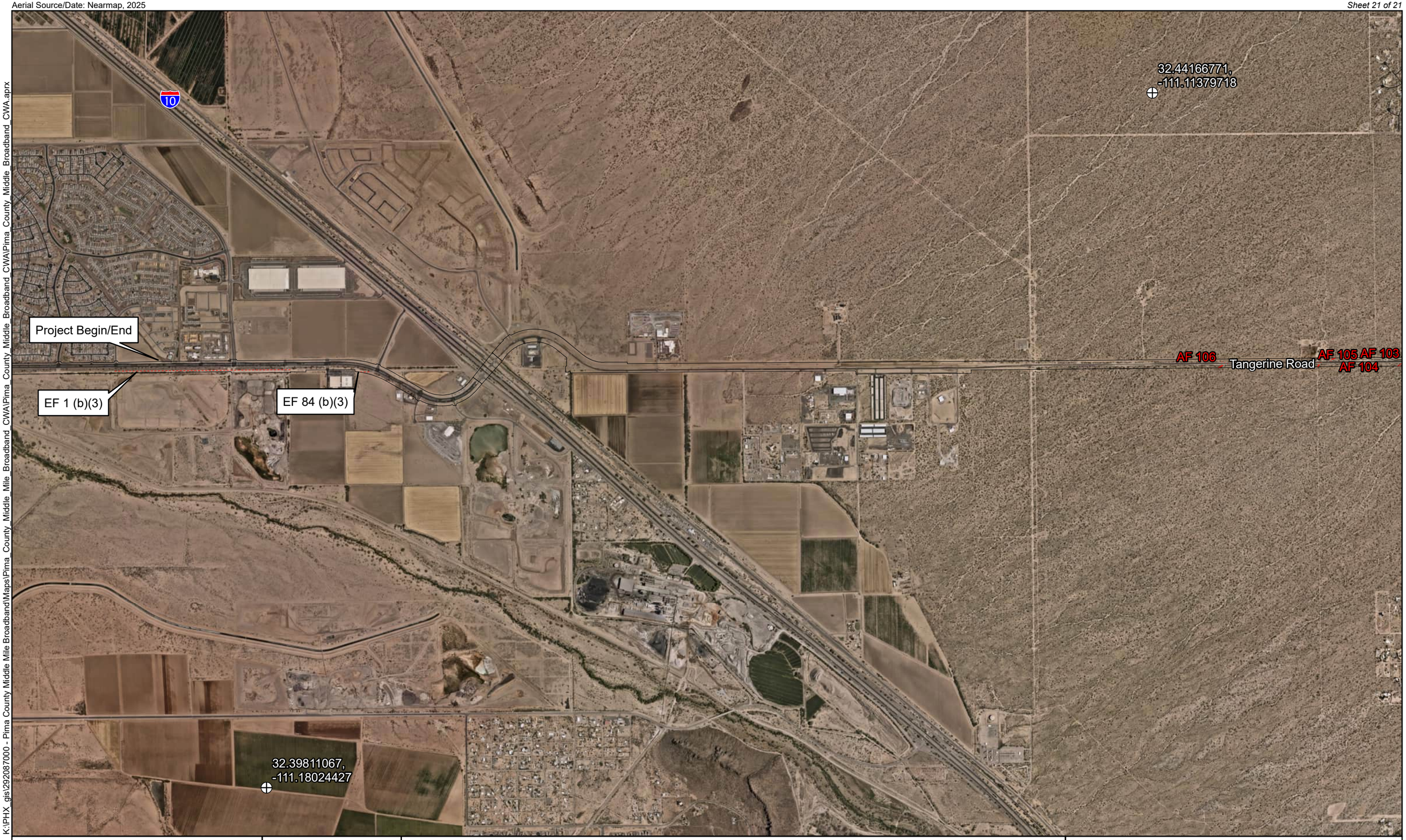

Figure 3. Aquatic Feature Delineation Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area
Aquatic Features
Excluded Features
Sheetflow
Control Point
Photo Location/Direction
Flow Direction

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

Source/Date: USGS National Hydrography Dataset, 2025

Santa Cruz River Reach B (TNW)
Roger Road Waste Water Treatment
Plant to Pima/Pinal County Line

17.3 miles

EA Study Area

Oracle Junction
Catalina
Marana
Rillito
Oro Valley
Casas Adobes
Picture Rocks
Catalina Foothills
Flowing Wells
Tanque Verde
Tucson
Tucson Estates
Drexel Heights
Tucson International Airport
Vail
New Tucson
Sahuarita
East Sahuarita
San Xavier
Green Valley
Helvetia
Rosemont Camp
Whitetail
Willow Canyon
Highlinks
Campo Bonito

TORTOLITA MOUNTAINS
TUCSON MOUNTAINS
SIERRITA MOUNTAINS
TINAJA HILLS
SAMANIEGO RIDGE
ORACLE RIDGE
SANTA CATALINA MOUNTAINS
RINCON VALLEY
DAVIDSON CANYON

4695 ft
4688 ft
4382 ft
7497 ft
9152 ft
8545 ft
3136 ft
6190 ft

Guild Wash
Big Wash
Canada del Oro Wash
CAÑADA DEL ORO
Santa Cruz River
Pantano Wash
Demetrie Wash
W Ajo Hwy
S Nogales Hwy
SANTA CRUZ VALLEY

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Figure 4. USGS National Hydrography Dataset Strahler Stream Order Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Stream Order
<1
1
2
3
4
5
6
7
8

0 1.75 3.5 7 Miles
Scale: 1" = 3.5 miles

N
W E
S

Aerial Source/Date: Esri, 2025

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

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Figure 3. Section 404/401 Compliance Map - Key Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

- EA Study Area
- Aquatic Features
- Excluded Features
- Sheetflow

0 1.75 3.5 7 Miles

Scale: 1" = 3.5 miles

N W E S

EF 2 (b)(3)

Moore Road

AF 1 - Santa Cruz River

See Inset Map

Tangerine Road

Project Begin/End

EF 3 (b)(3)

EF 1 (b)(3)

Sanders Road

Avra Valley Road

EF 4 (b)(3)

Sandario Road

EF 5 (b)(3)

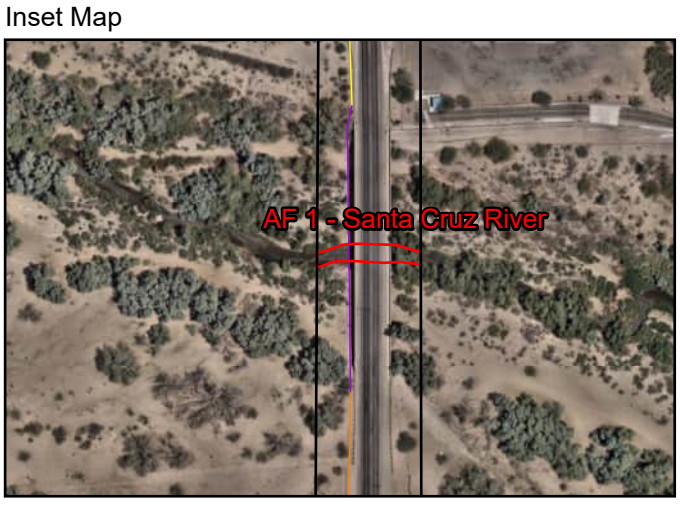
EF 6 (b)(3)

EF 7 (b)(8)

EF 8 (b)(8)

AF 2 - Central Arizona Project

Inset Map



Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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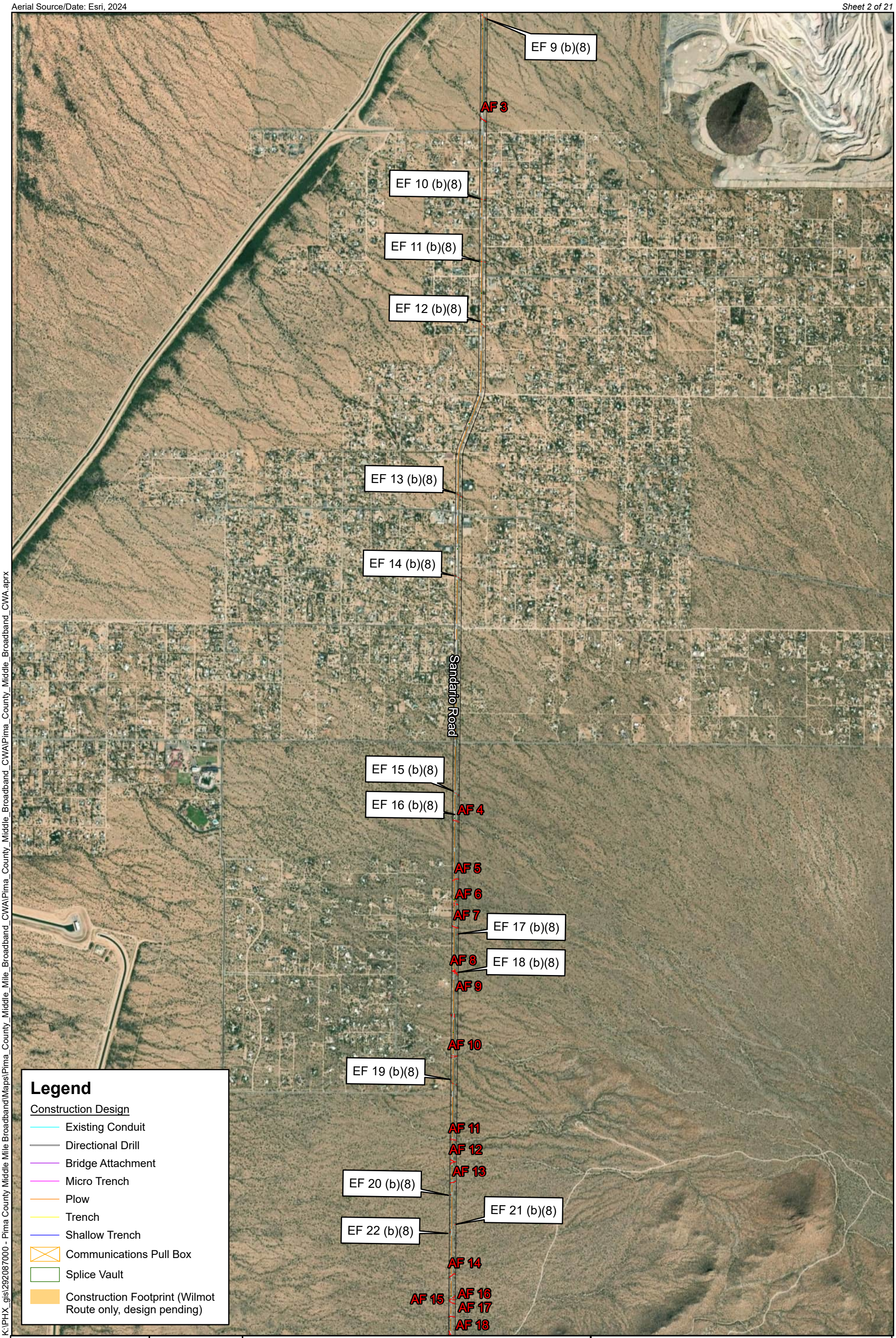

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

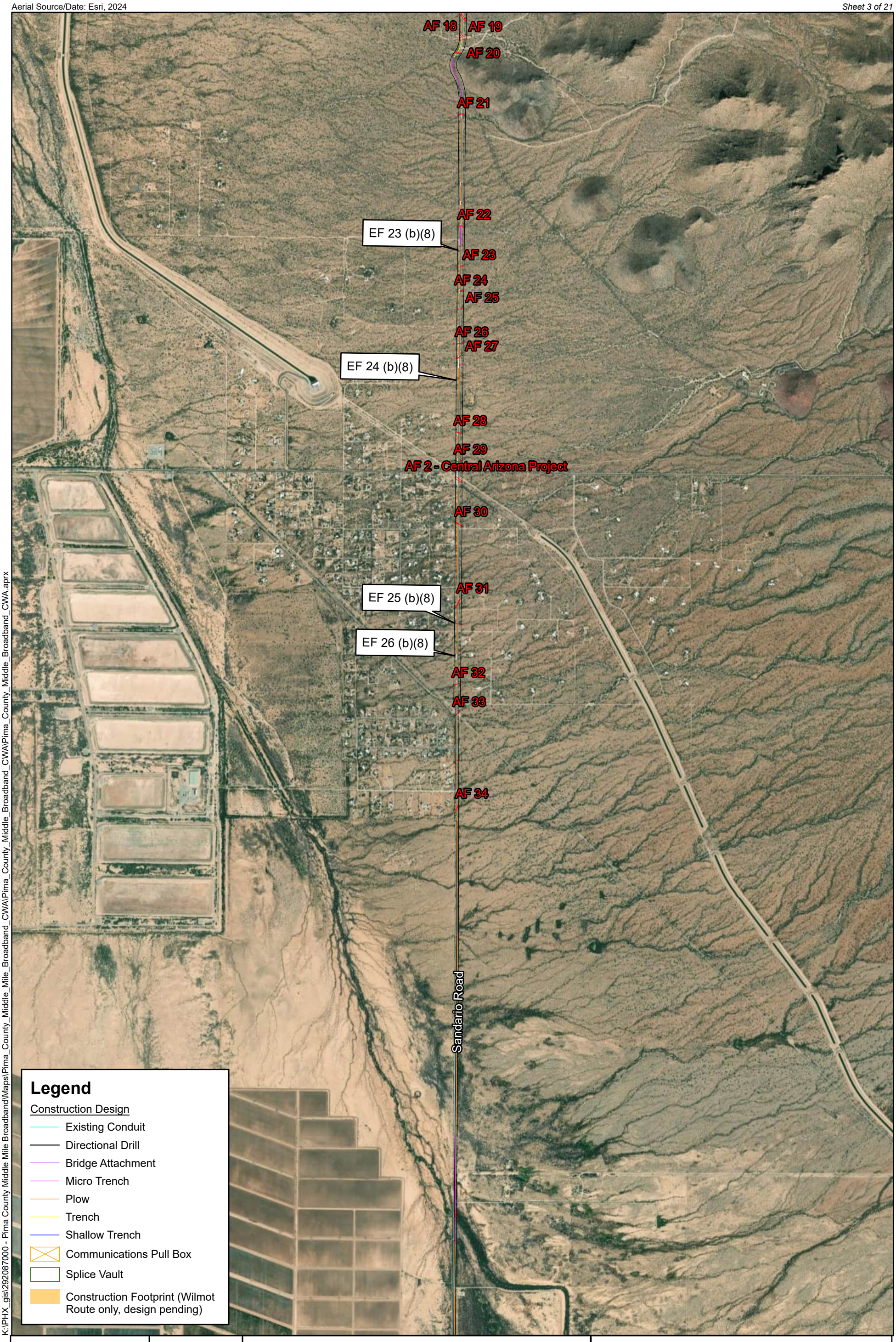

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Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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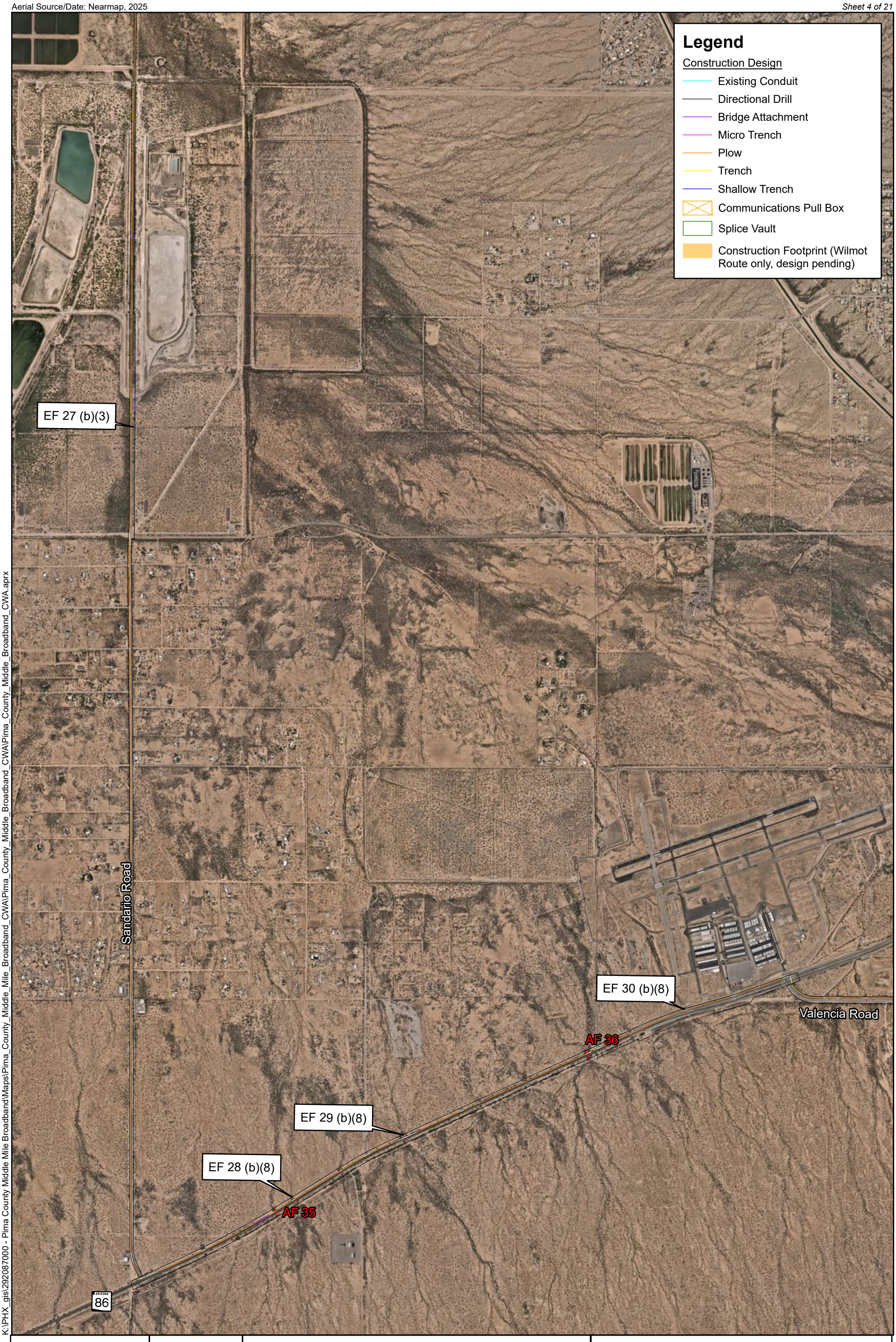

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

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Figure 5. Section 404/401 Compliance Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

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Drexel Road

Oak Tree Drive

EF 39 (b)(3)

EF 38 (b)(3)

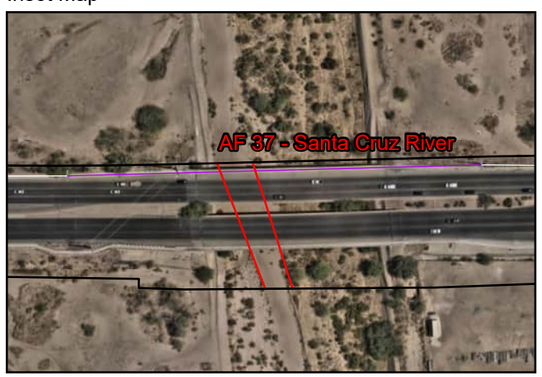
EF 37 (b)(8)

Valencia Road

AF 37 - Santa Cruz River

See Inset Map

Inset Map



Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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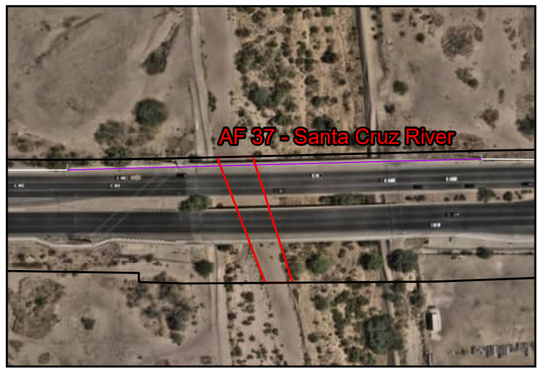

AF 37 - Santa Cruz River

See Inset Map

Valencia Road

EF 40 (b)(8)

Alvernon Way

EF 41 (b)(3)

19

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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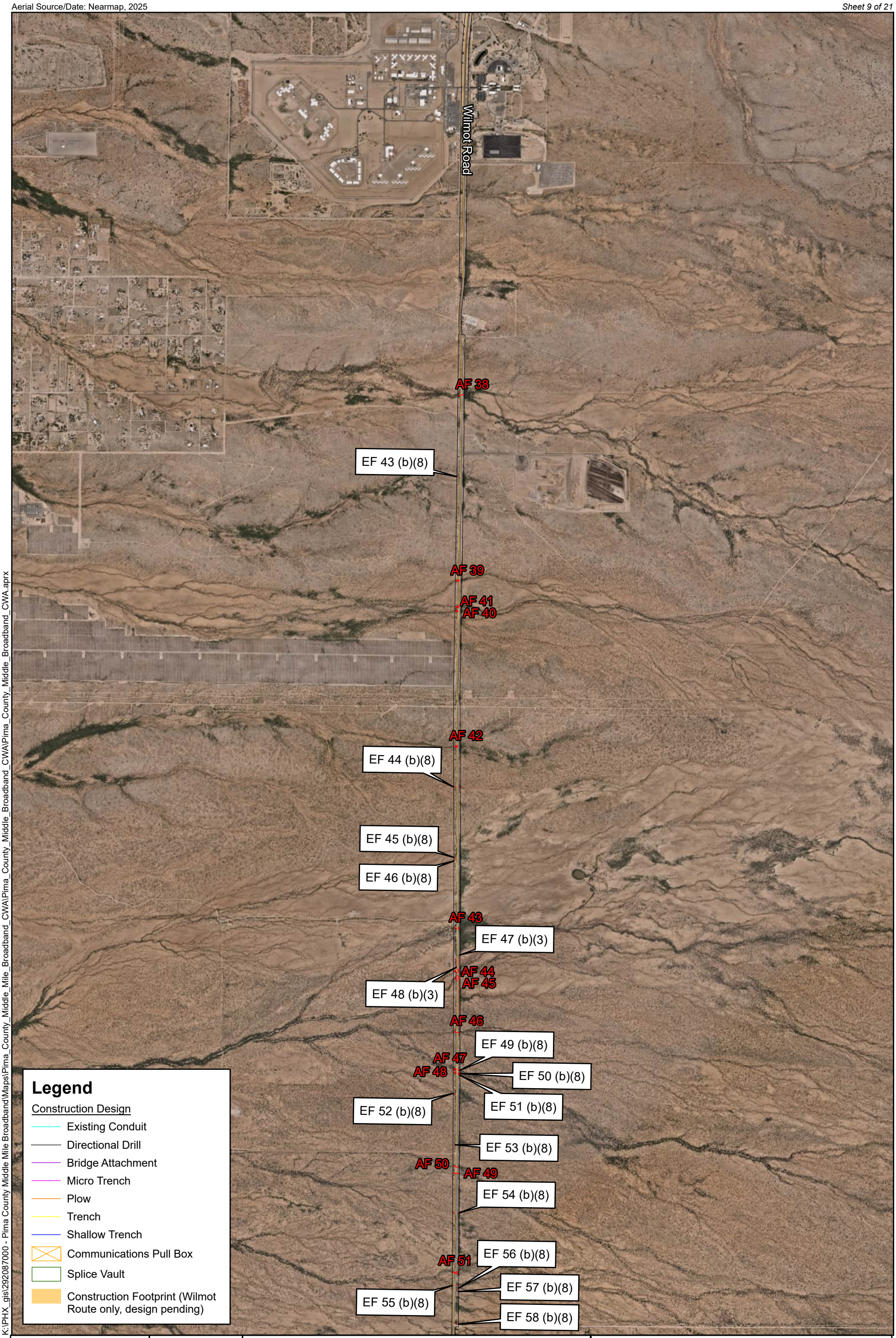

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

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EF 59 (b)(8)

EF 60 (b)(8)

EF 61 (b)(8)

EF 62 (b)(8)

EF 63 (b)(8)

AF 52

EF 64 (b)(3)

EF 65 (b)(3)

AF 53

Wilmot Road

Sahuarita Road

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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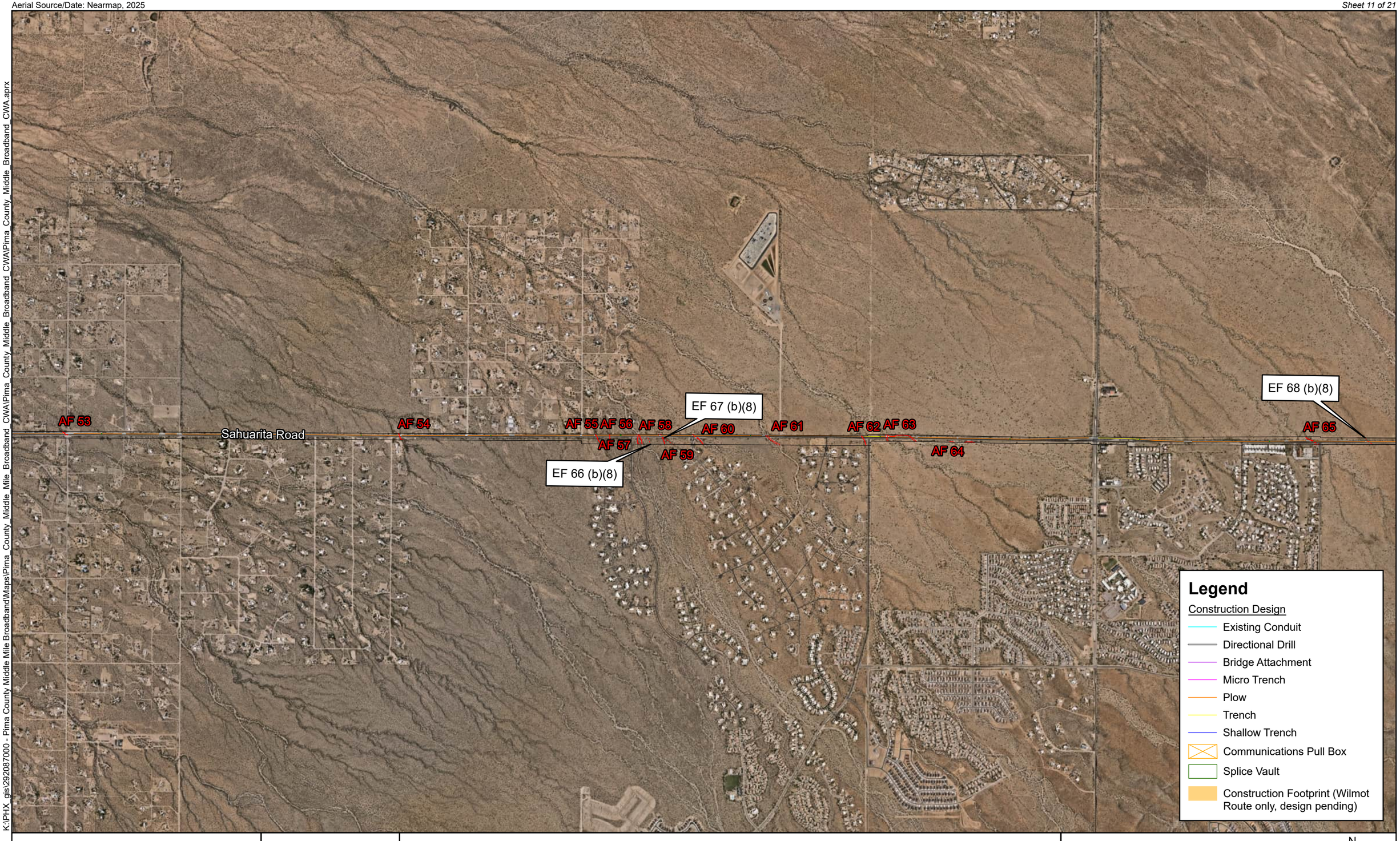

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Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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EF 68 (b)(8)
EF 69 (b)(8)
EF 70 (b)(8)
EF 73 (b)(8)
EF 74 (b)(8)
EF 71 (b)(8)
EF 72 (b)(8)
EF 75 (b)(8)
AF 65
AF 66
AF 67
AF 68
AF 69
AF 70
AF 71
AF 72
AF 73
AF 74
Sahuarita Road
ARIZONA 83

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

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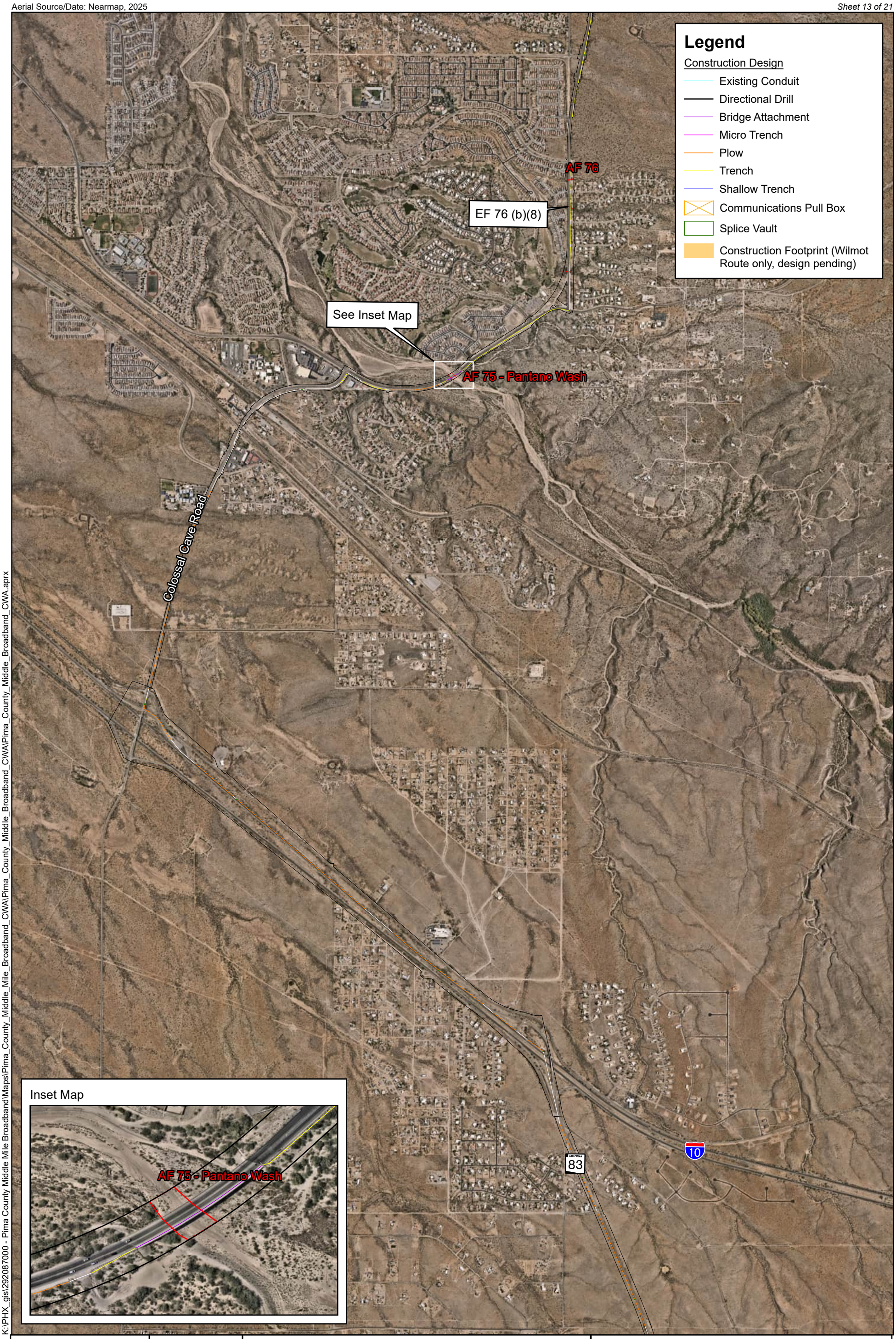

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Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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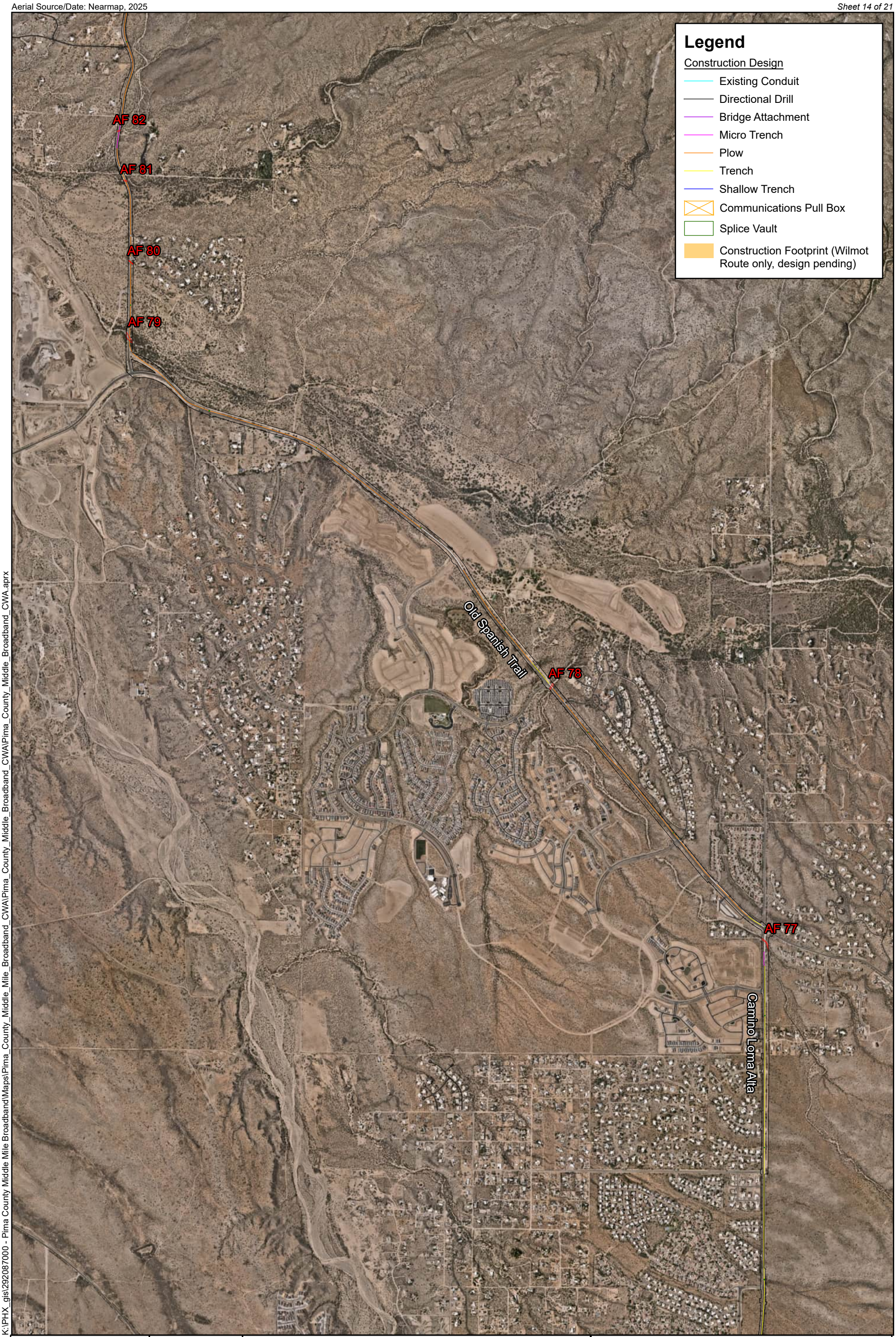

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Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

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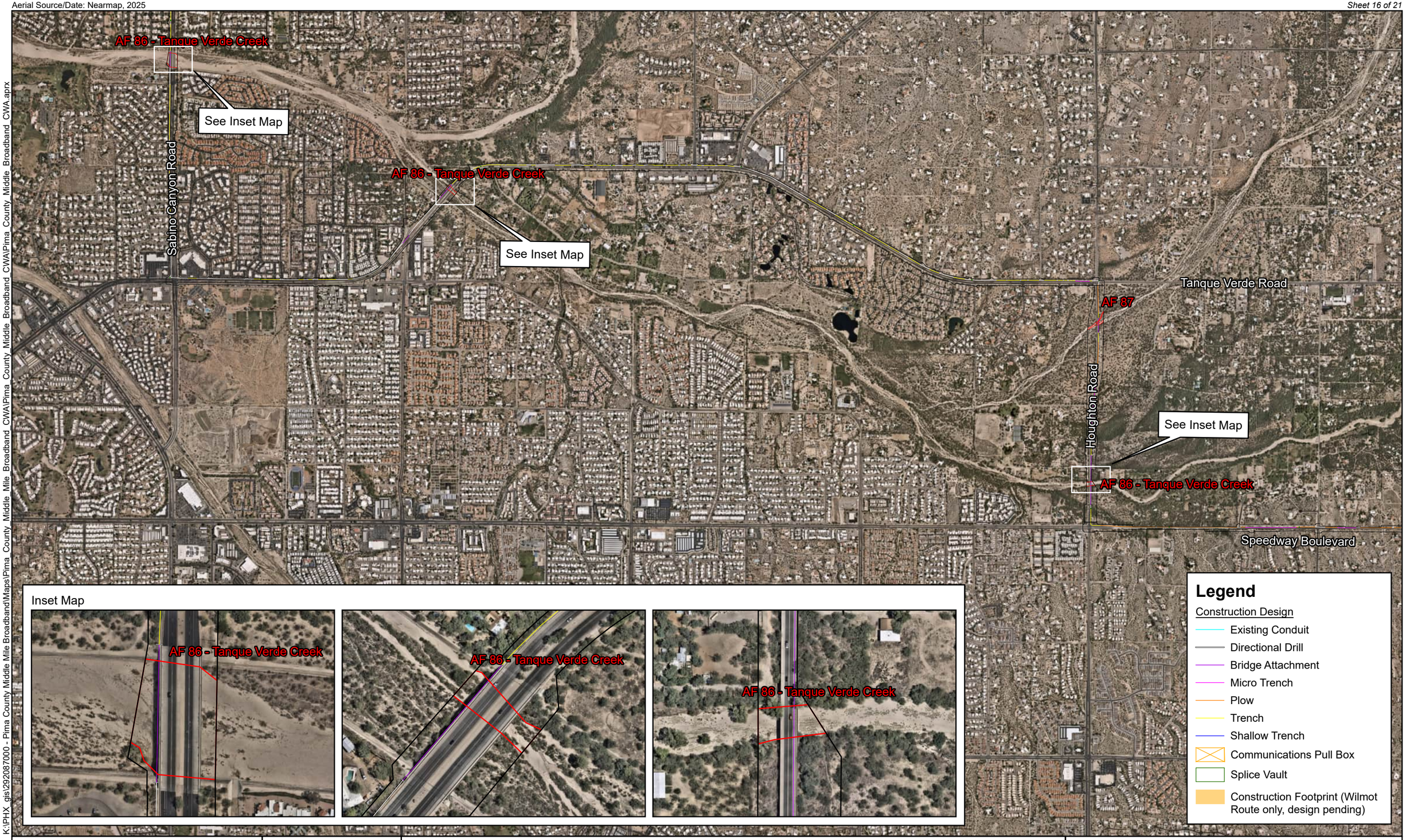

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Figure 5. Section 404/401 Compliance Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

K:\PHX_gis\292087000 - Pima County Middle Mile Broadband\Maps\Pima_County_Middle_Mile_Broadband_CWA\Pima_County_Middle_Mile_Broadband_CWA.aprx

AF 90

AF 89

AF 88

Sunrise Drive

Swan Road

Kolb Road

Sabino Canyon Road

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

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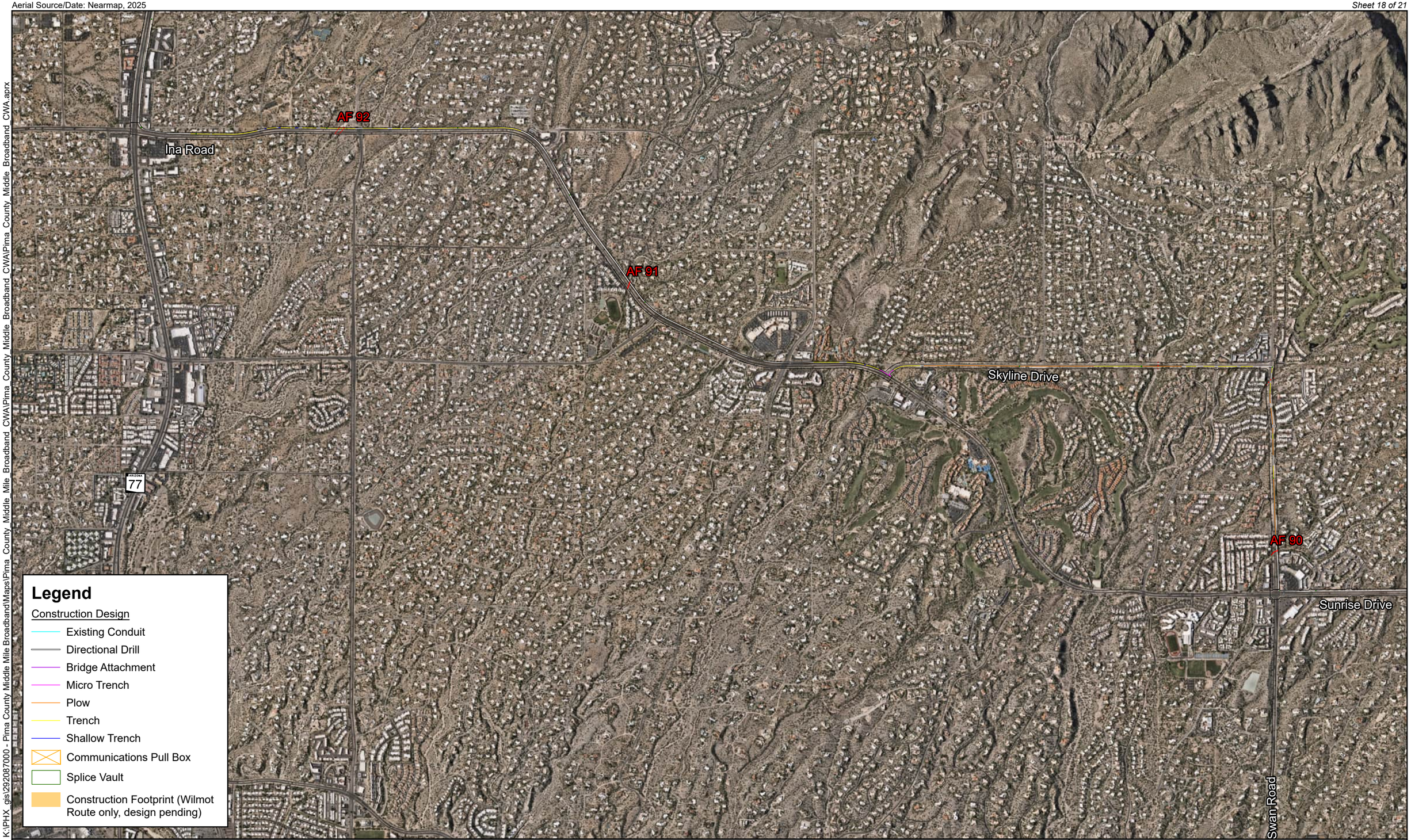

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

AF 96

AF 95

Tangerine Road

La Canada Drive

AF 94 - Canada del Oro

AF 93

Magee Road

ARIZONA 77

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Inset Map

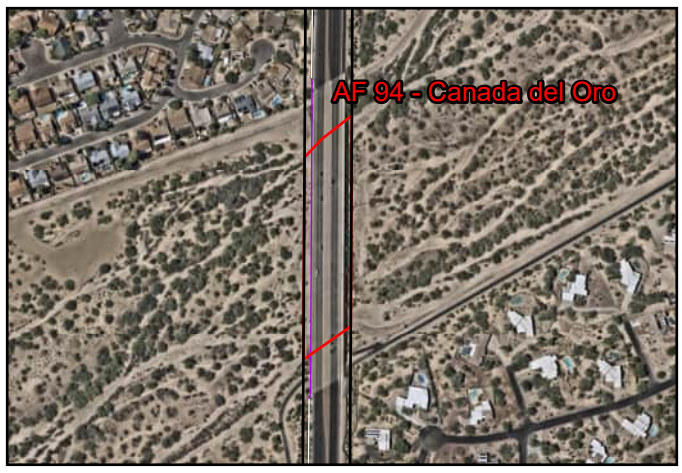

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Figure 5. Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

K:\PHX_gis\292087000 - Pima County Middle Mile Broadband\Maps\Pima_County_Middle_Mile_Broadband_CWA\Pima_County_Middle_Broadband_CWA.aprx

Tangerine Road

AF 106 AF 105 AF 104 AF 103 AF 102 AF 101 AF 100 AF 99 AF 98 AF 97 AF 96

EF 82 (b)(3)

EF 81 (b)(3)

EF 83 (b)(8)

EF 80 (b)(8)

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Figure 5. Section 404/401 Compliance Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

K:\PHX_gis\292087000 - Pima County Middle Mile Broadband\Maps\Pima_County_Middle_Mile_Broadband_CWA\Pima_County_Middle_Broadband_CWA.aprx

Figure 5. Section 404/401 Compliance Map | Pima County, Arizona

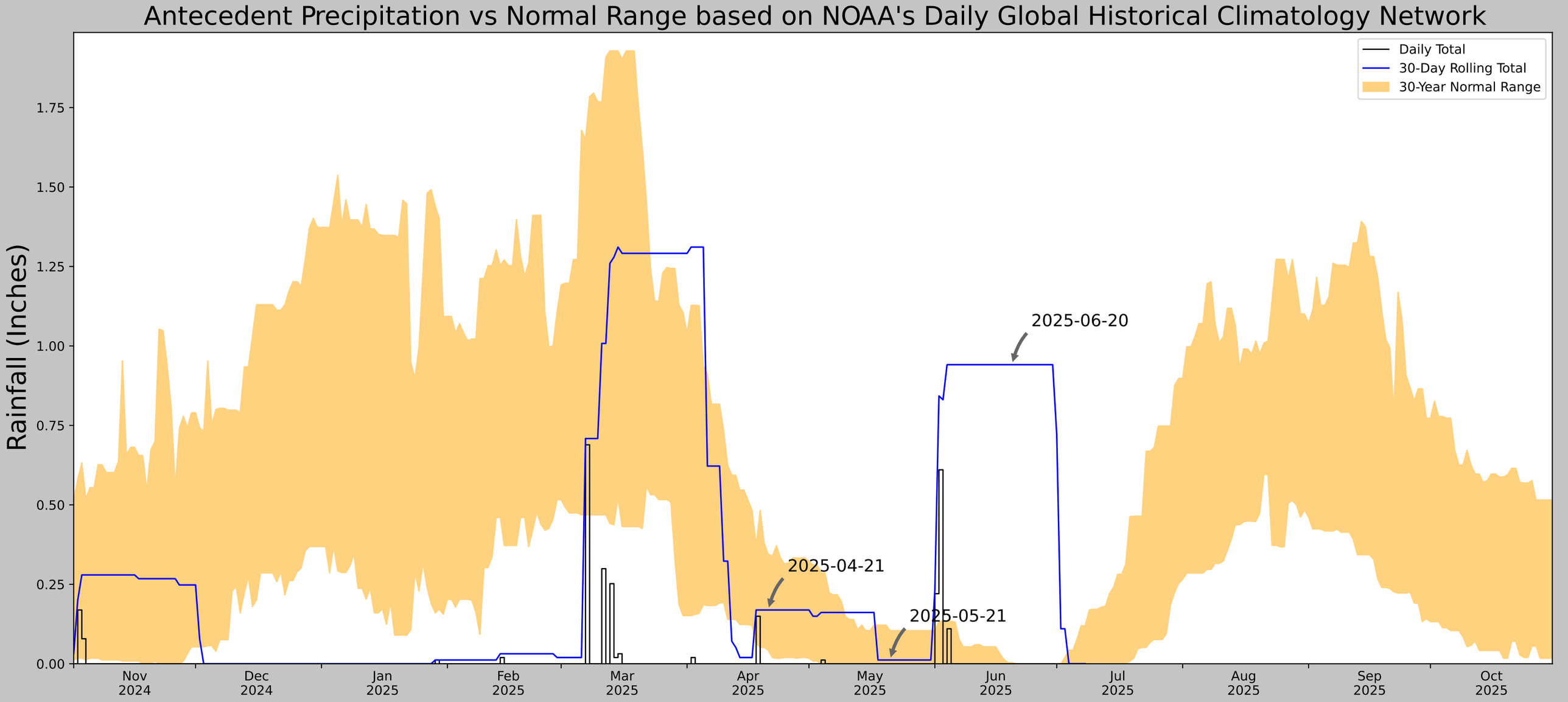
Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S



Coordinates	33.671515, -111.865735
Observation Date	2025-06-20
Elevation (ft)	1844.274
Drought Index (PDSI)	Extreme drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-06-20	0.0	0.003543	0.940945	Wet	3	3	9
2025-05-21	0.0	0.104331	0.011811	Normal	2	2	4
2025-04-21	0.041732	0.344488	0.169291	Normal	2	1	2
Result							Wetter than Normal - 15

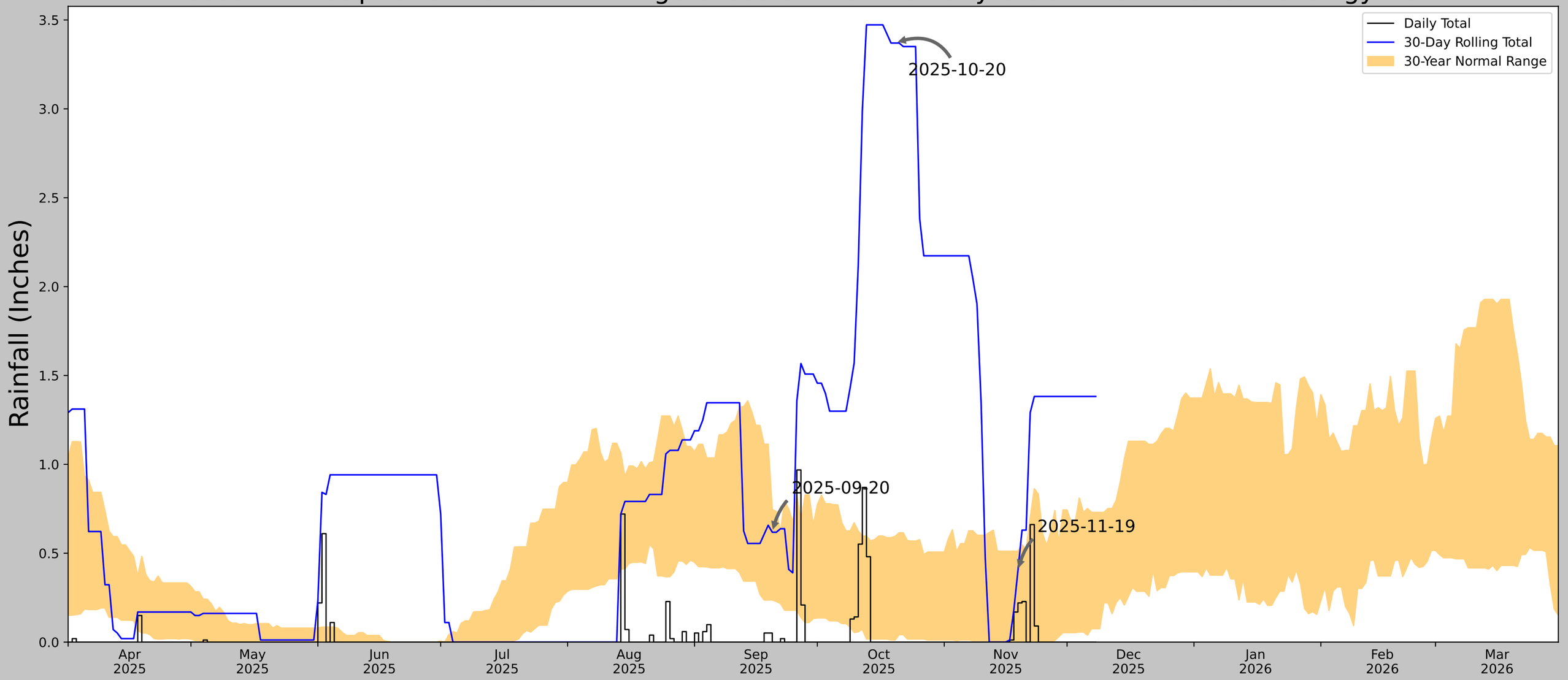
US Army Corps of Engineers

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

ERDC

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
SCOTTSDALE MUNI AP	33.6122, -111.923	1431.102	5.258	413.172	4.539	8359	90
SCOTTSDALE 6.8 NNW	33.594, -111.9272	1381.89	1.281	49.212	0.639	6	0
SCOTTSDALE 4.0 NW	33.6158, -111.9566	1428.15	1.949	2.952	0.883	3	0
SCOTTSDALE 8.0 N	33.6159, -111.8861	1458.005	2.139	26.903	1.02	2	0
PHOENIX DEER VALLEY MUNI AP	33.6903, -112.0661	1486.877	9.842	55.775	4.978	1150	0
FOUNTAIN HILLS	33.6011, -111.7128	1580.053	12.12	148.951	7.259	1833	0



Coordinates	33.67151, -111.86574
Observation Date	2025-11-19
Elevation (ft)	1844.274
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-11-19	0.0	0.511811	0.401575	Normal	2	3	6
2025-10-20	0.011811	0.595276	3.370079	Wet	3	2	6
2025-09-20	0.236614	0.746457	0.61811	Normal	2	1	2
Result							Normal Conditions - 14

Figures and tables made by the
Antecedent Precipitation Tool
Version 3.0

US Army Corps of Engineers.
ERDC

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
SCOTTSDALE MUNI AP	33.6122, -111.923	1431.102	5.258	413.172	4.538	8723	90
SCOTTSDALE 6.8 NNW	33.594, -111.9272	1381.89	1.281	49.212	0.639	7	0
SCOTTSDALE 4.0 NW	33.6158, -111.9566	1428.15	1.949	2.952	0.883	3	0
SCOTTSDALE 8.0 N	33.6159, -111.8861	1458.005	2.139	26.903	1.02	2	0
PHOENIX DEER VALLEY MUNI AP	33.6903, -112.0661	1486.877	9.842	55.775	4.978	1150	0
FOUNTAIN HILLS	33.6011, -111.7128	1580.053	12.12	148.951	7.259	1468	0

Streamflow Duration Assessment Methods

SDAM Version 3.0.0 Release Date: June 2025

https://www.epa.gov/streamflow-duration-assessment

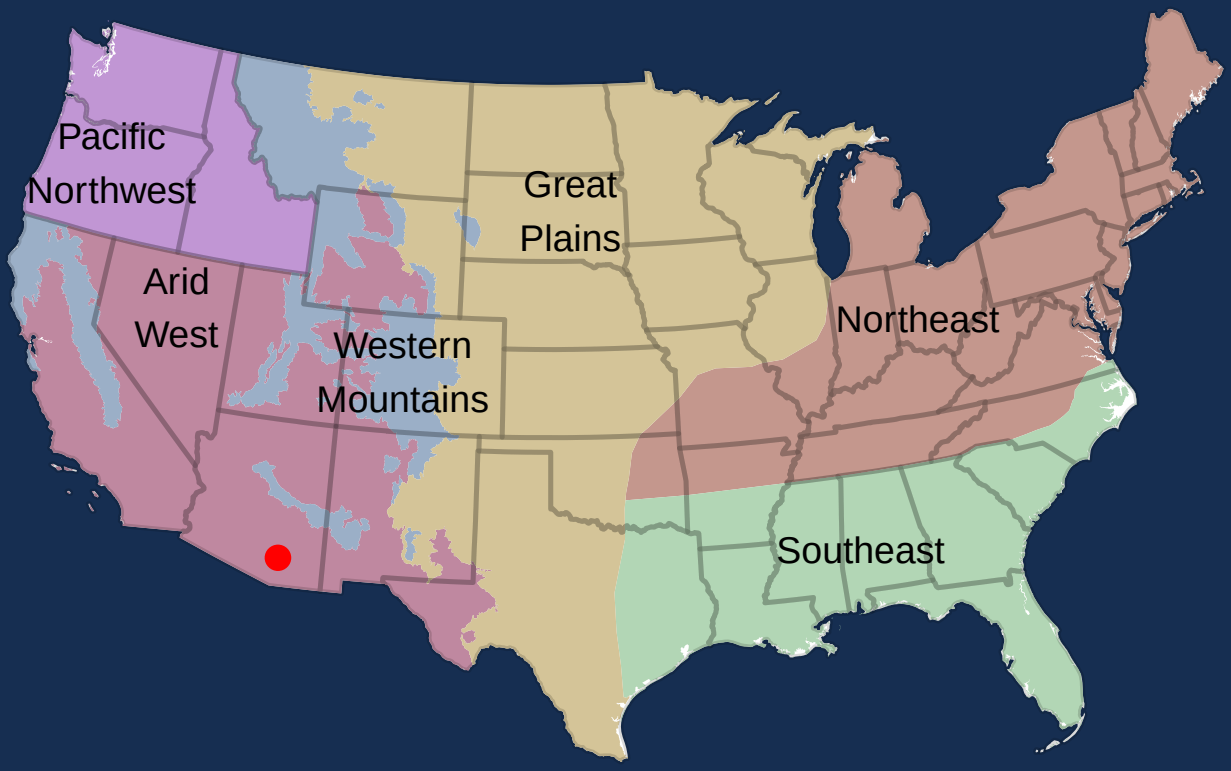
Visit date: 2025-06-20

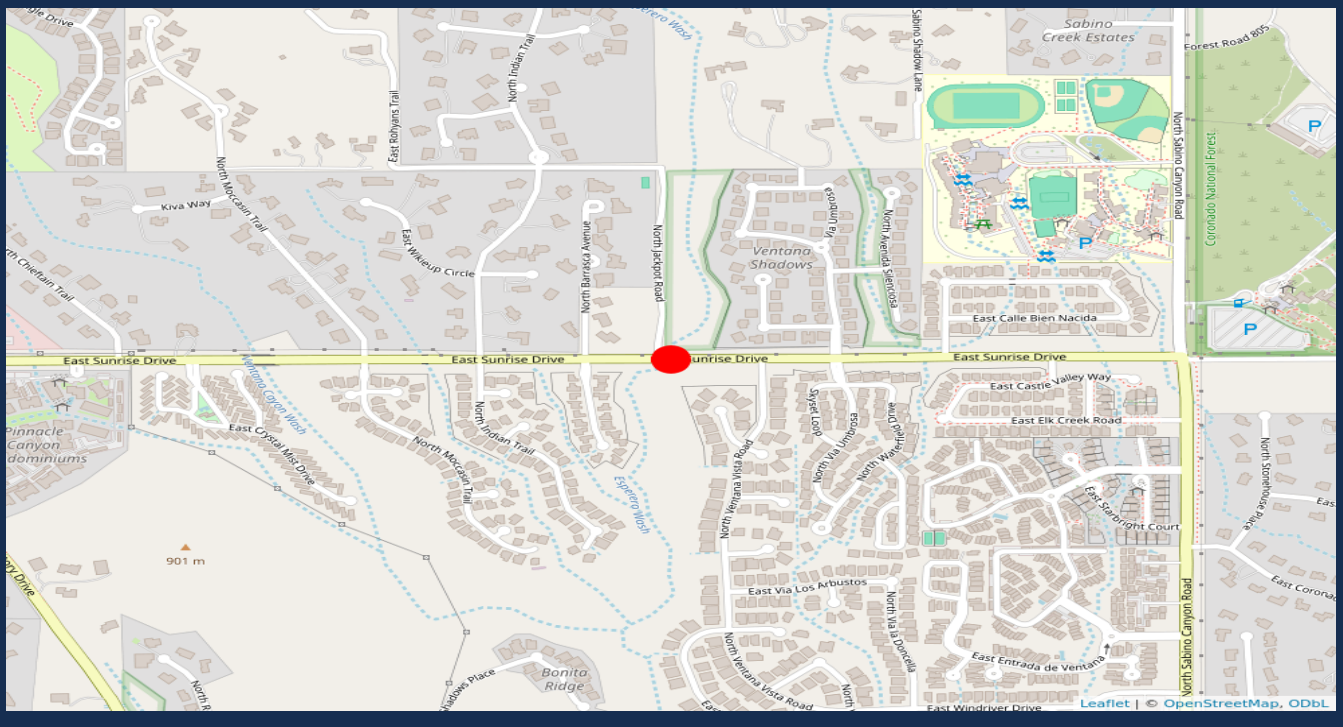
Report generated date: 2025-07-10

Project name: Pima County Regional Middle Mile Project

Site code: AF 81

Regional SDAM classification: EPHEMERAL





General site information

Project name or number: Pima County Regional Middle Mile Project

Site code or identifier: AF 81

SDAM Region: Arid West

Adjacent SDAM Regions within 10 miles: None

Assessor(s): Avery Pritchard and Grace Harwin

Waterway name: Espero Wash

Visit date: 2025-06-20

Current weather conditions: Clear/Sunny

Notes on current or recent weather conditions:

Location: 32.308905 N, -110.832265 E

Surrounding land use within 100 m: Urban, industrial, or residential, openspace

Notes on land use:

Description of reach boundaries:

Assessment reach length (m): 54.79

Disturbed or difficult conditions: None

Notes on disturbances or difficult site conditions:

Observed hydrology

Percent of reach with surface flow: 0

Percent of reach with surface and sub-surface flows: 0

Number of isolated pools: 0

Notes on observed hydrology:

Site photos

Top of reach looking downstream:

Middle of reach looking upstream:

Middle of reach looking downstream:

Bottom of reach looking upstream:

Site sketch

Indicators

Mean bankfull channel width (m): 3.048

Notes on mean bankfull channel width:

Mean bankfull channel width photos and descriptions:

Perennial indicator taxa: No perennial indicator taxa detected

Aquatic macroinvertebrates in assessment area: Aquatic macroinvertebrates absent

Notes on aquatic macroinvertebrates:

Macroinvertebrate photos and photo descriptions:

Slope (to the nearest half-percent): 1

Notes about slope:

Slope photos and descriptions:

Number of hydrophytic plant species: 0

Vegetation in assessment area: vegetation absent

Notes on hydrophytic plants:

Hydrophyte photos and photo descriptions:

Prevalence of upland rooted plants in streambed: 0 (Poor) Rooted upland plants are prevalent within the streambed/thalweg.

Notes about upland rooted plants:

Upland rooted plants photos and descriptions:

Algal cover: Not Detected

Check here if algae exclusively appears to have been deposited from an upstream source, and no local growth is evident: Not checked

Notes about algal cover:

Algal cover photos and descriptions:

Differences in vegetation: 1 (Weak) Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.

Notes about differences in vegetation:

Vegetation differences photos and descriptions:

Riffle-pool sequence: 0 (Poor) No riffle-pool sequences observed.

Notes about riffle-pool sequence:

Riffle-pool photos and descriptions:

Supplemental information

Additional notes about the assessment:

Supplemental information photos and descriptions:

Arid West Regional SDAM classification

EPHEMERAL

SDAM resources

End of Report

Photo No. 1

View of Aquatic Feature (AF) 1 (Santa Cruz River) looking downstream (northwest). Note work at this location is limited to conduit installation via bridge attachment and any impacts to WOTUS will be avoided.

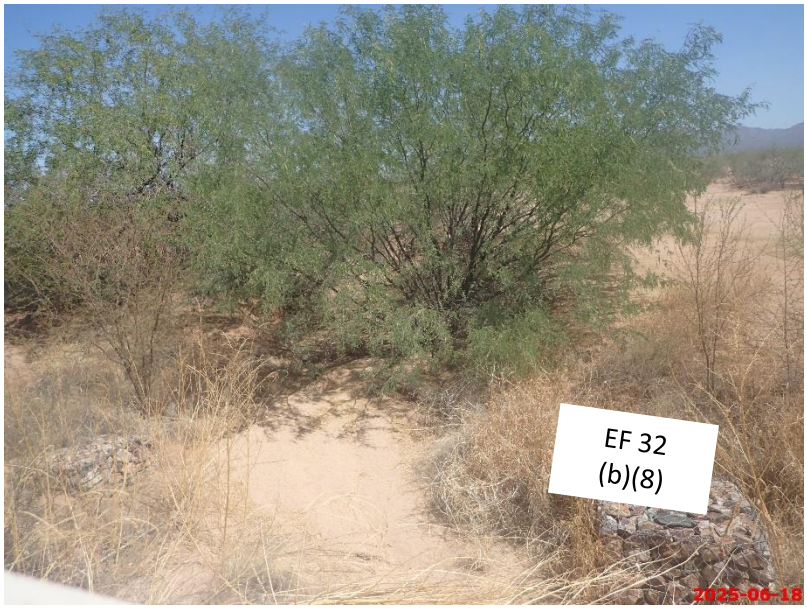
Photo No. 2

View of AF 19 (typical non-relatively permanent water [RPW]) looking downstream (west) from Sandario Road.

Photo No. 3

View of sheetflow (typical) looking southeast from Sandario Road. Note no ordinary high water mark (OHWM). Note USGS National Hydrography Dataset (NHD) Stream Order (SO) 4 reach crosses the project limits along this feature.

Photo No. 4



View of Excluded Feature (EF) 32 (typical) looking north from Valencia Road.

Photo No. 5

View of AF 37 (Santa Cruz River) looking upstream (south). Note work at this location is limited to conduit installation via bridge attachment.

Photo No. 6

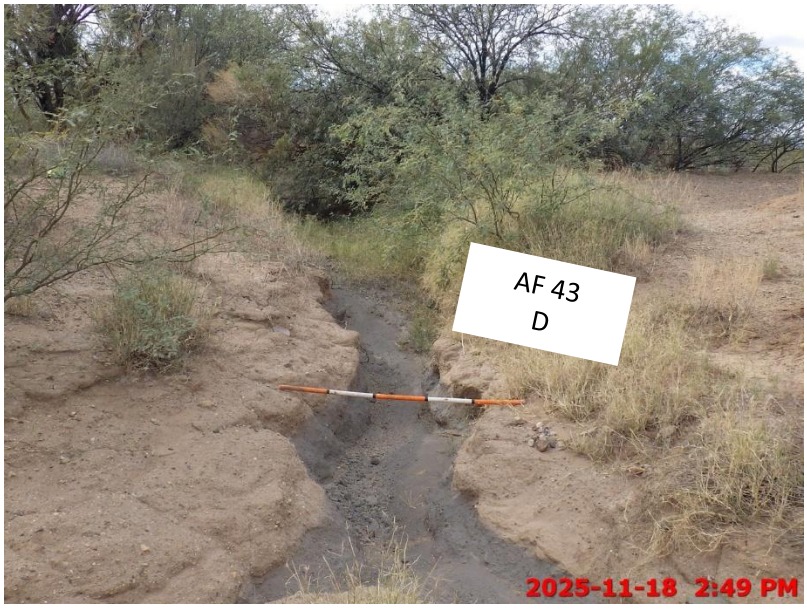
View of AF 37 (Santa Cruz River) looking downstream (north).

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 7

View of sheetflow (typical) looking east from Wilmot Road (upstream from AF 43). Note USGS NHD SO 3 reach crosses the project limits along this path.

Photo No. 8



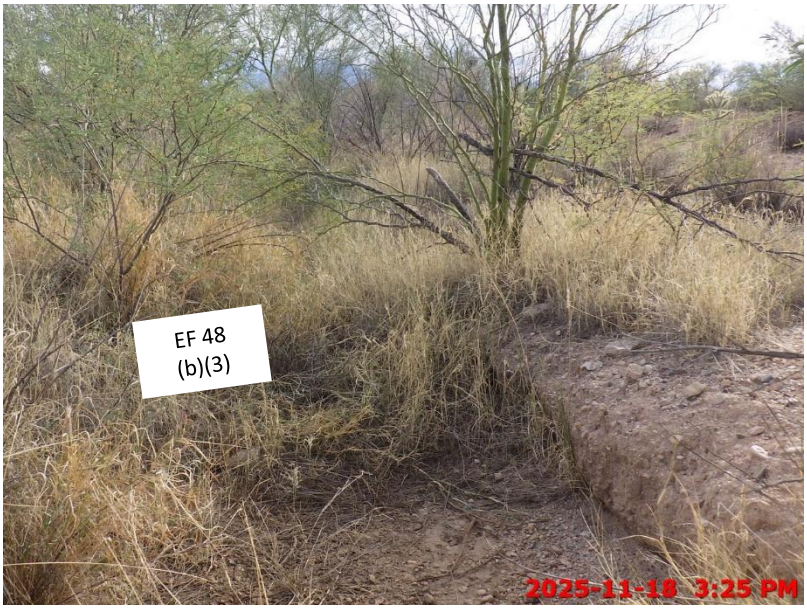
View of AF 43 (typical non-RPW) looking downstream (west) from Wilmot Road. Note USGS NHD SO 3 reach crosses the project limits along this feature.

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 9

View of EF 48 looking north along Wilmot Road.

Photo No. 10



View of EF 48 looking south along Wilmot Road.

Photo No. 11

View of sheetflow (typical) looking southeast across Wilmot Road. Note no OHWM. Note USGS NHD SO 3 reach crosses the project limits along this feature.

Photo No. 12

View of sheetflow (typical) looking northwest from Wilmot Road. Note no OHWM. Note USGS NHD SO 3 reach crosses the project limits along this feature.

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 13

View of AF 66 (typical non-RPW) looking upstream (southeast) towards Sahuarita Road. Note at-grade crossing (typical).

Photo No. 14

View of AF 66 looking downstream (northwest) from Sahuarita Road.

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 15

View of AF 86 (Tanque Verde Creek) looking upstream (west) from Houghton Road. Note work at this location is limited to conduit installation via bridge attachment.

Photo No. 16

View of AF 86 looking downstream (west).

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 17

View of AF 88 (typical non-RPW) looking upstream (north) from Sunrise Drive.

Photo No. 18

View of AF 88 looking downstream (south) towards Sunrise Drive.

Alternating orange and white scale bar on rod in photographs depicts 1-foot intervals

Photo No. 19

View of AF 94 (Canada del Oro Wash) looking upstream (northeast) towards La Canada Drive. Note work at this location is limited to conduit installation via bridge attachment.

Photo No. 20

View of AF 94 looking downstream (southwest) from La Canada Drive.

APPENDIX E: BIOLOGICAL RESOURCES

Table E-1. Federally and State-Listed Species in the Project Area[12]

Common Name	Scientific Name	Federal Status[13]	State-Status[14]	Habitat Description	Potential for Occurrence / Determination of Effects
Birds					
Cactus Ferruginous Pygmy-owl	*Glaucidium brasilianum cactorum*	LT	SGCN 1	Areas of desert woodlands with tall canopy cover. Primarily found in Sonoran desert scrub and occasionally in riparian drainages and woodlands within semi-desert grassland communities. Prefers to nest in cavities in saguaro cacti but has been found in low-density suburban developments that include natural open spaces (USFWS 2016).	No effect. According to AGFD habitat suitability model, the action area contains approximately 98% suitable habitat primarily near Oro Valley and the Catilina Foothills (AGFD 2025). However, the construction footprint is highly disturbed. No suitable habitat within the action area based on field reconnaissance.
California Least Tern	*Sternula antillarum browni*	LE	NA	Sparsely vegetated and exposed flats, typically along the shorelines of inland rivers, lakes, reservoirs, or drainage systems below 2,000 feet (USFWS 2016).	No effect. No suitable habitat observed within the action area during field reconnaissance.
Mexican Spotted Owl	*Strix occidentalis lucida*	LT	SCGN 1	Nests in canyons and dense forests with multi-layered foliage structure. These sites have high canopy closure, high basal area, many snags, and many downed logs. In Arizona, they occur primarily in mixed-conifer, pine-oak, and evergreen oak forests; also occurs in ponderosa pine forest and rocky canyonlands (AGFD 2020c).	No effect. According to AGFD habitat suitability model, the action area contains approximately 45% suitable habitat primarily near Tanque Verde Creek (AGFD 2025). However, the construction footprint is highly disturbed. No suitable habitat within the action area based on field reconnaissance.

Common Name	Scientific Name	Federal Status[13]	State-Status[14]	Habitat Description	Potential for Occurrence / Determination of Effects
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	LE	SCGN 1	Dense riparian woodland communities along rivers, streams, lakesides, and wetlands below 8,500 feet elevation. Prefers dense canopy cover, large volume of understory foliage, and surface water during mid-summer (USFWS 2016).	No effect. According to AGFD habitat suitability model, the action area does not contain suitable breeding habitat (AGFD 2025), and no suitable breeding or foraging habitat was observed within the action area during field reconnaissance.
Yellow-billed Cuckoo	*Coccyzus americanus*	LT	SCGN 1	Large blocks of riparian woodlands including cottonwood, willow, and tamarisk bosques below 6,500 feet (USFWS 2016).	The proposed construction in the vicinity of Sunrise Drive bridge is located within Pima County's Section 10 Permit Area and yellow-billed cuckoo is a species covered by Pima County's Section 10 Permit. As such, any impacts to YBCU would be mitigated according to the Section 10 Permit terms.
Mammals					
Jaguar	*Panthera onca*	LE	SCGN 1	Found in thornscrub, desertscrub, chaparral, semidesert grassland, Madrean evergreen woodland, deciduous forest, and conifer forest between 1,600 and 9,000 feet and associated with water in southeastern Arizona (AGFD 2020b).	No effect. No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area contains less than 0.01% suitable habitat (AGFD 2025).
Mexican Wolf	*Canis lupus baileyi*	XN	SCGN 1	Chaparral, woodland, and forested areas. May cross desert areas between 4,000 and 12,000 feet (USFWS 2016)	No effect. No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).
Ocelot	*Leopardus pardalis*	LE	SCGN 1	Variable, including thornscrub, semi-arid woodland, tropical deciduous and semi-deciduous forest,	No effect. No suitable habitat within the action area based of field reconnaissance. According to AGFD

Common Name	Scientific Name	Federal Status[13]	State-Status[14]	Habitat Description	Potential for Occurrence / Determination of Effects
				subtropical forest, lowland rainforest, palm savanna,and seasonally flooded savanna woodland. In Arizona, most recent (since 2009) detections have occurred in Madrean evergreen woodland, semidesert grassland, and Great Plains grassland in habitats greater than 9,850 feet (USFWS 2016).	habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).
Sonoran Pronghorn	*Antilocapra americana sonoriensis*	XN	SCGN 1	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations at elevations below 650 feet (USFWS 2016).	No effect. No suitable habitat within the action area based of field reconnaissance. According to AGFD habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).
Fish					
Desert Pupfish	*Cyprinodon macularius*	LE	SGCN 1	Shallow springs, small streams, and marshes. Tolerates saline and warm water (USWFS 2016).	According to AGFD habitat suitability model, the action area contains less than 0.05% suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Gila Chub	*Gila intermedia*	LE	SGCN 1	Pools, springs, cienegas, and streams (USFWS 2016).	According to AGFD habitat suitability model, the Project does not contain suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Gila Topminnow	*Poeciliopsis occidentalis*	LE	SGCN 1	Isolated to small streams, springs, and cienegas vegetated shallows (USFWS 2016).	According to AGFD habitat suitability model, the Project does not contain suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.

Common Name	Scientific Name	Federal Status[13]	State-Status[14]	Habitat Description	Potential for Occurrence / Determination of Effects
Insects					
Monarch Butterfly	*Danaus plexippus*	PT	NA	Blooming nectar plants are available during the monarch migration timeframe (ECOS 2025).	Approximately 34 acres of vegetation, including trees, shrubs, cacti, and groundcover, would be removed during construction of this Project; however, less than 2% are nectar plants based on field observations, and suitable stopover, foraging, and breeding habitat exists beyond the action area. This Project will not jeopardize the continued existence of the species.
Reptiles/Amphibians					
Northern Mexican Gartersnake	*Thamnophis eques megalops*	LT	SGCN 1	Cienegas, stock tanks and rivers that are densely vegetated such as lowland river riparian woodlands, and upland stream gallery forests most frequently between 3,000 to 5,000 feet in elevation (USFWS 2016).	According to AGFD habitat suitability model, the action area contains approximately 64% suitable habitat primarily near Tanque Verde Creek (AGFD 2025). However, the construction footprint is within and adjacent to the existing roadway alignment within disturbed shoulders. No suitable habitat was observed within the action area during field reconnaissance.
Chiricahua Leopard Frog	*Rana chiricahuensis*	LT	SGCN 1	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists (USFWS 2016).	According to AGFD habitat suitability model, the action area contains less than 15% suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Plants					
Arizona Eryngo	*Eryngium sparganophyllum*	LE	NA	Cienega obligate that occurs at elevations between 2,700 and 4,000 feet (USFWS 2016).	No suitable habitat within the action area and no individuals observed during field reconnaissance.

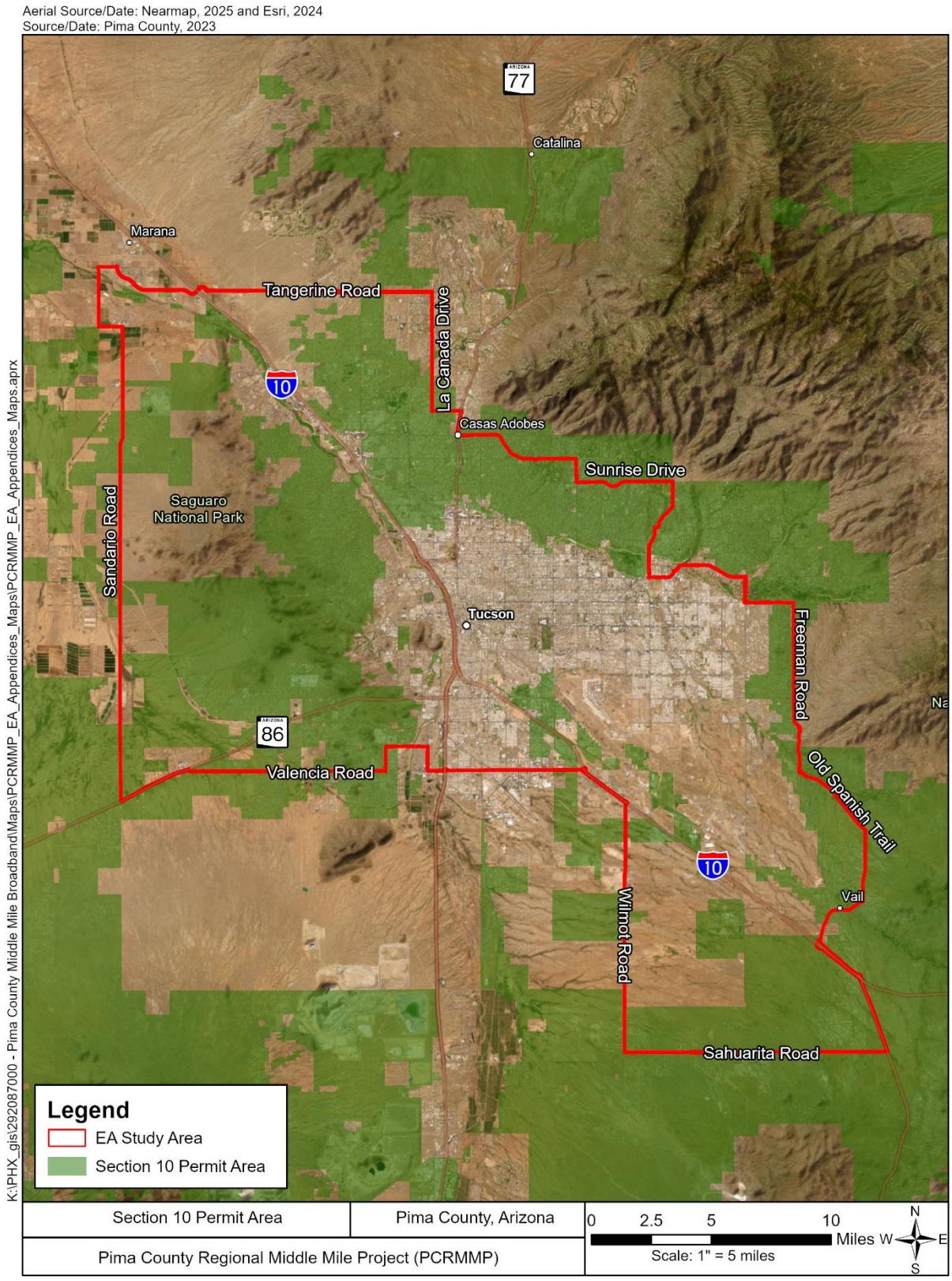
Common Name	Scientific Name	Federal Status[13]	State-Status[14]	Habitat Description	Potential for Occurrence / Determination of Effects
Huachuca Water-umbel	*Lilaeopsis schaffneriana var. recurva*	LE	NA	Cienegas, perennial low gradient streams, wetlands (USFWS 2016).	According to PimaMaps habitat model, the Project contains low to medium suitable habitat primarily along the Santa Cruz River and Tanque Verde Creek (Pima County 2025c). However, no suitable habitat was observed within the action area during field reconnaissance.
Pima Pineapple Cactus	*Coryphantha scheeri var. robustispina*	LE	NA	Sonoran desertscrub or semi-desert grassland communities, within alluvial valleys or on hillsides in rocky to sandy or silty soils (USFWS 2016).	Potential effects to the PPC from this Project include direct impact (crushing with equipment) and the potential degradation of suitable habitat due to the introduction of invasive plant species. Protocol surveys conducted within potentially suitable habitat in the construction footprint beyond the Pima County Section 10 Permit Area resulted in the documentation of six individual PPC. Mitigation measures will be implemented to prevent impacts to the Pima pineapple cactus. The Project will have no effect on the Pima pineapple cactus or its habitat.

[12] The federal and state species lists were verified to be accurate on December 15, 2025.

[13] E = Endangered, T = Threatened, C = Candidate, PE = Proposed Endangered, PT = Proposed Threatened, XN=Experimental Population, Non-Essential.

[14] SGCN = Species of Greatest Conservation Need

Section 10 Permit Area



BIOLOGICAL EVALUATION

PIMA COUNTY REGIONAL MIDDLE MILE PROJECT

Prepared for:

PIMA COUNTY

Prepared by:

Kimley»Horn

January 2026

Submittal 4

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Appendix E – Pima Pineapple Cactus Survey Map
Appendix F – Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects
Appendix G – Section 404/401 Compliance Map

1. Project Overview

1.1 Federal Nexus

The project evaluated in this Biological Evaluation (BE) is funded in part by the National Telecommunications and Information Administration (NTIA).

This BE addresses the proposed action in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that, through consultation (or conferencing for proposed species) with the U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat (CH). This document evaluates the potential effects of the proposed project on species that are federally listed under the ESA. Specific project design elements are identified that avoid or minimize adverse effects of the proposed project on listed species and/or CH.

Pima County holds a Section 10 Permit as part of the Multi-Species Conservation Plan (MSCP), which allows for continued development while complying with the ESA. The Section 10 Permit Area includes private lands within unincorporated Pima County, land within the cities and towns of Tucson, Marana, and Oro Valley, and adjacent counties where construction and maintenance of Pima County infrastructure occurs, fee simple and County-owned lands, Arizona State Land Department (ASLD) land leased or acquired in fee simple by Pima County or used as road easements, ASLD and Bureau of Land Management (BLM) land released to the private sector, and BLM land that Pima County patents for open-space purposes through the Recreation and Public Purpose Act (RPPA) or through land exchange. The Section 10 Permit Area does not include Pima County right-of-way (ROW) on federal or tribal land or ROW on ASLD land held by the cities and towns of Tucson, Marana, and Oro Valley. Species specific surveys were not conducted within the sections covered by the Section 10 Permit. The sections beyond the Section 10 Permit Area are within the Arizona Department of Transportation (ADOT) easement on BLM, Arizona State Land Department (ASLD), Union Pacific Railroad (UPRR), and Bureau of Reclamation (BOR) lands; Pima County easement on National Park Service (NPS), BLM, UPRR, and BOR lands; City of Tucson easement on ASLD land; Town of Marana easement on BLM and ASLD land; or Town of Oro Valley easement on ASLD land. Species specific surveys were conducted in these sections, as needed.

1.2 Project Description

The project is a 134.61-mile open access fiber middle mile ring throughout Pima County (referred to as the overall project). In Pima County, the current broadband offerings do not provide reliable and affordable service to the most unserved and underserved residents of the community. The fiber middle mile network would connect unserved and underserved Pima County residents by reducing the cost for last mile providers. See Section 4 for detailed Scope of Work for additional details. Construction is anticipated to begin in the summer of 2026 and project duration is anticipated to be approximately 24 months.

1.3 Project Location

The project is located in Pima County along various roadways including: Magee Road, State Route (SR) 77, La Canada Drive, Tangerine Road, Ina Road, Freeman Road, Speedway Boulevard, Interstate 10 (I-10), Colossal Cave Road, SR 83, Sahuarita Road, Wilmot Road, Valencia Road, Sandario Road, and SR 86 (**see Figures 1 and 2**). The project would occur within Pima County owned land, Pima County Flood Control District, Pima County ROW, Pima County easement on ASLD, NPS, UPRR, and BOR, ADOT ROW, ADOT easement on ASLD, BLM, UPRR, and BOR, City of Tucson ROW, City of Tucson easement on UPRR, and ASLD, Town of Marana ROW, Town of Marana easement on ASLD and BLM, and Town of Oro Valley ROW and easement on ASLD. Staging areas have yet to be determined and will be the responsibility of the contractor.

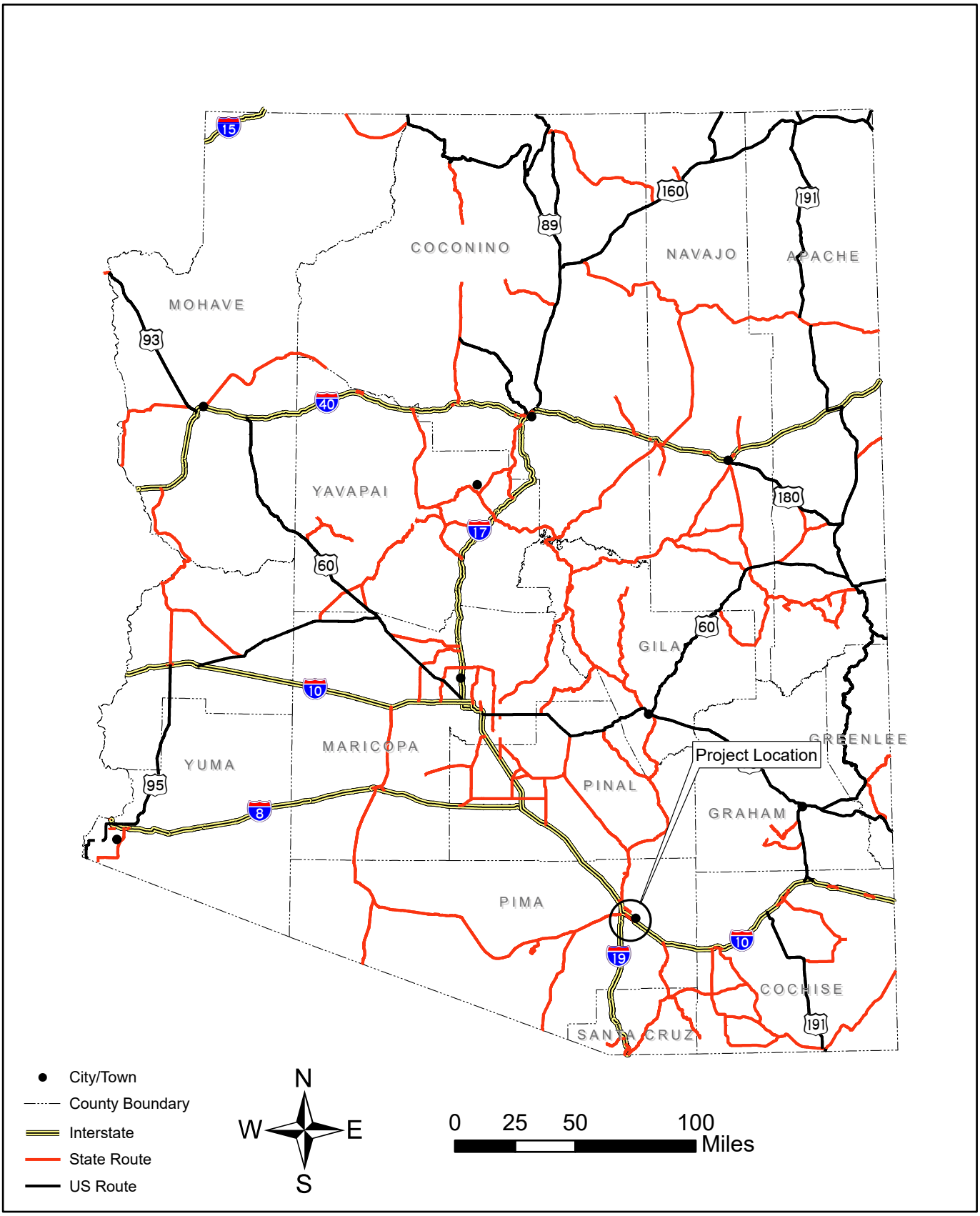

Figure 1. State Map
Pima County Regional Middle Mile Project (PCRMMP)

Aerial Source/Date: Esri, 2024

Legend

Construction Footprint

Mammoth
Oracle
San Manuel
Catalina
Marana
10
1
2
3
Casas Adobes
Saguaro National Park
Tucson
4
5
6
Vail
ARIZONA 83
Green Valley
Las Cienegas NCA

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Figure 3. Project Location Map-Key Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 2.5 5 10 Miles

Scale: 1" = 5 miles

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

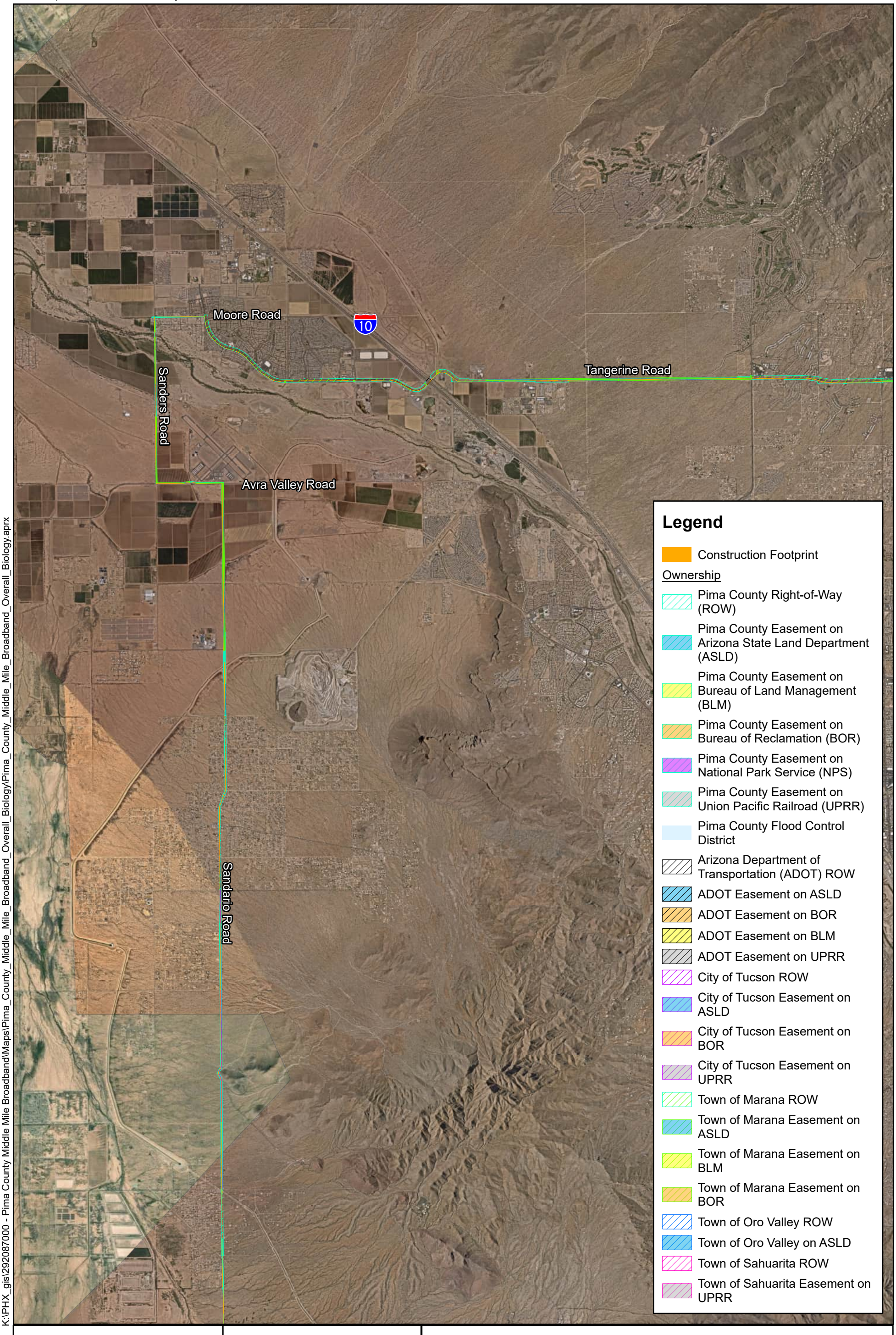

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Figure 2. Project Location Map
Sheet 1 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

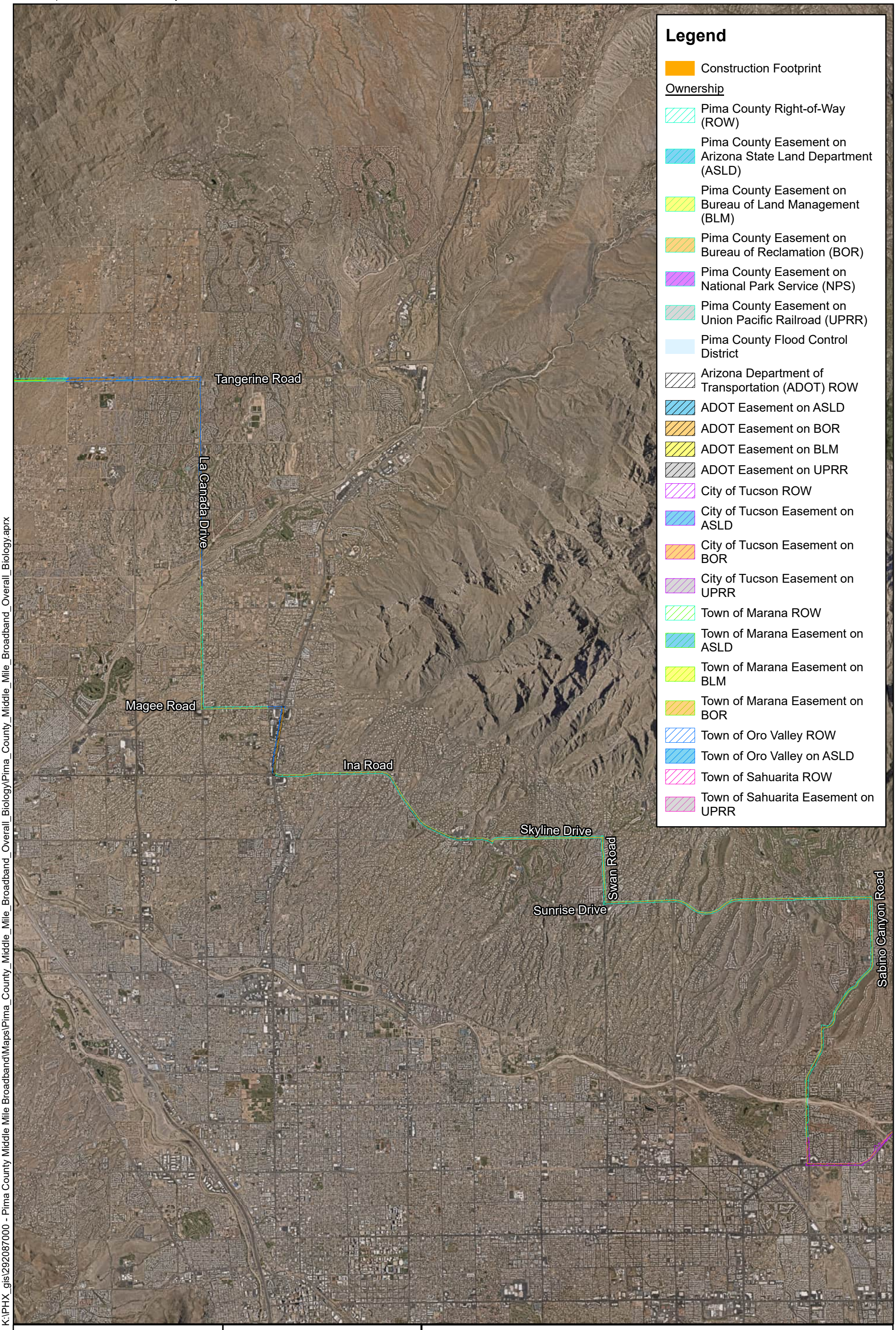

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Figure 2. Project Location Map Sheet 2 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

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Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

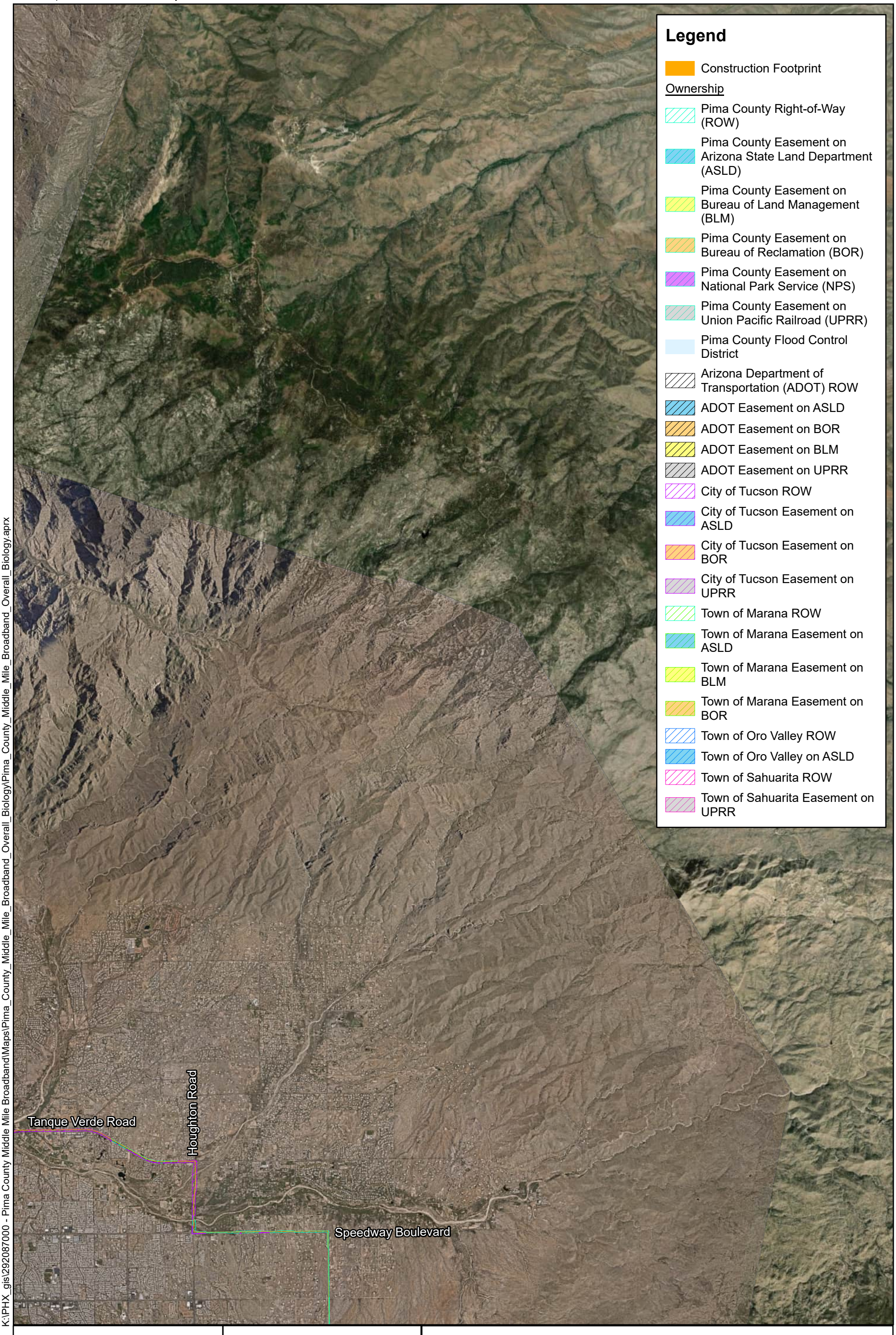

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Figure 2. Project Location Map Sheet 3 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

N
W E
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Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

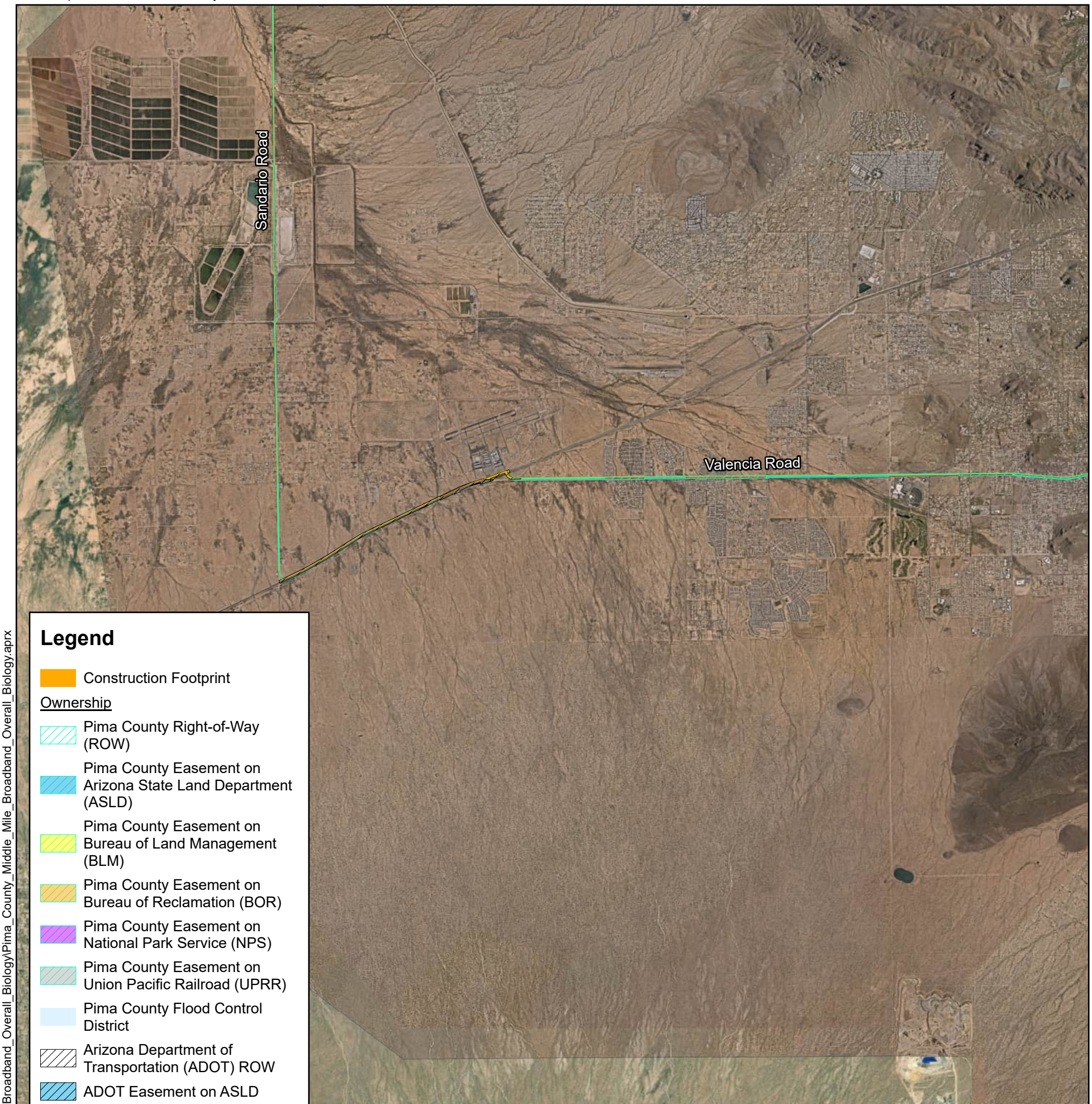

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Figure 2. Project Location Map
Sheet 4 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

Cardinal Avenue
Oak Tree Drive
Drexel Road
Valencia Road
Alvernon Way
10
Wilmot Road
Sahuarita Road

Legend

- Construction Footprint

Ownership

- Pima County Right-of-Way (ROW)
- Pima County Easement on Arizona State Land Department (ASLD)
- Pima County Easement on Bureau of Land Management (BLM)
- Pima County Easement on Bureau of Reclamation (BOR)
- Pima County Easement on National Park Service (NPS)
- Pima County Easement on Union Pacific Railroad (UPRR)
- Pima County Flood Control District
- Arizona Department of Transportation (ADOT) ROW
- ADOT Easement on ASLD
- ADOT Easement on BOR
- ADOT Easement on BLM
- ADOT Easement on UPRR
- City of Tucson ROW
- City of Tucson Easement on ASLD
- City of Tucson Easement on BOR
- City of Tucson Easement on UPRR
- Town of Marana ROW
- Town of Marana Easement on ASLD
- Town of Marana Easement on BLM
- Town of Marana Easement on BOR
- Town of Oro Valley ROW
- Town of Oro Valley on ASLD
- Town of Sahuarita ROW
- Town of Sahuarita Easement on UPRR

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Figure 2. Project Location Map
Sheet 5 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

N
W E
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Aerial Source/Date: Esri, 2024, Nearmap, 2025
Ownership Source/Date: Pima County Assessor's Office, 2025; ASLD, 2025; and BLM, 2025

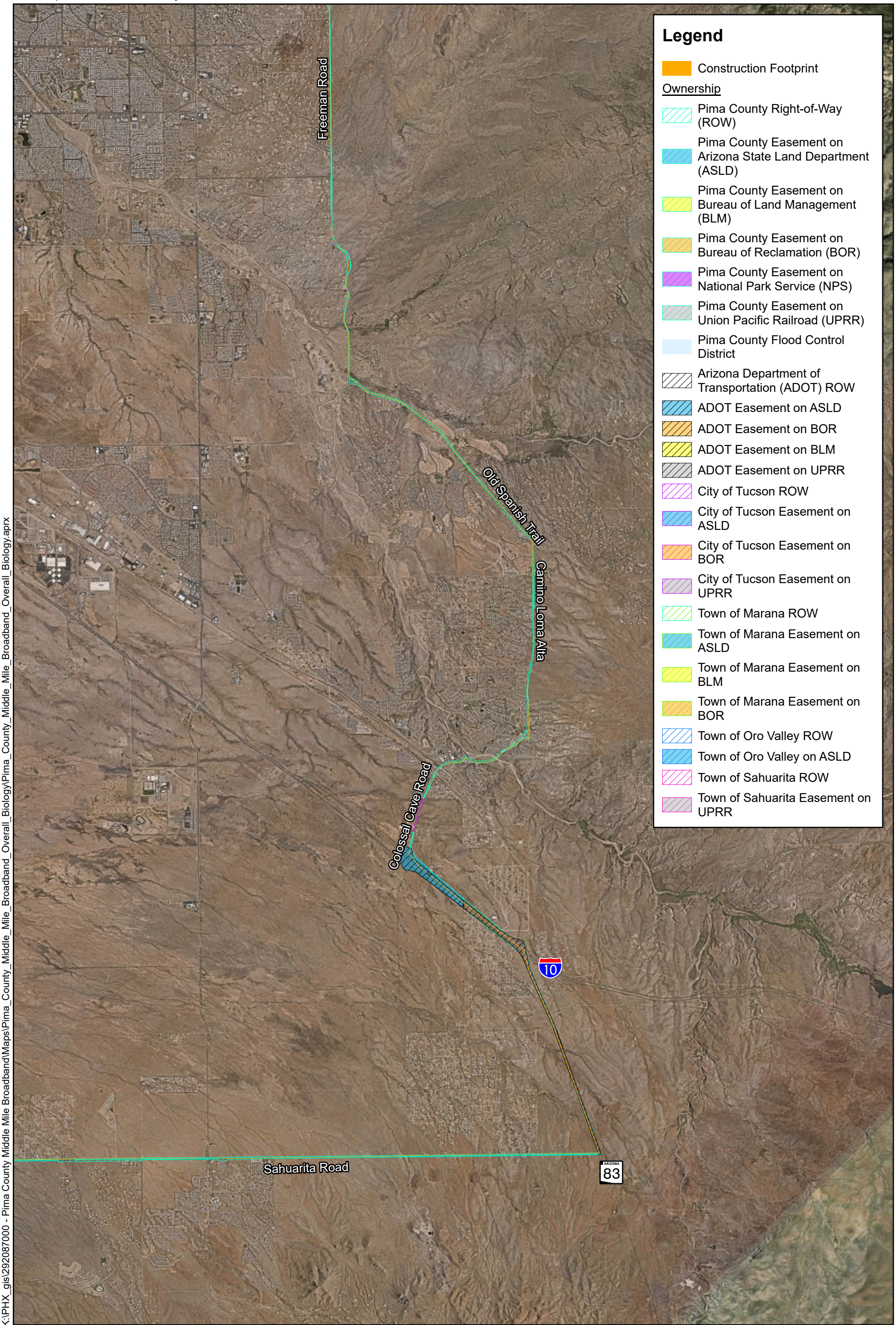

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Figure 2. Project Location Map Sheet 6 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

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2. Federally Proposed and Listed Species and Designated Critical Habitat

The USFWS Information for Planning and Consultation (IPaC) system was accessed on November 17, 2025 (Consultation Code 2026-0016530) and the Arizona Game and Fish Department (AGFD) Online Environmental Review Tool (OERT) was accessed on November 17, 2025; both are included in **Appendix C**. The ESA species list from the IPaC receipt was reviewed by a qualified biologist (Avery Pritchard, Kimley-Horn), and the species are listed in **Table 1** below. Neither the IPaC search nor the AGFD OERT identified CH within the search area for the project. Justifications for excluding species from further evaluation are included in **Table 1**. The project will have no effect on species excluded from further evaluation. The only detailed species analyses included in this BE are for the yellow-billed cuckoo (*Coccyzus americanus*), monarch butterfly (*Danaus plexippus*), and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*).

Table 1– Project Species List

Species	Status	Habitat Requirements	Exclusion Justification
Mammals			
Jaguar (*Panthera onca*)	ESA LE	Found in thornscrub, desertscrub, chaparral, semidesert grassland, Madrean evergreen woodland, deciduous forest, and conifer forest between 1,600 and 9,000 feet and associated with water in southeastern Arizona (AGFD 2020a).	No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area contains less than 0.01% suitable habitat (AGFD 2025).
Mexican Wolf (*Canis lupus baileyi*)	ESA XN	Chaparral, woodland, and forested areas. May cross desert areas between 4,000 and 12,000 feet (USFWS 2016).	No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).
Ocelot (*Leopardus pardalis*)	ESA LE	Variable, including thornscrub, semi-arid woodland, tropical deciduous and semi-deciduous forest, subtropical forest, lowland rainforest, palm savanna, and seasonally flooded savanna woodland. In Arizona, most recent (since 2009) detections have occurred in Madrean evergreen woodland, semidesert grassland, and Great Plains grassland in habitats	No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).

Species	Status	Habitat Requirements	Exclusion Justification
		greater than 9,850 feet (USFWS 2016).	
Sonoran Pronghorn (*Antilocapra americana sonoriensis*)	ESA XN	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations at elevations below 650 feet (USFWS 2016).	No suitable habitat within the action area based on field reconnaissance. According to AGFD habitat suitability model, the action area does not contain suitable habitat (AGFD 2025).
Birds			
Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum cactorum*)	ESA LT	Areas of desert woodlands with tall canopy cover. Primarily found in Sonoran desertscrub and occasionally in riparian drainages and woodlands within semi-desert grassland communities. Prefers to nest in cavities in saguaro cacti but has been found in low-density suburban developments that include natural open spaces (USFWS 2016).	According to AGFD habitat suitability model, the action area contains approximately 98% suitable habitat primarily near Oro Valley and the Catalina Foothills (AGFD 2025). However, the construction footprint is highly disturbed. No suitable habitat within the action area based on field reconnaissance.
California Least Tern (*Sternula antillarum browni*)	ESA LE	Sparsely vegetated and exposed flats, typically along the shorelines of inland rivers, lakes, reservoirs, or drainage systems below 2,000 feet (USFWS 2016).	No suitable habitat within the action area based on field reconnaissance.
Mexican Spotted Owl (*Strix occidentalis lucida*)	ESA LT	Nests in canyons and dense forests with multi-layered foliage structure. These sites have high canopy closure, high basal area, many snags, and many downed logs. In Arizona, they occur primarily in mixed-conifer, pine-oak, and evergreen oak forests; also occurs in ponderosa pine forest and rocky canyonlands (AGFD 2020b).	According to AGFD habitat suitability model, the action area contains approximately 45% suitable habitat primarily near Tanque Verde Creek (AGFD 2025). However, the construction footprint is highly disturbed. No suitable habitat within the action area based on field reconnaissance.

Species	Status	Habitat Requirements	Exclusion Justification
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	ESA LE	Dense riparian woodland communities along rivers, streams, lakesides, and wetlands below 8,500 feet elevation. Prefers dense canopy cover, large volume of understory foliage, and surface water during mid-summer (USFWS 2016).	According to AGFD habitat suitability model, the action area does not contain suitable breeding habitat (AGFD 2025), and no suitable breeding or foraging habitat was observed within the action area during field reconnaissance.
Yellow-Billed Cuckoo (*Coccyzus americanus*)	ESA LT	Large blocks of riparian woodlands including cottonwood, willow, and tamarisk bosques below 6,500 feet (USFWS 2016).	Evaluated in detail. See Species Evaluation section.
Reptiles			
Northern Mexican Gartersnake (*Thamnophis eques megalops*)	ESA LT	Cienegas, stock tanks, and rivers that are densely vegetated, such as lowland river riparian woodlands, and upland stream gallery forests, most frequently between 3,000 to 5,000 feet in elevation (USFWS 2016).	According to AGFD habitat suitability model, the action area contains approximately 64% suitable habitat primarily near Tanque Verde Creek (AGFD 2025). However, the construction footprint is within the highly disturbed ROW. No suitable habitat was observed within the action area during field reconnaissance.
Amphibians			
Chiricahua Leopard Frog (*Rana chiricahuensis*)	ESA LT	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists (USFWS 2016).	According to AGFD habitat suitability model, the action area contains less than 15% suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Fishes			
Desert Pupfish (*Cyprinodon macularius*)	ESA LE	Shallow springs, small streams, and marshes. Tolerates saline and warm water (USFWS 2016).	According to AGFD habitat suitability model, the action area contains less than 0.05% suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.

Species	Status	Habitat Requirements	Exclusion Justification
Gila Chub (*Gila intermedia*)	ESA LE	Pools, springs, cienegas, and streams (USFWS 2016).	According to AGFD habitat suitability model, the project does not contain suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Gila Topminnow (incl. Yaqui) (*Poeciliopsis occidentalis*)	ESA LE	Isolated to small streams, springs, and cienegas vegetated shallows (USFWS 2016).	According to AGFD habitat suitability model, the project does not contain suitable habitat (AGFD 2025), and no suitable habitat was observed within the action area during field reconnaissance.
Insects			
Monarch Butterfly (*Danaus plexippus*)	ESA PT	Blooming nectar plants that are available during the monarch migration timeframe (ECOS 2025a).	Evaluated in detail. See Species Evaluation section.
Flowering Plants			
Arizona Eryngo (*Eryngium sparganophyllum*)	ESA LE	Cienega obligate that occurs at elevations between 2,700 and 4,000 feet (USFWS 2016).	No suitable habitat within the action area and no individuals observed during field reconnaissance.
Huachuca Water-umbel (*Lilaeopsis schaffneriana var. recurve*)	ESA LE	Cienegas, perennial low gradient streams, wetlands (USFWS 2016).	According to PimaMaps habitat model, the project contains low to medium suitable habitat primarily along the Santa Cruz River and Tanque Verde Creek (Pima County 2025). However, no suitable habitat was observed within the action area during field reconnaissance.
Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*)	ESA LE	Sonoran desertscrub or semi-desert grassland communities, within alluvial valleys or on hillsides in rocky to sandy or silty soils (USFWS 2016).	Evaluated in detail. See Species Evaluation section.
[1]Status Definitions: ESA = Endangered Species Act; LE = Listed Endangered, LT = Listed Threatened, PT = Proposed Threatened, XN – Experimental Population, Non-Essential			

3. Environmental Baseline

The environmental baseline represents the current biological and physical conditions of the action area (defined in Section 5). This baseline describes the current conditions and reflects the following:

- Past and present impacts of all federal, state, or private activities,
- Anticipated impacts of all proposed federal projects that have already undergone Section 7 consultation, and
- Impacts of state or private actions that are contemporaneous with the consultation in process.

A site visit was conducted between June 18-20, 2025, and November 18-19, 2025, by Kimley-Horn biologists (Avery Pritchard, Grace Harwin, and Rachel Haughton). Wildlife observed included coyote (*Lepus californicus*), javelina (*Tayassu tajacu*), desert cottontail (*Sylvilagus audubonii*), round-tail ground squirrel (*Xerospermophilus tereticaudus*), Clark's spiny lizard (*Sceloporus clarkii*), western whiptail (*Aspidoscelis tigris*), European starling (*Sturnus vulgaris*), Gila woodpecker (*Melanerpes uropygialis*), verdin (*Auriparus flaviceps*), cliff swallow (*Petrochelidon pyrrhonota*), black gnatcatcher (*Polioptila melanura*), white-winged dove (*Zenaida asiatica*), red-tailed hawk (*Buteo jamaicensis*), northern cardinal (*Cardinalis cardinalis*), common raven (*Corvus corax*), red-winged blackbird (*Agelaius phoeniceus*), yellow warbler (*Setophaga petechia*), blue grosbeak (*Passerina caerulea*), Bell's vireo (*Vireo bellii*), lesser nighthawk (*Chordeiles acutipennis*), Anna's hummingbird (*Calypte anna*), vermilion flycatcher (*Pyrocephalus rubinus*), pyrrhuloxia (*Cardinalis sinuatus*), green heron (*Butorides virescens*), mourning dove (*Zenaida macroura*), great-tailed grackle (*Quiscalus mexicanus*), dark-eyed junco (*Junco hyemalis*), and Rufous-winged sparrow (*Peucaea carpalis*).

The action area (as described in Section 5. Project Action Area) is located in Arizona Upland Subdivision – Sonoran Desertscrub, Lower Colorado River Basin Subdivision – Sonoran Desertscrub, and Semidesert Grassland Biotic Communities at an approximate elevation between 1,980 and 3,680 feet (Data Basin 2012). The action area is situated throughout Pima County and is between the Santa Catalina and Rincon Mountain Ranges to the east and Avra and Santa Cruz Valleys to the west. The terrain slopes vary throughout, with an approximate change in elevation of 1,700 feet throughout the action area. Predominant geological features along the action area primarily include Quaternary surficial deposits, Holocene River Alluvium (0-10 kilo-annum [Ka]), Early Pleistocene to Late Miocene Basin Deposits (0.75-10 mega-annum [Ma]), Cretaceous to Upper Jurassic Sedimentary Rocks With Minor Volcanic Rocks (80-160 Ma), Early Pleistocene to Latest Pliocene Surficial Deposits (0.75-3 Ma), Pliocene to Middle Miocene Deposits (2-16 Ma), Middle Proterozoic Granitic Rocks (1400-1450 Ma), Middle Proterozoic Sedimentary Rocks (700-1300), Early Tertiary to Late Cretaceous Volcanic Rocks (50-82 Ma), and Tertiary to Early Proterozoic Gneissic Rocks (15-1800 Ma) (USGS 2025).

Within the action area, Magee Road, SR 77, La Canada Drive, Tangerine Road, Ina Road, Freeman Road, Speedway Boulevard, I-10, Colossal Cave Road, SR 83, Sahuarita Road, Wilmot Road, Valencia Road, Sandario Road, and SR 86 are principal arterial, interstate, urban and rural arterial and collector roads within existing ROW/easement. The action area spans beyond the existing ROW/easement and includes residential, commercial, and institutional development, agricultural land, and native and disturbed desert. The project would occur within Pima County owned land, Pima County Flood Control District, Pima County ROW, Pima County easement on ASLD, NPS, UPRR, and BOR land, ADOT ROW, ADOT easement on ASLD, BLM, UPRR, and BOR land, City of Tucson ROW, City of Tucson easement on UPRR and ASLD, Town of Marana ROW, Town of Marana easement on ASLD and BLM land, and Town of Oro Valley ROW and easement on ASLD land.

The primary watercourses crossing the action area include Central Arizona Project (CAP), the Santa Cruz River, Pantano Wash, Tanque Verde Creek, and Canada Del Oro, as well as ephemeral washes including Black Wash, Airport Wash, Ventana Canyon Wash, Espero Wash, and various unnamed ephemeral washes (see Section 4.2 for details). All washes throughout the action area drain northwest to the Santa Cruz River. No other perennial sources of water are present within the action area. See

Appendix A for representative photographs of the construction footprint, action area, and surrounding landscape.

The construction footprint is located within the action area and includes disturbed shoulders and adjacent areas within existing ROW/easement along Magee Road, SR 77, La Canada Drive, Tangerine Road, Ina Road, Freeman Road, Speedway Boulevard, I-10, Colossal Cave Road, SR 83, Sahuarita Road, Wilmot Road, Valencia Road, Sandario Road, and SR 86.

The dominant vegetation observed within the construction footprint consists of creosote (*Larrea tridentata*), brittlebush (*Encelia farinosa*), buffelgrass (*Pennisetum ciliare),* and Bermuda grass (*Cynodon dactylon*). Vegetation density within the proposed construction footprint ranges from 0 to 40% canopy cover, 0-80% shrub cover, and 0-100% groundcover.

4. Scope of Work

4.1 Construction

The project consists of 14 segments:

- Segment 1 (North Segment) – Magee Road/SR 77 to La Canada Drive/Tangerine Road
- Segment 2 (ADOT) – Ina Road to Magee Road
- Segment 3 (Northeast Segment) – Freeman Road/Speedway Boulevard to Ina Road/SR 77
- Segment 4 (East Segment) – I-10/Colossal Cave Road TI to Freeman Road/Speedway Boulevard
- Segment 5 (ADOT) – I-10 – SR 83 to Colossal Cave Road
- Segment 6 (ADOT) – Sahuarita Road to I-10
- Segment 7 (Sahuarita Segment) – Wilmot Road to SR 83 (along Sahuarita Road)
- Segment 8 (South Segment) – Valencia Road/I-10 to Sahuarita Road (along Wilmot Road)
- Segment 9 (Valencia Segment) – SR 86 to Alvernon Way (along Valencia Road)
- Segment 10 (ADOT) – I-19/Valencia Road TI Crossing
- Segment 11 (ADOT) – SR 86 – Sandario Road to Valencia Road
- Segment 14 (West Segment) – Marana HS to SR 86 (along Sandario Road)
- Segment 13 (Marana Segment) – Sandario Road/Sanders Road to La Canada Drive (along Tangerine Road)
- Segment 14 (ADOT) – I-10/Tangerine Road TI Crossing

This project will occur in three phases, consisting of construction footprint preparation, project construction, and construction footprint restoration.

Construction Preparation

Staging activities would consist of equipment and/or material being staged on or near the project site during construction. The staging areas have not yet been determined and will be the responsibility of the contractor. Staging on federal lands is not anticipated.

Spring or rigid stand signs will be utilized for traffic control. Ground disturbance and vegetation removal will not be required.

Project Construction

Conduit Installation

All construction is limited to existing ROW, easement, and County/City/Town property to minimize impacts to the environment. The construction footprint will be cleared of vegetation with a bushhog or similar mowing equipment. Installation of the conduit will be installed via horizontal directional drilling,

trenching, shallow trenching, micro-trenching within pavement, attaching to existing bridges, rocksaw, and plowing.

Horizontal Directional Drilling

Installation of conduit via horizontal directional drilling uses a surface-launched drilling rig to bore into the substrate below along a predetermined horizontal path. The drilling rig used for directional boring is typically hydraulically powered and equipped with a drill bit or hydraulic cutting jet nozzle for softer soils. Directional boring involves digging an entrance pit with earth moving equipment and drilling a pilot hole. The pilot hole is then re-drilled with a wider-diameter drill once or multiple times to enlarge the boring to the diameter of the conduit. The minimum cover to top of conduit is 40 inches; however, if the 40-inch minimum can't be achieved due to depth of existing utilities, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry).

Trenching

Installation of conduit via trenching would require a backhoe or small excavator. Excavated material is typically cast to the side of the trench as it is being excavated. Once conduit has been placed in the trench, native material would be backfilled. Any excess excavated material would be disposed of offsite per technical specifications. Shallow trenching would be utilized over existing drainage structures or where minimum depth cannot be obtained. Shallow trench depths vary based on utility conflicts, however the minimum cover to top of conduit is 18 inches. The shallow trench would be backfilled with a minimum of 15 inches of two sacks of sand slurry per cubic yard.

Micro-trenching

Installation of conduit via micro-trenching would require a ride-on trencher that has a vacuum excavator with a cutting wheel that creates a narrow cut into existing pavement. The width of the trench is 4-inches with a depth varying between 16 to 24 inches. Trench would be backfilled with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry) with a 2.5-inch by 2-foot asphalt 'T' Patch.

Rigid Metal Conduit

Rigid metal conduit would be attached to existing bridge structures using hand tools. The conduit would be attached to the bridge barrier or hung below the bridge deck using minimum ½ inch diameter mechanical expansion anchors. Where rigid metal conduit is installed below grade, the conduit would be wrapped using approved PVC Tape. Anchors would be placed approximately three inches away from the edge of deck. The conduit would be attached to the concrete barrier via C-Channel Struts with Strut Clamps or hung below the bridge deck via hangar assembly.

Plowing

Installation of conduit via plowing would require a small trackhoe with a plow attachment on the back end and a conduit spool on the front end. Plow depths vary based on utility conflicts; however, the minimum cover to top of conduit is 40 inches. If the minimum 40 inches can't be achieved, the conduit shall be encased with two sacks per cubic yard of controlled low-strength material (two sacks of sand slurry). Plowing would be compacted the same day, utilizing a track wheel.

Rocksaw

Installation of fiber conduit using a rocksaw trencher involves a machine equipped with a rock-cutting wheel and a conduit spool system. This method is effective for cutting through hard surfaces like asphalt, concrete, and compacted soil. Trench depths vary depending on existing utility conflicts. Trenches are typically backfilled and compacted the same day using the machine's integrated compaction wheel or track system.

Pull Box and Vault

Communication pull boxes will be placed approximately every 3,000 feet and splice vaults will be placed approximately every 25,000 feet. Fiber splice enclosures will be installed only in the vault locations. The

excavation area for communication pull boxes would be approximately 4 feet wide by 6 feet long, and the excavation area for splice vaults would be approximately 5 feet wide by 7 feet long. Each excavation area will then be backfilled with select excavated backfill material and compacted to top of grade.

Construction Footprint Restoration

The construction footprint will be restored to preconstruction conditions to the extent practicable. Trenches, bore holes, etc., will be backfilled when construction in the area is completed. Seeding is anticipated due to the length of the project. Construction is anticipated to begin in summer of 2026 and the construction duration is anticipated to be approximately 24 months.

4.2 Potential Impacts on Water Quality and Clean Water Act Compliance

If the overall project will result in disturbance of 1 or more acres of land, a Stormwater Pollution Prevention Plan (SWPPP) and an Arizona Pollutant Discharge Elimination System (AZPDES) permit will be required (ADEQ 2025a and ADEQ 2025b). Construction of the project would disturb approximately 228 acres; therefore, a SWPPP and an AZPDES permit will be required.

This project would not involve disturbance to jurisdictional waters of the U.S. (WOTUS) as regulated by the U.S. Army Corps of Engineers (Corps); therefore, a Clean Water Act (CWA) Section 404 Permit is not required (see **Appendix G**). The project construction footprint is not within 1-mile upstream or ½-mile downstream of not-attaining or Outstanding Arizona Water (OAW) or on a tributary to an impaired water or OAW and within 1 mile of the impaired water or OAW. The project construction footprint is within 1-mile upstream or ½ mile downstream of the Santa Cruz River, which is impaired for *E. coli*. However, due to the scope of work, no impacts to water quality are anticipated.

5. Project Action Area

The action area includes all areas to be affected directly or indirectly by the action and not merely the construction footprint (50 CFR §402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment, focusing on, but not exclusive to, the installation of the fiber middle mile ring.

Potential effects of this action on the environment resulting from this project include loss of habitat due to removal of vegetation, potential degradation of suitable habitat due to the introduction of invasive plant species, and disruption of wildlife from construction noise and potential lighting during night construction. The action area was determined based on temporary construction noise, which is the farthest-reaching impact.

The removal of vegetation may cause loss of shelter and foraging habitat for insects, predator, and prey. Introduction of invasive plant species from construction equipment and activities can potentially allow for alteration or degradation of suitable habitat of species. Invasive plant species, such as tamarisk (*Tamarix* spp.), have the potential to modify suitable habitat by out-competing native species for water and impacting plant community composition. Introduction of these species could cause degradation of potentially suitable habitat for insects, predator, and prey species; however, environmental commitments for invasive plant species will be required for this project (see Section 7).

During field reconnaissance, roadway noise was measured at various locations along rural and urban arterials and collector roads using the National Institute for Occupational Safety and Health Sound Level Meter (NIOSH SLM) mobile app (version 1.2.6.42). The measured roadway noise ranged from 60 to 75 A-weighted decibels (dBA) within the construction footprint (NIOSH SLM 2023). According to the Pima Association of Governments Traffic Count Report, approximately 37,317 vehicles use Sunrise Drive (average traffic count throughout the action area) per day (TCDS 2024). To be conservative, the noise level produced throughout the action area was estimated to be 65 dBA.

The action area for the project was defined by the farthest-reaching impact during construction, which in this case is temporary construction noise. The action area is based on the loudest piece of equipment used for the longest duration (an excavator) that will be utilized for approximately 24 months. An excavator, which produces a noise level of 85 dBA at 50 feet from the source on flat ground surface, was utilized as a point source to compare construction noise levels with the ambient noise produced by traffic throughout the action area to evaluate potential noise impacts to wildlife. L_{eq} is defined as the equivalent continuous noise level measured over a specific time period. In defining the action area for this project, the Roadway Construction Noise Model (RCNM) was used to determine the distance between the construction footprint and where the construction noise would attenuate to ambient dBA measured from L_{eq}, which was determined to be approximately 200 feet (FHWA 2006). This action area was determined to be conservative and appropriate for all potential impacts being evaluated in this BE (see **Figure 3. Action Area Map**).

Aerial Source/Date: Esri, 2024

Legend

- Construction Footprint
- Action Area

Mammoth
Oracle
San Manuel
Catalina
Marana
10
1
2
3
Casas Adobes
Saguaro National Park
Tucson
4
5
6
Vail
10
ARIZONA 83
Green Valley
Las Cienegas NCA

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Figure 3. Action Area Map-Key Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 2.5 5 10 Miles

Scale: 1" = 5 miles

N W E S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

Legend

- Construction Footprint
- Action Area
- Rivers/Streams
- Photo Location/Direction
- Yellow-billed Cuckoo (YBCU) Critical Habitat (CH)

Moore Road

Tangerine Road

Sanders Road

Santa Cruz River

Avra Valley Road

Sandario Road

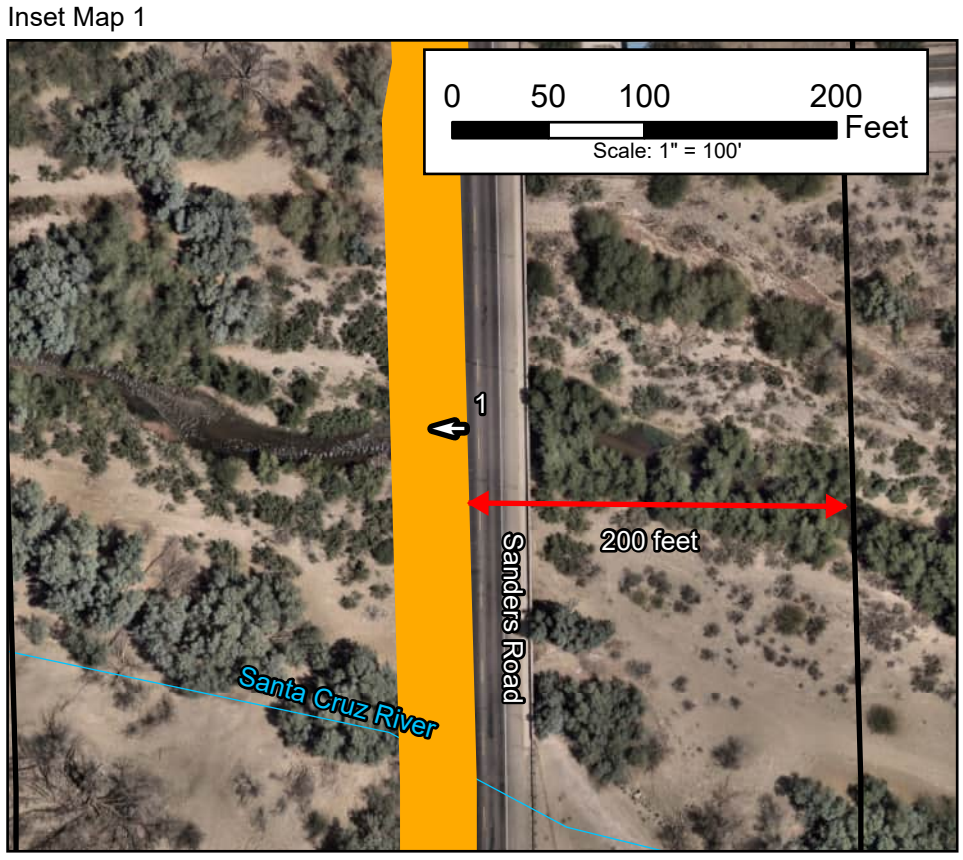
1

2

See Inset Map 1

See Inset Map 2

Inset Map 1



Inset Map 2

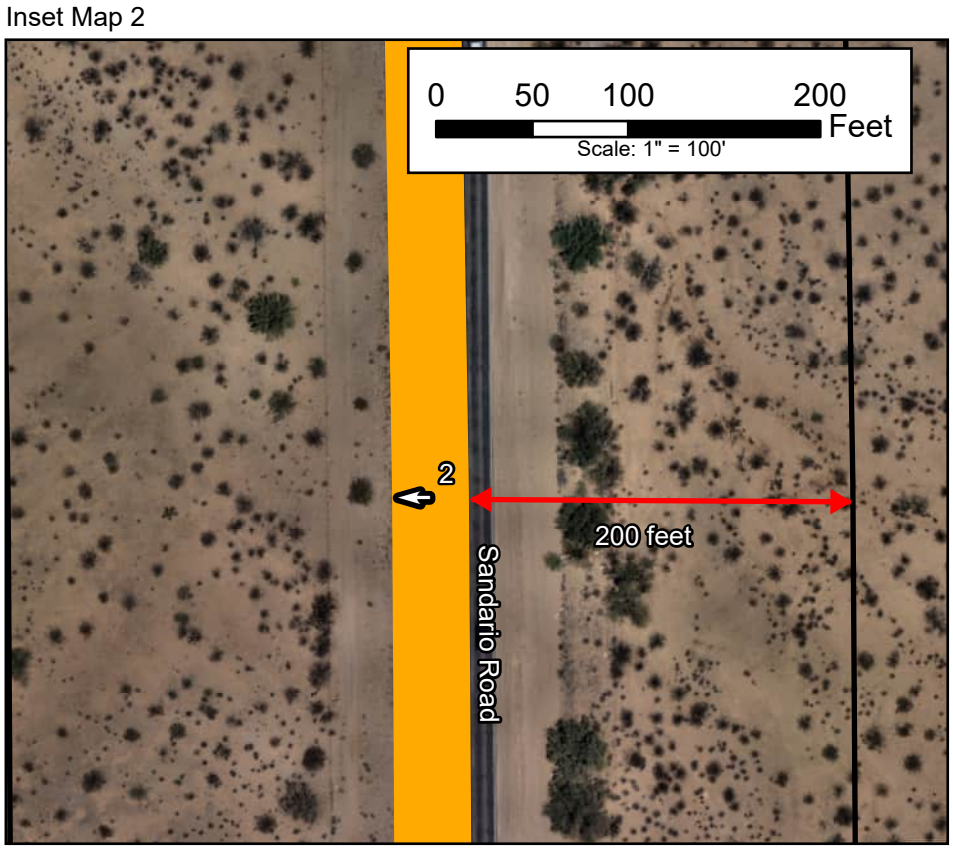


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Figure 3. Action Area Map
Sheet 1 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000
Feet
Scale: 1" = 7,000'

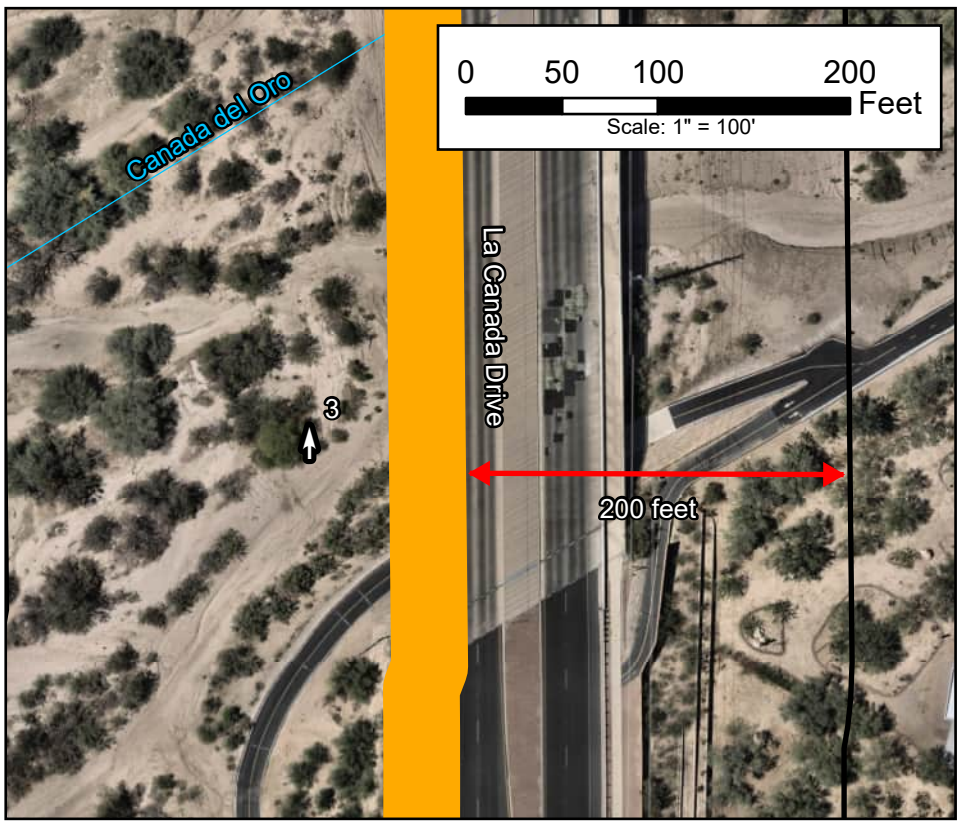
N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

Legend

- Construction Footprint
- Action Area
- Rivers/Streams
- Photo Location/Direction
- Yellow-billed Cuckoo (YBCU) Critical Habitat (CH)

Inset Map 3



Tangerine Road
La Canada Drive
Canada del Oro
3
See Inset Map 3
Magee Road
Pima Wash
Ina Road
Skyline Drive
Swan Road
Ventana Canyon Wash
4
Sunrise Drive
See Inset Map 4
Sabino Canyon Road

Inset Map 4

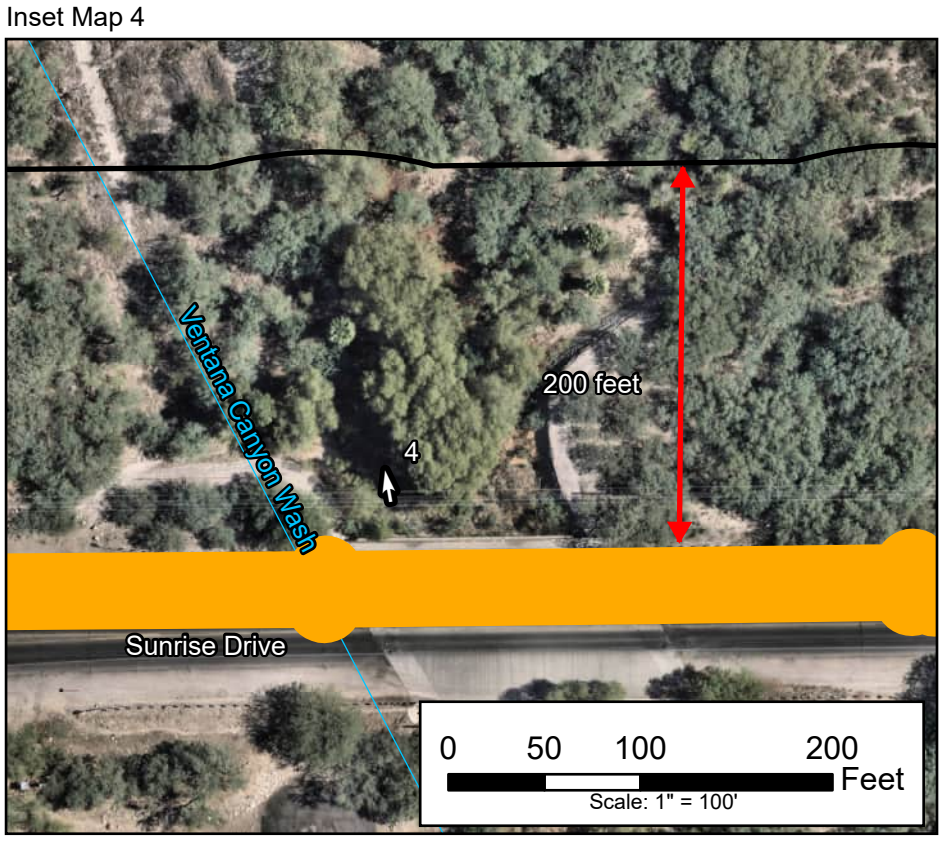


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Figure 3. Action Area Map
Sheet 2 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000
Feet
Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

Legend

- Construction Footprint
- Action Area
- Rivers/Streams
- Photo Location/Direction
- Yellow-billed Cuckoo (YBCU) Critical Habitat (CH)

Sabino Creek

Houghton Road

Tanque Verde Road

Tanque Verde Creek

Speedway Boulevard

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Figure 3. Action Area Map
Sheet 3 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000 Feet

Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

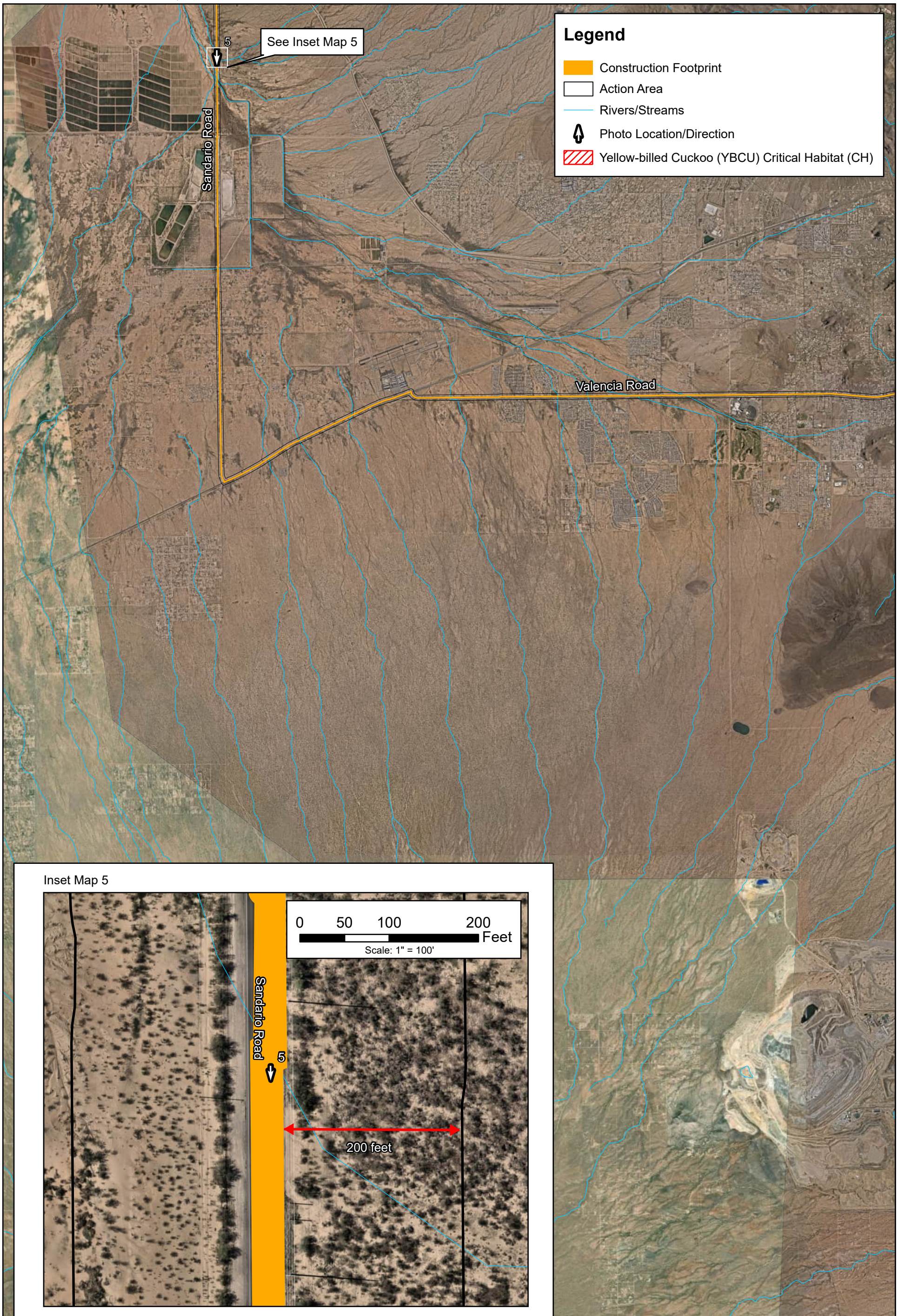

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Figure 3. Action Area Map
Sheet 4 of 6

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

0 3,500 7,000 14,000
Feet
Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

Legend

- Construction Footprint
- Action Area
- Rivers/Streams
- Photo Location/Direction
- Yellow-billed Cuckoo (YBCU) Critical Habitat (CH)

Cardinal Avenue
Oak Tree Drive
Santa Cruz River
Drexel Road
Valencia Road
Alvernon Way
North Fork Airport Wash
South Fork Airport Wash
See Inset Map 6
6
Wilmot Road
Sahuarita Road

Inset Map 6

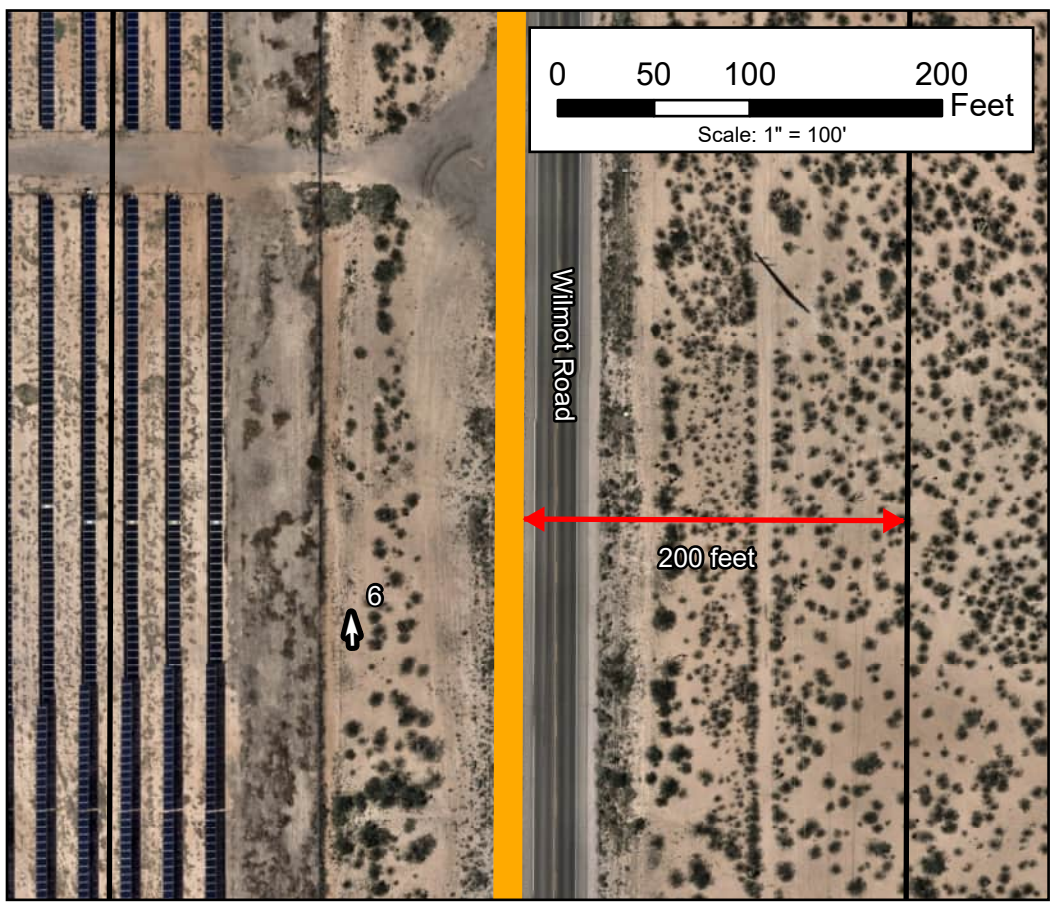

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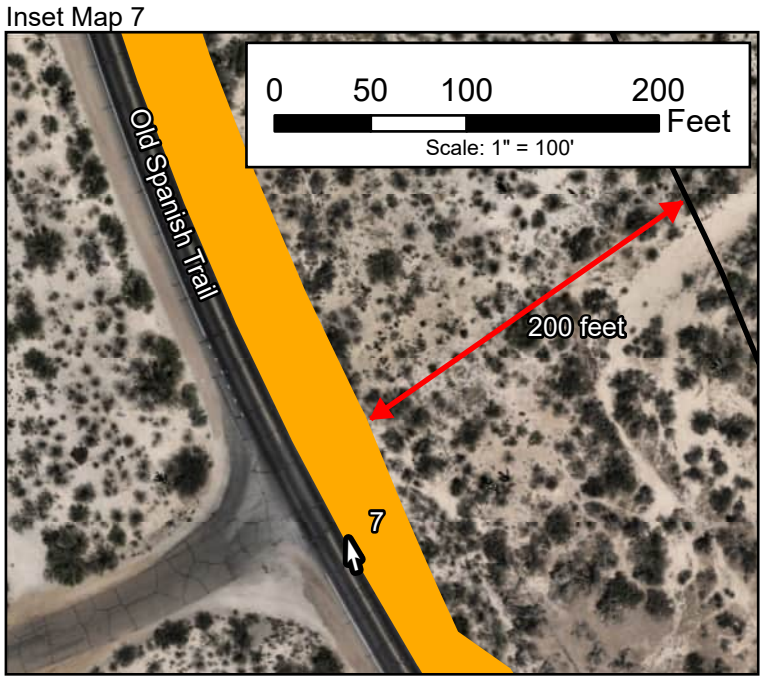
Figure 3. Action Area Map Sheet 5 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 3,500 7,000 14,000
Feet
Scale: 1" = 7,000'

N
W E
S

Aerial Source/Date: Esri, 2024, Nearmap, 2025

Inset Map 7



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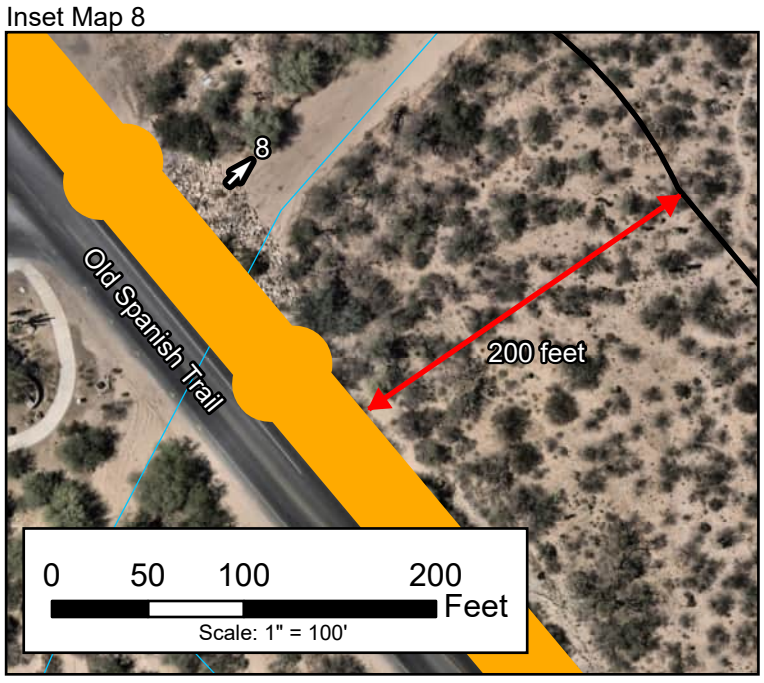

Freeman Road

See Inset Map 7

7

Rincon Creek

8

See Inset Map 8

Old Spanish Trail

Camino Loma Alta

Pantano Wash

Colossal Cave Road

Cienega Creek

Sahuarita Road

Legend

- Construction Footprint
- Action Area
- Rivers/Streams
- Photo Location/Direction
- Yellow-billed Cuckoo (YBCU) Critical Habitat (CH)

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Figure 3. Action Area Map Sheet 6 of 6	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	0 3,500 7,000 14,000 Feet Scale: 1" = 7,000' N W E S

6. Species Evaluation

6.1 Yellow-billed Cuckoo

Status

Threatened (79 FR 59991; October 03, 2014) with Final Critical Habitat (86 FR 20798 21005; April 21, 2021).

	Feeding		Breeding	Sheltering	
	Juvenile	Adult	Adult	Juvenile	Adult
Habitat	Riparian woodlands with cottonwood-willow, salt cedar, or mesquite communities.	Riparian woodlands with cottonwood-willow, salt cedar, or mesquite communities. Woody lowland vegetation near fresh water during winter.	Riparian woodlands with cottonwood-willow, salt cedar, or mesquite communities.	Riparian woodlands with cottonwood-willow, salt cedar, or mesquite communities.	Riparian woodlands with cottonwood-willow, salt cedar, or mesquite communities. Woody lowland vegetation near fresh water during winter.
Prey	Insect regurgitant	Insects, frogs, and lizards	Insects, frogs, and lizards	N/A	N/A
Perches	N/A	Tree branches	Tree branches	N/A	Tree branches
Cover	Nest 1 to 6 meters above ground within dense understory foliage and > 70 percent canopy coverage.	Greater than 70 percent canopy cover.	Greater than 70 percent canopy cover.	Nest 1 to 6 meters above ground within dense understory foliage and > 70 percent canopy coverage.	Greater than 70 percent canopy cover.
Temperature	N/A	N/A	Nests require canopy coverage that provides cooler temperatures	N/A	N/A
Lighting	Diurnal	Diurnal	Day light hours	Roosts during the night and under dense canopy coverage	Roosts during the night and under dense canopy coverage

	Feeding		Breeding	Sheltering	
	Juvenile	Adult	Adult	Juvenile	Adult
				during the day.	during the day.
Moisture	N/A	N/A	Nests require canopy coverage that provides higher humidity.	N/A	N/A
Sound	Sensitive to noise	Sensitive to noise	Sensitive to noise	Sensitive to noise	Sensitive to noise
Water	Perennial rivers and streams	Perennial rivers and streams	Perennial rivers and streams	Perennial rivers and streams	Perennial rivers and streams
Dispersal	N/A	Home ranges average 100 acres in size.	Migrates from Central and South America to the western United States.	N/A	N/A
Seasonal Activity	N/A	Insects, frogs, and lizards during summer. Fruits and seeds during winter	Mid-June to late August	Late August; begin migration to winter grounds	Late August; begin migration to winter grounds

Life History

Species Description and Ecology

The yellow-billed cuckoo (YBCU) is a medium-sized bird with a slender, long-tailed profile and a stout, slightly down-curved bill that is blue-black above and yellow on the base of the lower mandible. Plumage is grayish brown above and white below, with red primary flight feathers and tail feathers that are boldly patterned with black and white below. YBCUs have short, bluish gray legs, and adults have a narrow, yellow eye ring. As a member of the avian family Cuculidae, they share the common feature of a zygodactyl foot (two toes pointing forward and two toes pointing backward).

The YBCU is a long-distance neotropical migrant, and the western population breeds along river systems west of the Rocky Mountains, which separates them from the eastern yellow-billed cuckoo population. The western population is considered a biologically separate population segment; therefore, populations west of the Continental Divide have been identified as a Distinct Population Segment for conservation purposes. (Daw 2014).

YBCUs hunt while perched motionless on a tree branch, scanning foliage for prey items. During migration and breeding season, the species feed primarily on insects such as caterpillars, cicadas, and katydids; but will also consume tree frogs and lizards. The species migrates to Central and South America for the winter, where fruits and seeds are eaten more frequently (AGFD 2011 and Daw 2014). YBCUs have

relatively large home ranges, with the average home range size covering over 100 acres; however, home ranges encompassing up to 500 acres have been recorded (USFWS 2014a).

Reproduction

Typically, western YBCUs are late migraters and arrive on their breeding grounds in early to mid-June. Once on the breeding grounds, the species may time the onset of breeding to coincide with an abundance of large insects such as cicadas. Peak nesting season for the YBCU occurs from July to early August. Nests are placed on the horizontal branch of a tree, such as a willow, and both the male and female participate in constructing the nest. The nest is a loosely-built, flat, saucer-shaped, stick nest lined with bark and leaves. The nest cup is relatively shallow, ranging from 2 to 4 centimeters deep, and is usually positioned 1 to 6 meters above ground; below a dense patch of canopy, and concealed by surrounding foliage. YBCUs will lay 3 to 4 unmarked, pale greenish-blue eggs. Incubation lasts 9 to 11 days, and eggs will change color to greenish-yellow before hatching. Young are born altricial and will leave the nest 6 to 9 days after hatching. On occasion, the species may parasitize broods of other cuckoos (AGFD 2011 and Daw 2014).

Suitable Habitat

The western population of YBCUs occupy riparian woodlands along perennial rivers and streams at elevations below 6,600 feet. Cottonwood-willow galleries are most often inhabited; however, salt cedar, mesquite bosques, and other riparian tree communities may also be used. The species requires relatively large contiguous patches of multi-layered riparian habitat with dense understory foliage for nesting. The multi-layered canopy structure provides the necessary microclimate of cooler temperatures and higher humidity needed for successful nesting (AGFD 2011 and Daw 2014).

Physical or biological features (PBFs) for YBCU habitat were identified as three distinct habitat elements; riparian woodland structure, availability of prey populations, and riverine processes. The PBFs that were identified in the April 2021 Final Rule Designation of Critical Habitat for the species include:

PBF 1—Riparian woodlands; mesquite woodlands (mesquite-thorn-forest), and Madrean evergreen woodland drainages.

a. Rangewide breeding habitat (including areas in the Southwest) – woodlands within floodplains or in upland areas or terraces often greater than 325 feet in width and 200 acres or more in extent with an overstory and understory vegetation component in contiguous or nearly contiguous patches adjacent to intermittent or perennial watercourses. The slope of the watercourses is generally less than 3 percent but may be greater in some instances. Nesting sites within the habitat have an above average canopy closure (greater than 70 percent) and have a cooler, more humid environment than the surrounding riparian and upland habitats.

b. Southwestern breeding habitat – composed of more arid riparian woodlands (including mesquite bosques), desertscrub and desert grassland drainages with a tree component, and Madrean evergreen woodlands (oak and other tree species), in perennial, intermittent, and ephemeral drainages. These more arid riparian woodland drainages also bisect other habitat types, including Madrean evergreen woodland, native and nonnative desert grassland, and desertscrub. More than one habitat type within and adjacent to the drainage may contribute toward nesting habitat. Southwestern breeding habitat is more water-limited, contains a greater proportion of xero-riparian and non-riparian plant species, and is often narrower, more open, patchier, or sparser than elsewhere in the DPS and may persist only as narrow bands or scattered patches along the bankline or as small in-channel islands. The habitat

contains a tree or large-shrub component with a variable overstory canopy and understory component that is sometimes less than 200 acres. Riparian trees (including xero-riparian) in these ecosystems may even be more sparsely distributed and less prevalent than non-riparian trees. Adjacent habitat may include managed (mowed) nonnative vegetation or terraces of mesquite or other drought-tolerant species within the floodplain. In narrow or arid ephemeral drainages, breeding habitat commonly contains a mix of non-riparian vegetation found in the base habitat as well as riparian (including xero-riparian) trees.

PBF 2—Adequate prey base.
Presence of prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies, moth larvae, spiders), lizards, and frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

PBF 3—Hydrologic processes, in natural or altered systems, that provide for maintaining and regenerating breeding habitat.

a. Rangewide breeding habitat hydrologic processes – Hydrologic processes (either natural or managed) in river and reservoir systems that encourage sediment movement and deposits and promote riparian tree seedling germination and plant growth, maintenance, health, and vigor (e.g., lower-gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). In some areas where habitat is being restored, such as on terraced slopes above the floodplain, this may include managed irrigated systems that may not naturally flood due to their elevation above the floodplain.

b. Southwestern breeding habitat hydrologic processes – In southwestern breeding habitat, elevated summer humidity and runoff resulting from seasonal water management practices or weather patterns and precipitation (typically from North American Monsoon or other tropical weather events) provide suitable conditions for prey species production and vegetation regeneration and growth. Elevated humidity is especially important in southeastern Arizona, where cuckoos breed in intermittent and ephemeral drainages.

Threats
The primary causes for YBCU declines in the western United States are due to loss, degradation, and fragmentation of riparian habitats. The threats to riparian habitat used by YBCUs are a result of alteration of hydrology due to dams, water diversions, management of riverflow that differs from natural hydrological patterns, channelization, and levees and other forms of bank stabilization that encroach into the floodplain (USFWS 2014b).

Range and Survey History
Within Arizona, the YBCU is found along rivers in southern and central Arizona, as well as extreme northeast portions of the state (AGFD 2011). Statewide surveys have been conducted in Arizona at historical YBCU locations during 1998 and 1999. During these surveys, cuckoos were documented along 25 drainages, with the majority occurring along the San Pedro, Agua Fria, and Verde rivers and Sonoita and Cienega creeks (Corman and Magill 2000). Another survey effort conducted in 2005 focused on sites along the Lower Colorado and Gila Rivers in La Paz and Yuma County. The majority of YBCU detections for this study occurred at the Colorado and Gila River confluence, Limitrophe Division North near Yuma, and the Quigley Wildlife Management Area along the Gila River (Johnson et. al., 2006). These studies have attributed the decline in western YBCU populations to habitat loss, as loss of riparian habitat in Arizona has been substantial.

Habitat Suitability Evaluation

The construction footprint and action area are not located within CH for the YBCU. The nearest CH to the action area is approximately 1.5 miles east near Cienega Creek.

The construction footprint does not contain suitable nesting or foraging/stopover habitat as it lacks riparian woodlands, mesquite woodlands (mesquite-thorn-forest), and Madrean evergreen woodland drainages. In areas where woodlands are present, work is limited to attaching conduit to the outside of bridges with a bucket truck or similar from the bridge deck. Based on this construction methodology, vegetation removal will not be required. The action area does not contain suitable nesting habitat as it lacks perennial hydrologic processes; however, it does contain suitable foraging and stopover habitat at Ventana Canyon Wash along Sunrise Drive. The canopy within the action area at Ventana Canyon Wash contains Fremont cottonwood and willow with a density of approximately 70-80%. The subcanopy primarily consists of mesquite, ranging from 40-60% density. According to the AGFD habitat suitability model, an average of 75% of the habitat at this location is potentially suitable for the YBCU (AGFD 2025).

Regarding an adequate prey base within the construction footprint and action area, Ventana Canyon Wash is ephemeral and only flows in response to storm events. Therefore, frogs would likely only be present in above-average monsoon seasons, and large insect fauna would likely be present during monsoon season, the seasonal nature of flow precludes prey variety and populations.

In conclusion, the construction footprint and action area do not contain suitable nesting habitat; however, the action area does contain marginally suitable foraging/stopover habitat.

Analysis and Determination of Effects

Effects: Potential effects to the YBCU from construction activities would include deterrence from utilizing marginally suitable stopover/foraging habitat within the action area due to higher sustained noise levels during construction and potential degradation of suitable habitat due to the introduction of invasive plant species. No effects are anticipated from operation/maintenance activities as noise levels from operation/maintenance would not exceed the noise level produced along Sunrise Drive near the Ventana Canyon Wash Bridge.

Construction of the project can produce temporary sustained noise levels above the average daily noise levels. According to the TCDS Report, approximately 37,317 vehicles use Sunrise Drive per day (TCDS 2024). To be conservative, the noise level produced along the Sunrise Drive within the action area was estimated to be 65 dBA.

The action area for the construction is based on the loudest equipment used (excavator) that will be utilized adjacent to the Ventana Canyon Wash Bridge for approximately two weeks. An excavator, which produces a noise level of 85 dBA at 50 feet from the source on flat ground surface, was utilized as a point source to compare construction noise levels with the ambient noise produced by traffic on Sunrise Drive to evaluate potential noise impacts to wildlife.

L_{eq} is defined as the equivalent continuous noise level measured over a specific time period. In defining the action area for this project, the RCNM Version 1.1 was used to determine the distance between the construction footprint and where the construction noise would attenuate to ambient dBA measured from L_{eq}, which was determined to be approximately 200 feet for the bridge work (FHWA 2006). The increase in activity and noise could deter the species from using the action area for foraging/stopover.

Introduction of invasive plant species from construction equipment and activities can potentially allow for alteration or degradation of marginal stopover habitat of the YBCU. Invasive plant species, such as Palmer's amaranth (*Amaranthus palmeri*), have the potential to cause degradation of suitable foraging

habitat of YBCU. Environmental commitments discussed in Section 7 will be implemented to prevent the introduction or spread of invasive plant species.

To summarize, the construction footprint and action area do not contain suitable nesting habitat. The action area does contain marginally suitable stopover/foraging habitat; however, higher quality habitat exists beyond the action area. Construction at the Ventana Canyon Wash Bridge will last approximately two weeks; the increase in activity and noise could deter the species from using the action area for foraging/stopover during the two-week period. Construction activities have the potential to introduce invasive plant species to the construction footprint; however, environmental commitments will be implemented to prevent the introduction or spreading of invasive plant species. Operation/maintenance activities would not exceed noise levels on Sunrise Drive near the Ventana Canyon Wash Bridge.

Interrelated and Interdependent Actions:

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no significant independent utility apart from the action under consideration. There are no interrelated or interdependent actions associated with this project at this time.

The proposed construction in the vicinity of Ventana Canyon Wash Bridge along Sunrise Drive is located within Pima County's Section 10 Permit Area, and YBCU is a species covered by Pima County's Section 10 Permit. As such, any impacts to YBCU will be mitigated according to the Section 10 Permit terms.

6.2 Monarch Butterfly

Status

Proposed to be listed as a threatened species (December 12, 2024) (USFWS 2024a).

Species Summary Table

	Feeding		Breeding	Overwintering
	Egg, larva, pupa	Adult	Adult	Adult
Habitat	Milkweed	Blooming nectar plants	Blooming nectar plants along migration route to higher elevations and cooler temperatures	Roosting trees in groves along the coast of California and Baja California, or low-elevation riparian areas in central and southern Arizona
Food Source	Milkweed	Blooming nectar plants	Blooming nectar plants; require milkweed for oviposition	Blooming nectar plants
Cover	N/A	N/A	N/A	Roosting trees provide protection from excessive

				sunlight and extreme weather
Temperature	Requires temperatures 53°-91° F to develop	Requires temperatures 53°-91° F to develop	Moderate temperatures	Moderate temperatures
Water	N/A	Sources must be present	More commonly found near water sources	Sources must be present
Dispersal	N/A	N/A	Throughout Arizona	Central and southern Arizona, and coastline in California and Mexico
Seasonal Activity	Daily and year-round	Daily and year-round	Early Spring to Fall	Winter

Life History

Species Description and Ecology

The adult monarch butterfly is characterized by bright orange wings surrounded by a black border with white spots and covered with black veins (USFWS 2024a). There are two migratory populations in North America, separated by the Rocky Mountains: the Eastern migratory population and the Western migratory population.

Monarch butterflies are thought to have four life stages: egg, larva, pupa, and adult. Larva emerge from eggs after two to five days. Larva pupates into a pupa, which emerges 6 to 14 days later as an adult butterfly. Multiple generations of adult butterflies are produced during the breeding season, typically living two to five weeks, while overwintering migratory adults live six to nine months (USFWS 2024a).

Monarch butterflies migrate to Arizona in the spring from overwintering sites in California and Mexico. They follow the blooming of nectar plants to the north and from low to higher elevations and back between spring and fall. While the majority of monarch butterflies return to overwintering sites in the fall, some monarch butterflies remain in sheltered low-elevation riparian areas in central and southern Arizona during the winter months (USFWS 2024a).

Adult monarch butterflies eat nectar from blooming nectar plants. Common desert blooming nectar plants with high numbers of monarch butterflies observed across their range in Arizona include rubber rabbitbrush, lateflowering thoroughwort (*Eupatorium serotinum*), common sunflower (*Helianthus annuus*), and golden crownbeard (*Verbesina encelioides*) (The Xeres Society for Invertebrate Conservation 2018). Eggs and larval monarch butterflies are milkweed obligates; larvae feed on milkweed to sequester toxic cardenolides as a defense against predators (ECOS 2025a).

Reproduction

Monarch butterfly breeding season in Arizona typically occurs from early spring to early fall. Monarch butterflies migrating to overwintering sites in the fall enter reproductive diapause (suspended reproduction) and break reproductive diapause before migrating away from their overwintering sites in February and March. As they migrate to cooler climates, monarch butterflies breed, and their offspring continue to disperse further north until they reenter reproductive diapause in the fall and begin the cycle of generational migration over again (USFWS 2024a).

Suitable Habitat

Monarch butterflies can be found throughout Arizona, where blooming nectar plants are available. They also require milkweed to lay eggs and develop as larvae. Nectar and milkweed resources are often associated with riparian corridors, but are found throughout Arizona (Western Monarch Milkweed Mapper 2017). Suitable overwintering sites protect monarch butterflies from the elements and maintain moderate temperatures that are warm enough to prevent freezing yet cool enough to prevent lipid depletion. In Arizona, monarch butterflies may overwinter in low desert washes (USFWS 2024a).

Threats

Primary threats to monarch butterfly include habitat loss, continued exposure to insecticides, and effects of climate change. Urban, agricultural, and industrial development have resulted in significant loss and degradation of the species habitat. Other factors causing the loss or alteration of monarch butterfly habitat include intensive herbicide usage for weed control, which has resulted in widespread milkweed eradication. Additional threats to the species include disease and parasitism: specifically, a protozoan parasite *Ophryocystis elektroscirrha*, which decreases survival and fitness in the monarch (USFWS 2024a).

Range and Survey History

Monarch butterfly populations have been declining at overwintering sites in both the Eastern and Western migratory populations. Non-migratory populations inside and outside of North America are considered extant. Milkweed and monarch have been documented throughout Arizona (Western Monarch Milkweed Mapper 2017). Based on available data, the current range and distribution for the species is largely the same as was historically documented. No population extirpations or range reductions have been documented in Arizona (USFWS 2024a).

Habitat Suitability Evaluation

The project limits contain suitable breeding habitat and vegetation suitable as food or stopover habitat, including Arizona willow (*Salix arizonica*), velvet mesquite (*Neltuma velutina*), desertbroom (*Baccharis sarothroides),* desert globemallow *(Sphaeralcea ambigua),* and desert milkweed *(Asclepias subulata)*. According to the Western Monarch Mapper, the nearest documented monarch butterfly breeding observation is over approximately 0.7 miles from the project limits, and there is milkweed documented within a half mile of the construction footprint in multiple locations (Western Monarch Milkweed Mapper 2017).

Analysis and Determination of Effects

Impacts: Potential impacts to monarch butterfly from this project would include temporary impacts due to removal and trimming of suitable breeding and foraging/stopover habitat.

The project limits contain suitable breeding habitat and vegetation suitable as food/stopover habitat, including desert milkweed, desert willow, velvet mesquite, desert globemallow, and desertbroom. All occurrences of milkweed observed within the construction footprint are landscaped plants.

Approximately 34 acres of vegetation, including trees, shrubs, cacti, and groundcover, will be removed during construction of this project; however, less than 2% are nectar plants based on field observations, and suitable stopover, foraging, and breeding habitat exists beyond the action area.

Interrelated and Interdependent Actions:

There are no interrelated or interdependent actions associated with this project at this time.

Determination:

This project will not jeopardize the continued existence of the species.

6.3 Pima Pineapple Cactus

Status

Endangered (58 FR 49875; September 23, 1993) without critical habitat.

Species Summary Table

	Breeding
	Adult
Biotic Community	Semi-desert grasslands and Sonoran Desertscrub
Elevation Range	2,300 – 5,000 feet
Habitat Characteristics	Flat ridgetops and areas with less than 10 to 15 percent slopes
Soil Type	Shallow to deep and silty to rocky, with a preference for silty to gravelly deep alluvial soils
Cover	Open
Lighting	Full
Water	Drought Tolerant
Tolerance of Disturbed Conditions	Often found in disturbed conditions, but can be destroyed by physical disturbance
Sensitivity to Herbicides	Sensitive to herbicide treatments depending on the formulation and application; PPC is also very sensitive to soil-active herbicide and Diquat, 2,4-D, and diuron are highly toxic to this species (White 2007)
Pollinators	Native bees and honeybees; not self-pollinating
Dispersal	Reseeds close to mother plant and dispersed by animals eating fruits
Seasonal Activity	Flowers early July until August
Known Sensitivities	Soil-active herbicides

Life History

Species Description and Ecology

The Pima pineapple cactus (PPC) is a hemispherical cactus up to 18 inches tall and 7 inches in diameter. The spines appear in clusters that are situated on tubercles, with one strong central spine that is usually hooked, and 6-15 straight radial spines. The spines are very stout and are often straw colored, but can become black with age. The plants can be single-stemmed, multi-headed, or can appear in clusters that are formed when seeds germinate at the base of a mother plant, or when a tubercle of the mother plant roots. PPC are similar in appearance to juvenile barrel cactus (*Ferocactus*); however, the spines and areoles of the PPC are located on the tubercules, rather than ribs (AGFD 2008).

Reproduction

The cactus typically flowers in mid-July through August with the onset of summer rains. Flowers are yellow, salmon, or occasionally white in color with a relatively narrow floral tube. The PPC is not a self-pollinating plant. Its primary pollinator is the Cactus bee (*Diadasia rinconis*), which is a ground-nesting, solitary native bee. It is also suggested that European honeybees are a likely pollinator. Fruits are green, ellipsoid, and succulent (AGFD 2008; USFWS 1993; USFWS 2007). Propagation occurs through seed dispersal and germination or from the rooting of tubercles on the mother plant. Seeds typically establish near the base of the mother plant, and seeds are dispersed by rabbits and rodents (ECOS 2025b).

Suitable Habitat

PPC can be found in Semidesert grassland and Sonoran desertscrub from 2,300 to 5,000 feet in elevation (AGFD 2008). Most commonly, PPC occur in open areas on flat ridgetops or other areas with less than 10–15 percent slope. Soils range from shallow to deep and silty to rocky, with a preference for silty to gravelly deep alluvial soils (USFWS 1993). Associated plant species include white-thorn acacia (*Acacia constricta),* velvet mesquite*,* triangle-leaf bursage (*Ambrosia deltoidea*), snakeweed (*Gutierrezia microcephala*), and various other cacti and grasses (AGFD 2008).

Threats

Residential and commercial development, road construction and maintenance, and utility corridor construction associated with a rapidly growing human population continue to be the most significant threats to the PPC throughout its range (USFWS 2024b). The spread of nonnative perennial grasses into the PPC's typically arid, open habitats is also a significant threat. Lehmann's lovegrass (*Eragrostis lehmanniana*) and buffelgrass (*Pennisetum ciliare*), in particular, are a problem because they often grow in dense stands and may threaten the cactus (and other native plants) both as competitors for scarce resources and by increasing wildfire risk (USFWS 2007).

Range and Survey History

In Arizona, PPC may be found between the Baboquivari Mountains and the western foothills of the Santa Rita Mountains from southern Tucson south to the United States/Mexico border (USFWS 1993). PPC are difficult to detect and exist in low densities within suitable habitat. Thus, systematic surveys are expensive and have not been completed in much of its range. Many surveys have been conducted since 1975 as part of specific development projects or focused in areas deemed as highly suitable for the species. As of 2015, the Arizona Natural Heritage Program contains 7,558 records of PPC, of which 1,837 no longer exist due to human development. Monitoring studies on PPC have been conducted on King Anvil Ranch in the Altar Valley from 1997 to 2012 and on Coronado National Forest lands in the Santa Cruz Valley from 1995 to 2007, with a recent partial survey performed in 2015. Both of these monitoring studies showed significant declines in plant numbers (USFWS 2017).

Protocol surveys were conducted within potentially suitable habitat in the construction footprint beyond the Pima County Section 10 Permit Area coverage between June 18-20 and November 18-19, 2025. The survey utilized the "Three Tier Method" recommended in the USFWS protocol for the species (Roller 1996). Approximately 83 acres of the construction footprint are located outside Pima County Section 10 Permit Area coverage and include ADOT easement on ASLD and BOR lands; Pima County easement on NPS, BLM, and BOR lands; City of Tucson easement on ASLD land; Town of Marana easement on ASLD land; or Town of Oro Valley easement on ASLD land. Tier I of the survey methodology consisted of walking transects spaced three meters apart covering the survey area. Tier II and Tier III intensive searches were then conducted within 25-meter-radius and 50-meter-square areas, respectively, around each cactus found during the Tier I surveys. The survey for PPC documented six individual PPC within the survey area approximately 30-85 feet from the edge of pavement. Five PPC were found on the southbound (SB) side of Wilmot Road, and one PPC was found on the northbound (NB) side of Wilmot Road (Pima Pineapple Cactus Survey Area Map is included in **Appendix E**).

Habitat and Suitability Evaluation

Suitable habitat is limited within the construction footprint due to factors including roadway improvements and the presence of dense invasive species (buffelgrass, Bermuda grass, Russian thistle, and Johnsongrass). The undeveloped lands surrounding certain portions of the construction footprint are suitable for PPC occupancy as they contain a diverse combination of plant species commonly associated with the cactus, including velvet mesquite, as well as the alluvial soils and slopes necessary to provide suitable habitat for this species. One section (Pima County on NPS along Old Spanish Trail) contained

areas that were unsuitable due to steepness. Additionally, portions of the Town of Marana and Town of Oro Valley easements on ASLD were unsuitable due to being landscaped.

Analysis and Determination of Effects

Effects: Potential effects to the PPC from this project include direct impact (crushing with equipment) and the potential degradation of suitable habitat due to the introduction of invasive plant species. Precautionary measures will be implemented by Pima County to prevent the harm of the known PPC in proximity to the construction footprint. These measures will include preconstruction protocol surveys in areas that are beyond the Section 10 Permit Area within suitable habitat in the construction footprint, fencing an avoidance area around the PPC prior to construction, and depicting PPC avoidance areas on the design plans. No monitoring is recommended due to limited scope and construction duration in these areas. The above precautionary measures are detailed in Section 7 below.

Additionally, the project design and construction footprint is limited to the disturbed shoulder (within 15 feet from the edge of pavement) along Wilmot Road. The nearest distance that PPC was observed from the construction footprint was over 45 feet from the construction footprint.

Invasive plant species, such as Palmer's amaranth, have the potential to modify suitable habitat by out-competing native species for water, impacting plant community composition. Introduction of these species could cause degradation of potentially suitable habitat for PPC. Standard environmental commitments will be implemented to prevent the introduction or spreading of invasive plant species.

Interrelated and Interdependent Actions:

There are no interrelated or interdependent actions associated with this project at this time.

Determination:

The project will have no effect on the Pima pineapple cactus or its habitat.

7. Environmental Commitments

Environmental commitments will be implemented to prevent the spread of noxious and invasive species and prevent impacts to PPC, migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants. Noxious and invasive species, migratory birds, western burrowing owls, Sonoran desert tortoises, and protected native plants are discussed in **Appendix B**.

Pima County Responsibilities:

- **The Pima County Project Manager will review and approve the resumes of the qualified biologist(s) employed by the contractor.**

- **Pima County shall employ a qualified biologist to complete pre-construction protocol surveys for Pima pineapple cactus within 14 days of construction in all suitable habitat that will be disturbed beyond the Pima County Section 10 Permit Area. Upon completion of the surveys, the qualified biologist shall provide the Pima County Project Manager survey results.**

Contractor Responsibilities:

- **If vegetation clearing will occur during the migratory bird breeding season (March 1 - August 31), the contractor shall avoid any active bird nests. If the active nests cannot be avoided, the contractor shall notify the Project Manager (Tony Somers (520-724-9302)) to evaluate the situation. During the non-breeding season (September 1 - February 28) vegetation removal is not subject to this restriction.**
- **To prevent the introduction of invasive species seeds, all earthmoving and hauling equipment shall be washed prior to entering the construction site and the contractor shall inspect all construction equipment and remove all attached debris, including plant parts, soil and mud, prior to the equipment entering the construction site.**
- **To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction and hauling equipment and remove all debris, including plant parts, soil and mud, prior to leaving the construction site.**
- **The contractor shall develop a Noxious and Invasive Plant Species Treatment and Control Plan in accordance with the requirements in the contract documents.**
- **Plants to be controlled shall include those listed in the state and federal noxious weed and the state invasive species lists in accordance with state and federal laws and executive orders.**
- **The plan and associated treatments shall include all areas within the project right-of-way and easements as shown on the project plans.**
- **The treatment and control plan shall be submitted to the Pima County Project Design & Construction Department Project Manager for review and approval prior to implementation by the contractor.**
- **Control of noxious and invasive species in the project area shall be performed prior to the start of ground-disturbing activities, throughout the duration of construction, and any landscape establishment period.**
- **Protected native plants within the project limits will be impacted by this project; therefore, the contractor will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the contractor will send the notification at least 60 (sixty) calendar days prior to the start of construction.**
- **The contractor shall employ a qualified biologist(s) to fence off known Pima pineapple cactus locations. The qualified biologist(s) shall have sufficient Pima pineapple cactus experience to carry out these duties.**
- **Within 14 days of construction, the contractor shall submit the resumes of the qualified biologist(s) to the Pima County Project Manager (Tony Somers) for approval.**
- **Within 14 days of construction, the qualified biologist(s) shall fence off an avoidance area around all known Pima pineapple cactus locations in the project limits using T-posts and orange plastic mesh construction fencing. There shall be a (minimum) 10-meter buffer between any Pima pineapple cactus and the fencing material. The contractor shall furnish the fencing materials.**
- **Contractor Responsibilities (continued):**
- **The contractor shall avoid all fenced and otherwise designated sensitive resource areas within or adjacent to the project area.**

- **The contractor will contact the Pima County Project Manager (Tony Somers) at least ten (10) working days prior to the commencement of work to ensure compliance with avoidance areas.**
- **The contractor shall restrict all construction activities and vehicle use to areas as identified in the design plans.**
- **If any damage to a Pima pineapple cactus occurs, or if previously unidentified Pima pineapple cacti are encountered during any activity related to construction, the contractor shall stop work immediately at that location and shall take all reasonable steps to protect the cactus in place. The Contractor shall notify the qualified biologist (if onsite) and contact the Pima County Project Manager (Tony Somers) (520-724-9302)) immediately to make arrangements for proper treatment of the cactus.**
- **Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, contractors' employees, supervisors, inspectors, and subcontractors, shall review the attached "Western Burrowing Owl Awareness" flyer.**
- **If any burrowing owls or active burrows are identified, the contractor shall notify the owner immediately. No construction activities shall take place within 100 feet of any active burrow.**
- **If the Owner, in cooperation with the biologist, determines that burrowing owls cannot be avoided, the contractor shall employ a qualified biologist holding a permit from the U.S. Fish and Wildlife Service to relocate burrowing owls from the project area, as appropriate.**
- **If any Sonoran Desert tortoises are encountered during construction, the contractor shall adhere to the AGFD "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects," revised September 22, 2014.**

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9. Signatures

Prepared by: Date: 01/19/2026

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APPENDIX A

PHOTOS

Photo No. 1

View of Santa Cruz River looking west from Sanders Road. Work in this area will be limited to conduit being attached to the bridge from the top of the bridge. No removal of vegetation will occur.

Photo No. 2

View of the potentially suitable western burrowing owl habitat looking west from the construction footprint on Sandario Road.

Photo No. 3

View of La Canada Drive Bridge looking north from the action area. Work in this area will be limited to conduit being attached to the bridge from the top of the bridge. No removal of vegetation will occur.

Photo No. 4

View of suitable foraging/stopover habitat for yellow-billed cuckoo looking northwest at the action area north of Sunrise Drive Bridge. Work in this area will be limited to conduit being attached to the bridge from the top of the bridge. No removal of vegetation will occur.

Photo No. 5

View of highly disturbed shoulder looking south along Sandario Road within the construction footprint. Note potentially suitable habitat for the Pima pineapple cactus (PPC) beyond the construction footprint.

Photo No. 6

View of suitable habitat for the PPC looking south within typical ROW along Wilmot Road.

Photo No. 7

View of typical ROW within NPS land looking northwest from within the construction footprint on Old Spanish Trail.

Photo No. 8

View of potentially suitable dispersal habitat for Sonoran desert tortoise looking northeast from the construction footprint on Sahuarita Road.

APPENDIX B

OTHER SPECIAL STATUS SPECIES

I. MIGRATORY BIRD TREATY ACT

Migratory birds may nest on the ground, on structures, or in trees, shrubs, or other vegetation within the action area. The construction footprint and surrounding ROW were investigated by Avery Pritchard, Grace Harwin, and Rachel Haughton between June 18-20, 2025, and November 18-19, 2025, by windshield and foot survey for indications that migratory birds may nest in the area. Active and inactive swallows nests were observed beneath multiple bridges; however, all bridge work is anticipated to occur from the bridge deck. Therefore, no impacts to swallows are anticipated. Inactive nests were also observed throughout the construction footprint. Approximately 34 acres of vegetation (trees, shrubs, cacti, and groundcover) suitable for nesting will be trimmed and/or removed during construction. Mitigation measures are included to avoid impacts to nesting birds.

The action area for the project was defined by the farthest-reaching impact during construction, which in this case is temporary construction noise. An excavator produces a noise level of 85 dBA at 50 feet from the source on flat ground surface, and was utilized as a point source to compare construction noise levels with the ambient noise produced by traffic on Sunrise Drive to evaluate potential noise impacts to wildlife. L_{eq} is defined as the equivalent continuous noise level measured over a specific time period. In defining the action area for this project, the RCNM was used to determine the distance between the construction footprint and where the construction noise would attenuate to ambient dBA measured from L_{eq}, which was determined to be approximately 200 feet (FHWA 2006).

Nesting birds may avoid the action area during the temporary increase in noise levels; however, to avoid any impacts to migratory birds, the following environmental commitments will be implemented.

Contractor Responsibility:

- **If vegetation clearing will occur during the migratory bird breeding season (March 1 - August 31), the contractor shall avoid any active bird nests. If the active nests cannot be avoided, the contractor shall notify the Project Manager (Tony Somers (520-724-9302)) to evaluate the situation. During the non-breeding season (September 1 - February 28) vegetation removal is not subject to this restriction.**

II. NOXIOUS AND INVASIVE PLANT SPECIES

The construction footprint and surrounding ROW/easements were surveyed for the presence of noxious and invasive plants between June 18-20, 2025, and November 18-19, 2025, during field reconnaissance via windshield and foot survey. The following noxious and/or invasive plants were observed within the construction footprint and surrounding ROW: tamarisk, Palmer's amaranth, buffelgrass, cheeseweed, fountain grass, Bermuda grass, Russian thistle, Johnsongrass, red brome, and cheatgrass. Therefore, mitigation measures are required.

Contractor Responsibilities:

- **To prevent the introduction of invasive species seeds, all earthmoving and hauling equipment shall be washed prior to entering the construction site and the contractor shall inspect all construction equipment and remove all attached debris, including plant parts, soil and mud, prior to the equipment entering the construction site.**

- **To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction and hauling equipment and remove all debris, including plant parts, soil and mud, prior to leaving the construction site.**

Contractor Responsibilities (continued):

- **The contractor shall develop a Noxious and Invasive Plant Species Treatment and Control Plan in accordance with the requirements in the contract documents.**
    - **Plants to be controlled shall include those listed in the state and federal noxious weed and the state invasive species lists in accordance with state and federal laws and executive orders.**
    - **The plan and associated treatments shall include all areas within the project right-of-way and easements as shown on the project plans.**
    - **The treatment and control plan shall be submitted to the Pima County Project Design & Construction Department Project Manager for review and approval prior to implementation by the contractor.**
    - **Control of noxious and invasive species in the project area shall be performed prior to the start of ground-disturbing activities, throughout the duration of construction, and any landscape establishment period.**

III. STATE SENSITIVE SPECIES

The AGFD OERT report was accessed on November 17, 2025 (Project ID: HGIS-26759) to determine whether special status species have been reported to occur in the area surrounding the project. The AGFD OERT listed the yellow-billed cuckoo, western burrowing owl (*Athene cunicularia hypugaea*), Sonoran desert tortoise (*Gopherus morafkai*), monarch butterfly, and Pima pineapple cactus within three miles of the project. The yellow-billed cuckoo, monarch butterfly, and Pima pineapple cactus were analyzed in detail. The western burrowing owl and Sonoran desert tortoise are evaluated below.

Western Burrowing Owl (*Athene cunicularia hypugaea*)

The western burrowing owl is listed as a Tier 2 Species of Greatest Conservation Need (SGCN) by the AGFD. They are also protected federally by the Migratory Bird Treaty Act (MBTA) and Arizona State Law (ARS Title 17). The western burrowing owl utilizes well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. Western burrowing owls are known to occupy vacant lots near human habitation, golf courses, and/or airports (AGFD 2022).

According to the AGFD's habitat suitability model, the potentially suitable habitat ranged from 75% to 99% for the western burrowing owl within the project limits. While portions of the construction footprint have been disturbed by roadway improvements and utilities, approximately 15% remains potentially suitable habitat. During field reconnaissance, no western burrowing owls or burrows with signs of occupation were observed; however, potentially suitable burrows and potentially suitable habitat (vacant, agricultural land, and native desert) are present within and adjacent to the construction footprint. Therefore, the following mitigation measures should be implemented:

Contractor Responsibilities:

- **Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, contractors' employees, supervisors, inspectors, and subcontractors, shall review the attached "Western Burrowing Owl Awareness" flyer.**
- **If any burrowing owls or active burrows are identified, the contractor shall notify the owner immediately. No construction activities shall take place within 100 feet of any active burrow.**

Contractor Responsibilities (continued):

- **If the Owner, in cooperation with the biologist, determines that burrowing owls cannot be avoided, the contractor shall employ a qualified biologist holding a permit from the U.S. Fish and Wildlife Service to relocate burrowing owls from the project area, as appropriate.**

Sonoran Desert Tortoise (*Gopherus morafkai*)

The Sonoran Desert tortoise is listed under the Candidate Conservation Agreement (CCA) by the USFWS and a Tier 1 SGCN by the AGFD. The Sonoran Desert tortoise occupies rocky, steep slopes and bajadas (lower mountain slopes), and in paloverde-mixed cacti associations. Incised washes are important for sheltering in lower-elevation habitat. Intermountain valleys and basins are used for dispersal (AGFD 2020c).

According to the AGFD's habitat suitability model, an average of 80 to 100% of the habitat within the project limits is potentially suitable for the Sonoran Desert tortoise. While portions of the construction footprint have been disturbed by roadway improvements and utilities, less than 1% remains potentially suitable habitat. During field reconnaissance, no Sonoran desert tortoise were observed within the construction footprint; however, potentially suitable habitat (caliche banks and washes) is present within and adjacent to the construction footprint. Therefore, the following mitigation measure should be implemented:

Contractor Responsibility:

- **If any Sonoran Desert tortoises are encountered during construction, the contractor shall adhere to the AGFD "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects," revised September 22, 2014.**

IV. PROTECTED NATIVE PLANTS

The construction footprint and surrounding ROW/easements were surveyed for the presence of protected native plants between June 18-20 and November 18-19, 2025, via windshield and foot survey. The following protected plants were found within the construction footprint: velvet mesquite, honey mesquite (*Neltuma glandulosa*), desert ironwood (*Olneya tesota*), Arizona willow, Engelmann's prickly-pear (*Opuntia engelmannii*), pencil cholla (*Opuntia arbuscula*), buckhorn cholla (*Opuntia acanthocarpa*), teddy-bear cholla (*Opuntia bigelovii*), and barrel cactus (*Ferocactus cylindraceus*). Native plants will be removed as part of the project; therefore, the following mitigation measure should be implemented.

Contractor Responsibility:

- **Protected native plants within the project limits will be impacted by this project; therefore, the contractor will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the contractor will send the notification at least 60 (sixty) calendar days prior to the start of construction.**

APPENDIX C

USFWS INFORMATION FOR PLANNING AND CONSULTATION AND AGFD ONLINE ENVIRONMENTAL REVIEW TOOL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
Phone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer To: 11/17/2025 18:13:19 UTC
Project Code: 2026-0016530
Project Name: PCMMBP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within the One-Range that has been delineated for the species (candidate, proposed, or listed) and it's critical habitat (designated or proposed) with which your project polygon intersects. These range delineations are based on biological metrics, and do not necessarily represent exactly where the species is located. Please refer to the species information found on ECOS to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.
If the Federal action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual

or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream affects. If the Federal action agency determines that the action may jeopardize a *proposed* species or may adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 *et seq.*). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1,026 species of birds are protected by the MBTA, including the western burrowing owl (*Athene cunicularia hypugaea*). Protected western burrowing owls can be found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle or golden eagle nest occurs in or near the proposed project area, our office should be contacted for Technical Assistance. An evaluation must be performed to determine whether the project is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see https://www.fws.gov/law/bald-and-golden-eagle-protection-act and https://www.fws.gov/program/eagle-management).

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: https://www.fws.gov/program/migratory-bird-permit. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital television, radio, and emergency broadcast) can be found at https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation.

The U.S. Army Corps of Engineers (Corps) may regulate activities that involve streams (including some intermittent streams) and/or wetlands. We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources, please visit this link or visit https://www.fws.gov/program/national-

wildlife-refuge-system to locate the refuge you would be working in or around.

If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our Tribal Coordinator, John Nystedt, at 928/556-2160 or John_Nystedt@fws.gov.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (*Gopherus morafkai*) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program (https://www.azgfd.com/wildlife-conservation/planning-for-wildlife/project-evaluation-program/).

We appreciate your concern for threatened and endangered species. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If we may be of further assistance, please contact our Flagstaff office at 928/556-2118 for projects in northern Arizona, our general Phoenix number 602/242-0210 for central Arizona, or 520/670-6144 for projects in southern Arizona.

Sincerely,
/s/

Heather Whitlaw
Field Supervisor
Attachment

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
(602) 242-0210

PROJECT SUMMARY

Project Code: 2026-0016530
Project Name: PCMMBP
Project Type: New Constr - Below Ground
Project Description: Fiber installation
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.20094895,-110.73805528631664,14z

Counties: Pima County, Arizona

ENDANGERED SPECIES ACT SPECIES

There is a total of 17 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Jaguar *Panthera onca* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3944	Endangered
Mexican Wolf *Canis lupus baileyi* Population: U.S.A. (portions of AZ and NM)see 17.84(k) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3916	Experimental Population, Non-Essential
Ocelot *Leopardus (=Felis) pardalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4474	Endangered
Sonoran Pronghorn *Antilocapra americana sonoriensis* Population: U.S.A. (AZ), Mexico No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4750	Experimental Population, Non-Essential

BIRDS

NAME	STATUS
Cactus Ferruginous Pygmy-owl *Glaucidium brasilianum cactorum* There is **final** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/1225	Threatened
California Least Tern *Sternula antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

REPTILES

NAME	STATUS
Northern Mexican Gartersnake *Thamnophis eques megalops* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened

AMPHIBIANS

NAME	STATUS
Chiricahua Leopard Frog *Rana chiricahuensis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1516	Threatened

FISHES

NAME	STATUS
Desert Pupfish *Cyprinodon macularius* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7003	Endangered
Gila Chub *Gila intermedia* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/51	Endangered
Gila Topminnow (incl. Yaqui) *Poeciliopsis occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1116	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Arizona Eryngo *Eryngium sparganophyllum* Population: There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10705	Endangered
Huachuca Water-umbel *Lilaeopsis schaffneriana var. recurva* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1201	Endangered
Pima Pineapple Cactus *Coryphantha scheeri var. robustispina* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4919	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information

on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

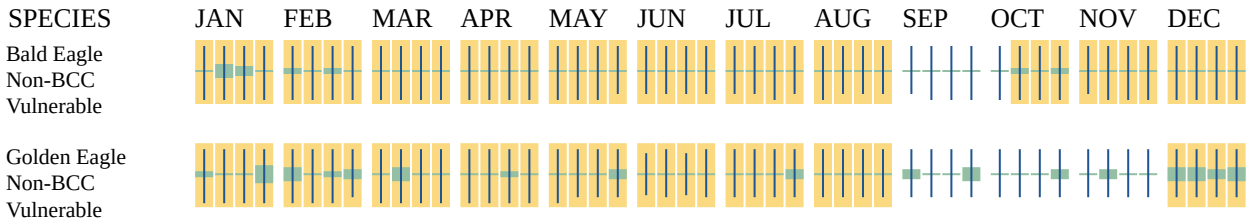
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Avocet *Recurvirostra americana* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11927	Breeds Apr 21 to Aug 10

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bendire's Thrasher *Toxostoma bendirei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31
Black-chinned Sparrow *Spizella atrogularis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10575	Breeds Jun 1 to Aug 31
Costa's Hummingbird *Calypte costae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Gila Woodpecker *Melanerpes uropygialis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5960	Breeds Apr 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31
Grace's Warbler *Setophaga graciae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9514	Breeds May 20 to Jul 20
Lawrence's Goldfinch *Spinus lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15

NAME	BREEDING SEASON
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds elsewhere

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

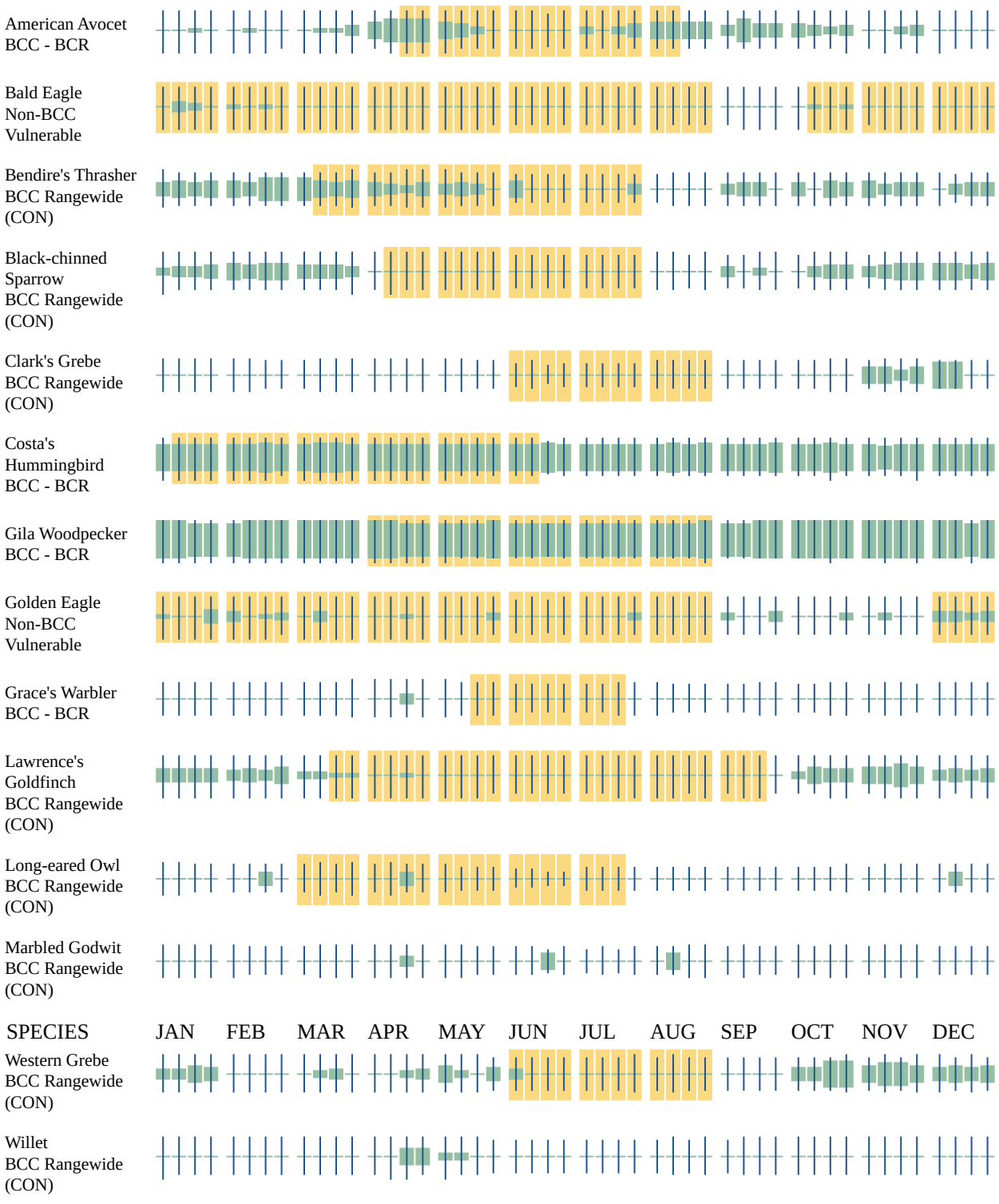
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R4SBAx
- R2USC
- R5UBFx
- R2UBH
- R5UBH
- R4SBA
- R4SBC

FRESHWATER FORESTED/SHRUB WETLAND

- PFOC

FRESHWATER POND

- PUSC

LAKE

- L2USC

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Arlette Aguilera
Address: 1661 E Camelback Rd
Address Line 2: Suite 400
City: Phoenix
State: AZ
Zip: 85016
Email arlette.aguilera@kimley-horn.com
Phone: 6023714543

LEAD AGENCY CONTACT INFORMATION

Lead Agency: National Telecommunications and Information Administration

Arizona Environmental Online Review Tool Report

Arizona Game and Fish Department Mission
To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Based on the project type entered, no further review is needed. Please review the entire report for project type and/or species recommendations for the location information entered. If you have questions about the project/species specific recommendations, please contact the Project Evaluation Program directly at PEP@azgfd.gov.

Project Name:
PCRMMP

Project Type:
Communication, Fiber optic cable installation (below ground), New lines or expansion of existing lines

Project ID:
HGIS-26759

User Project Number:
292087000

Project Description:
Fiber installation

Contact Person:
Arlette Aguilera

Organization:
Kimley-Horn

On Behalf Of:
CONSULTING

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. Arizona Wildlife Conservation Strategy (AWCS), specifically Species of Greatest Conservation Need (SGCN), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

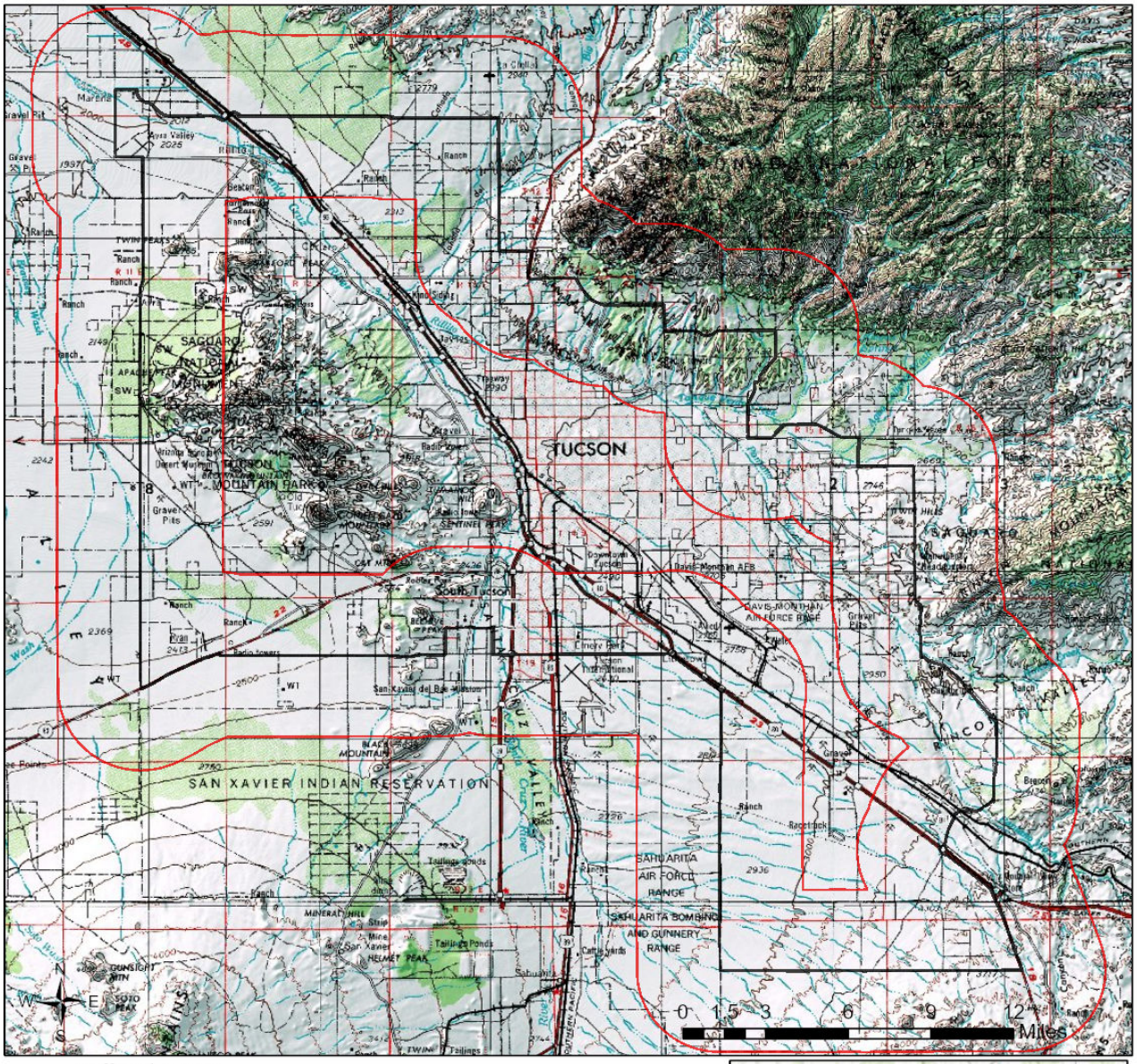
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
   Project Evaluation Program, Habitat Branch
   Arizona Game and Fish Department
   5000 West Carefree Highway
   Phoenix, Arizona 85086-5000
   Phone Number: (623) 236-7600
   Fax Number: (623) 236-7366
   Or
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies.

PCRMMP

USA Topo Basemap With Locator Map



Buffered Project Boundary

Project Boundary

Project Size (acres): 2,788.94

Lat/Long (DD): 32.1341 / -110.9532

County(s): Pima

AGFD Region(s): Tucson

Township/Range(s): T11S, R11E; T11S, R12E; T11S, R13E +

USGS Quad(s): AVRA; BROWN MOUNTAIN +

County of Yavapai, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
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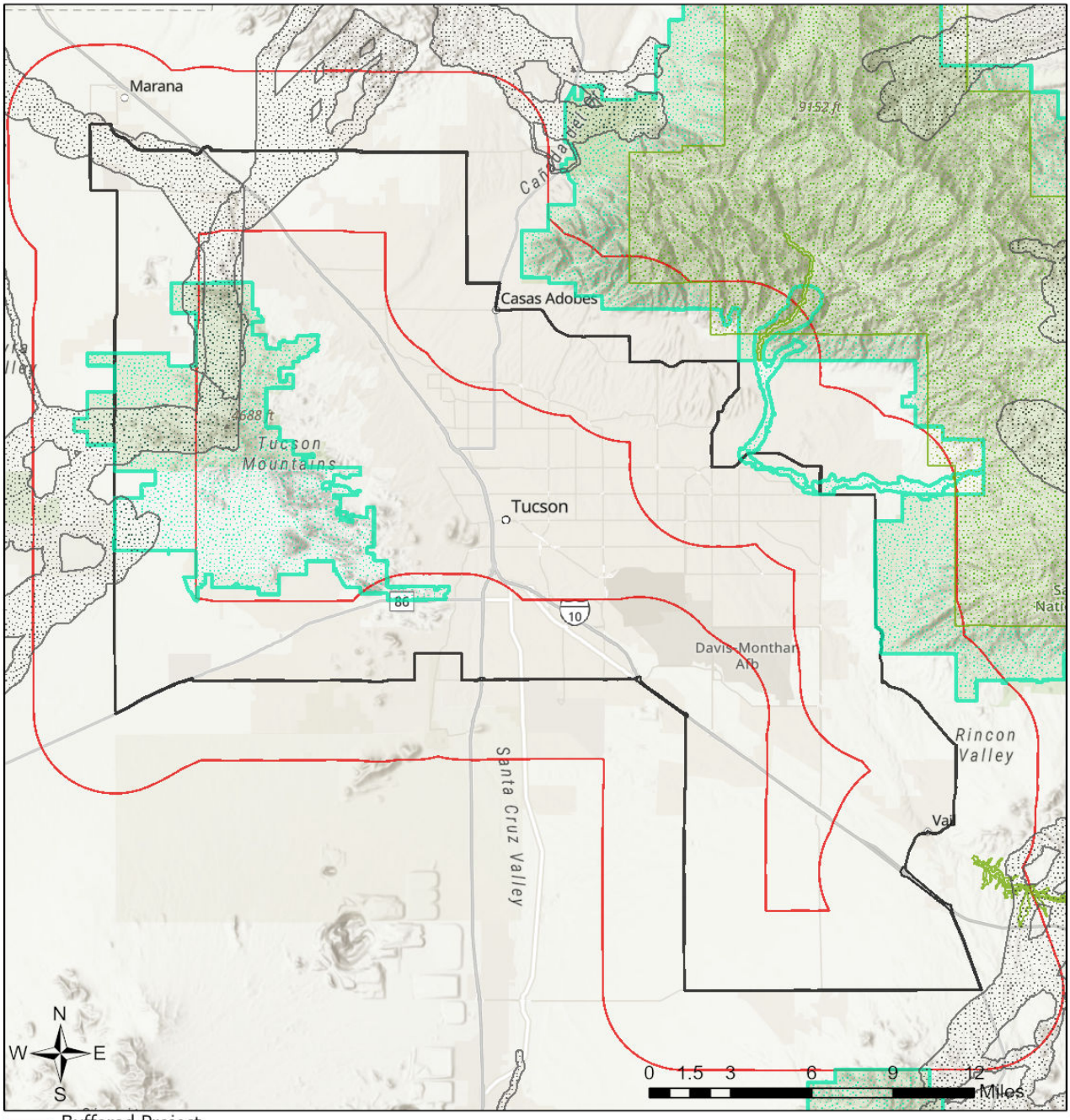
Esri, USGS

PCRMMP

Important Areas



- Buffered Project Boundary
- Project Boundary
- Important Bird Areas
- Critical Habitat
- Wildlife Connectivity

Project Size (acres): 2,788.94

Lat/Long (DD): 32.1341 / -110.9532

County(s): Pima

AGFD Region(s): Tucson

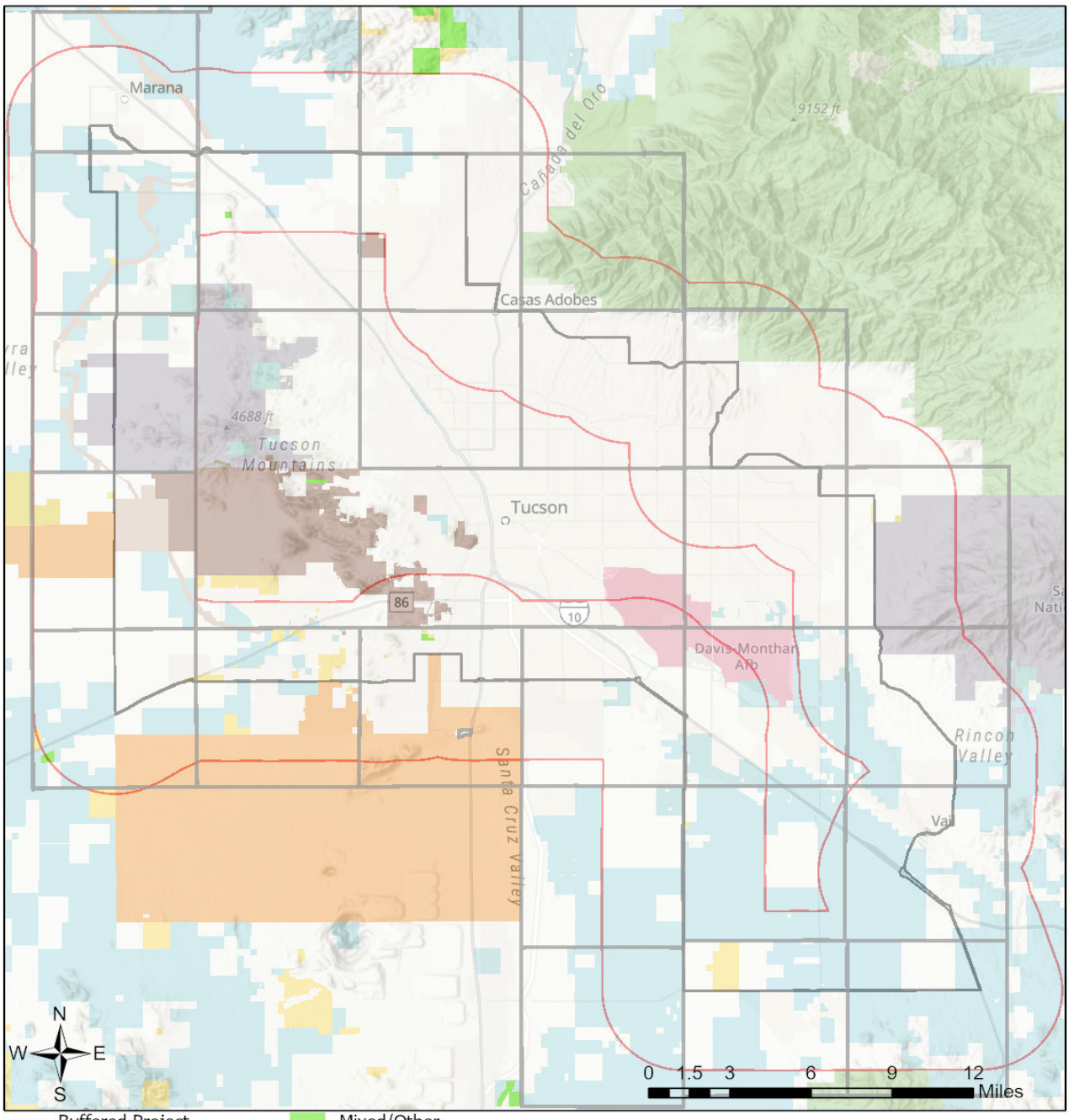
Township/Range(s): T11S, R11E; T11S, R12E; T11S, R13E +

USGS Quad(s): AVRA; BROWN MOUNTAIN +

Esri, CGIAR, USGS
CONANP, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS

PCRMMP

Township/Ranges and Land Ownership



- Buffered Project Boundary
- Project Boundary
- AZ Game & Fish Dept.
- BLM
- BOR
- Indian Res.
- Military
- Mixed/Other
- National Park/Mon.
- Private
- State & Regional Parks
- State Trust
- US Forest Service
- Wildlife Area/Refuge
- Township/Ranges

Project Size (acres): 2,788.94

Lat/Long (DD): 32.1341 / -110.9532

County(s): Pima

AGFD Region(s): Tucson

Township/Range(s): T11S, R11E; T11S, R12E; T11S, R13E +

USGS Quad(s): AVRA; BROWN MOUNTAIN +

Esri, CGIAR, USGS
CONANP, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Abutilon parishii	Pima Indian Mallow		S	S	SR	
Accipiter atricapillus	American Goshawk		S	S		2
Aechmophorus occidentalis	Western Grebe					2
Agave schottii var. treleasei	Trelease Agave		S		HS	
Agelaius phoeniceus	Red-winged Blackbird					2
Agosia chrysogaster chrysogaster	Gila Longfin Dace			S		2
Ammospermophilus harrisii	Harris' Antelope Squirrel					2
Amoreuxia gonzalezii	Saiya		S		HS	
Anthus rubescens	American Pipit					2
Aphelocoma woodhouseii	Woodhouse's Scrub-Jay					2
Aquila chrysaetos	Golden Eagle	BGA		S		2
Aquila chrysaetos	Golden Eagle			S		2
Argia sabino	Sabino Canyon Dancer		S			
Aspidoscelis arizonae	Little Striped Whiptail			S		
Aspidoscelis sonorae	Sonoran Spotted Whiptail					2
Aspidoscelis stictogrammus	Giant Spotted Whiptail		S			2
Athene cunicularia hypugaea	Western Burrowing Owl		S	S		2
Auriparus flaviceps	Verdin					2
Bat Colony						
Buteo regalis	Ferruginous Hawk			S		2
Buteo swainsoni	Swainson's Hawk					2
Buteogallus anthracinus	Common Black Hawk					2
Calamospiza melanocorys	Lark Bunting					2
Callipepla squamata	Scaled Quail					2
Calypte costae	Costa's Hummingbird					2
Camptostoma imberbe	Northern Beardless-Tyrannulet		S			2
Campylorhynchus brunneicapillus	Cactus Wren					2
Cardellina rubrifrons	Red-faced Warbler					2
Cardinalis sinuatus	Pyrrhuloxia					2
Carex ultra	Cochise Sedge		S	S		
Catharus guttatus	Hermit Thrush					2
Catharus ustulatus	Swainson's Thrush					2
Catostomus clarkii	Desert Sucker		S	S		2
Chaetodipus baileyi	Bailey's Pocket Mouse					2
Charadrius vociferus	Killdeer					2
Chilomeniscus cinctus	Banded Sandsnake					2
Choeronycteris mexicana	Mexican Long-tongued Bat		S	S		2
Circus hudsonius	Northern Harrier					2
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S	S		1

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Colaptes chrysoides	Gilded Flicker			S		2
Coluber bilineatus	Sonoran Whipsnake					2
Columbina inca	Inca Dove					2
Contopus cooperi	Olive-sided Flycatcher					2
Contopus sordidulus	Western Wood-Pewee					2
Corvus cryptoleucus	Chihuahuan Raven					2
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat		S	S		1
Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE		S		
Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE		S	HS	
Crotalus tigris	Tiger Rattlesnake					2
Cylindropuntia x kelvinensis	Kelvin Cholla				SR	
Cynanthus latirostris	Broad-billed Hummingbird		S			2
Cyprinodon eremus	Quitobaquito Pupfish	LE				1
Cyprinodon macularius	Desert Pupfish	LE		S		1
Danaus plexippus	Monarch	PT		S		
Dendrocygna autumnalis	Black-bellied Whistling-Duck					2
Echinocactus horizonthalonius var. nicholii	Nichol Turk's Head Cactus	LE		S	HS	
Echinocereus arizonicus	Arizona Hedgehog Cactus	LE				
Echinocereus fasciculatus	Magenta-flower Hedgehog-cactus				SR	
Echinocereus santaritensis	Santa Rita Hedgehog Cactus				SR	
Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus				SR	
Elgaria kingii	Madrean Alligator Lizard					2
Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher		S			2
Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		S		1
Empidonax wrightii	Gray Flycatcher					2
Eremophila alpestris	Horned Lark					2
Eryngium sparganophyllum	Arizona Eryngo	LE		S		
Euderma maculatum	Spotted Bat		S	S		2
Eugenes fulgens	Rivoli's Hummingbird					2
Eumops perotis californicus	Greater Western Bonneted Bat			S		2
Euphagus cyanocephalus	Brewer's Blackbird					2
Falco mexicanus	Prairie Falcon					2
Falco peregrinus anatum	American Peregrine Falcon		S	S		1
Falco sparverius	American Kestrel					2
Gastrophryne mazatlanensis	Sinoloan Narrow-mouthed Toad			S		2
Geothlypis tolmiei	MacGillivray's Warbler					2

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Gila ditaenia	Sonora Chub	LT				1
Gila intermedia	Gila Chub	LE		S		1
Gila robusta	Roundtail Chub		S	S		1
Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LT	S	S		1
Gopherus agassizii	Mohave Desert Tortoise	LT		S		1
Gopherus morafkai	Sonoran Desert Tortoise	CCA	S	S		1
Haliaeetus leucocephalus	Bald Eagle	NA, BGA	S	S		1
Heloderma suspectum	Gila Monster					1
Icterus bullockii	Bullock's Oriole					2
Icterus cucullatus	Hooded Oriole					2
Icterus parisorum	Scott's Oriole					2
Ictinia mississippiensis	Mississippi Kite					2
Incilius alvarius	Sonoran Desert Toad					2
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		2
Lanius ludovicianus	Loggerhead Shrike					2
Lasiurus cinereus	Hoary Bat					2
Lasiurus frantzii	Desert Red Bat		S			2
Lasiurus xanthinus	Western Yellow Bat		S			2
Leptonycteris yerbabuenae	Lesser Long-nosed Bat			S		1
Lepus alleni	Antelope Jackrabbit					2
Lysiloma watsonii	Littleleaf False Tamarind				SR	
Macrotus californicus	California Leaf-nosed Bat			S		2
Mammillaria thornberi	Thornber Fishhook Cactus				SR	
Manihot davisiae	Arizona Manihot		S			
Megascops kennicottii	Western Screech-owl					2
Melanerpes uropygialis	Gila Woodpecker					2
Melospiza lincolnii	Lincoln's Sparrow					2
Melozone aberti	Abert's Towhee		S			2
Melozone fusca	Canyon Towhee					2
Micruroides euryxanthus	Sonoran Coralsnake					2
Muhlenbergia elongata	Sycamore Muhly		S			
Muhlenbergia palmeri	Palmer's Muhly		S			
Myiarchus tuberculifer	Dusky-capped Flycatcher					2
Myotis auriculus	Southwestern Myotis					2
Myotis thysanodes	Fringed Myotis					2
Myotis velifer	Cave Myotis			S		2
Myotis yumanensis	Yuma Myotis					2
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					2
Nyctinomops macrotis	Big Free-tailed Bat					2

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Opuntia engelmannii	Cactus-apple				SR	
Opuntia versicolor	Stag-horn Cholla				SR	
Oreoscoptes montanus	Sage Thrasher					2
Parabuteo unicinctus	Harris's Hawk					2
Passerculus sandwichensis	Savannah Sparrow					2
Patagioenas fasciata	Band-tailed Pigeon					2
Peniocereus greggii var. transmontanus	Desert Night-blooming Cereus				SR	
Peucaea carpalis	Rufous-winged Sparrow					2
Phrynosoma solare	Regal Horned Lizard					2
Phyllorhynchus browni	Saddled Leaf-nosed Snake					2
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE,UR		S		1
Pooecetes gramineus	Vesper Sparrow					2
Progne subis hesperia	Desert Purple Martin			S		2
Pyrgulopsis sp. 29	La Cebadilla Cienega Springsnail					1
Ramosomyia violiceps	Violet-crowned Hummingbird		S			2
Rana chiricahuensis	Chiricahua Leopard Frog	LT		S		1
Rana yavapaiensis	Lowland Leopard Frog		S	S		1
Selasphorus platycercus	Broad-tailed Hummingbird					2
Setophaga graciae	Grace's Warbler					2
Setophaga nigrescens	Black-throated Gray Warbler					2
Sonorella rinconensis	Posta Quemada Talussnail					2
Sonorella walkeri	Santa Rita Talussnail					2
Spizella breweri	Brewer's Sparrow					2
Stevia lemmonii	Lemmon's Stevia		S			
Strix occidentalis lucida	Mexican Spotted Owl	LT		S		1
Tadarida brasiliensis	Brazilian Free-tailed Bat					2
Terrapene ornata luteola	Desert Box Turtle			S		1
Tumamoca macdougalii	Tumamoc Globeberry		S	S	SR	
Xyrauchen texanus	Razorback Sucker	LE,PT		S		1

Note: Status code definitions can be found at https://www.azgfd.com/wildlife-conservation/on-the-ground-conservation/state-wildlife-action-plan/state-wildlife-action-plan-status-definitions/.

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Agua Caliente Wash	Pima County Wildlife Movement Area - Riparian/Wash					
Bear Canyon-Sycamore Reservoir to Confluence with Sabino Canyon	Conservation Opportunity Area					

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
CAP Canal	Pima County Wildlife Crossing Area					
CAP Wildlife Mitigation Corridor: Roskruge Mountains to Tucson Mountains	Pima County Wildlife Movement Area - Landscape					
Concentrated drainages across State Route 86 towards Brawley Wash	Pima County Wildlife Movement Area - Landscape					
Coyote - Ironwood - Tucson Linkage Design	Wildlife Connectivity					
Lee Moore Wash Flow Corridors	Pima County Wildlife Movement Area - Riparian/Wash					
Pantano Wash	Pima County Wildlife Movement Area - Riparian/Wash					
Pascua Yaqui Reservation	Pascua Yaqui Reservation					
Rillito Creek/Tanque Verde Wash	Pima County Wildlife Movement Area - Riparian/Wash					
Rincon Creek	Pima County Wildlife Movement Area - Riparian/Wash					
Riparian Area	Riparian Area					
Roskruge Mountains to Avra Valley	Pima County Wildlife Movement Area - Landscape					
Sabino Creek Complex	Conservation Opportunity Area					
Sabino Creek	Pima County Wildlife Movement Area - Riparian/Wash					
Saguaro National Park (East) to Rincon Valley	Pima County Wildlife Movement Area - Landscape					
Saguaro National Park (West) across buried CAP Canal Pipeline to Avra Valley	Pima County Wildlife Movement Area - Landscape					
Saguaro National Park (West)/Sandario Road Wash Crossing (Culvert)	Pima County Wildlife Crossing Area					
San Xavier Indian Reservation	San Xavier Indian Reservation					
Santa Cruz River	Pima County Wildlife Movement Area - Riparian/Wash					
Tanque Verde Wash/Sabino Canyon IBA	Important Bird Area					
Tohono Indian Reservation	Tohono Indian Reservation					
Tortolita Fan to Canada del Oro	Pima County Wildlife Movement Area - Landscape					
Tortolita Mountains - Tortilla Mountains	Pinal County Wildlife Movement Area - Landscape					
Tucson - Tortolita - Santa Catalina Mountains Linkage Design	Wildlife Connectivity					

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Tucson Mountain Park to Tohono O'odham Nation (San Xavier)/Santa Cruz River	Pima County Wildlife Movement Area - Landscape					
Tucson Mountains IBA	Important Bird Area					
Tucson Mountains	Conservation Opportunity Area					
Tucson Sky Islands and Sonoran Uplands IBA	Important Bird Area					
Tucson Sky Islands	Conservation Opportunity Area					
Tucson Urban Riparian Linkages	Pima County Wildlife Movement Area - Riparian/Wash					
Ventana Canyon Wash	Pima County Wildlife Movement Area - Riparian/Wash					

Note: Status code definitions can be found at https://www.azgfd.com/wildlife-conservation/on-the-ground-conservation/state-wildlife-action-plan/state-wildlife-action-plan-status-definitions/.

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Accipiter atricapillus	American Goshawk		S	S		2
Ammodramus savannarum ammolegus	Arizona grasshopper sparrow		S	S		2
Ammodramus savannarum perpallidus	Western Grasshopper Sparrow					2
Ammospermophilus harrisii	Harris' Antelope Squirrel					2
Anaxyrus retiformis	Sonoran Green Toad			S		2
Anthus spragueii	Sprague's Pipit					2
Antrostomus ridgwayi	Buff-collared Nightjar		S			2
Aquila chrysaetos	Golden Eagle	BGA		S		2
Artemisiospiza nevadensis	Sagebrush Sparrow					3
Asio otus	Long-eared Owl					2
Aspidoscelis sonorae	Sonoran Spotted Whiptail					2
Aspidoscelis stictogrammus	Giant Spotted Whiptail		S			2
Aspidoscelis xanthonotus	Red-backed Whiptail		S			2
Athene cunicularia hypugaea	Western Burrowing Owl		S	S		2
Auriparus flaviceps	Verdin					2
Botaurus lentiginosus	American Bittern					2
Buteo regalis	Ferruginous Hawk			S		2
Buteo swainsoni	Swainson's Hawk					2
Buteogallus anthracinus	Common Black Hawk					2
Calcarius ornatus	Chestnut-collared Longspur					2
Callipepla squamata	Scaled Quail					2

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Calypte costae	Costa's Hummingbird					2
Camptostoma imberbe	Northern Beardless-Tyrannulet		S			2
Campylorhynchus brunneicapillus	Cactus Wren					2
Catharus ustulatus	Swainson's Thrush					2
Chaetodipus baileyi	Bailey's Pocket Mouse					2
Charadrius montanus	Mountain Plover					2
Chilomeniscus cinctus	Variable Sandsnake					2
Choeronycteris mexicana	Mexican Long-tongued Bat		S	S		2
Chordeiles minor	Common Nighthawk					2
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S	S		1
Colaptes chrysoides	Gilded Flicker			S		2
Coluber bilineatus	Sonoran Whipsnake					2
Columbina inca	Inca Dove					2
Corvus cryptoleucus	Chihuahuan Raven					2
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat		S	S		1
Crotalus cerberus	Arizona Black Rattlesnake					2
Crotalus tigris	Tiger Rattlesnake					2
Crotaphytus nebrius	Sonoran Collared Lizard					2
Cynanthus latirostris	Broad-billed Hummingbird		S			2
Cynomys ludovicianus	Black-tailed Prairie Dog	CCA		S		1
Cyprinodon macularius	Desert Pupfish	LE		S		1
Dendrocygna autumnalis	Black-bellied Whistling-Duck					2
Elgaria kingii	Madrean Alligator Lizard					2
Empidonax wrightii	Gray Flycatcher					2
Euderma maculatum	Spotted Bat		S	S		2
Eugenes fulgens	Rivoli's Hummingbird					2
Eumops perotis californicus	Greater Western Bonneted Bat			S		2
Falco mexicanus	Prairie Falcon					2
Falco peregrinus anatum	American Peregrine Falcon		S	S		1
Falco sparverius	American Kestrel					2
Gastrophryne mazatlanensis	Sinoloan Narrow-mouthed Toad			S		2
Gila intermedia	Gila Chub	LE		S		1
Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	LT	S	S		1
Gopherus morafkai	Sonoran Desert Tortoise	CCA	S	S		1
Haemorhous cassinii	Cassin's Finch					2
Heloderma suspectum	Gila Monster					1
Icterus bullockii	Bullock's Oriole					2
Icterus cucullatus	Hooded Oriole					2
Icterus parisorum	Scott's Oriole					2

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Incilius alvarius	Sonoran Desert Toad					2
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		2
Lanius ludovicianus	Loggerhead Shrike					2
Lasiurus cinereus	Hoary Bat					2
Lasiurus frantzii	Desert Red Bat		S			2
Lasiurus xanthinus	Western Yellow Bat		S			2
Leptonycteris yerbabuenae	Lesser Long-nosed Bat			S		1
Lepus alleni	Antelope Jackrabbit					2
Macrotus californicus	California Leaf-nosed Bat			S		2
Megascops kennicottii	Western Screech-owl					2
Melanerpes uropygialis	Gila Woodpecker					2
Melospiza lincolnii	Lincoln's Sparrow					2
Melozone aberti	Abert's Towhee		S			2
Micrathene whitneyi	Elf Owl					3
Micruroides euryxanthus	Sonoran Coralsnake					2
Myadestes townsendi	Townsend's Solitaire					2
Myiarchus tuberculifer	Dusky-capped Flycatcher					2
Myiodynastes luteiventris	Sulphur-bellied Flycatcher		S			2
Myotis auriculus	Southwestern Myotis					2
Myotis thysanodes	Fringed Myotis					2
Myotis velifer	Cave Myotis			S		2
Myotis yumanensis	Yuma Myotis					2
Neotoma mexicana mexicana	Mexican Woodrat					2
Notiosorex cockrumi	Cockrum's Desert Shrew					2
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					2
Nyctinomops macrotis	Big Free-tailed Bat					2
Panthera onca	Jaguar	LE		S		1
Parabuteo unicinctus	Harris's Hawk					2
Passerculus sandwichensis	Savannah Sparrow					2
Perognathus amplus	Arizona Pocket Mouse					2
Peucaea botterii arizonae	Arizona Botteri's Sparrow			S		2
Peucaea carpalis	Rufous-winged Sparrow					2
Phrynosoma solare	Regal Horned Lizard					2
Phyllorhynchus browni	Saddled Leaf-nosed Snake					2
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE,UR		S		1
Pooecetes gramineus	Vesper Sparrow					2
Progne subis hesperia	Desert Purple Martin			S		2
Psiloscops flammeolus	Flammulated Owl					2

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Rana chiricahuensis	Chiricahua Leopard Frog	LT		S		1
Rana yavapaiensis	Lowland Leopard Frog		S	S		1
Setophaga nigrescens	Black-throated Gray Warbler					2
Sigmodon arizonae cienegae	Arizona Cotton Rat					2
Sonorella rinconensis	Posta Quemada Talussnail					2
Sonorella sabinoensis	Santa Catalina Talussnail					2
Spizella breweri	Brewer's Sparrow					2
Strix occidentalis lucida	Mexican Spotted Owl	LT		S		1
Tadarida brasiliensis	Brazilian Free-tailed Bat					2
Terrapene ornata	Ornate Box Turtle			S		1
Thamnophis eques	Mexican Gartersnake	PS				1
Thomomys umbrinus intermedius	Southern Pocket Gopher					2
Toxostoma bendirei	Bendire's Thrasher					2
Toxostoma lecontei	LeConte's Thrasher			S		2
Troglodytes pacificus	Pacific Wren					2

Species of Economic and Recreation Importance Predicted that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Callipepla squamata	Scaled Quail					
Odocoileus hemionus	Mule Deer					
Odocoileus virginianus	White-tailed Deer					
Patagioenas fasciata	Band-tailed Pigeon					
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

Project Type: Communication, Fiber optic cable installation (below ground), New lines or expansion of existing lines

Project Type Recommendations:
Minimize the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects and pathogens. Precautions should be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. See the Arizona Department of Agriculture website for a list of prohibited and restricted noxious weeds at https://www.invasivespeciesinfo.gov/ and the Arizona Native Plant Society https://aznps.com/invas for recommendations on how to control these species. To view a list of documented invasive species or to report invasive species in or near your project area visit iMapInvasives - a national cloud-based application for tracking and managing invasive species at https://imap.natureserve.org/imap/services/page/map.html.

- To build a list: zoom to your area of interest, use the identify/measure tool to draw a polygon around your area of interest, and select “See What’s Here” for a list of reported species. To export the list, you must have an account and be logged in. You can then use the export tool to draw a boundary and export the records in a csv file.

The AZGFD recommends that wildlife surveys are conducted to determine if noise-sensitive species, such as birds or mammals, occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

If trenching or digging of large holes is necessary, the AZGFD recommends trenching/digging and backfilling crews be close together to minimize the amount of open holes at any given time. Where trenches or holes cannot be back-filled immediately, the AZGFD recommends escape ramps be constructed in each hole and at least every 90 meters in trenches. Escape ramps can be short lateral trenches or wooden planks sloping to the surface. The AZGFD recommends that slopes be less than 45 degrees (1:1) and trenches and holes that have been left open be inspected to remove animals prior to backfilling.

Project Location and/or Species Recommendations:
Analysis indicates that your project is located in the vicinity of an identified ***wildlife habitat linkage corridor***. The **Arizona Missing Linkages** represent ideal connections within or between intact blocks or core habitats. The blocks are currently disconnected or isolated and the linkages should be examined for improving permeability, or are currently intact and in need of preservation and/or enhancement. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: https://www.azgfd.com/wildlife/planning/habitatconnectivity/identifying-corridors/. Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

HDMS records indicate that one or more native plants listed on the **Arizona Native Plant Law and Antiquities Act** have been documented within the vicinity of your project area. Please contact:
Arizona Department of Agriculture
1688 W Adams St.
Phoenix, AZ 85007
Phone: 602.542.4373
https://agriculture.az.gov/sites/default/files/Native%20Plant%20Rules%20-%20AZ%20Dept%20of%20Ag.pdf starts on page 44

HDMS records indicate that **Chiricahua Leopard Frogs** have been documented within the vicinity of your project area. Please review the Chiricahua Leopard Frog Management Guidelines found at: https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/planningFor/wildlifeFriendlyGuidelines/FINALLithchirHabitatGdlns.pdf

Analysis indicates that your project is located in the vicinity of an identified **Conservation Opportunity Area (COA)**. While there are many areas in Arizona that present abundant conservation opportunities, COAs are specific areas on the landscape that the Department identified as having the greatest potential for conservation efforts. COAs were identified using species and habitat data, the presence of unique landscape features, and Departmental expertise. COAs range in size, scope, and focal species and/or habitats and are strictly a non-regulatory conservation tool for the public and our conservation partners to consider. For more information regarding this particular COA near your project area and the Department's suggestions for potential conservation efforts, please visit the COA profile at https://awcs.azgfd.com/conservation-opportunity-areas.

Analysis indicates that your project is located in the vicinity of an identified ***wildlife habitat connectivity feature***. The **County-level Stakeholder Assessments** contain five categories of data (Barrier/Development, Wildlife Crossing Area, Wildlife Movement Area- Diffuse, Wildlife movement Area- Landscape, Wildlife Movement Area- Riparian/Washes) that provide a context of select anthropogenic barriers, and potential connectivity. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: https://www.azgfd.com/wildlife-conservation/planning-for-wildlife/planning-for-wildlife-identifying-corridors/.
Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

Analysis indicates that your project is located in the vicinity of an identified ***wildlife habitat connectivity feature***. The **Detailed Wildlife Connectivity Assessments** represent ideal connections within or between intact blocks or core habitats. The blocks are currently disconnected or isolated and the linkages should be examined for improving permeability, or are currently intact and in need of preservation and/or enhancement. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: https://www.azgfd.com/wildlife/planning/habitatconnectivity/identifying-corridors/
Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

The analysis has detected one or more **Important Bird Areas** within your project vicinity. Please see http://aziba.org/?page_id=38 for details about the Important Bird Area(s) identified in the report.

HDMS records indicate that **Lesser Long-nosed Bats** have been documented within the vicinity of your project area. Please review the Lesser Long-nosed Bat Management Guidelines at: https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/planningFor/wildlifeFriendlyGuidelines/FINALlecuyeHabitatGdln.pdf

HDMS records indicate that one or more **Listed, Proposed, or Candidate** species or **Critical Habitat** (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at https://www.fws.gov/office/arizona-ecological-services or:

Phoenix Main Office
9828 North 31st Avenue #C3
Phoenix, AZ 85051-2517
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that **Peregrine Falcons** have been documented within the vicinity of your project area. Please review the Peregrine Falcon Management Guidelines at: https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/planningFor/wildlifeFriendlyGuidelines/peregrineFalconConservGuidelines.pdf.

This review has identified **riparian areas** within the vicinity of your project. During the planning stage of your project, avoid, minimize, or mitigate any potential impacts to riparian areas identified in this report. Riparian areas play an important role in maintaining the functional integrity of the landscape, primarily by acting as natural drainages that convey water through an area, thereby reducing flood events. In addition, riparian areas provide important movement corridors and habitat for fish and wildlife. Riparian areas are channels that contain water year-round or at least part of the year. Riparian areas also include those channels which are dry most of the year, but may contain or convey water following rain events. All types of riparian areas offer vital habitats, resources, and movement corridors for wildlife. The Pinal County Comprehensive Plan (i.e. policies *6.1.2.1* and *7.1.2.4*), Open Space and Trails Master Plan, Drainage Ordinance, and Drainage Design Manual all identify riparian area considerations, guidance, and policies. Guidelines to avoid, minimize, or mitigate impacts to riparian habitat can be found at https://www.azgfd.com/wildlife-conservation/planning-for-wildlife/planning-for-wildlife-wildlife-friendly-guidelines/. Further consultation with the Arizona Game and Fish Department and Pinal County may be warranted.

HDMS records indicate that **Sonoran Desert Tortoise** have been documented within the vicinity of your project area. Please review the Tortoise Handling Guidelines found at https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/2014%20Tortoise%20handling%20guidelines.pdf.

Tribal Lands are within the vicinity of your project area and may require further coordination. Please contact:
Pascua Yaqui Tribe
7474 S Camino de Oeste
Tucson, AZ 85746
(520) 883-5000 ext. 5016
(520) 883-5014 (fax)

Tribal Lands are within the vicinity of your project area and may require further coordination. Please contact:
Tohono O'odham Nation
PO Box 837
Sells, AZ 85634
(520) 383-1511
(520) 383-3377 (fax)

HDMS records indicate that **Western Burrowing Owls** have been documented within the vicinity of your project area. Please review the western burrowing owl resource page at https://www.azgfd.com/wildlife-conservation/conservation-and-endangered-species-programs/burrowing-owl-management/.

APPENDIX D

WESTERN BURROWING OWL AWARENESS FLYER

Western Burrowing Owl Awareness

The purpose of this flyer is to provide contractors working on projects with basic knowledge to reduce the risk of incidental take of Western Burrowing Owls.

Legal Status:

Western Burrowing Owls (*Athene cunicularia*) are protected under the Federal Migratory Bird Treaty Act of 1918. All migratory birds and their parts are fully protected. They are also protected under Arizona State Law in Title 17-101, Title 17-235, and Title 17-236.

What to look for:

- Description– small, ground-dwelling owl.
- Length– 19.5-25.0 cm (7.68-9.85 inches)
- Wingspan– 58.42 cm (23.0 inches)
- Mass– about 150 grams
- Males are typically slightly larger than females.
- Round head, lacks ear tufts.
- Distinct oval facial ruff, framed by a broad, puffy white eyebrow.
- Eyes contain a bright yellow iris.

Where are owls found?

- Dry, open, short grass, treeless plains.
- Dependent on fossorial mammals. (ground squirrels, prairie dogs, badgers, etc.) to construct burrows.
- Human dominated landscapes: golf courses, airports, agricultural fields.

Identifying an active burrow:

- Owls use burrows constructed by ground squirrels, badgers, coyotes and tortoises. They can also use pipes, culverts, and ditches.
- Presence of excrement (whitewash) near entrance to burrow.
- Burrowing owls frequently decorate entrance of burrows with cow or horse manure, feathers, vegetation and trash items.

How to avoid them:

- Scan ahead prior to arriving at a sign location.
- If burrowing owls are observed within the project area, stop and move at least 100 feet beyond the owl or occupied burrow before resuming work.

If you think your work may potentially impact a Burrowing Owl or active burrow, please stop.
Move at least 100 feet from the animal or burrow before resuming work.

Source: Arizona Game and Fish Department Animal Abstract: Western Burrowing Owl. Heritage Data Management System

APPENDIX E

PIMA PINEAPPLE CACTUS SURVEY MAP

Aerial Source/Date: Esri, 2024 and Nearmap, 2025

Legend

- EA Study Area
- Construction Footprint
- Observed Pima Pineapple Cactus (PPC)
- PPC Survey Transects

Catalina
Marana
Casas Adobes
Saguaro National Park
Tucson
Saguaro National Park
19
10
See Inset Map
Vail
Green Valley
Las Cienegas NCA
acori
nal
l Park

Inset Map

Wilmot Road

0 700 1,400 2,800 Feet

Scale: 1" = 1,400'

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Pima Pineapple Cactus Survey Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

0 2.5 5 10 Miles

Scale: 1" = 5 miles

N
W E
S

APPENDIX F

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40□Celsius (105□Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40□Celsius (105□Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department's tortoise adoption program. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting license from the Department to facilitate handling or temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department's Environmental On-Line Review Tool Department during the planning stages of any project that may affect desert tortoise habitat.
- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.
- Take is prohibited by state law.
- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department.

APPENDIX G

SECTION 404/401 COMPLIANCE MAP

Aerial Source/Date: Esri, 2025

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

Section 404/401 Compliance Map - Key Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

- EA Study Area
- Aquatic Features
- Excluded Features
- Sheetflow

0 1.75 3.5 7 Miles

Scale: 1" = 3.5 miles

N W E S

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EF 2 (b)(3)

Moore Road

AF 1 - Santa Cruz River

See Inset Map

Tangerine Road

Project Begin/End

EF 3 (b)(3)

Sanders Road

EF 1 (b)(3)

Avra Valley Road

EF 4 (b)(3)

Sandario Road

EF 5 (b)(3)

EF 6 (b)(3)

EF 7 (b)(8)

EF 8 (b)(8)

AF 2 - Central Arizona Project

Inset Map

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

EF 9 (b)(8)

AF 3

EF 10 (b)(8)

EF 11 (b)(8)

EF 12 (b)(8)

EF 13 (b)(8)

EF 14 (b)(8)

Sandario Road

EF 15 (b)(8)

EF 16 (b)(8)

AF 4

AF 5

AF 6

AF 7

EF 17 (b)(8)

AF 8

EF 18 (b)(8)

AF 9

AF 10

EF 19 (b)(8)

AF 11

AF 12

AF 13

EF 20 (b)(8)

EF 21 (b)(8)

EF 22 (b)(8)

AF 14

AF 15

AF 16

AF 17

AF 18

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

AF 18
AF 19
AF 20
AF 21
AF 22
EF 23 (b)(8)
AF 23
AF 24
AF 25
AF 26
AF 27
EF 24 (b)(8)
AF 28
AF 29
AF 2 - Central Arizona Project
AF 30
AF 31
EF 25 (b)(8)
EF 26 (b)(8)
AF 32
AF 33
AF 34
Sandario Road

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

- EA Study Area
- Aquatic Features
- Excluded Features
- Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

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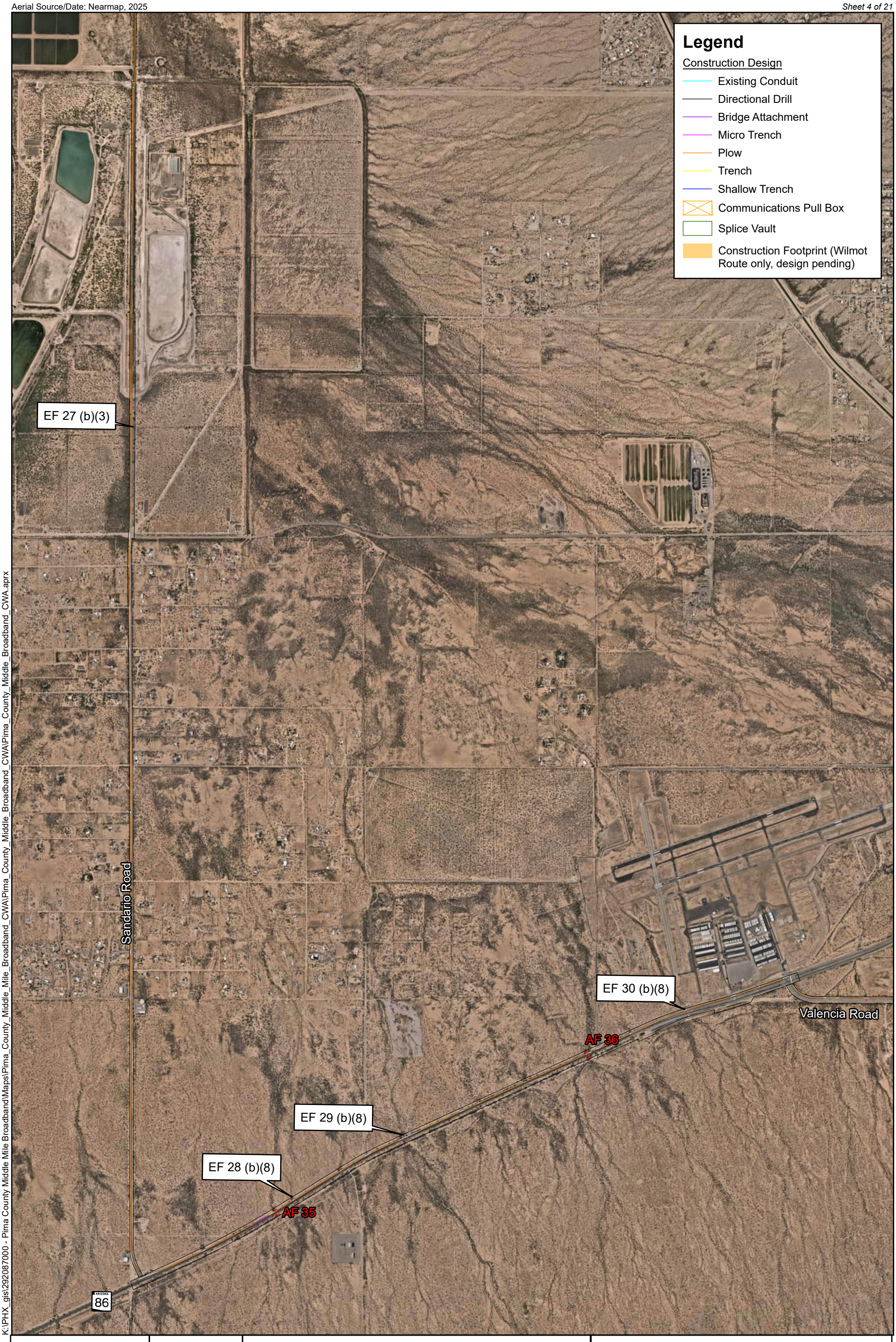

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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

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ARIZONA 86

EF 32 (b)(8)

EF 33 (b)(8)

EF 34 (b)(8)

EF 35 (b)(8)

Valencia Road

EF 31 (b)(8)

EF 36 (b)(8)

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

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Drexel Road

Oak Tree Drive

EF 39 (b)(3)

EF 38 (b)(3)

EF 37 (b)(8)

Valencia Road

AF 37 - Santa Cruz River

See Inset Map

Inset Map

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map | Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

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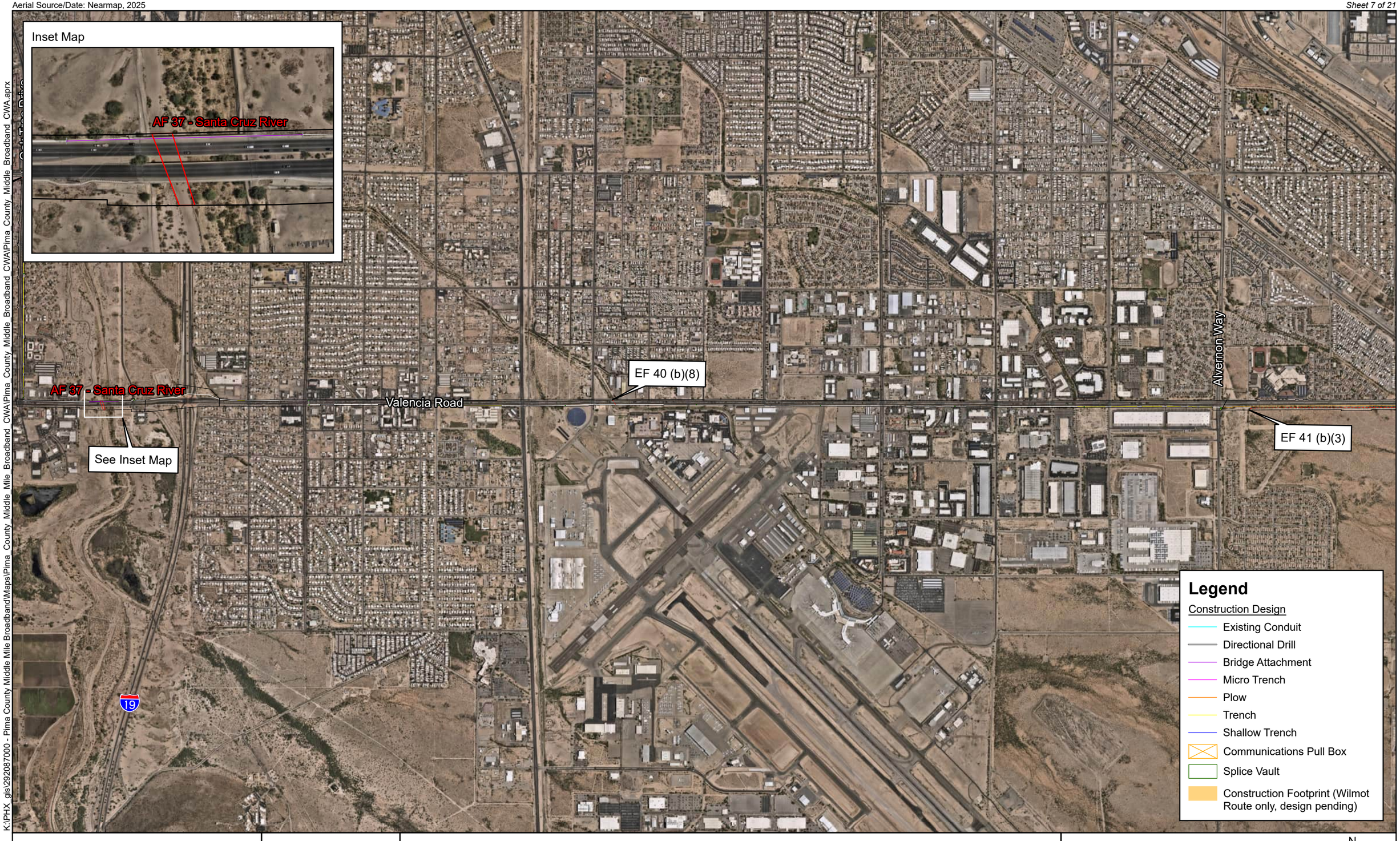
Scale: 1" = 2,000'

N W E S



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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

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Scale: 1" = 2,000'

N W E S

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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
Sheetflow

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Scale: 1" = 2,000 feet

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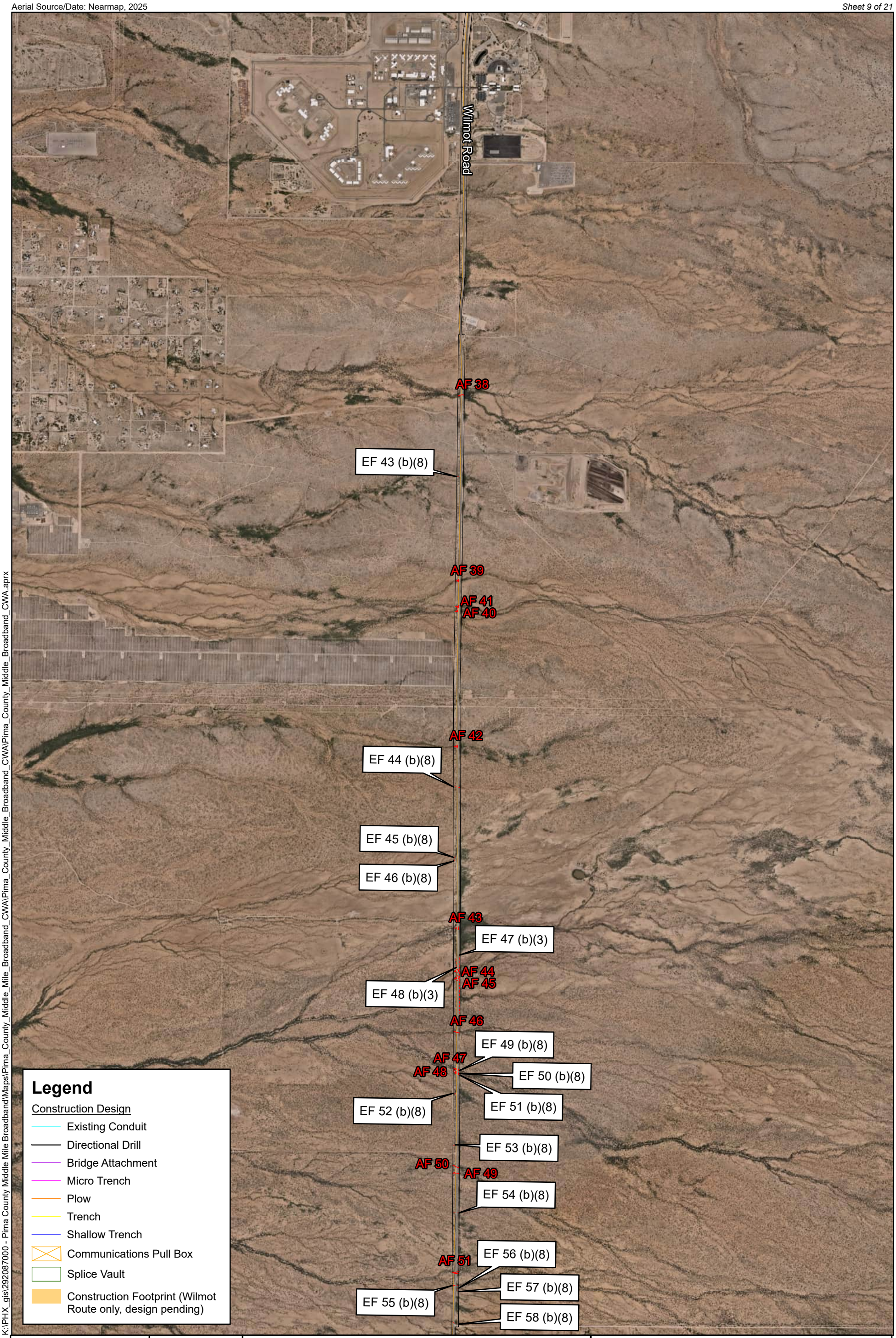

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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000 feet

N W E S

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EF 59 (b)(8)

EF 60 (b)(8)

EF 61 (b)(8)

EF 62 (b)(8)

EF 63 (b)(8)

AF 52

EF 64 (b)(3)

EF 65 (b)(3)

AF 53

Wilmot Road

Sahuarita Road

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N

W E

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AF 53
AF 54
AF 55
AF 56
AF 57
AF 58
AF 59
AF 60
AF 61
AF 62
AF 63
AF 64
AF 65
Sahuarita Road
EF 66 (b)(8)
EF 67 (b)(8)
EF 68 (b)(8)

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

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EF 68 (b)(8)
EF 69 (b)(8)
EF 70 (b)(8)
EF 73 (b)(8)
EF 74 (b)(8)
EF 71 (b)(8)
EF 72 (b)(8)
EF 75 (b)(8)

AF 65
AF 66
AF 67
AF 68
AF 69
AF 70
AF 71
AF 72
AF 73
AF 74

Sahuarita Road

ARIZONA 83

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

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Scale: 1" = 2,000'

N W E S

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
- Micro Trench
- Plow
- Trench
- Shallow Trench
- Communications Pull Box
- Splice Vault
- Construction Footprint (Wilmot Route only, design pending)

AF 76

EF 76 (b)(8)

See Inset Map

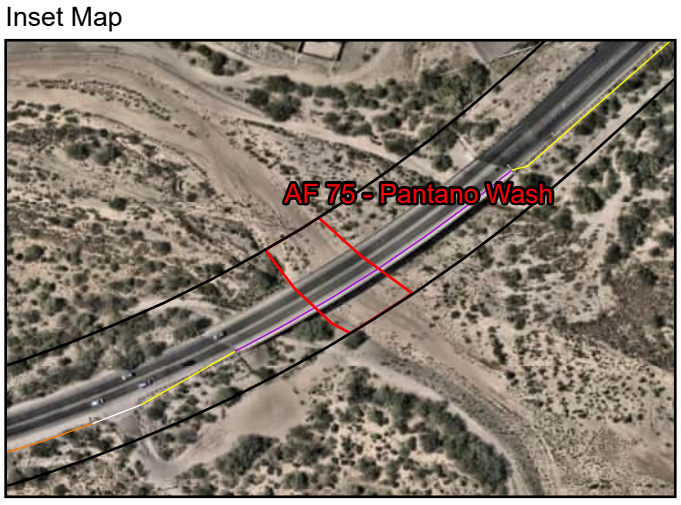
AF 75 - Pantano Wash

Colossal Cave Road

83

10

Inset Map



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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

Aquatic Features

Excluded Features

Sheetflow

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Scale: 1" = 2,000 feet

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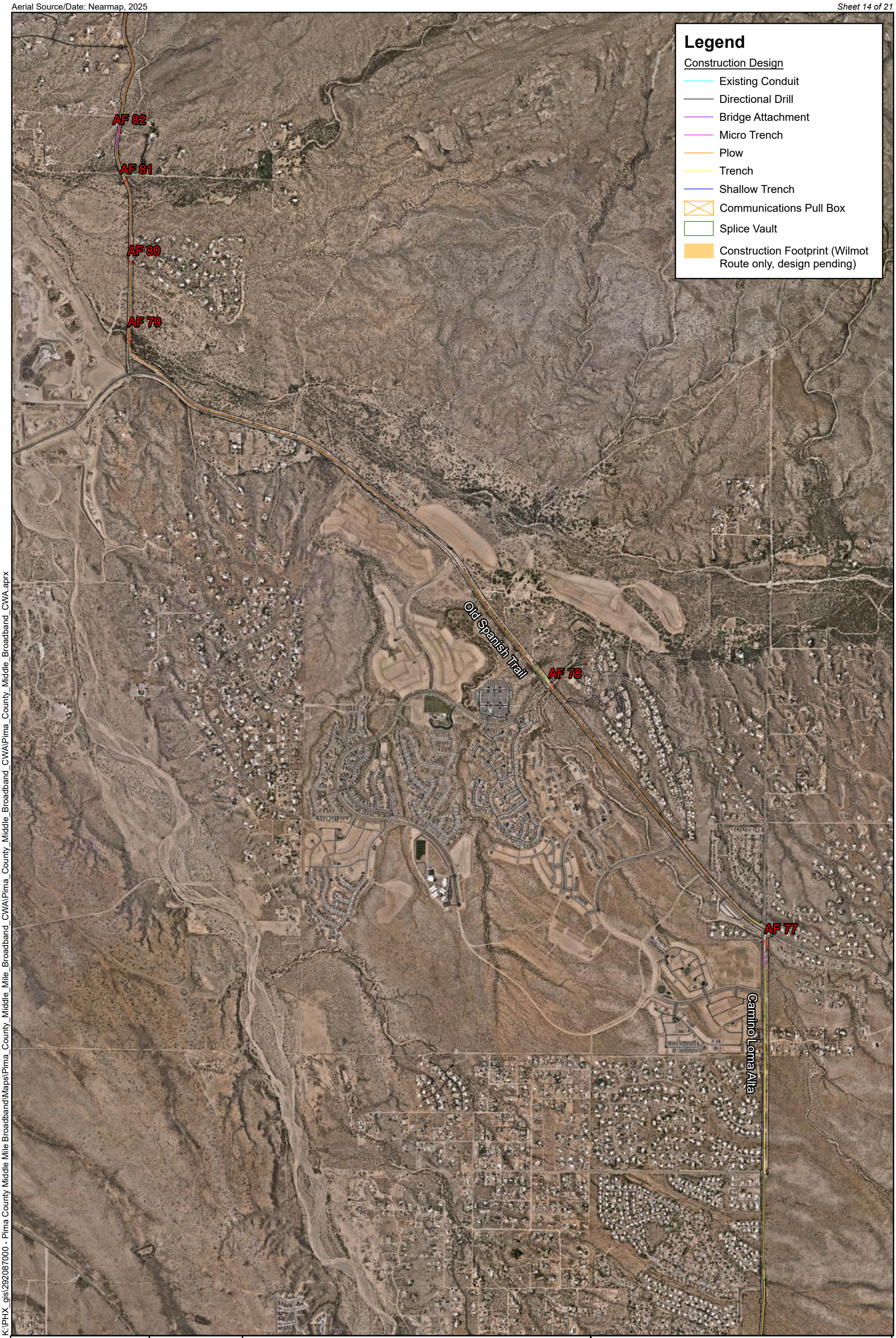

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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area
Aquatic Features
Excluded Features
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AF 86 - Tanque Verde Creek

See Inset Map

Sabino Canyon Road

AF 86 - Tanque Verde Creek

See Inset Map

Tanque Verde Road

AF 87

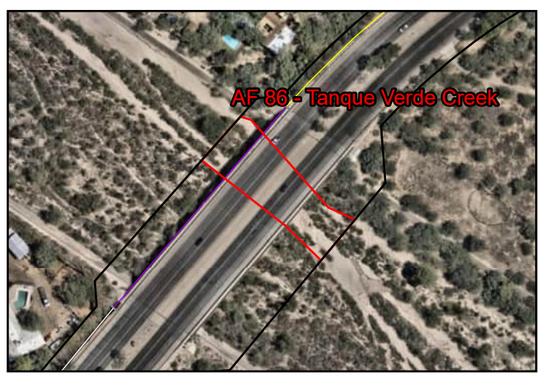
Houghton Road

See Inset Map

AF 86 - Tanque Verde Creek

Speedway Boulevard

Inset Map



Legend

Construction Design

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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

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Aquatic Features

Excluded Features

Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

AF 90

AF 89

AF 88

Sunrise Drive

Swan Road

Kolb Road

Sabino Canyon Road

Legend

Construction Design

- Existing Conduit
- Directional Drill
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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

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Scale: 1" = 2,000'

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Legend

Construction Design

- Existing Conduit
- Directional Drill
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- Micro Trench
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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

0 1,000 2,000 4,000 Feet

Scale: 1" = 2,000'

N W E S

AF 96

AF 95

Tangerine Road

La Canada Drive

AF 94 - Canada del Oro

AF 93

Magee Road

ARIZONA 77

Legend

Construction Design

- Existing Conduit
- Directional Drill
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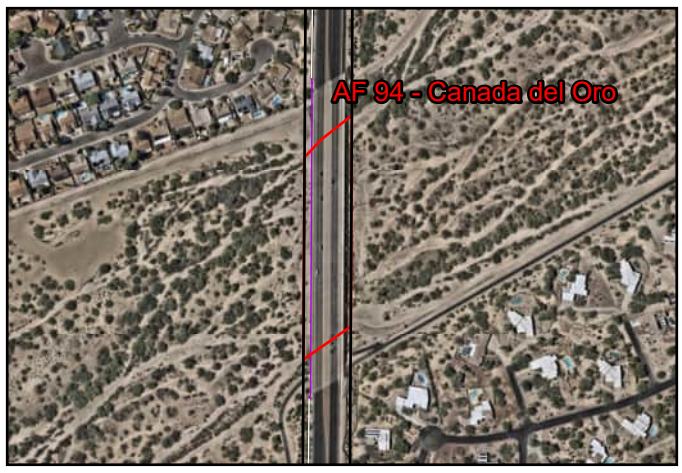

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Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area

Aquatic Features

Excluded Features

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Scale: 1" = 2,000 feet

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Tangerine Road

AF 106 AF 105 AF 104 AF 103 AF 102 AF 101 AF 100 AF 99 AF 98 AF 97 AF 96

EF 82 (b)(3)

EF 81 (b)(3)

EF 83 (b)(8)

EF 80 (b)(8)

Legend

Construction Design

- Existing Conduit
- Directional Drill
- Bridge Attachment
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Section 404/401 Compliance Map

Pima County, Arizona

Pima County Regional Middle Mile Project (PCRMMP)

EA Study Area

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Excluded Features

Sheetflow

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Scale: 1" = 2,000'

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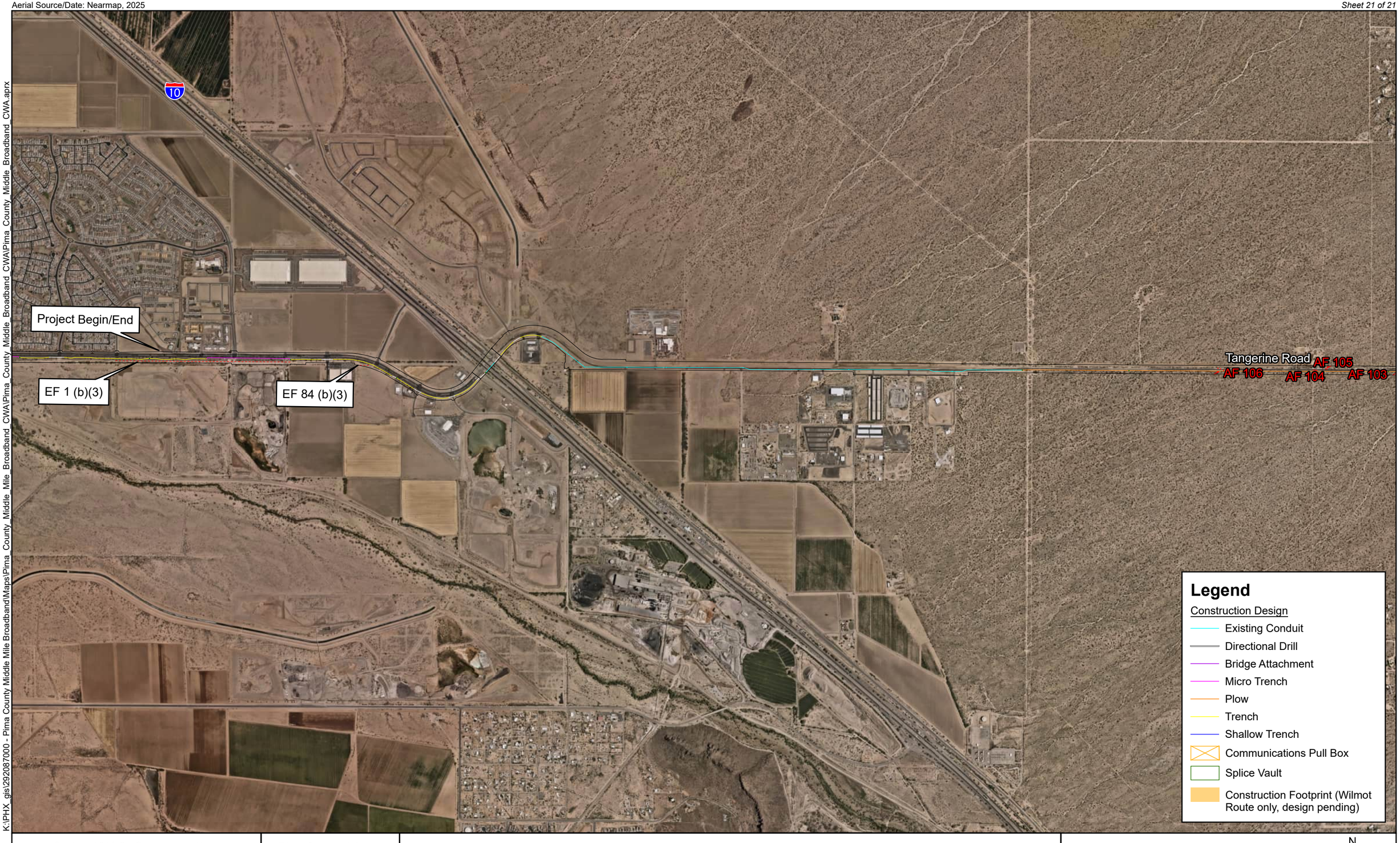

Section 404/401 Compliance Map	Pima County, Arizona
Pima County Regional Middle Mile Project (PCRMMP)	

EA Study Area | Aquatic Features | Excluded Features | Sheetflow

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Scale: 1" = 2,000'

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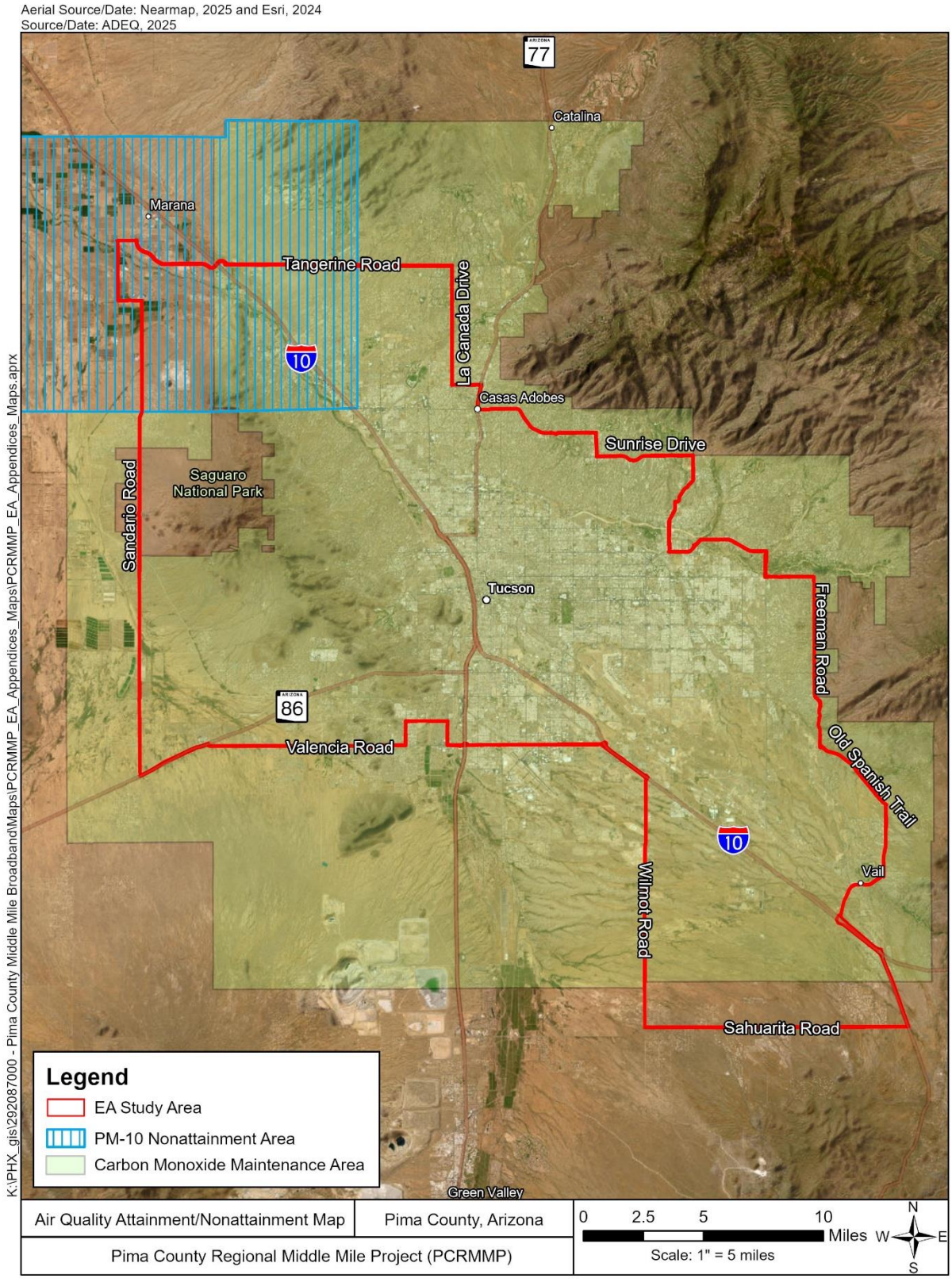
APPENDIX F: LAND USE AND RECREATION

Table F-1 – Impacts on State and Federal Land

Landowner	Total Acres in Project	Acres Impacted
ASLD	598	99
BLM	39	18
BOR	31	9
NPS	83	14

APPENDIX G: AIR QUALITY

Air Quality Attainment/Nonattainment Map



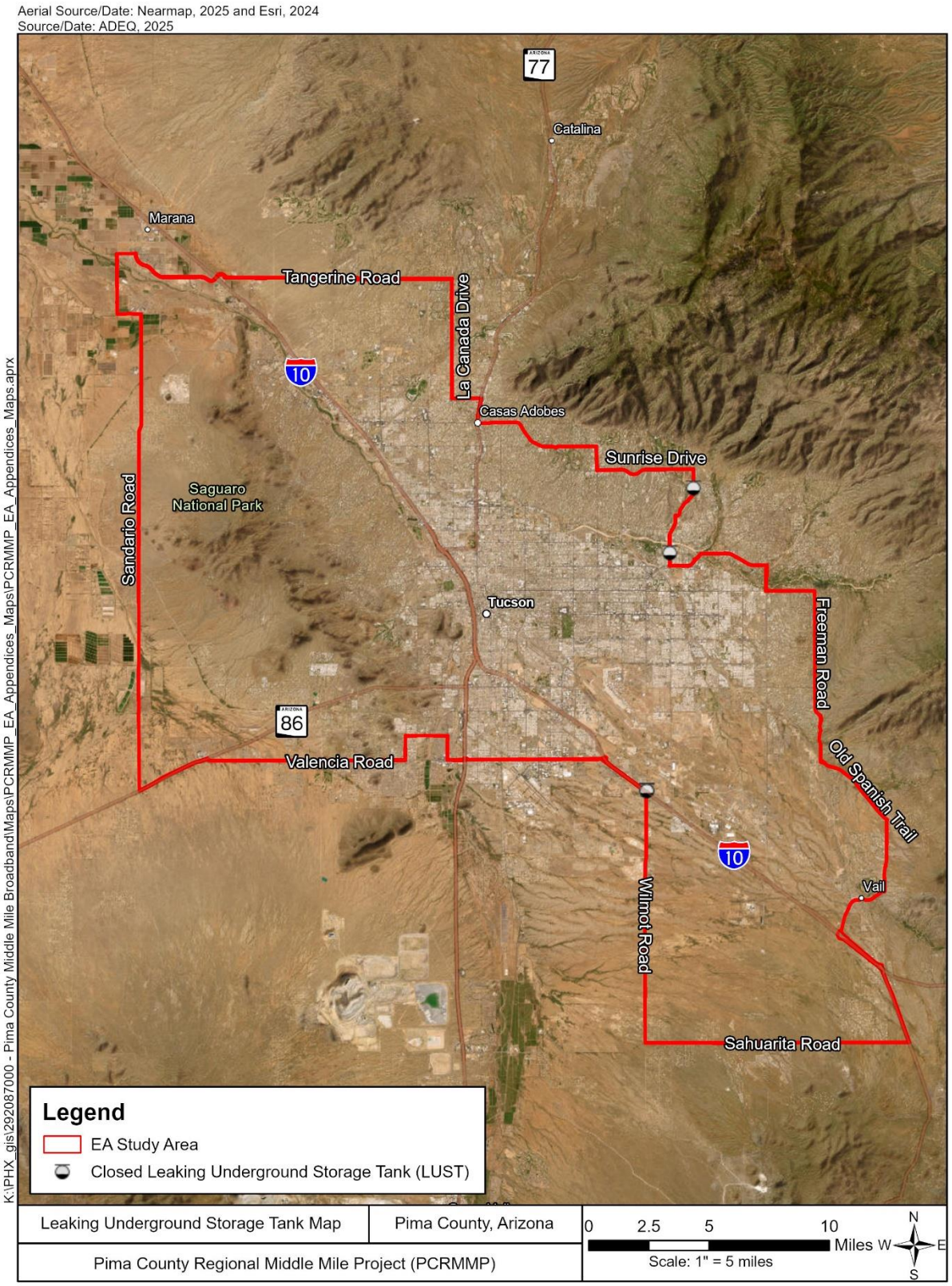
APPENDIX H: NOISE

Table H-1 - State and Local Noise Ordinances

Municipality	Regulation	Time Periods
State of Arizona	Section 9-500.52	A municipality may not enact or enforce any noise ordinance, rule or regulation that prohibits any general construction activities between May 1 and October 15 of each year between the hours of 5:00 am and 7:00 pm.
Pima County	9.30.070 Construction of buildings and other projects	Residential Zones April 15-October 15: work must occur between 6:00 am – 7:00 pm October 16th – April 14th: work must occur between 7:00 am and 7:00 pm Commercial and Industrial Zones Work must occur between 5:00 am and 7:00 pm Weekends and Holidays Work must occur between 7:00 am and 7:00 pm
City of Tucson	Section 16-31 Excessive Noise	Weekdays (Monday- Saturday) Work must occur between sunrise and 8:00 pm Weekends and Holidays Work must occur between 9:00 am and 6:00 pm
Town of Oro Valley	Section 10-1-4 Noise	Weekdays (Monday- Saturday) May 1 -October 15: 5:00 am to 7:00 pm October 16 - April 30: 6:00 am to 6:00 pm Weekends May 1 -October 15: 7:00 am to 7:00 pm October 16 - April 30: 8:00 am to 6:00 pm
Town of Marana	Section 11-5-4 Construction Noise	Residential Zones Weekdays: Work must occur between 6:00 am – 7:00 pm Saturday: Work must occur between 7:00 am – 7:00 pm Sunday: Work must occur between 9:00 am – 7:00 pm Commercial and Industrial Zones Work must occur between 5:00 am and 8:00 pm

APPENDIX I: HEALTH AND HUMAN SAFETY

Leaking Underground Storage Tank Map



APPENDIX J: BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

Infrastructure

- Follow all applicable federal, state, and local requirements for construction on or near public roads.
- Follow all applicable federal, state, and local laws concerning traffic speed and safety during the transport of equipment.
- Follow all applicable federal, state, or local requirements regarding utilities (water, sewer, power, and electricity) and construction within a utility ROW as to not exceed any acceptable limits.
- Follow all applicable state and local one-call laws and procedures for buildouts.
- Schedule deployment activities outside of peak traffic hours and avoid roads with heavy traffic volumes during peak travel hours, when scheduling the transport of heavy equipment or construction materials.
- Design staging areas to minimize unnecessary equipment and material mobilizations.
- Repave and restore disturbed roads and public road rights-of-way (ROWs), in accordance with federal, state, and local laws, as quickly as possible to minimize traffic impediments that hinder access to local public safety and emergency facilities and to allow traffic capacity and safety conditions to return to their pre-construction condition.
- Design new deployment activities within ROWs, to the extent possible, and outside of roadways and thoroughfares to minimize potential impacts on traffic flow or safety.
- Coordinate closely with public safety officials, emergency and medical facilities, and existing telecommunications providers so that each is aware of the deployment activities and schedule.
- Schedule new construction outside of seasons known to cause more accidents (e.g., hurricane or winter storm seasons or times of the year when wildfires are more likely to occur) so that potential service disruptions are less likely to coincide with times of increased demand.
- Confirm or otherwise install detection systems so that if a disruption to utility services or telecommunications systems occurs, it is identified and can be repaired quickly.
- Implement a backup telecommunications system, as needed and feasible, which allows first responders to communicate during deployment activities.
- Complete deployment activities as quickly and safely as possible to avoid any possible disruptions to utility services.
- Complete deployment activities that could interrupt power during non-peak times to minimize disruption of service.

Soil

- Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize erosion and sedimentation and restore disturbed soil.
- Minimize soil disturbance to the extent practicable.
- Avoid construction in areas with steep (greater than 20 percent) or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations, if practical.

- Develop a soil erosion and sedimentation control plan for disturbed areas and implement BMPs and mitigation measures including the use of silt fences, fiber rolls, gravel bag berms, erosion control blankets, retention ponds, straw and sandbag barriers, and other controls as needed to reduce soil erosion, stormwater runoff, and sedimentation.
- Schedule construction activities to avoid the movement of heavy equipment across land surfaces immediately following heavy rainfall or cover exposed areas with tarps or similar materials to prevent exposure.
- Minimize the area of bare soil at any one time as much as possible by constructing in stages.
- Revegetate disturbed areas as progressively and quickly as practicable to achieve stabilization.
- For areas requiring plowing, remove and store topsoil with a woven weed barrier or similar material for post-construction site restoration.
- Segregate topsoil or surface soil from subsurface layers to avoid compaction, and avoid areas identified as having soils vulnerable to compaction by selecting alternate locations to construct facilities, if practical.
- All vehicles should stay on existing roads or previously disturbed areas to the maximum extent practicable. Use timber mats or similar infrastructure to distribute vehicle and heavy equipment weight.
- Use deep tillage procedures where practical to loosen compacted soils.
- Restore soil surface to original or improved contours.
- Identify and maintain topsoil and implement temporary topsoil storage areas. Replace topsoil as soon as possible following construction.

Geology

- Follow all applicable federal, state, and local requirements for construction codes, seismic criteria, and geotechnical designs.
- Follow all applicable federal, state, and local requirements for mineral, fossil fuel, and paleontological resources.
- Locate construction/deployment activities outside of seismically active areas, high-risk seismic hazard zones, and active faults. Avoid construction in locations with karst topography or that have shown recent subsidence, or steep or unstable slopes that are susceptible to erosion.
- Avoid, to the extent practicable, deployment in areas that undergo significant geomorphological changes, such as within streams and rivers
- Consider alternate methods to trenching for placement of fiber optic cable in sensitive areas.
- Avoid rock ripping to preserve bedrock resources, topography, and physiography.
- Minimize the area/volume of disturbed terrain during construction.
- Restore topographic features and grades to pre-construction/deployment conditions.

Water Resources

- Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize introduction of eroded materials into waterbodies.

- Develop a Storm Water Pollution Prevention Plan (SWPPP), including engineered or site designed methods to control stormwater.
- Develop a Spill Prevention, Control, and Countermeasure (SPCC) Plan to prevent, contain, and report accidental spills.
- Minimize ground disturbance in or near waterbodies during construction, by minimizing the total area of bare soil, restoring native vegetation, and using silt fences and erosion control blankets.

Biological Resources

- Follow all applicable federal, state, and local requirements for vegetation removal, disturbance, and restoration. Obtain all appropriate permits and comply with permit conditions to minimize or avoid impacts to vegetation.
- Avoid construction/deployment in areas with high quality habitat or sensitive vegetation (i.e., woodlots and wetlands), unique habitat (i.e., shorelines and streambanks), or designated natural resources.
- Minimize land clearing and vegetation disturbance, specifically to native vegetation, by using existing roads, previously disturbed areas, and unvegetated areas, and consolidate construction activities and staging areas as much as possible (collocation and use of existing ROWs) to reduce vegetation loss. Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss.
- The contractor shall develop a Noxious and Invasive Plant Species Treatment and Control Plan in accordance with the requirements in the contract documents.
    - Plants to be controlled shall include those listed in the state and federal noxious weed and the state invasive species lists in accordance with state and federal laws and executive orders.
    - The plan and associated treatments shall include all areas within the project right-of-way and easements as shown on the project plans.
    - The treatment and control plan shall be submitted to the Pima County Project Design & Construction Department Project Manager for review and approval prior to implementation by the contractor.
    - Control of noxious and invasive species in the project area shall be performed prior to the start of ground-disturbing activities, throughout the duration of construction, and any landscape establishment period.
- To prevent the introduction of invasive species seeds, all earthmoving and hauling equipment shall be washed prior to entering the construction site and the contractor shall inspect all construction equipment and remove all attached debris, including plant parts, soil and mud, prior to the equipment entering the construction site.
- To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction and hauling equipment and remove all debris, including plant parts, soil and mud, prior to leaving the construction site.

- For work on National Park Service (NPS) land, NPS shall inspect all equipment before work begins and equipment must be free of soil and organic material before being off loaded or work begins.
- Restore disturbed areas as progressively and quickly as possible to pre-construction use and vegetation cover using native and certified seed mixes and seed dispersal, management, and maintenance processes. Close and revegetate any temporary and unnecessary roads after completion of the project.
- Protected native plants within the project limits will be impacted by this project; therefore, the contractor will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the contractor will send the notification at least 60 (sixty) calendar days prior to the start of construction.

Wildlife

- Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable.
- Turn off all unnecessary lighting at night. If nighttime lighting is required use motion sensor security lights that are activated as needed. Minimize or avoid the use of sodium vapor lights at site facilities to reduce attraction of migratory birds.
- Limit construction equipment and vehicles to approved roads or ROWs.
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss.
- If vegetation clearing will occur during the migratory bird breeding season (March 1 - August 31), the contractor shall avoid any active bird nests. If the active nests cannot be avoided, the contractor shall notify the Project Manager to evaluate the situation. During the non-breeding season (September 1 - February 28) vegetation removal is not subject to this restriction.
- Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, contractors' employees, supervisors, inspectors, and subcontractors, shall review the attached "Western Burrowing Owl Awareness" flyer.
- If any burrowing owls or active burrows are identified, the contractor shall notify the Project Manager to evaluate the situation immediately. No construction activities shall take place within 100 feet of any active burrow.
- If the Owner, in cooperation with the biologist, determines that burrowing owls cannot be avoided, the contractor shall employ a qualified biologist holding a permit from the U.S. Fish and Wildlife Service to relocate burrowing owls from the project area, as appropriate.

Threatened and Endangered Species

- Follow all applicable federal and state requirements for construction activities.
- The Pima County Project Manager will review and approve the resumes of the qualified biologist(s) employed by the contractor.
- Pima County shall employ a qualified biologist to complete pre-construction protocol surveys for Pima pineapple cactus within 14 days of construction in all suitable habitat that will be disturbed beyond the Pima County Section 10 Permit Area. Upon completion of the surveys, the qualified biologist shall provide the Pima County Project Manager survey results.

- The contractor shall employ a qualified biologist(s) to fence off known Pima pineapple cactus locations. The qualified biologist(s) shall have sufficient Pima pineapple cactus experience to carry out these duties.
- Within 14 days of construction, the contractor shall submit the resumes of the qualified biologist(s) to the Pima County Project Manager for approval.
- Within 14 days of construction, the qualified biologist(s) shall fence off an avoidance area around all known Pima pineapple cactus locations in the project limits using T-posts and orange plastic mesh construction fencing. There shall be a (minimum) 10-meter buffer between any Pima pineapple cactus and the fencing material. The contractor shall furnish the fencing materials.
- The contractor shall avoid all fenced and otherwise designated sensitive resource areas within or adjacent to the project area.
- The contractor will contact the Pima County Project Manager at least ten (10) working days prior to the commencement of work to ensure compliance with avoidance areas.
- The contractor shall restrict all construction activities and vehicle use to areas as identified in the design plans.
- If any damage to a Pima pineapple cactus occurs, or if previously unidentified Pima pineapple cacti are encountered during any activity related to construction, the contractor shall stop work immediately at that location and shall take all reasonable steps to protect the cactus in place. The Contractor shall notify the qualified biologist (if onsite) and contact the Pima County Project Manager immediately to make arrangements for proper treatment of the cactus.
- If any Sonoran Desert tortoises are encountered during construction, the contractor shall adhere to the AGFD "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects," revised September 22, 2014.

Land Use and Recreation

Land Use

- Follow applicable federal, state, and local land use and zoning plans and policies to ensure compatibility with existing and surrounding land uses.
- Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and land use issues and concerns specific to the region.
- Signage areas, access roads, and/or easements that would require temporary closure or limited access to accommodate certain land uses.
- Schedule construction activities to minimize impacts to existing and surrounding land uses.
- Utilize existing roads, ROWs, easements, and utility corridors to minimize the number of new access roads.
- Give preference to development options that involve the use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, new buried infrastructure, etc.), especially near recreation lands.
- Avoid or minimize construction activities in areas covered by existing incompatible easements.
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure.

- Select infrastructure designs that minimize contrast with the surrounding landscape and land uses.

Recreation

- Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify recreation activities specific to the region and their respective seasons.
- Schedule deployment activities, where feasible, to not interfere with seasonal recreation activities.
- Utilize existing roads, ROWs, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access roads.
- Give preference to infrastructure locations that are compatible with existing park or recreation planning documents.

Cultural Resources

- Follow all applicable federal requirements for agency and tribal consultation on the identification and assessment of effects to cultural resources.
- Comply with all relevant and applicable federal, state, or local regulations and guidance regarding visual and aesthetic conditions and impacts.
- Follow all applicable federal and state requirements if inadvertent discoveries of human remains are made during deployment or operations.
- Ensure usage of an appropriate indirect effects Area of Potential Effects as part of pre-siting or pre-deployment surveys to sufficiently account for potential indirect effects to cultural resources.
- Establish procedures for pre-deployment monitoring if a project has the potential to adversely and indirectly affect historic properties to collect baseline data, monitor potential indirect effects during deployment, and determine if effects have occurred post-deployment.
- Develop BMPs and mitigation measures as part of a Programmatic Agreement to address any potential effects, if they were to occur.
- Use low-impact construction alternatives, when feasible. For instance, ripping could be used as an alternative to blasting near structures or archaeological sites identified as at risk of effects from vibration. Other techniques, such as bored piling, could be used to minimize the vibration generated.
- Restrict the timing of deployment activities so as not to disturb the use of historic properties. Stop work at certain times when traditional and/or religious properties are in use, such as religious festivals or cultural ceremonies.
- Consult with site users through a community liaison team to understand site usage and how the project could affect user access.
- Arrange alternative access using stakeholder input if access to an important cultural heritage site is restricted or blocked. Notify the public of the blockage and alternate means of access.
- Select infrastructure designs that minimize construction footprints.
- Design projects to mitigate potentially negative visual and auditory impacts of facilities, such as noise-reducing barriers, low-profile constructions, proper siting to maximize the use of topography and vegetation, screening, blending with topographic forms and existing vegetation

patterns, and use of environmental coloration or advanced camouflage techniques to limit visual effects.

- Proposed design should take into account the scenic character of the surrounding area to reasonably minimize or avoid visual impacts to the surrounding area when viewed from existing roadways or shorelines (design structures to complement the natural landscape; for example, use paint that blends with the surrounding landscape).
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried infrastructure, etc.), and specifically avoid the construction of new aerial fiber optic plant and/or new wireless communication towers within or in locations within sight of federal or other lands where visual resources are regulated (e.g., units of the National Park System, or areas where local zoning regulations emphasize protection of views or aesthetic conditions), or where residents and visitors have come to expect high visual quality and the absence of human-built structures.
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation, and that are as far from surrounding residences as possible.
- Implement sensitive grading techniques that blend with the natural terrain, and where appropriate, use vegetation as screens to block views of structures and roadways.
- Revegetate disturbed areas as progressively and quickly as practicable to restore vegetative cover.
- Reduce or eliminate the need for lighting on poles or structures or restrict the duration and directionality of needed lighting.

Air Quality

- Follow all applicable federal, state, and local requirements for obtaining air pollution control permits for applicable emission sources and follow standards for nuisance and fossil fuel-powered generators.
- Avoid constructing and operating emission sources in extreme or severe nonattainment areas and Class I Areas, and ensure all activities comply with general conformity requirements in nonattainment and maintenance areas.
- For equipment with internal combustion engines, use engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels), and/or install emission control devices.
- Ensure all diesel engines are compliant with USEPA emission standards for the corresponding engine class, and when possible, use low-sulfur or ultra-low-sulfur diesel fuel in construction equipment, trucks, vehicles, and generators.
- When possible, use vehicles with hybrid or electric technology to reduce or eliminate criteria pollutant emissions from fuel combustion.
- Obtain permits, where required, to install and operate fossil fuel-powered generators. If possible, consider using hydrogen-fueled generators to reduce nitrous oxide emissions.
- To control dust from construction or other land-disturbing activities, spray water on roads/construction areas, limit the area of uncovered soil to the minimum needed for each

activity, site staging areas to minimize fugitive dust, use a soil stabilizer (chemical dust suppressor), mulch areas or use a temporary gravel cover, limit the number and speed of vehicles on the site, and cover trucks hauling dirt.

- Implement a dust control plan for construction activities and any travel over unpaved roads, and post and enforce speed limits on dirt/gravel roads to reduce airborne fugitive dust.
- Limit idling time of construction vehicle and equipment and conduct proper vehicle maintenance.
- Ensure all activities conform to the latest air quality regulations called State Implementation Plan (SIP) which are approved by the EPA.
- Ensure all equipment is appropriately sized for the project.
- Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment, power generators, and aerial platforms are maintained in accordance with manufacturer's specifications.

Noise

- Follow all applicable federal, state, and local requirements for construction noise and vibration restrictions.
- For those projects involving heavy equipment for deployment that can generate noise and vibration, avoid deployment in areas with highly sensitive receptors and construct facilities in alternate locations. Such sensitive areas include foraging or breeding areas for disturbance-sensitive congregatory species (such as some species of bats, colonial waterbirds, and seabirds), particularly those species that are listed as threatened or endangered, as well as wilderness areas (where recreational activities such as hiking, bird watching, etc. occur).
- For construction and grading activities near populated areas, heavy equipment should use noise mufflers to limit noise exposure on noise-sensitive receptors.
- For construction and grading activities near other noise sensitive receptors, including parks or other protected areas, heavy equipment should use noise mufflers to limit noise exposure, and the use of such equipment should be limited to operation only during daytime hours.
- Equipment that is expected to generate significant noise and vibration should include mitigation measures during the design and implementation phases of the project (e.g., use of noise barriers such as walls, shrubbery).
- Limit construction activities to daytime hours (7 a.m. to 7 p.m.) to the extent possible when increased noise and vibration levels are more tolerable and avoid construction on Sundays and legal holidays.
- Implement BMPs and mitigation measures as directed by the local jurisdiction such as avoiding unnecessary revving of engines, switching off equipment when not in use, changing location of stationary construction equipment, minimizing drop height of materials, replacing conventional audible reversing alarms with more quiet alternative reversing warning systems, setting equipment away from noise sensitive areas (if practicable), notifying adjacent residents in advance of construction work, installing temporary acoustic barriers around stationary construction noise sources, and other controls as needed to reduce increased noise levels.

- Ensure, as practicable, all heavy equipment, power generators, and boats are maintained in accordance with manufacturer's specifications.

Health and Human Safety

- Follow all applicable federal, state, and local requirements for hazardous materials and hazardous waste management.
- Utilize trained and licensed heavy equipment operators when available or required.
- Develop site-specific Health and Safety Plans that identify all potential physical and chemical hazards present at the site, including historic contamination.
- Develop and utilize Standard Operating Procedures for site preparation activities and include description of work practice controls and administrative controls.
- Ensure workers wear proper safety equipment, such as high visibility safety vests, hard hats, steel toe boots, gloves, eye protection, and hearing protection.
- Provide daily safety meetings to review activities, potential hazards, and safety objectives.
- Conduct air and noise monitoring to ensure levels stay within health-protective levels for communities and workers, and as required, that workers are trained and comply with personal protective equipment requirements as established by the Occupational Safety and Health Administration (OSHA).
- Ensure that appropriate measures are taken in compliance with applicable regulations (including Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act) if construction occurs in an area where there is the potential for legacy contamination, to protect workers and the public from unacceptable levels of exposure to contaminants as a result of deployment activities.
- Establish an emergency response plan (including emergency preparedness and response activities, resources, and responsibilities) to attend to specific emergencies (e.g., accidental spills) that could arise during deployment.
- Ensure that reporting requirements are followed in the event that Emergency Planning and Community Right-to-Know Act reporting thresholds are reached for the shipping, handling or storage of gasoline or diesel used for equipment and generators.

APPENDIX K: PUBLIC COMMENT

From: [redacted]
Sent: Monday, April 6, 2026 10:08 AM
To: NEPAComments <NEPAComments@ntia.gov>
Subject: Middle-Mile Broadband

This comment concerns the proposed middle-mile broadband being contemplated for Pima County. Time was when people just dealt with massive communication voids across this country, and then the telegraph showed up. We could not look back after that.

Eventually, telephony made its debut on the national scene, and we could not look back on that, either. Few can imagine, and even fewer could embrace, communities being unable to communicate with each other because of the lack of telephone access.

The internet has dialed that up to more than just communication; providing services and information between and among millions of people across the U.S. Again, there's no going back from that technological shift.

I believe that it is incumbent on local governments to create and support the infrastructure necessary to move us forward as a society, and so I fully support and applaud the efforts of the county to create and maintain this ring of access for the people in the area.

Kind regards,
-=[redacted]