TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

Prepared for:

United States Department of Agriculture
Rural Development- Arizona State Office
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January 21, 2020

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Acronyms and Abbreviations

ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
BMPs	Best Management Practices
E	East
ER	Environmental Report
FPPA	Farmland Protection Policy Act
gpm	gallons per minute
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
R	Range
RD	Rural Development
Stantec	Stantec Consulting Services Inc.
T	Township
Tacna Water	Yuma County Improvement District 2017-02
U.S.	United States
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
W	West
WMIDD	Wellton Mohawk Irrigation and Drainage District

1.0 INTRODUCTION

1.1 Purpose and Need for the Proposal

An application for federal funding by the United States (U.S.) Department of Agriculture (USDA), Rural Development (RD) is being submitted by Yuma County on behalf of the Yuma County Improvement District 2017-02 (Tacna Water). The purpose of the funding application is to replace the current water distribution system to the town of Tacna, Arizona, which is an USDA eligible area for water systems funding. The town of Tacna currently has a water distribution system that is more than 39 years old and has drinking water deemed as non-drinkable due to high levels of arsenic.

Funding is needed to provide safe drinking water to the residents of Tacna. The proposed Project will upgrade the current water distribution system in order to address leaks and erosion. Additionally, plans are in place to address the existing poor water quality, as the Arizona Department of Environmental Quality (ADEQ) placed an Administrative Order on the water system deeming the water non-drinkable due to high arsenic levels in 2012. The current water system is operating under an administrative order from the ADEQ and if the current water distribution system is not addressed the community will continue to be out of compliance with the ADEQ. This report has been prepared to evaluate the appropriate level of National Environmental Policy Act (NEPA) documentation for the USDA RD funding assistance to construct and operate a clean and reliable drinking water system for Tacna Water.

1.2 Project Background

The existing water system in Tacna has been in place since 1980. It is owned by the Tacna Water Management Company. The system includes a groundwater well, piping, pumps and water storage. Some upgrading of the system has been completed since 1980 including installation of a water intake on the Wellton-Mohawk canal, installation of water treatment in 2007, and repainting of the water storage tank. The existing water system serving the community of Tacna includes approximately 10,000 linear feet of polyvinyl chloride and transit pipe, an above ground welded steel water storage tank, a well, a booster pump and an intake on the Wellton-Mohawk canal. The system includes 175 service connections and typically provides water to 135 to 160 customers (approximately 310 people). The water system includes no fire hydrants and currently does not provide fire protection. No water treatment is currently provided. The piping and the tank are reported to be in poor conditions with evidence of leaks (Stantec, 2019a).

1.3 Project Location and Description

The proposed Project is located in the town of Tacna in Yuma County, Arizona, approximately 42 miles from Yuma, Arizona (**Figure 1**). The Project can be accessed east or west along Interstate 8. The proposed replacement water system would include infrastructure located within portions of Township (T) 8 South (S), Range (R) 17 West (W), Section 25 and T8S, R16W, Section 30, Gila and Salt River Baseline and Meridian.

The proposed Tacna replacement water system (Project) would consist of three components and are discussed in detail below: 1) water supply and treatment; 2) water storage; and 3) a replacement water distribution system.

Six potential sites have been identified to house the new water treatment and storage facilities (**Figure 2**).

1.3.1 Water Supply and Treatment

The town of Tacna has two options available for water supply including either a groundwater well or a surface water intake from the Wellton Mohawk Irrigation and Drainage District (WMIDD) canal. The water supply and treatment system would be designed to be capable of meeting the peak hour demand and maximum day demand respectively, at a minimum. A back-up water supply would also be constructed to allow for times when the primary water source may be unavailable.

If Yuma County chooses a groundwater well, the proposed well would be located adjacent to the proposed treatment and storage site depending on the site selected, similar to the current configuration. The proposed well would replace the existing well and would be required to be located more than 100 feet from a septic system and spacing of at least 200 feet is recommended between two wells. An Arizona Department of Water Resources impact study would be recommended prior to well drilling to identify any conflicts. It is anticipated that water from the groundwater well would require arsenic treatment (Stantec, 2019a).

If surface water intake from the WMIDD canal is chosen, the existing intake ownership can be cancelled or transferred to the new water system and therefore a new intake would not be required. Water samples from the WMIDD canal indicate that filtration and disinfection would be required to comply with the ADEQ Surface Water Treatment Rule; however, arsenic treatment would not be required for use of the canal water (Stantec, 2019a).

1.3.2 Water Storage

As a new water distribution system would be constructed to serve the community, the new system would be designed to include fire protection, which require water storage meet the maximum day demand as well as fire flows. The Yuma County Chief Building Official/Fire Code Official recommends a fire storage of 1,000 gallons per minute (gpm) for every two hours (Stantec, 2019a). The proposed water storage tank would be designed to hold a volume of approximately 180,000 gallons of water which would meet maximum day demand and fire flows (Stantec, 2019a). **Table 1** details the proposed water storage requirements for the proposed Project.

Table 1 Proposed Water Storage

Water Storage Factors	Storage Capacity	
	Existing	Future
ADD (gallons/day)	31,000	40,300
PMD (gallons/day)	46,500	60,450

Water Storage Factors	Storage Capacity	
	Existing	Future
Fire Flow Rate (gpm)	1,000	1,000
Fire Flow Duration	2	2
FFC (gallons)	96,000	96,000
Minimum Required Storage (PMD+FFC)	142,500	156,450

Source: Stantec, 2019a
ADD = Average Day Demand
PMD = Peak Month Demand
FFC = Fire Flow Capacity

1.3.3 Replacement Distribution System

The proposed water distribution system would consist of a replacement pumping system which would pump water from the storage tank and a network of piping to each of the users. The pumps would provide pressure to the users. The pipe main sizes would be minimum six-inch diameter with hydrants to provide fire flows for fire protection. Small diameter service piping would provide service to the users from the six-inch mains. The pump system would meet the peak hour demand for normal usage and maximum day demand plus the required fire flow for fire protection, as needed. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system in order reach all users (**Figure 2**) (Stantec, 2019a). Approximately three miles of piping would be required for the proposed Project.

1.4 Project Alternatives

The following alternatives were considered for a new water system to eliminate the health and safety risks associated with the quality of the water and the condition of the water infrastructure at the town of Tacna.

1.4.1 Alternative 1

Alternative 1 would consist of the construction of a new intake on the WMIDD canal as the new primary water supply, with a backup groundwater well to be used during a potential canal dry-up. As stated in Section 1.2.1, the existing intake ownership would be cancelled or transferred to the new water system and the new well would replace the existing well. Alternative 1 would provide filtration and disinfection for the canal water prior to consumption. In addition, Alternative 1 would provide a new storage tank, pump station, and a replacement distribution system throughout the community. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system. As the potential canal dry-up would not be considered a regular occurrence, no treatment would be proposed for the backup groundwater well. Should the canal water dry up and the use of the back-up groundwater well was initiated, a notice would be sent to users that the water is not potable.

1.4.2 Alternative 2 (Preferred Alternative)

Alternative 2 would be similar to Alternative 1 and would include the construction of a new intake on the WMIDD canal as the new primary water supply, with a backup groundwater well to be use during a potential canal dry-up. As stated in Section 1.2.1, the existing intake ownership would be cancelled or transferred to the new water system and the new well would replace the existing well. However, under Alternative 2, the new system would provide filtration and disinfection for the canal water and arsenic treatment for the groundwater well so that either water source can be used at any time. In addition, Alternative 2 would provide a new storage tank, pump station, and a replacement distribution system throughout the community. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system. Yuma County has identified Alternative 2 as the preferred option for the proposed Project.

1.4.3 Alternative 3

Under Alternative 3, construction of a new intake on the WMIDD canal would occur as the new primary water supply. Under Alternative 3, there would be no back-up water supply and only replacement parts would be made available for repairs as needed. The water supply from the WMIDD canal would have filtration and disinfection. Additionally, a new storage tank, pump station, and a replacement distribution system would be constructed. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system.

1.4.4 Alternative 4

Under Alternative 4, construction of a new groundwater well would occur as the primary water supply, with a second groundwater well to be used as the back-up water supply. Both wells would be treated for arsenic and a new storage tank, pump station, and a replacement distribution system would be constructed. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system.

1.4.5 Alternative 5

Under Alternative 5, construction of a new groundwater well would occur as the primary water supply and an additional back-up water supply would not be constructed. Replacement parts, including a back-up pump, would be made available for repairs as needed. The well would be treated for arsenic and a new storage tank, pump station, and a replacement distribution system would be constructed. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system.

1.4.6 Alternative 6 (No Action)

Under Alternative 6, Yuma County would take no action and would continue to operate with the existing water system. The No Action Alternative would not be considered a viable option, as the ADEQ has issued an administrative order on the current water system and the town of Tacna would continue to be out of compliance with the ADEQ. Under the Safe Drinking Water Act,

pursuant to Arizona Revised Statutes § 49-353(A)(2)(a), the ADEQ enforces safe drinking water standards and drinking water rules and programs. The ADEQ provides technical assistance to water suppliers and can take legal action against systems that fail to provide water that meets drinking water standards. This alternative does not address the impacts of the deteriorating existing water system components and, therefore it is not considered feasible and has not be developed further.

2.0 PROJECT ENVIRONMENT

The format of this Environmental Report (ER) follows the guidance provided in RD Instruction 1970-B, Subpart B - NEPA Categorical Exclusions under §1970.54, Exhibit C: Guide to Applicants for Preparing Environmental Reports for Categorical Exclusions. Resources covered in this ER follow the provided guidance and include the following:

- Land Ownership/Land Use;
- Historic Preservation;
- Threatened and Endangered Species/Biological Resources;
- Wetlands and Section 404 Waterways;
- Floodplains;
- Coastal Areas;
- Important Farmland;
- Environmental Risk Management; and
- Other Resources (Water Resources, Air Quality, Noise, Visual, and Transportation).

2.1 Land Ownership/Land Use

The proposed Project occurs within portions of T8S, R17W, Section 25 and T8S, R16W, Section 30. The Project area consists of residential and commercial structures with nearby agriculture areas. The proposed Project pipeline alignment would cross approximately 2.73 miles of private land, 0.002 miles of Bureau of Reclamation land and 0.51 miles of State Trust Land. **Figure 3** displays the land ownership of the Project area and **Table 2** presents the land ownership acreage of the six different potential sites as part of the proposed Project.

Table 2 Land Ownership of Potential Sites

Potential Site ID	Land Ownership	Acres
1	Bureau of Reclamation	4.62
2	Private Land	0.23
3	State Trust Land	0.60
4	Private Land	0.52
	State Trust Land	0.08
5	Private Land	0.17
6	State Trust Land	2.43

There are no special areas as determined by the Arizona Game and Fish Department (AZGFD) or critical habitats as determined by the U.S. Fish and Wildlife Service (USFWS) within the Project area. In addition, there are no Formally Classified Lands (Wild and Scenic Rivers, National Natural Landmarks, National Parks, or Wilderness Areas) within the Project area.

The proposed Project is not anticipated to adversely impact land use as it would only be a replacement to the existing system that currently exists in the town of Tacna. Nearby residences and businesses would have minor disturbances from construction activities including a short-term, temporary increase in noise and dust during construction. The final treatment site selection would require Yuma County work with the legal, existing landowner prior to any development and secure any required permits.

The town of Tacna has a 58 percent minority population with 49 percent of the population identified as low income (EPA, 2019a) (**Appendix A**). While, the population of Tacna has a large low income, minority population, the proposed Project would comply with water quality regulations and would result in safe drinking water for the residents and would not negatively affect the quality and/or level of services provided to the community. The Project would not change the current land use pattern of the area, it would provide the residents a degree of protection from health hazards, and the Project would not result in a disproportionate adverse impact to the residents of Tacna.

2.2 Historic Preservation

A Class III cultural resources inventory was completed on October 10, 2019 for the proposed Project to fulfill the cultural resources compliance requirements of the USDA RD as required under Section 106 of the National Historic Preservation Act. The results of the survey are contained in a separate report which follows the Arizona State Historic Preservation Office Survey Report Summary Form guidelines (Stantec, 2019b) (**Appendix B**).

Prior to conducting the field survey, a records search was conducted at the Arizona State Museum. The search revealed that six archaeological surveys were previously conducted within the 0.5-mile radius of the Project area and there were no surveys previously conducted directly within the Project area. Furthermore, no archaeological sites were previously documented within the Project area; however, four previously documented sites are located within the 0.5-mile radius of the Project area.

No historic or prehistoric cultural resources and/or isolated occurrences were identified during the field survey; therefore, no impacts to cultural resources from the proposed Project are anticipated to occur.

2.3 Threatened and Endangered Species/Biological Resources

Stantec Consulting Services Inc. (Stantec) completed a biological baseline field survey on September 18, 2019 for the purpose of identifying vegetation communities present, the presence of noxious weeds, the presence of federally threatened and endangered species or state listed

sensitive species or their habitat, and any other wildlife species within the Project area. Prior to performing the biological baseline surveys, Stantec contacted the USFWS and the AZGFD to request information regarding threatened and endangered and sensitive wildlife and vegetation species as having the potential to occur in the Project area.

The USFWS identified the following Threatened, Endangered, or Candidate species have the potential to occur within the Project area (**Appendix C**):

- Sonoran pronghorn (*Antilocapra americana sonoriensis*);
- Southwestern willow flycatcher (*Empidonax trailii extimus*);
- Yellow-billed cuckoo (*Coccyzus americanus*); and
- Yuma clapper rail (*Rallus longirostris yumanensis*).

In addition, the AZGFD's Environmental Online Review Tool was utilized to identify potential Special Status Species and Species of Greatest Conservation Concern that may occur within the Project area or the vicinity of the Project area. The AZGFD identified numerous Special Status Species and Species of Greatest Conservation Concern that may occur or have suitable habitat in the Project area or vicinity of the Project area. Suitable habitat for migratory birds were also identified during initial data review. The specific species identified as having the potential to occur, or having potential habitat within or adjacent to the Project area, are detailed in **Appendix C**.

No Threatened, Endangered, or Candidate species were identified during the biological baseline field survey for the Project. Furthermore, it was determined that the Project area had a low potential of occurrence for the four species identified by the USFWS due to marginal habitat conditions and proximity to human activity and disturbance. Suitable habitat for the Sonoran pronghorn was identified, but it was determined that this species would likely avoid the habitat as a result of existing human activity and disturbance. Habitat for the other three USFWS identified species was not found during the field survey; however, all four species may travel through the Project area (Stantec, 2019c).

No AZGFD Special Status Species or Species of Greatest Conservation Concern were identified during the general wildlife survey. Habitat for those species identified as having potential to occur during review of the AZGFD Environmental Online Review Tool was assessed to be non-existent or low to medium during the field survey, with the existing human presence and disturbance likely deterring the use of any potential habitat under existing conditions. However, potential habitat for western burrowing owl (*Athene cunicularia hypugaea*), Sonoran Desert toad (*Incilius alvarius)*, migratory birds, and two mammal species was identified. Potential foraging habitat for several bat species was identified because of the Project's proximity to the Welton-Mohawk canal, but roosting habitat was found to be lacking within the Project area due to limited roosting locations. The proposed Project is not anticipated to have significant impacts on wildlife species and impacts are assumed to be short-term and negligible if pre-construction clearance surveys are conducted. Indirect impacts may include avoidance of suitable habitat due to noise generated from construction of the Project. Direct or indirect impacts would cease once construction of the Project is completed (Stantec, 2019c).

It is recommended that prior to construction activities, the unpaved areas of surface disturbance should be surveyed for active western burrowing owl burrows by a qualified biologist within three to five days prior to surface disturbance. Identified suitable habitat should be surveyed by a qualified biologist utilizing the AZGFD 2009 Burrowing Owl Survey Protocol. Surveys should be conducted within the first two hours of dawn or dusk during calm weather. If active burrows are discovered, then the AZGFD should be notified to implement conservation measures prior to surface disturbance. If inactive burrows are discovered, then the biologist should implement conservation measures prior to surface disturbance in coordination with AZGFD.

In addition, all vegetation clearing should be completed during the non-migratory bird breeding season, September through April. If it is necessary to clear trees or shrubs during the breeding season, then a migratory bird survey should be completed by a qualified biologist on the lands identified for disturbance and adjacent areas of potential effect. If an active migratory bird nest is discovered, then a buffer around the nest should be established in coordination with AZGFD and disturbance should be avoided until the young have fledged the nest.

2.4 Wetlands

The National Wetland Inventory (NWI) identified a small number of riverine channels near the vicinity of the proposed Project, including the Welton-Mohawk canal (**Figure 4**). None of the NWI-identified channels fall within the proposed disturbance footprint of the Project except for one intermittent or ephemeral channel which crosses a very small portion of the existing water piping distribution system in the southwest portion of the Project area (**Figure 4**).

It is not anticipated that the proposed Project would impact the NWI-identified wetlands as the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system and disturbance would occur within the existing footprint of the current distribution system. In addition, the proposed water treatment and storage sites would not occur on any area of NWI-mapped wetlands or channels. If surface water intake from the WMIDD canal is chosen, the existing intake ownership can be cancelled or transferred to the new water system and therefore a new intake would not be required so impacts to the Welton-Mohawk canal would be negligible. The vegetation within the Project was not characteristic of wetland environments. In addition, none of the soil types found within the Project area are classified as hydric soil by the Natural Resources Conservation Service (NRCS)

2.5 Floodplains

The proposed Project would be located with the Federal Emergency Management Agency Flood Insurance Rate Map Panel 1675E within a Zone X, area of minimal flood hazard, which is determined to be outside the 100-year and 500-year floodplain or other Special Flood Hazard Area (**Figure 5**) (FEMA, 2008). The proposed Project is not anticipated to impact floodplains as the Project would not be constructed in a 100-year or 500-year floodplain, nor would it impact any intermittent or ephemeral channels beyond existing conditions.

2.6 Coastal Areas, Zone and Barriers

There are no coastal areas, zones or barriers within the proposed Project area. Construction of the proposed Project would not be within coastal areas, zones or barriers and therefore no impacts to coastal areas would occur from the proposed Project.

2.7 Important Farmland

The proposed Project is located in areas that are designated as prime farmland and/or farmland of unique importance by the NRCS (**Figure 6**). These areas are considered prime or unique farmland by NRCS if they are irrigated or reclaimed of excess salts. However, the area is currently not farmed or irrigated and is not used as farmland and does not appear to have been used as farmland in the recent past. The Farmland Protection Policy Act (FPPA) is intended to minimize irreversible conversion of farmland to nonagricultural uses. Under the FPPA requirements, it states that should a project occur on land already in urban development or used for water storage, the activity is not subject to the FPPA (NRCS, 2019).

As the proposed Project would be located on lands that have been previously developed into an urban setting and would also include lands used for water storage, the proposed Project would be exempt from the requirements of the FPPA. The proposed Project would not be permanently converting existing agriculture lands to non-agricultural uses and no impacts are anticipated to occur to important farmlands.

2.8 Environmental Risk Management

The proposed Project would include the replacement of the existing water distribution system, water supply and treatment, and water storage and is not anticipated to include hazardous materials or require waste handling.

Construction crews are not expected to encounter hazardous material during construction. Any chemicals or material used for treatment would be stored in an approved location and comply with applicable regulations. There is the potential for vehicles used during construction to release oil, gasoline, diesel fuel or hydraulic fluid, but is considered negligible and similar to a normal construction site and construction would comply with applicable regulations regarding petroleum spills and cleanup. No environmental impacts are anticipated.

2.9 Other Resources

2.9.1 Water Resources

The proposed Project is not located within any key water resource areas (i.e., sole source aquifers) (EPA, 2019b). There are no surface water bodies within the proposed Project sites. No environmental impacts are anticipated to water resources as the Project is not within a sole source aquifer and no surface water is within the Project area. The Welton-Mohawk canal is located to the north of the Project, but it is not anticipated that additional groundwater pumping or surface

water withdrawal would be required beyond existing conditions. Implementing appropriate storm water pollution prevention Best Management Practices (BMPs) are anticipated to occur during construction activities to minimize impacts to water resources.

2.9.2 Air Quality

Yuma County, Arizona is currently in a moderate nonattainment area for particulate matter 10 microns or less and marginal nonattainment for 8-hour ozone with the U.S. Environmental Protection Agency's National Ambient Air Quality Standards (EPA, 2019c). The proposed Project is not anticipated to require any new operations sources of air emissions. During Project construction, there would be a temporary increase in air emissions from Project construction activities due to an increase in diesel and gasoline powered vehicles and heavy machinery, as well as fugitive dust related to earthmoving activities. Construction activities are anticipated to occur for approximately one year. These impacts are considered short-term and negligible. After completion of construction, disturbed areas would be void of vegetation which may result in increased wind erosion, contributing to increased dust levels until the area is naturally revegetated. This would result in a long-term, negligible impact since much of the area is already bare ground and void of vegetation.

In addition, the proposed Project would implement the Yuma County recommended BMPs for dust control methods during construction activities. With the implementation of dust control BMPs, the proposed Project is not anticipated to significantly contribute to dust emissions in the Project area.

2.9.3 Noise

The proposed Project would be located within a sparsely populated area with an existing water system (Stantec, 2019a). No increase in noise levels are expected after construction of the Project is completed as there is already an existing water system and this Project does not propose anything that would increase noise levels beyond existing conditions.

2.9.4 Visual Impacts

The proposed Project is not anticipated to have significant visual impacts in the Project area. The proposed Project would be located within an urban setting that currently has structures on the visual landscape. In addition, the water pipeline distribution system would be buried and would not be visible on the landscape of the Project area. It is anticipated that the new water storage and treatment systems would be constructed to blend with the existing form, line, color and texture of the landscape.

2.9.5 Transportation

The proposed Project would be located within a sparsely populated area (Stantec, 2019a). Traffic increases and related impacts would only occur during construction and would cease once construction of the Project is finished. In addition, Yuma County would also require a traffic control permit to further reduce traffic impacts during construction.

3.0 SUMMARY OF ENVIRONMENTAL MEASURES

Environmental protection measures and BMPs would be implemented during construction activities to reduce potential impacts from the proposed Project. A summary of BMPs and mitigation measures are provided below.

3.1 Biological Resources

Pre-construction clearance surveys should be conducted prior to construction activities to avoid impacts to wildlife species.

3.2 Construction Activities

The proposed Project would be required to obtain a traffic control permit to reduce traffic related impacts during construction. In addition, the proposed Project would implement the Yuma County recommended BMPs for dust control methods during construction activities.

4.0 REFERENCES

Federal Emergency Management Agency (FEMA). 2008. FIRM Flood Insurance Rate Map. Panel 1675E. Accessed November 2019 online at: https://msc.fema.gov/portal/home.

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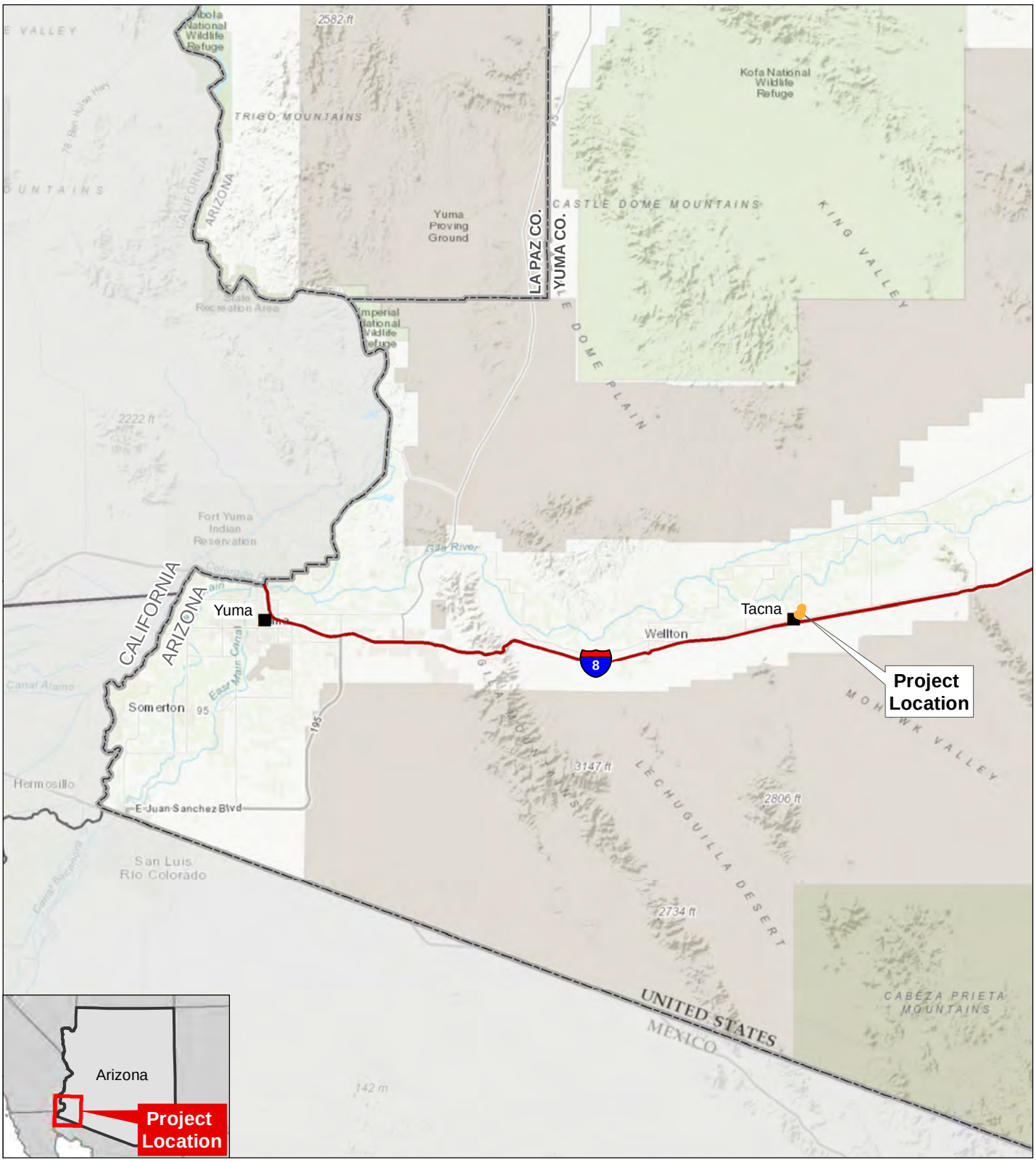
FIGURES



N

Stantec

0 5 10 Miles

1 in = 10 miles

YUMA COUNTY
TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

T16-17W, R8S Yuma County, AZ
NAD 1983 State Plane Arizona West FIPS 0203

DRAWN BY: BT	1ST REVIEW: CJ	2ND REVIEW: KC
DATE: 1/15/2020	PROJECT NO: 181300937	

Figure 1
Vicinity Map

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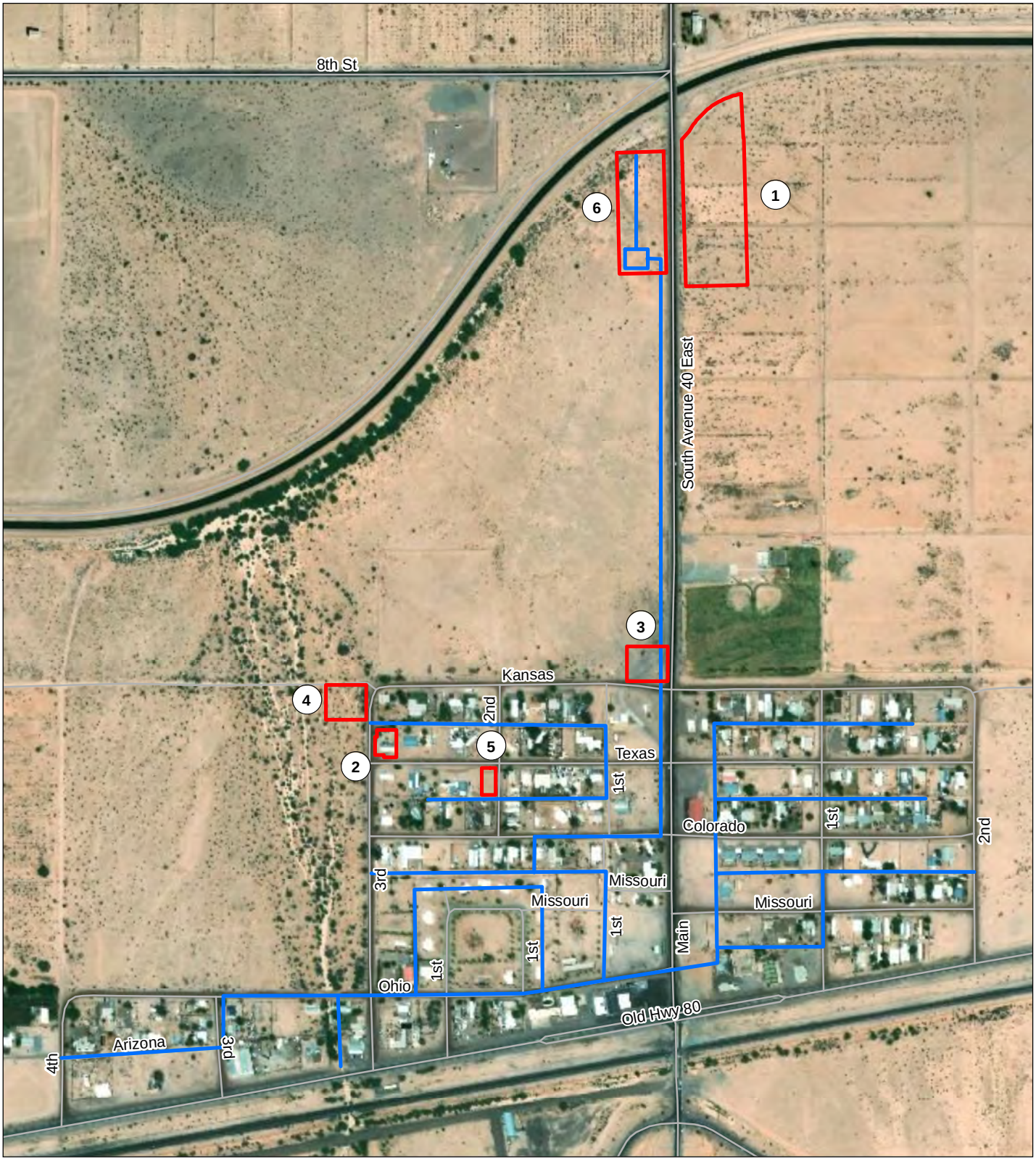
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Legend

- Potential Water Treatment and Storage Sites
- Replacement Distribution System
- Roads

N

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0 300 600 Feet

1 in = 600 feet

YUMA COUNTY
TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

T16-17W, R8S Yuma County, AZ
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Figure 2
Site Plan

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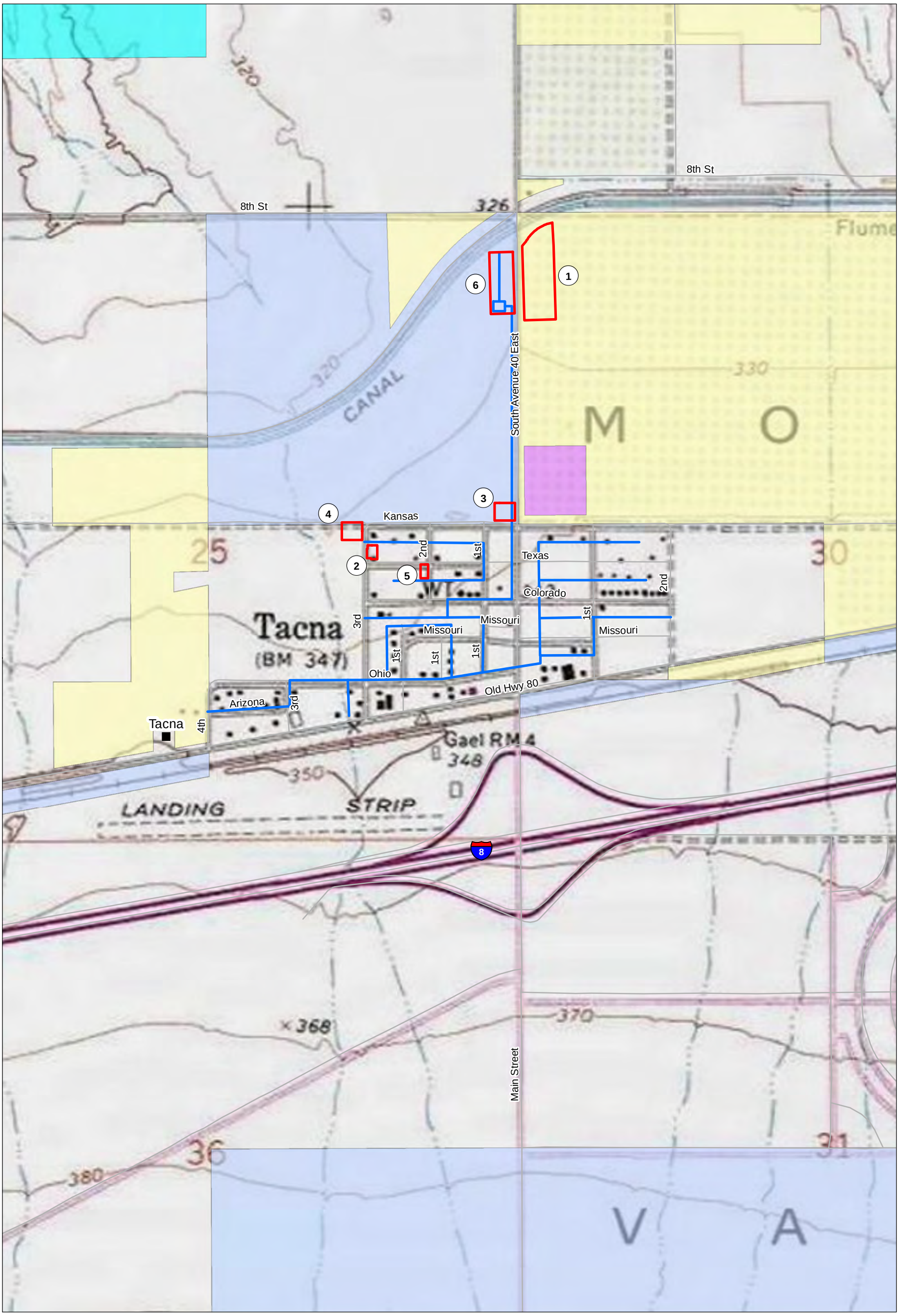

Legend

- Potential Water Treatment and Storage Sites
- Replacement Distribution System
- Roads

Land Ownership

- Bureau of Reclamation
- County
- Private
- State Trust Land
- State Wildlife Area

N

Stantec

Feet
0 400 800
1 in = 800 feet

T16-17W, R8S Yuma County, AZ
NAD 1983 State Plane Arizona West FIPS 0203

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YUMA COUNTY
TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

Figure 3
Land Ownership

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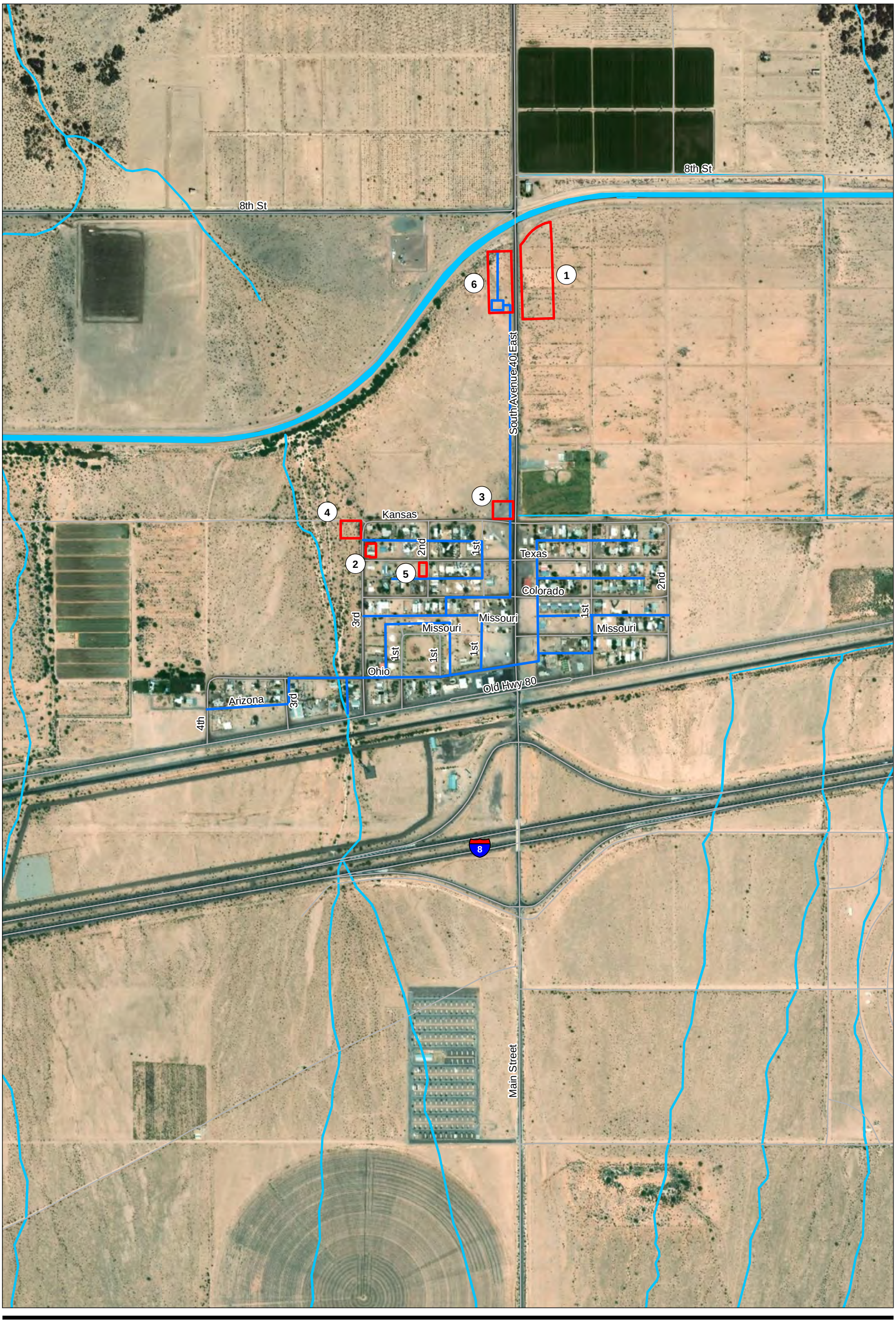

Legend

- Potential Water Treatment and Storage Sites
- Replacement Distribution System
- Roads

NWI Wetland Type

- Riverine

N

Stantec

Feet

0 400 800 1 in = 800 feet

T16-17W, R8S Yuma County, AZ
NAD 1983 State Plane Arizona West FIPS 0203

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TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

Figure 4
National Wetland Inventory Map

V:\2037\Active\181300937\03_data\gis_cad\gis\mxds\Environmental_Report\Fig4_NWI_Wetlands_11x17P.mxd Revised: 2020-01-15 By: botaylor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

8th St
South Avenue 40 East
Kansas
Texas
Colorado
Missouri
Missouri
Missouri
Ohio
Arizona
Old Hwy 80
Main Street
1st
2nd
3rd
4th
1
2
3
4
5
6
8

Note: FIRM Panel = 1675
FEMA Flood Zone data downloaded 11/12/2019

Legend

Potential Water Treatment and Storage Sites

Replacement Distribution System

Roads

Flood Zone Class

Zone X (Areas determined to be outside the 0.2% annual chance floodplain)

N

Stantec

0 300 600 Feet

1 in = 600 feet

T16-17W, R8S Yuma County, AZ
NAD 1983 State Plane Arizona West FIPS 0203

DRAWN BY: BT | 1ST REVIEW: JT | 2ND REVIEW: KC

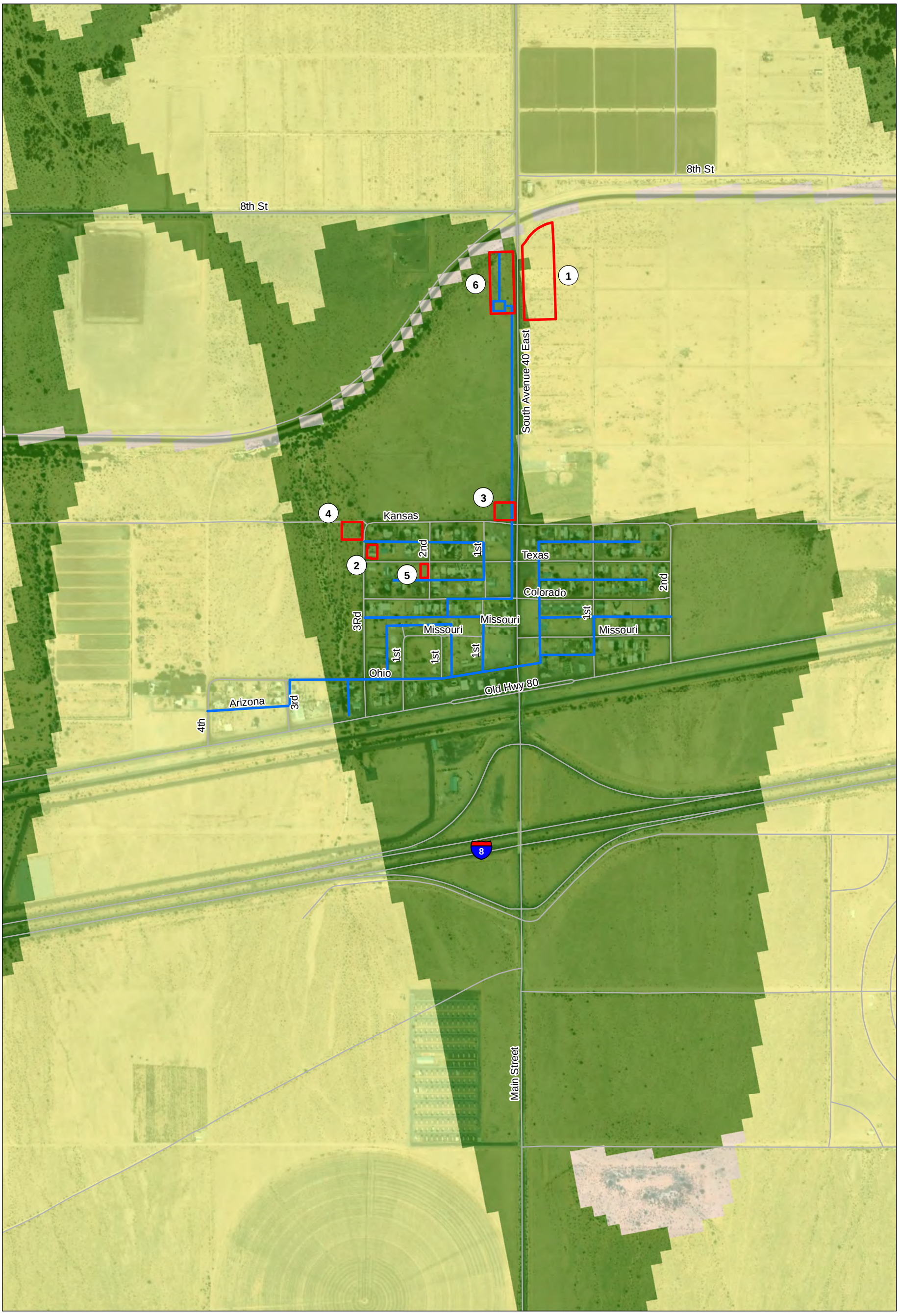
DATE: 1/15/2020 | PROJECT NO: 181300937

YUMA COUNTY
TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

Figure 5
FEMA Floodplains

V:\2037\Active\181300937\03_data\gis_cad\gis\mxds\Environmental_Report\Fig5_FEMA_Floodplains_11x17P.mxd Revised: 2020-01-15 By: botaylor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Potential Water Treatment and Storage Sites
- Replacement Distribution System
- Roads

Farmland Class

- Prime Farmland
- Not Prime Farmland
- Farmland of Unique Importance

N

Stantec

0 400 800 Feet

1 in = 800 feet

T16-17W, R8S Yuma County, AZ
NAD 1983 State Plane Arizona West FIPS 0203

DRAWN BY: BT	1ST REVIEW: JT	2ND REVIEW: KC
DATE: 1/15/2020	PROJECT NO: 181300937	

YUMA COUNTY
TACNA WATER PLANNING PROJECT
ENVIRONMENTAL REPORT

Figure 6
Prime Farmlands

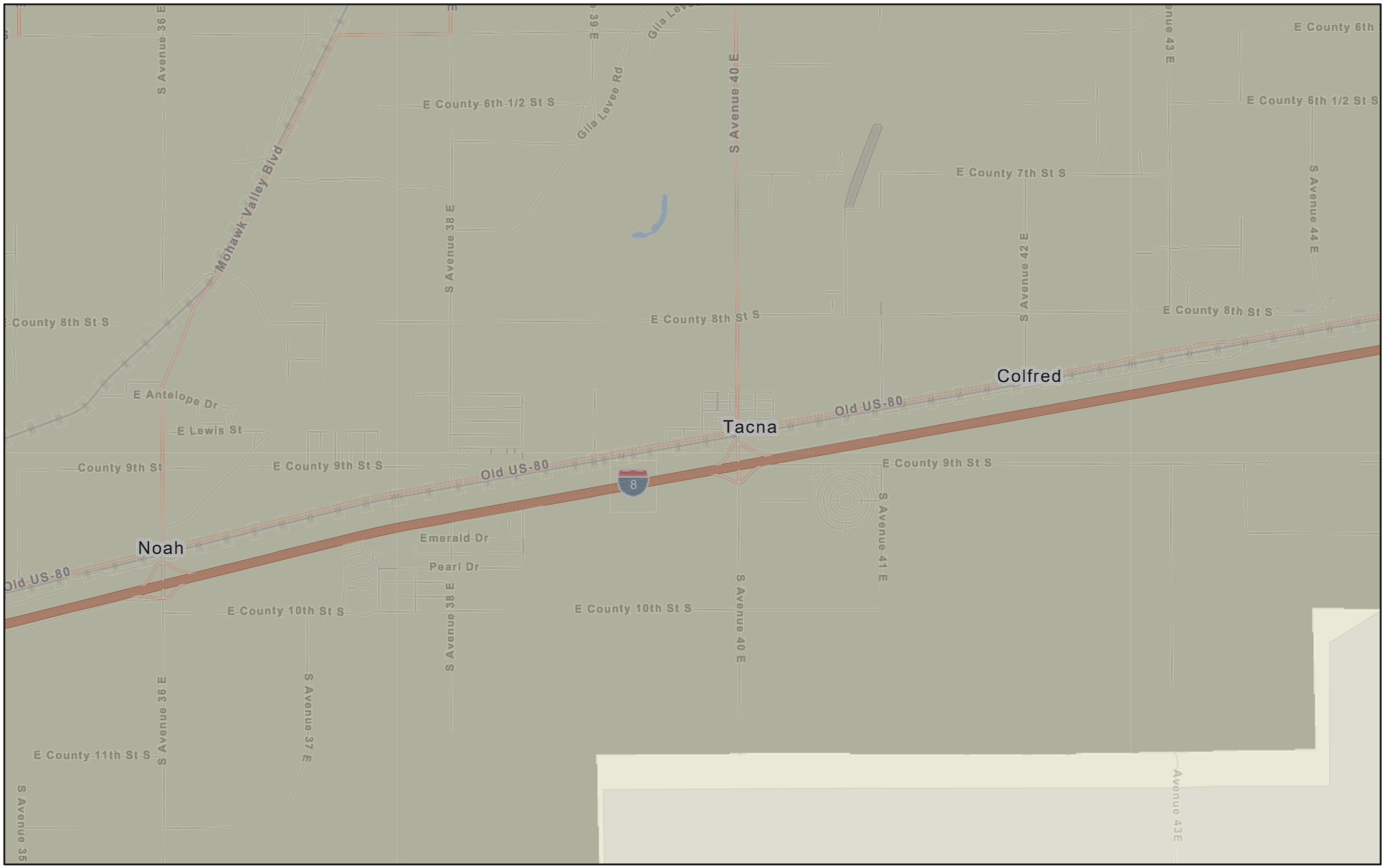
V:\2037\Active\181300937\03_data\gis_cad\gis\mxds\Environmental_Report\Fig6_Prime_Farmland_11x17P.mxd Revised: 2020-01-15 By: botaylor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Source: USDA NRCS, Esri

Appendix A

EJSCREEN Maps

Tacna Minority Populations



January 10, 2020

Minority Population (National Percentiles)

- Data not available
- Less than 50 percentile
- 50 -60 percentile
- 60 -70 percentile
- 70 -80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile

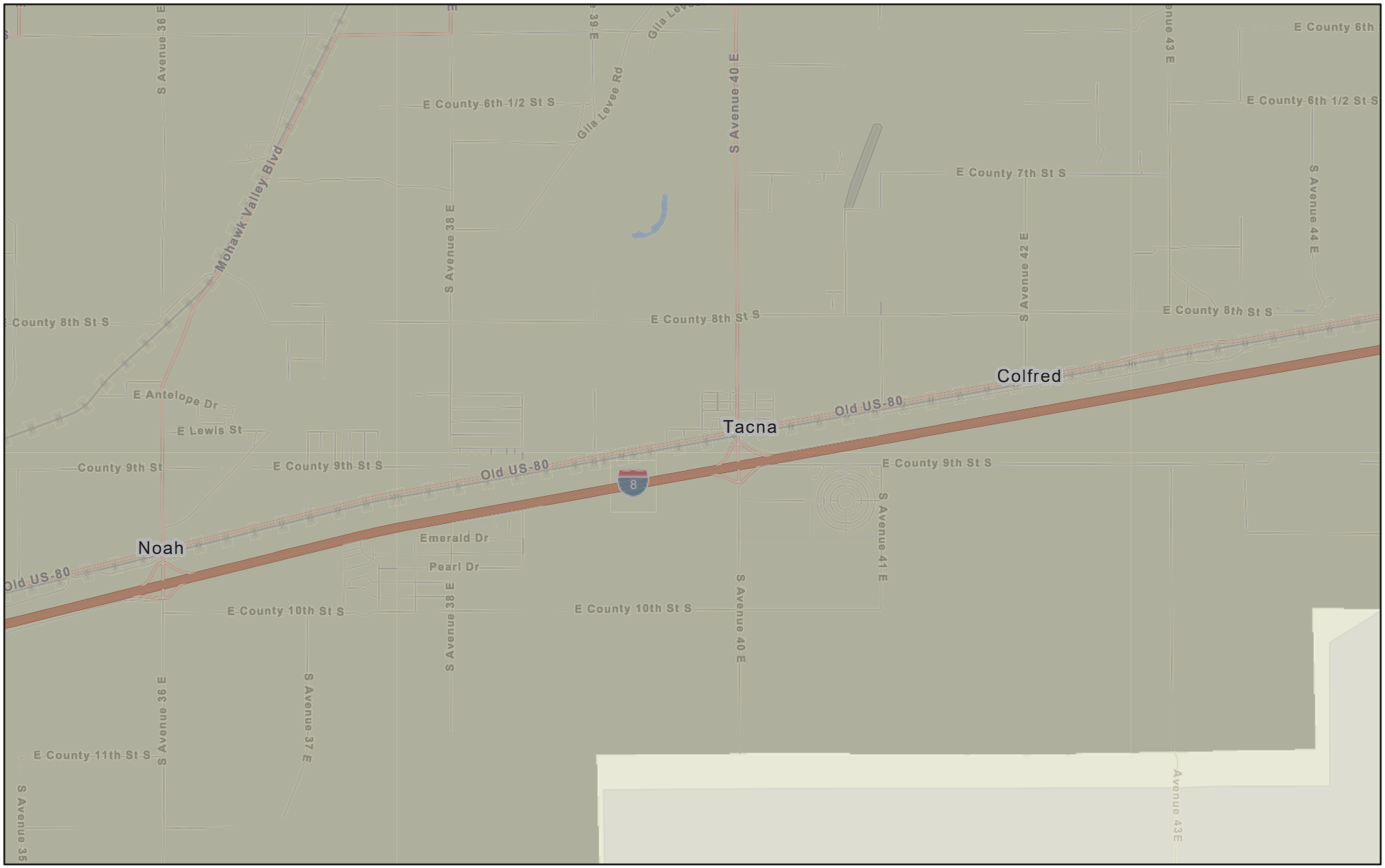
1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Tacna Low Income Populations



January 10, 2020

Low Income Population (National Percentiles)

- Data not available
- Less than 50 percentile
- 50 -60 percentile
- 60 -70 percentile
- 70 -80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile

1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Appendix B

Class III Cultural Resources Inventory Report Summary Form

STATE HISTORIC PRESERVATION OFFICE
SURVEY REPORT SUMMARY FORM

1. REPORT TITLE

1.a Report Title: Archaeological Survey of 46.2 acres of Land for the Proposed Tacna Water Distribution System Replacement Project, Tacna, Yuma County, Arizona
1.b Report Author: Mitch Marken, Ph.D., Hubert Switalski, B.A.
1.c Date: November 10, 2019 **1d. Report No.:** Pending

2. PROJECT REGISTRATION/PERMITS

2a. ASM Accession Number: Pending
2b. AAA Permit Number: 2019-057bl
2c. ASLD Lease Application Number: N/A
2d. Other Permit Number: N/A

3. ORGANIZATION/CONSULTING FIRM

3a. Name: Stantec Consulting Services, Inc.
3b. Internal Project Number: 181300937
3c. Internal Project Name: Tacna Water Distribution System Replacement Project
3d. Contact Names: Hubert Switalski, Mitch Marken, Ph.D.
3e. Contact Address: 38 Technology Drive, Irvine, CA. 92618-5312
3f. Contact Phone: 310-971-1500
3g. Contact Email: mitch.marken@stantec.com; ellen.brady@stantec.com

4. SPONSOR/LEAD AGENCY

4a. Sponsor: United States Department of Agriculture (USDA), Rural Department (RD)
4b. Lead Agency: Yuma County Improvement District
4c. Agency Project Number(s): N/A
4d. Agency Project Name: Tacna Water Distribution System Replacement Project
4e. Funding Source(s): USDA
4f. Other Involved Agencies: N/A
4g. **Applicable Regulations:** ASLD requirement to comply with the Arizona State Historic Preservation Act (ARS § 41-861 *et seq*.) in the issuance of leases and permits.

5.0 DESCRIPTION OF PROJECT OR UNDERTAKING:

Summary of Project

The existing water system in Tacna has been in place since 1980. It is owned by the Tacna Water Management Company. The system includes a groundwater well, piping, pumps and storage. Some upgrading of the system was completed since 1980 including installation of a water intake on the Wellton-Mohawk canal and installation of water treatment in 2007 and repainting of the water storage tank. The existing water system serving the community of Tacna includes approximately 10,000 linear feet of PVC and transit pipe, an above ground welded steel water storage tank, a well, a booster pump and an intake on the Wellton-Mohawk canal. The system includes 175 service connections and typically provides water to 135 to 160 customers (approximately 310 people). The water system includes no fire hydrants and currently does not provide fire protection. No water treatment is provided. The piping and the tank are reported to be in poor conditions with evidence of leaks (Stantec, 2019).

The proposed water distribution system would consist of a replacement pumping system which would pump water from the storage tank and a network of piping to each of the users. The pumps would provide pressure to the users. The pipe main sizes would be minimum six-inch diameter with hydrants to provide fire flows for fire protection. Small diameter service piping would provide service to the users from the six-inch mains. The pump system would meet the peak hour demand for normal usage and maximum day demand plus the required fire flow for fire protection, as needed. It is anticipated that the proposed replacement distribution piping would follow the same alignment as the existing piping distribution system in order to reach all users (Stantec, 2019a). It is anticipated that approximately 17,105 feet (3.24 miles) of piping would be required for the proposed project.

The extent of the entire project is depicted on the Tacna, AZ (1982) USGS 7.5-minute topographic quadrangle (Figure 2), including an aerial imagery of the entire community of Tacna (Figure 3).

6. PROJECT AREA/AREA OF POTENTIAL EFFECTS:
The project area includes alignment of the proposed water lines as well as the location of the proposed water filtration plant, including a 30-meter buffer surrounding each area, for the total of 46.2 acres. It is anticipated that any impacts from the proposed project will be contained within this acreage.

7. PROJECT LOCATION
7a. Address: N/A
7b. Route: N/A
7c. Mileposts Limits: N/A
7d. Nearest City/Town: Tacna, Arizona
7e. County: Yuma County
7f. Project Locator UTM: Center points of Segments – South to North
Northern-most extent (E 223249/N 3622795)
Southern-most extent (E 222683/N 3621494)
Eastern-most extent (E 223537/N 3621734)
Western-most extent (E 222310/N 3621522)

7g. NAD 83
7h. Zone: 12
7i. Baseline & Meridian: Gila and Salt River Meridian
7j. USGS Quadrangle(s): Tacna, AZ
7k. Legal Description(s): Township 8 South, Range 17 West, Section 25, and Township 8 South, Range 16 West, Section 30. E ½ of Section 25 and W ½ of Section 30.

8. SURVEY AREA
8a. Total Acres: 46.2
8b. Survey Area.

1. Land Jurisdiction	**2. Total Acres Surveyed**	**3. Total Acres Not Surveyed:**
Arizona State Lands	46.2 acres	N/A

9. ENVIRONMENTAL CONTEXTS
9a. Landform: Valley floor (Mohawk Valley) within the Lechuguilla Desert, and northern portion of the Sonoran Desert.
9b. Elevation: 320 – 360 feet AMSL

9c. Surrounding Topographic Features: The Project Area is surrounded by Muggins Mountains to the northwest, Mohawk Mountains to the southeast, and Copper Mountains to the south.

9d. Nearest Drainage: The Project Area is located approximately two miles south of Gila River and three miles southwest of Mohawk Wash.

9e. Local Geology:
The Sonoran Desert is part of the Great American Desert of western North America, extending from the northern part of the United States deep into Mexico. This portion of southern Arizona is within the Basin and Range Geologic Province, which stretches from southeastern Oregon and southward through Nevada into southern Arizona. The northern extension of the Sonoran Desert is largely determined by cold temperatures while the eastern boundary is delimited biologically, physically, and geographically by high mountain ranges to the south. Geologically, the Sonoran Desert is located within the Basin and Range Geologic Province characterized by elongated mountain ranges which are separated by broad, nearly flat valleys (Norris and Webb 1990:178).

In the Sonoran Desert many craggy low to mid elevation mountain ranges rise above vast basins. These ranges generally trend northwest-southeast and parallel one another. With the limited vegetative cover, there is a discreet break between the bedrock of the range and the eroded sands and gravel which form the relatively smooth skirt at their base. These alluvial fans form as rain washes weathered rock down into the valley from the slopes of the mountains above. A major period of volcanic activity occurred in southern Arizona about 25 million years ago. Glowing avalanches of hot gas and fragmented rock erupted from large volcanoes called calderas and flowed across the landscape incinerating everything in their path. Many of the volcanic deposits in the Sonoran Desert, including some exposed in Organ Pipe Cactus National Monument, are from this period of intense volcanism.

The Sonoran Desert is subdivided into several regions including the Lower Colorado Valley, which includes the Lecheguilla Desert (Shreve and Wiggins 1964). The Lower Colorado Valley is the largest subdivision of the Sonoran Desert and it occupies the lower drainages of the Colorado and Gila Rivers, the Salton Basin and the eastern coast of the Baja California. About 85% of the area outside of the delta of the Colorado River is comprised of bajadas or nearly level plains.

9f. Vegetation: The project area is located within the Lechuguilla Desert, within the northern portion of the Sonoran Desert. The vegetation of the Lower Colorado Valley, distinguished by its simplicity, is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), often making up 90 to 95 percent of the vegetation on the upland; and by mesquite (*Prosopis juliflora*), ironwood (*Olneya tesota*), blue paloverde (*Cercidium floridum*), and smoke tree (*Dalea spinosa*) along drainageways. Big galleta (*Hilaria rigida*) occurs on sandy soils, which often support a galaxy of annual plants during the winter rainy season.

9g. Soils/Deposition: The project area is located south of the Mohawk Canal and south of the Gila River and it is located within the flood plain of the Gila River. The surrounding area can be characterized as very typical of valley floor within a larger desert, without any observable granite outcrops, or any other geologic features. The soils of the Sonoran Desert are typical warm desert soils, showing modification of the parent materials associated with aridity. Distinguishing features are the low humus content and high content of readily soluble salts. The latter may lead to lime accumulations in the subsoil or the development of alkali conditions where drainage is impaired. The characteristic bajada slopes exhibit a

mixture of soil materials ranging from rocky near the top to fine materials at their lower extremities, these often giving way to fine-textured alluvial bottoms (McGinnies 1976).

9h. Buried Deposits: Not likely
9i. Justification: Most of the project area is located along existing paved roadways and within the small desert community of Tacna.

10. BUILT ENVIRONMENT: No structures or features observed.

11. INVENTORY CLASS COMPLETED
11a. Class I Inventory: No
11b. Researcher(s): N/A
11c. Class II Survey: No
11d Sampling Strategy: N/A
11e. Class III Inventory: Yes

12. BACKGROUND RESEARCH SOURCES
12a. AZSITE: N/A
12b. ASM Archaeological Records Office: During the records search (ASM Job No. 1772) conducted at the Arizona State Museum (ASM) the search revealed that six archaeological surveys were previously conducted within the ½-mile radius of the project area and there were no surveys previously conducted directly within the project area. Furthermore, no archaeological sites were previously documented within the project area; however, four previously documented sites are located within the ½-mile Study Area.
12c. SHPO Inventories and/or SHPO Library: N/A
12d. NRHP Database: N/A
12e. ADOT Portal: N/A
12f. GLO Maps: 1923 GLO Plat map reviewed – no resources near or within APE
12g. Land- Managing Agency Files: N/A
12h. Tribal Cultural Resources Files: N/A
12i. Local Government Websites: N/A
12j. Other: Historic period USGS topographic quadrangles, including Mohawk, AZ (1928) and Tacna, AZ (1968) were reviewed for presence of built environment resources.

13. BACKGROUND RESEARCH RESULTS:
The background research for the project revealed that relatively little in terms of previous archaeological work was conducted within the project area and the surrounding Study Area. Based on the results of the archival background research most of the previous projects were conducted along the alignment of the old US Highway 50, along an existing Union Pacific Railroad, and along the Mohawk Canal. The surveys resulted in the recordation of in-use segments of the Union Pacific Railroad (AZ Z:2:40 ASM) and the alignment of the old US Highway 50 (AZ FF:9:17 ASM). These resources were documented outside of the current project area and are considered in-use as existing transportation routes.

14. CULTURAL CONTEXTS

14a. Prehistoric Culture:
The earliest period of human occupation in North America is the Paleoindian Period which extends roughly from 10,000 to 8,000 B.C. when much of what is now Arizona was covered by open juniper-scrub oak woodlands. Moist grasslands in southwestern Arizona supported large game including now extinct wooly

mammoth. This period was characterized by large lanceolate, fluted projectile (spear) points and emphasized large game hunting.

A separate, contemporaneous tradition existed in western Arizona and the Great Basin, which incorporated crude, percussion flaked lithic tools rather than the finely manufactured bifaces of the Plains-center Paleoindian complexes. In portions of California and the Great Basin, this tradition was manifested as the San Dieguito complex (Rogers 1966).

Archaic Period

The end of the Pleistocene witnessed the retreat of the continental glaciers and initiated a trend of increasing temperatures and aridity resulting in vegetation shifts and desiccation of pluvial lakes in the Great Basin (Stone 1986). As a result, to the changing conditions, many large mammal species became extinct and in western Arizona there appears to have been a rapid retreat of the juniper woodlands. Furthermore, the end of the Pleistocene was also accompanied by shifts in human subsistence strategies include reliance on a broad range of plants and fauna with much less emphasis on the hunting of large game (Stone 1986).

Cultural developments of the Archaic Period in the region have been variously categorized as the San Dieguito-Pinto Complex (Cordell 1984), San Dieguito-Amargosa (Haury 1975), or the Western tradition of the Picosa Culture (Irwin-Williams 1979), or treated as separate cultural phenomena as the Amargos tradition and the Pinto complex (Ezzo 1994; Sterner 1992, among others). Rogers (1939) who defined the Amargosa tradition believed that an Amargosan incursion resulted in the displacement or absorption of San Dieguits groups in western Arizona (Rogers 1958). In general, this time period witnessed the addition of grinding implements and various projectile points reminiscent of the early San Dieguito tradition, which included scrapers, scraper planes, and flake choppers. Generally, the Archaic Period, including the various subdivisions and phases extends roughly from 6,000 B.C. to A.D 1.

The Ceramic Period

Stone (1986) points out that by definition, the Archaic Period in the Southwest ended with the introduction of ceramics and the practice of agriculture. While this transition took place over a long period of time, however, the events and processes that caused this transformation are unclear. Wilcox (1979) argues that near the end of the Archaic Period increasing population densities and decline in average effective precipitation may have reduced the efficiency of small hunting groups and favored the adoption of farming, and thus, increasing the reliance on storage, and caused a major shift towards rivers and perennial streams. This period further witnessed changes in the cultural assemblage in the Southwest, possibly caused by influences from the south (Patayan), north (Anasazi), and east (Hohokam).

As with most studies based on surface evidence, pottery is one of the most useful indicators of the temporal and cultural affiliation of the Native Americans who occupied the general project area. Based on observations and collections from several sites along the Colorado River, Rogers (1929) and Ezell (1954) concluded that the ceramic evidence points overwhelmingly toward Patayan or Yuman use during the latest prehistoric period and into historical times. Rogers emphasized differences in surface treatments and vessels and rim forms and proposed three periods of Patayan prehistory, which he coined Yuman I, II and III; however, this terminology was changed by Colton (1939), who rejected the terms, claiming it was a reference to an ethnographic culture and therefore not appropriate for prehistoric assemblages and replaced the term Yuman with Patayan, and renamed Rogers' phases accordingly to Patayan I, II, and III.

Patayan I

Rogers (1945) argued that the Patayan sequence, which started at A.D. 900 and lasted until A.D. 1050, began with immigration by either Hokan (Yuman) people from southern California or non-Hokan people from Papaqueria or Sonora. He defined Pataya I phase ceramics as polished red ware and vessels with the Colorado shoulder. Additional ceramic types characteristic of this period as defined by Rogers (1945) include Black Mesa Buff, Black Mesa Red-on-buff, Colorado Beige, Colorado Red-on-beige, and Colorado Red.

Patayan II

The subsequent Patayan II Period, which lasted between A.D. 1050 to 1500) witnessed a greater variation in ceramics and the spread of these forms from the Colorado Basin into the California and Arizona Deserts. This also coincides with at least two of the major Lake Cahuilla filling episodes with settlements occurring primarily along the shores of the lake and the Colorado River. Habitation camps and sites tended to be relatively short-term, with temporary camps being established away from known and reliable water sources. Ceramics characteristic of this period seem to change forms, including the disappearance of the Colorado shoulder, and the introduction of recurved rims and flaring margins (Schaefer 1988).

14b. Protohistoric Culture:

The Patayan III (Protohistoric Period A.D. 1500 +) is a period of ceramic continuity, increasing population size, and changing settlement patters. Wasley and Johnson (1965) point to an increase and movement of human population to the Lower Gila River and its displacement of the Hohokam people. It is believed that a desiccation of the Salton Trough may have caused local populations reliant on lake resources, to migrate further south towards the Colorado River delta or further west to inland mountains of California. This period is characterized by an increase and spread of buff wares and the introduction of smaller-sized projectile points such as the Desert side-notched and Cottonwood Triangular type points.

14c. Indigenous Historic Culture: Pima and Papago

The Project Area encompasses lands that ethnographically may have been occupied by the Pima Indians, who speak a Piman language of the Uto-Aztecan language family. All Pima Indians call themselves O'odham, meaning the people, and they further separate themselves into Akimel O'odham and Tohono O'odham, meaning the 'river people' and the 'desert people', respectively. As the project area is located approximately two miles south of the Gila River, it is very likely the over all project area was occupied by the Akimel O'odham, who found an abundance of floral and faunal resources along the river and within its floodplain (Fontana 1983:125-126).

14d. Euro-American Culture:

The Euro-American history of the area, including early Spanish contact, is described in detail by Ezell (1983). By the time of the Euro-American contact in the early 1700s, the Pima occupied at least seven rancherias separated from each other by distances of seven to nearly 40 miles, which were clustered along Santa Cruz and Gila Rivers (Ezell 1983:150). Gathering of wild plant foods was an important source of supplementary or emergency food. While hunting was of less importance, with the deer being the largest game taken, the mountain sheep may have been important in pre-Hispanic times. However, rabbits seemed to be the animal most frequently sought (Ezell 1983:151-152). The focus of the Pima subsistence was the reliance on irrigation with the waters of the Gila, the Salt, and Santa Cruz rivers, and an extensive system of canals and irrigation ditches distributed to water the field.

By the beginning of the Hispanic Period (1694-1853), the Pima, who lived beyond the Hispanic frontier, seemed to be preoccupied with the growth of the Apache and Quechan raiding, rather than with the Spanish settlements further south. As the Spanish seemed to favor the Pima and their possession of land that no Spanish presidio nor Spanish or Mexican settlement was ever founded on the Gila (Ezell 1983:151-153).

During the American Period (1853-), the Pima enjoyed an expanding economy of the first 15 years of the American rule. However, in 1867, a construction of a canal intended to reclaim 4,000 acres of land using the water from the Salt River and completed in 1868, caused many settlers to occupy lands above the Pima reservation. Subsequently, the introduction of new settlers, government agents and teachers, started an irreversible and pervasive process of change within the Pima society (Ezell 1983:157-160).

15. FIELD SURVEY PERSONNEL
15a. Principal Investigator: Ellen Brady
15b. Field Supervisor: Mitch Marken Ph.D. (with written permission to use Stantec's current 2019 permit, previous ASL blanket permit holder PI and FS levels)
15c. Crew: Mitch Marken, Ph.D., Hubert Switalski, and Sandra Hollispeasy
15d. Fieldwork Date(s): October 10, 2019

16. SURVEY METHODS
16a. Transect Intervals: Parallel transects spaced 10 to 15 meters apart.
16b. Coverage (%): 100 % coverage of the entire 46.2-acre Project Area.
16c. Site Recording Criteria: Any resources present.
16d. Ground Surface Visibility: Excellent.
16e. Observed Disturbances: The project area is located within the small desert community of Tacna. As a result, paved roadways, abandoned mobile homes, and general landscaping of residential areas was observed within the project area. Additionally, areas within the northern portion of the Project Area, immediately south of Wellton Mohawk Canal, appeared to have been flooded, either naturally or as part of an agricultural irrigation. Several abandoned modern (less than 50 years old) foundations and mechanically moved modern era refuse were observed on the west side of South Avenue 40 E.

17. FIELD SURVEY RESULTS
17a. No Cultural Resources Identified: X
17b. Isolated Occurrences (IOs) Only:
17c. Number of IOs Recorded: 0
17d. Table of IOs. N/A
18. COMMENTS: None
19. ATTACHMENTS
19a. Project Location Maps:
Figure 1 – Project Location and Vicinity Map
Figure 2 – Project Area with Archaeological Survey Coverage Map
Figure 3 – Project Area depicted on aerial imagery

19b. Land Jurisdiction Map: N/A
19c. Background Research Map(s): N/A
19d. GLO Map(s): N/A

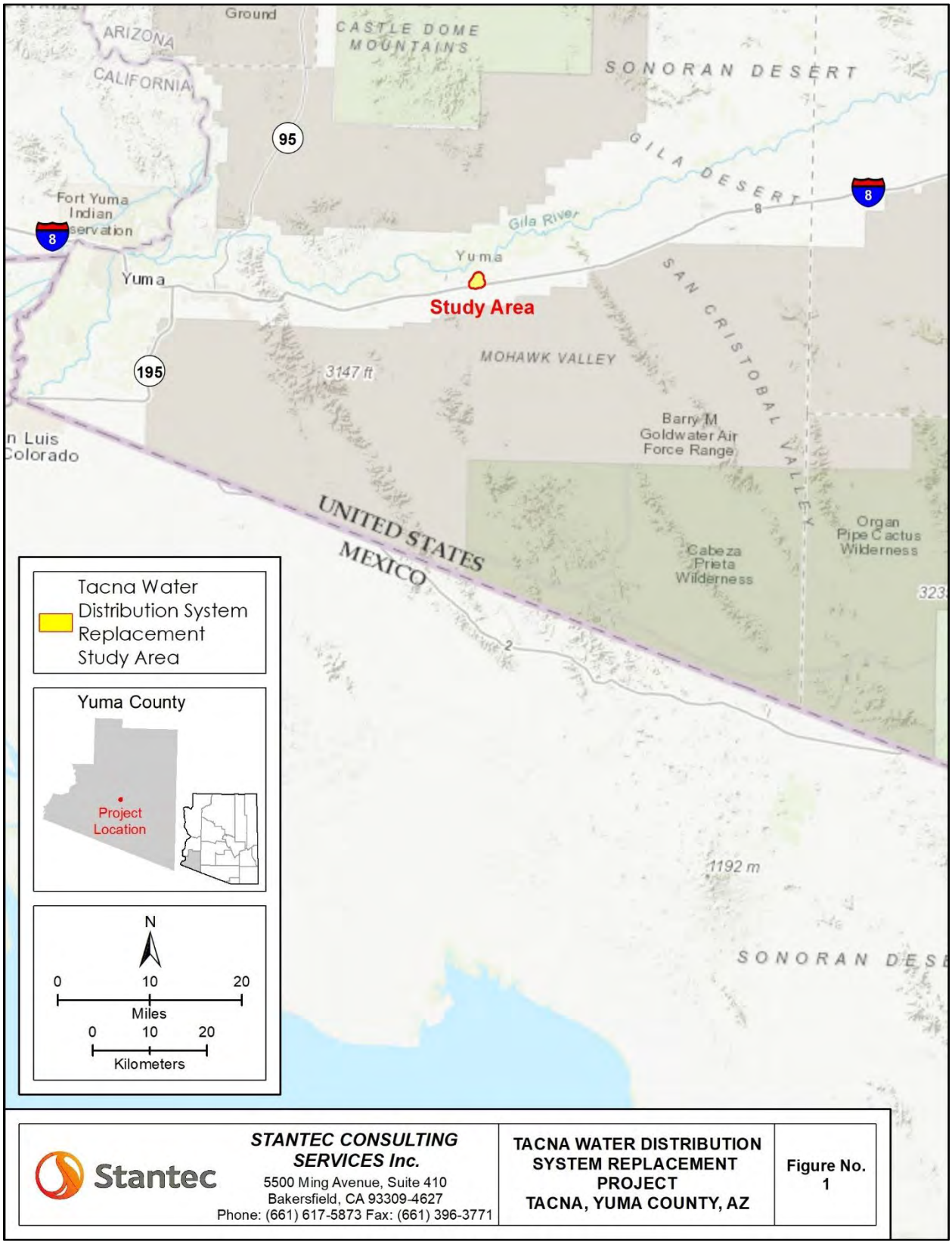


Figure 1. Tacna Water Distribution System Replacement Study Area Location and Vicinity Map.

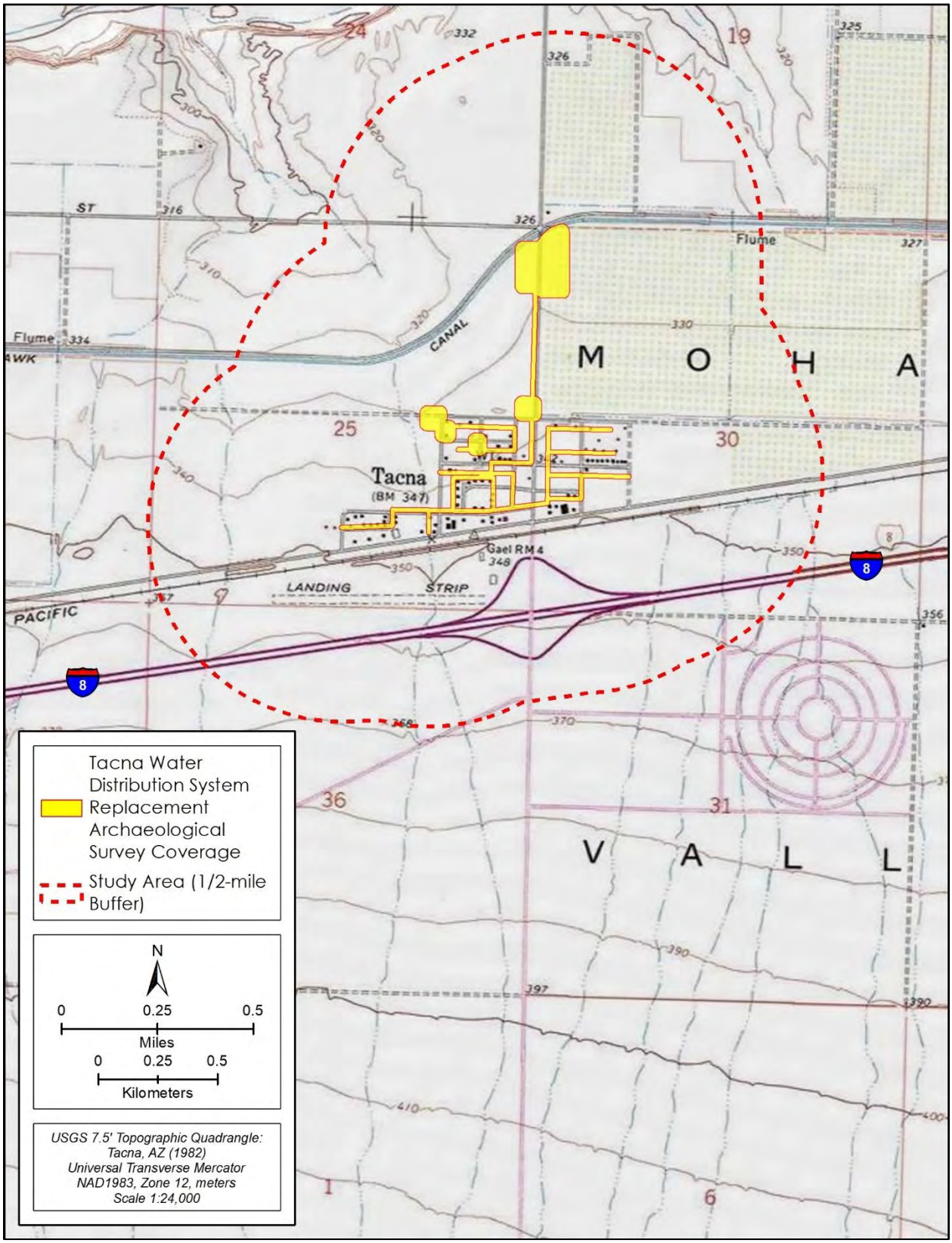


Figure 2. Archaeological survey coverage depicted on the Tacna, AZ (1982) USGS 7.5-minut topographic quadrangle.

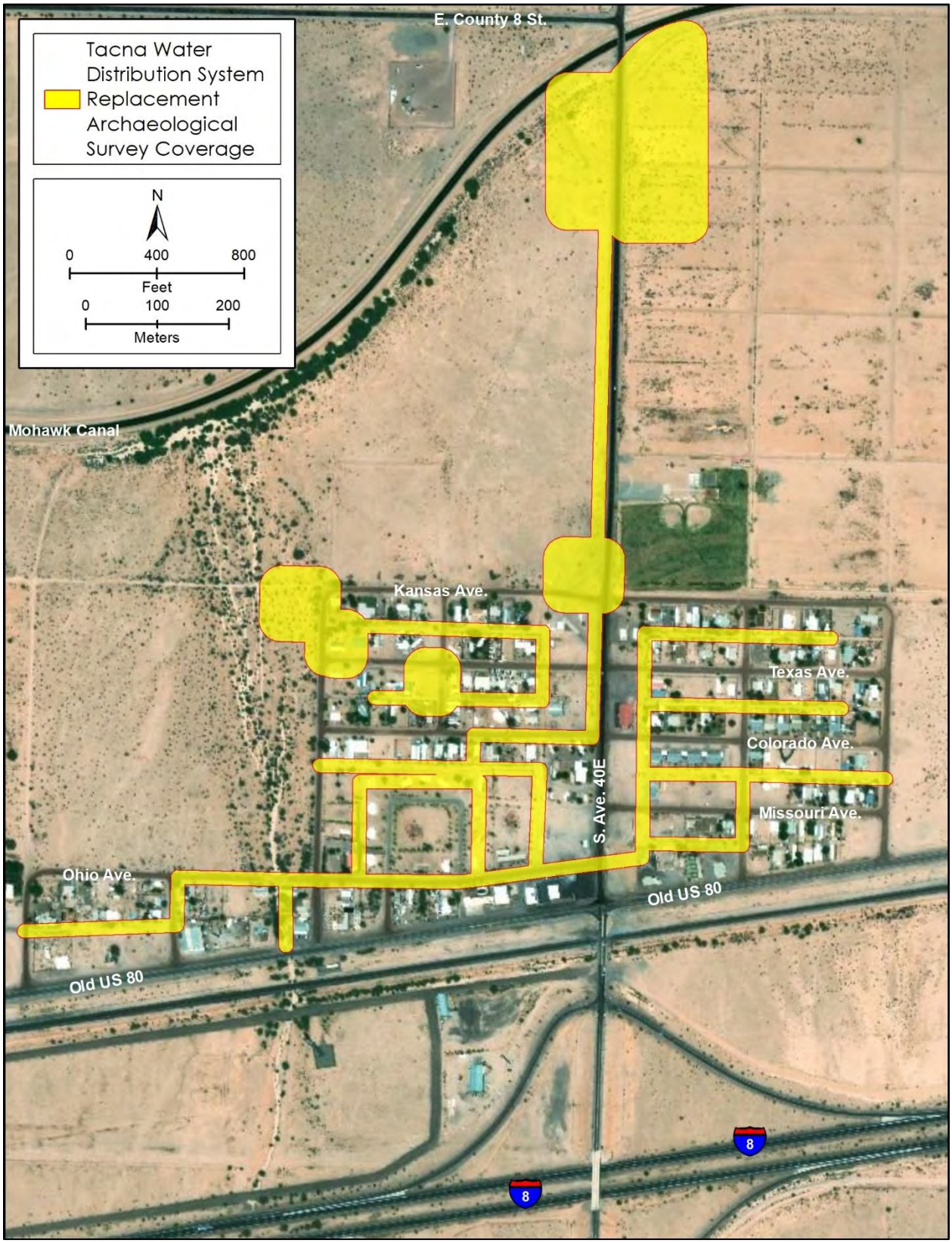


Figure 3. Tacna Water Distribution System Replacement Study Area shown on aerial imagery.

19e. References:

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20. CONSULTANT CERTIFICATION

I certify the information provided herein has been reviewed for content and accuracy and all work meets applicable agency standards.

_____

Signature

___Principal Investigator

Title

21. DISCOVERY CLAUSE

If previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 meters (100 feet) until a qualified archaeologist has documented the discovery and evaluated its eligibility for the Arizona or National Register of Historic Places in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency. If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the discovery and the area must be secured. The Arizona State Museum, lead agency, SHPO, and appropriate Tribes must be notified of the discovery. All discoveries will be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013) or Arizona Revised Statutes (A.R.S. § 41-844 and A.R.S. § 41-865), as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.

Appendix C

Biological Survey Report

BIOLOGICAL SURVEY REPORT
TACNA WATER PLANNING PROJECT

Prepared for:

Yuma County
Department of Development Services
2351 West 26th Street
Yuma, AZ 85364

Prepared by:

Stantec Consulting Services Inc.
6995 Sierra Center Parkway
Reno, Nevada 89511

January 21, 2020

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LIST OF ABBREVIATIONS

°F	Degrees Fahrenheit
amsl	Above Mean Sea Level
AZGFD	Arizona Game and Fish Department

Project	Tacna Replacement Water System
R	Range
S	South
SGCN	Species of Greatest Conservation Need
Stantec	Stantec Consulting Services Inc.
SWReGAP	Southwest Regional Gap Analysis Project
T	Township
U.S.	United States
USFWS	United States Fish and Wildlife Service
W	West

LIST OF APPENDICES

1.0 INTRODUCTION

The Yuma County Department of Development Services is proposing to replace the current water distribution system in the town of Tacna, Arizona (**Figure 1**). The town of Tacna currently has a water distribution system that is more than 39 years old and has drinking water deemed as non-drinkable due to high levels of arsenic.

The existing water system in Tacna has been in place since 1980. It is owned by the Tacna Water Management Company. The system includes a groundwater well, piping, pumps and storage. Some upgrading of the system was completed since 1980 including installation of a water intake on the Wellton-Mohawk canal, installation of water treatment in 2007, and repainting of the water storage tank. The existing water system serving the community of Tacna includes approximately 10,000 linear feet of polyvinyl choloride and transit pipe, an above ground welded steel water storage tank, a well, a booster pump and an intake on the Wellton-Mohawk canal. The system includes 175 service connections and typically provides water to 135 to 160 customers (approximately 310 people). The water system includes no fire hydrants and currently does not provide fire protection. No water treatment is provided. The piping and the tank are reported to be in poor conditions with evidence of leaks.

The proposed Tacna replacement water system (Project) would consist of three components: 1) water supply and treatment; 2) water storage; and 3) a water distribution system. The proposed Project area is shown on **Figure 2.**

Biological baseline field surveys were conducted for the purpose of identifying vegetation communities present, the presence of noxious weeds, the presence of federally threatened or endangered or state listed sensitive species or their habitat, and any other wildlife species occurring within the Project area. The field survey was conducted by a Stantec Consulting Services Inc. (Stantec) wildlife biologist on September 18, 2019.

1.1 PROJECT LOCATION

The Project area is located in the Town of Tacna in Yuma County, Arizona, approximately 42 miles east of Yuma, Arizona (**Figure 1**). The Project area can be accessed east or west along Interstate 8. The proposed Project would include infrastructure located within portions of Township (T) 8 South (S), Range (R) 17 West (W), in Section 25 and T8S, R16W, Section 30, Gila and Salt River Baseline and Meridian.

1.2 PROJECT AREA DESCRIPTION

The Project area is located in the Sonoran Basin and Range United States (U.S.) Environmental Protection Agency Level III Ecoregion of southwest Arizona. The ecoregion is distinguished by palo verde-cactus vegetation including saguaro (*Carnegiea gigantea*), cholla (*Cylindropuntia* spp.), and agave cacti (*Agave* spp.). The climate is characterized by being the driest in the U.S. (EPA, 2003).

Elevation within the Project area ranges from approximately 329 to 350 feet above mean sea level (amsl). Average precipitation is about 4.1 inches per year, with temperatures ranging from an average of 54 degrees Fahrenheit (°F) to 88°F (WRCC, 2005).

The Project area is within the Basin and Range Physiographic Province, Sonoran Desert subdivision, with approximately 20 percent mountains and 80 percent plains. The topography is characterized by mountain ranges that are roughly parallel. The basins between the ranges are relatively flat with gentle slopes next to the mountains that vary from hills and buttes up to mountains rising 4,000 feet amsl (Fenneman, 1931). The desert plains mostly lie below 2,000 feet amsl (Fenneman, 1931).

The Southwest Regional Gap Analysis Project (SWReGAP) data was used to gather vegetation community information for the Project area. The Project area is comprised of seven vegetation communities, with the Sonora-Mojave Creosote-White Bursage Desert Scrub community the dominant community type in the Project area (**Figure 3**).

The Sonora-Mojave Creosote-White Bursage Desert Scrub forms the vegetation matrix in broad valleys, lower bajadas, plains and low hills in the Mojave and lower Sonoran deserts. This desert scrub is characterized by a sparse to moderately dense layer (two to 50 percent cover) of xeromorphic microphyllous and broad-leaved shrubs. Creosote bush (*Larrea tridentata*) and Payne burrobush (*Ambrosia dumosa*) are typically dominants, but many different shrubs, dwarf-shrubs, and cacti may co-dominate or form typically sparse understories. Associated species may include: fourwing saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), Nevada jointfir (*Ephedra nevadensis*), ocotillo (*Fouquieria splendens*), water jacket (*Lycium andersonii*), and beavertail cactus (*Opuntia basilaris*). The herbaceous layer is typically sparse, but may be seasonally abundant with ephemerals (USGS, 2005).

2.0 AGENCY CONSULTATION

Prior to performing the biological baseline surveys, Stantec contacted the U.S. Fish and Wildlife Service (USFWS) and Arizona Game and Fish Department (AZGFD) to request information regarding threatened and endangered and sensitive wildlife and vegetation species with the potential to occur in the Project area. Appendix A includes agency responses to those requests and a summary of each Agency's response is provided below.

2.1 USFWS

The USFWS response letter identified four threatened, endangered, or candidate species with the potential to occur within the Project area.

2.1.1 Sonoran Pronghorn

Sonoran pronghorn (*Antilocapra americana sonoriensis*) are classified as endangered species by the USFWS and as a Species of Greatest Conservation Need (SGCN) in Arizona by the AZGFD (AZGFD, 2012). Sonoran pronghorn occupy desert plains and bajadas, and occasionally rocky hills and mountainous habitats. These animals are nomadic and require large expanses of land to survive as localized droughts are frequent and summer rains are sporadic. They must be able to move across the landscape during all seasons to locate areas with sufficient food and water. Sonoran pronghorn are very wary, capable of seeing long distances across the open desert, and flee the area when disturbed. No critical habitat has been identified for this species.

2.1.2 Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii* extimus) is classified as federally endangered by the USFWS and as a SGCN in Arizona by the AZGFD (AZGFD, 2012). The southwestern willow flycatcher nests in willows (*Salix* spp.) and other dense riparian vegetation along streams, rivers, lakes, and wetlands. Southwestern willow flycatchers are found along the lower Colorado River and tributaries where suitable dense stands of willow or salt cedar (*Tamarix* spp.) are adjacent to water or saturated soil. Critical habitat for this species has been designated but none occurs in the Project area. The nearest critical habitat occurs approximately 100 miles north of the Project area.

2.1.3 Yellow-billed Cuckoo

The western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*) is classified as threatened by the USFWS and as a SGCN by the AZGFD (AZGFD, 2012). Western yellow-billed cuckoos are found during the summer in low to medium elevation deciduous riparian woodlands throughout much of western North America. They nest in relatively large patches of riparian woodlands (generally larger than 50 acres) that typically have a well-developed riparian overstory canopy and an understory of shrubs (Halterman et al., 2015 and USFWS, 2013). Critical habitat for this species has been proposed by the USFWS along a 139-mile-long section of the

Colorado River north of the border with Mexico (USFWS, 2013). The nearest critical habitat is approximately 0.7 mile northwest of the Project area along the Gila River, a tributary to the Colorado River.

2.1.4 Yuma Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) is listed as endangered by the USFWS and as a SGCN in Arizona by the AZGFD (AZGFD, 2012). Critical habitat has not been designated for this bird. Yuma clapper rails are generally found in freshwater and alkali marshes dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches. This species prefers mature marsh stands along margins of shallow ponds with stable water levels. Nest sites selected by this species are near upland areas in shallow sites dominated by mature vegetation, often in the base of a shrub. Yuma clapper rails move into different cover types in winter, showing a preference for denser cover than in summer (USFWS, 2014).

2.2 AZGFD

In response to the request for data, the AZGFD's response letter included results from a data search of a three-mile buffer around the Project area. **Table 1** details the species identified by the AZGFD to potentially occur within the three-mile buffer of the Project.

Table 1 Special Status Wildlife Species with the Potential to Occur

Scientific Name	Common Name	Habitat
Amphibians		
Incilius alvarius	Sonoran Desert toad	Central and southern Arizona within several miles of permanent or temporary water sources.
Lithobates yavapaiensis	Lowland leopard frog	Inhabits aquatic systems in desert grasslands to pinyon-juniper. They are habitat generalists and breed in a variety of natural and man-made aquatic systems.
Reptiles		
Heloderma suspectum	Gila monster	Prefers rocky areas in desert scrub and semi-desert grassland. Found in lower mountain slopes, rocky bajadas, canyon bottoms, and arroyos.
Birds		
Melozone aberti	Abert's towhee	Low-elevation desert riparian and desert wash habitats. Habitat includes dense vegetation, including thickets of willow, cottonwood (*Populus* spp.), mesquite (*Prosopis* spp.), and salt cedar. Likely restricted to within and near xeroriparian washes with dense shrubs and agricultural areas within Project area.
Botaurus lentiginosus	American bittern	Marshlands and very wet meadows. Rarely seen away from dense reeds, rushes, cordgrass (*Spartina* spp.), cattails and other emergent vegetation.
Vireo bellii arizonae	Arizona Bell's vireo	Desert riparian woodlands, primarily with dense willow or mesquite. Uncommon along lower Colorado River.

Scientific Name	Common Name	Habitat
Haliaeetus leucocephalus	Bald eagle	Coasts, rivers, and large lakes. Open country and mountains during migration. Migrant and winter resident along lower Colorado River.
Spizella breweri	Brewer's sparrow	Sagebrush, brushy plains; in winter, also weedy fields. In summer typically in open flats covered with sagebrush; sometimes in stands of saltbush.
Calypte costae	Costa's hummingbird	Occurs in desert scrub in the Sonoran and Mojave Deserts, and chaparral and sage scrub areas in coastal California.
Buteo regalis	Ferruginous hawk	Plains and prairies throughout western North America. In southwestern Arizona, migrant and winter resident primarily near cultivated fields.
Melanerpes uropygialis	Gila woodpecker	Upper Sonoran Desert in areas with stands of saguaro, riparian woodlands, and suburban areas.
Colaptes chrysoides	Gilded flicker	Upper Sonoran Desert in areas with stands of saguaro, riparian woodlands, and suburban areas.
Toxostoma lecontei	LeConte's thrasher	Flat desert areas with sparse vegetation, especially saltbush flats.
Melospiza lincolnii	Lincoln's sparrow	Winters in the southern United States in brushes and weedy habitats.
Oerothlypis luciae	Lucy's warbler	Mesquite along desert streams and washes; willows, cottonwoods. Breeds mostly in cottonwood-mesquite woods near desert streams or in open groves of mesquite along dry washes in the Sonoran Desert.
Cistothorus palustris	Marsh wren	Marsh wrens occupy wetlands filled with cattails, sedges, bulrushes, and *Phragmites*. In the winter they also use brushy thickets near wetlands, tidal saltmarshes, and weedy agricultural canals.
Charadrius montanus	Mountain plover	Winters in semiarid plains and flats in the southwestern United States. Uncommon or rare along lower Colorado River.
Troglodytes pacificus	Pacific wren	Found in mixed forests near streams. During the nonbreeding season, may use more types of habitat including parks and gardens.
Sphyrapicus nuchalis	Red-naped sapsucker	They tend to avoid oak or pine-oak forests during the breeding season, but use them during migration and winter, along with orchards and woodlands near streams
Passerculus sandwichensis	Savannah sparrow	Live in grasslands with few trees, including meadows, pastures, grassy roadsides, sedge wetlands, and cultivated fields planted with cover crops like alfalfa.
Anthus spragueii	Sprague's pipit	On wintering grounds in Mexico and border areas of the southern U.S., they use both native and non-native grasslands with limited shrub cover, including some shortgrass environments, even occasionally athletic fields and heavily grazed pastures.
Rallus limicola	Virginia rail	Occupy shallow freshwater wetlands with tall stands of cattails and rushes.

Scientific Name	Common Name	Habitat
Athene cunicularia hypugaea	Western burrowing owl	Utilizes burrows made by mammals in arid regions and deserts. Likely to be common only near agricultural areas and along and near Colorado River.
Aix sponsa	Wood duck	Wooded areas of rivers and ponds. Uncommon in winter along the lower Colorado River.
Mammals		
Ammospermophilus harrisii	Harris' antelope squirrel	This squirrel prefers rocky desert habitats that contain cacti and shrubs.
Castor canadensis	American beaver	Rivers, streams, and lakes. Could occur along Colorado River.
Corynorhinus townsendii pallescens	Pale Townsend's big-eared bat	Townsend's big-eared bats will use a variety of habitats, almost always near caves or other roosting areas.
Euderma maculatum	Spotted bat	Habitats occupied range from arid deserts and grasslands through mixed conifer forests.
Eumops perotis californicus	Greater western bonneted bat	Large open area with roost sites having vertical faces. They will roost in small colonies in rock fissures in high cliff faces.
Macrotus californicus	California leaf-nosed bat	Mostly found in the Sonoran desertscrub; summer and winter range the same; primarily roost in mines, caves, and rock shelters.
Myotis velifer	Cave myotis	Desert scrub of creosote, brittlebush, palo verde, and cacti. Roost in caves, tunnels, and mineshafts, and under bridges, and sometimes in buildings within a few miles of water.
Myotis yumanensis	Yuma myotis	A variety of habitats but strongly associated with water, more so than most other bat species.
Nyctinomops femorosaccus	Pocket free-tailed bat	Inhabitant of semiarid desertlands. It has been found using day-roosts in caves, crevices in cliffs, and under the roof tiles of buildings.
Perognathus longimembris	Little pocket mouse	Preferred habitats include desert riparian, desert scrub, desert wash, coastal scrub, and sagebrush.
Sigmodon hispidus eremicus	Yuma hispid cotton rat	Inhabits tall-grass areas where such grasses offer both freedom of movement under a protective canopy and an adequate food supply.
Vulpes macrotis	Kit fox	Favors arid climates, such as desert scrub, chaparral, and grasslands.

Source: AZGFD, 2012 and 2019

3.0 SURVEY RESULTS

3.1 METHODS

Biological baseline field surveys were conducted by a Stantec biologist on September 18, 2019. On the day of the surveys, temperatures were between 92 and 102 degrees Fahrenheit with no clouds or wind. Six potential treatment sites (Sites 1 through 6) and the existing pipeline alignment of the wastewater distribution system were surveyed, including a 100-foot buffer to the six sites and a 20-foot buffer to portions of the pipeline alignment (**Figure 2**). The biologist performed a walking survey of the Project area and focused on surveying for those species identified in Section 2**,** as well as determining if potential habitat was present for those species. No species-specific survey protocols were used during this survey.

3.2 GENERAL HABITAT DESCRIPTIONS

3.2.1 Site 1

Site 1 is approximately 4.6 acres in size and located 0.3 mile north of Tacna adjacent to South Avenue 40 East and Site 6 (**Figure 2**). The SWReGAP landcover data shows this site as Sonora-Mojave Creosotebush-White Bursage Desert Scrub (**Figure 3**). This site was previously disturbed with evidence of vehicle tracks and trash located throughout. The site was mostly bare ground with scattered creosote and fourwing saltbush as dominant shrubs. Given the timing of the survey, no determination of grasses and forbs species could be made as these species were dried and unidentifiable. Photographs of Site 1 are provided in Appendix A.

3.2.2 Site 2

Site 2 is approximately 0.2 acre in size and located on the west side of Tacna (**Figure 2**). Site 2 contains an abandoned house that has been boarded up. The SWReGAP landcover data shows this site as developed (**Figure 3**). No native vegetation was present at this site and it was mostly bare ground. Photographs of Site 2 are provided in Appendix A.

3.2.3 Site 3

Site 3 is approximately 0.6 acre in size and is located in an empty lot on the north side of Tacna (**Figure 2**). The majority of Site 3 was bare ground with no vegetation present. The SWReGAP landcover data shows this site as developed (**Figure 3**). Within the 100-foot buffer area, fourwing saltbush and other unidentifiable forbs were noted as well as Russian thistle (*Kali tragus*). Photographs of Site 3 are provided in Appendix A.

3.2.4 Site 4

Site 4 is approximately 0.6 acre in size and is located immediately west of Tacna (**Figure 2**). Site 4 was heavily vegetated with trees and shrubs. The dominant vegetation included creosote,

fourwing saltbush, and paloverde (*Parkinsonia* spp.). It was noted that Site 4 had been used as a dumping spot with numerous piles of refuse present. The SWReGAP landcover data shows this site as Sonora-Mojave Creosotebush-White Bursage Desert Scrub (**Figure 3**). One unidentified stick nest was located in a paloverde tree within the buffer area. Photographs of Site 4 are provided in Appendix A.

3.2.5 Site 5

Site 5 is approximately 0.2 acre in size and is located in the middle of Tacna (**Figure 2**). This site consists of an empty lot that does not contain shrubs or trees. Some unidentifiable forbs were present, but the site was mostly bare ground. The SWReGAP landcover data shows this site as developed (**Figure 3**). Photographs of Site 5 are provided in Appendix A.

3.2.6 Site 6

Site 6 is approximately 2.4 acres in size and located 0.3 mile north of Tacna adjacent to South Avenue 40 East and Site 1 (**Figure 2**). The SWReGAP landcover data shows this site as Sonora-Mojave Creosotebush-White Bursage Desert Scrub (**Figure 3**). This site was previously disturbed with evidence of vehicle tracks and trash located throughout. Additionally, the foundations of several buildings were located at the site. The site was mostly bare ground with scattered creosote and fourwing saltbush as dominant shrubs. There was also a small stand of paloverde trees at the north edge of the site. Given the timing of the survey, no determination of grasses and forbs species could be made as these species were dried and unidentifiable. Photographs of Site 6 are provided in Appendix A.

3.2.7 Pipeline Alignment

As shown of **Figure 2,** the proposed Project would include the replacement of approximately three miles of piping for the proposed Project. All of the proposed pipelines would follow existing roads or alleyways. During the surveys, no existing vegetation was observed along the proposed routes. Photographs of the pipeline alignment are provided in Appendix A.

3.3 WILDLIFE OBSERVED

Table 2 lists the wildlife observed during the field surveys. No federally-listed or state sensitive species were observed during the survey.

Table 2 Wildlife Species Observed

Scientific Name	Common Name
Migratory Birds	
Cathartes aura	Turkey vulture
Spizella passerina	Chipping sparrow
Zenaida macroura	Mourning dove
Haemorhous mexicanus	House finch

Scientific Name	Common Name
Quiscalus quiscula	Common grackle
Corvus corax	Common raven
Mammals	
Canis latrans	Coyote
Reptile	
Cnemidophorus tigris	Western whiptail
Uta stansburiana	Common side-blotched lizard

4.0 CONCLUSIONS

As stated above, no federally listed or state sensitive species were identified as having the potential to occur were observed during the surveys. **Table 3** details the likelihood of the USFWS and AZGFD identified species with the potential to occur in the Project area and rationale.

Table 3 Likelihood of Sensitive Species to Occur

Species	Likelihood to Occur in the Project Area	Rationale
Sonoran pronghorn	Low	Suitable habitat is present, however, given the proximity to human activity, pronghorn would likely avoid the area.
Southwestern willow flycatcher	Low	No suitable habitat (riparian/wetlands) is present but individuals may travel through the Project area.
Yellow-billed cuckoo	Low	No suitable habitat (riparian/wetlands) is present but individuals may travel through the site from nearby critical habitat.
Yuma clapper rail	Low	No suitable habitat (riparian/wetlands) is present but individuals may travel through the Project area.
Sonoran Desert toad	Low-medium	Site is within 0.7 miles of a water source.
Lowland leopard frog	Low	No suitable habitat (riparian/wetlands) is present, but individuals may occur in nearby habitat.
Gila monster	None	No rocky areas are present in the Project area.
Abert's towhee	Low	While no suitable habitat (riparian/wetlands) is present, it may occur in nearby riparian areas.
American bittern	Low	No suitable habitat (riparian/wetlands) is present but individuals may travel through the Project area.
Arizona Bell's vireo	Low	No suitable habitat (riparian/wetlands) is present but individuals may travel through the Project area.
Bald eagle	Low	No suitable nesting habitat (open bodies of water) is present but this species may travel through the Project area.
Brewer's sparrow	Medium	Suitable habitat is present.
Costa's hummingbird	Medium	Suitable habitat is present.
Ferruginous hawk	Medium	Suitable habitat is present.
Gila woodpecker	Medium	Suitable habitat is present.
Gilded flicker	Medium	Suitable habitat is present.
Le Conte's thrasher	Medium	Suitable habitat is present.
Lincoln's sparrow	Medium	Suitable habitat is present.
Lucy's warbler	Low	No suitable habitat (riparian/wetlands) is present, but individuals may occur in nearby habitat.
Marsh wren	Low	No suitable habitat (riparian/wetlands) is present, but individuals may occur in nearby habitat.
Mountain plover	Medium	Suitable winter habitat is present.
Pacific wren	Medium	Suitable nonbreeding habitat is present.
Red-naped sapsucker	Low	No suitable habitat is present, but individuals may occur in nearby habitat.

Species	Likelihood to Occur in the Project Area	Rationale
Savannah sparrow	Medium	Suitable habitat is present.
Sprague's pipit	Medium	Suitable winter habitat is present.
Virginia rail	Low	No suitable habitat (riparian/wetlands) is present, but individuals may occur in nearby habitat.
Western burrowing owl	Medium	Suitable habitat is present.
Wood duck	None	No suitable habitat (riparian/wetlands) is present and a lack of ponds and rivers would prevent individuals from occurring.
Harris' antelope squirrel	Low-medium	Low quality habitat is present in the Project area.
American beaver	None	No suitable habitat (open bodies of water) is present and individuals would be unlikely to use the Project area.
Pale Townsend's big-eared bat	Low-Medium	Roosting sites are limited but Individuals may forage in the Project area.
Spotted bat	Low-Medium	Roosting sites are limited but Individuals may forage in the Project area
Greater western bonneted bat	None	No suitable habitat (large cliff faces) is present.
California leaf-nosed bat	Low-Medium	Roosting sites are limited but Individuals may forage in the Project area
Cave myotis	Low-Medium	Roosting sites are limited but Individuals may forage in the Project area
Yuma myotis	Low-Medium	Suitable habitat is nearby (0.7 miles) and individuals may forage in the Project area.
Pocket free-tail bat	Low-Medium	Roosting sites are limited but Individuals may forage in the Project area
Little pocket mouse	Medium	Suitable habitat is present.
Yuma hispid cotton rat	None	Suitable habitat (dense, tall grasslands) is absent from the Project area.
Kit fox	Medium	Suitable habitat is present.

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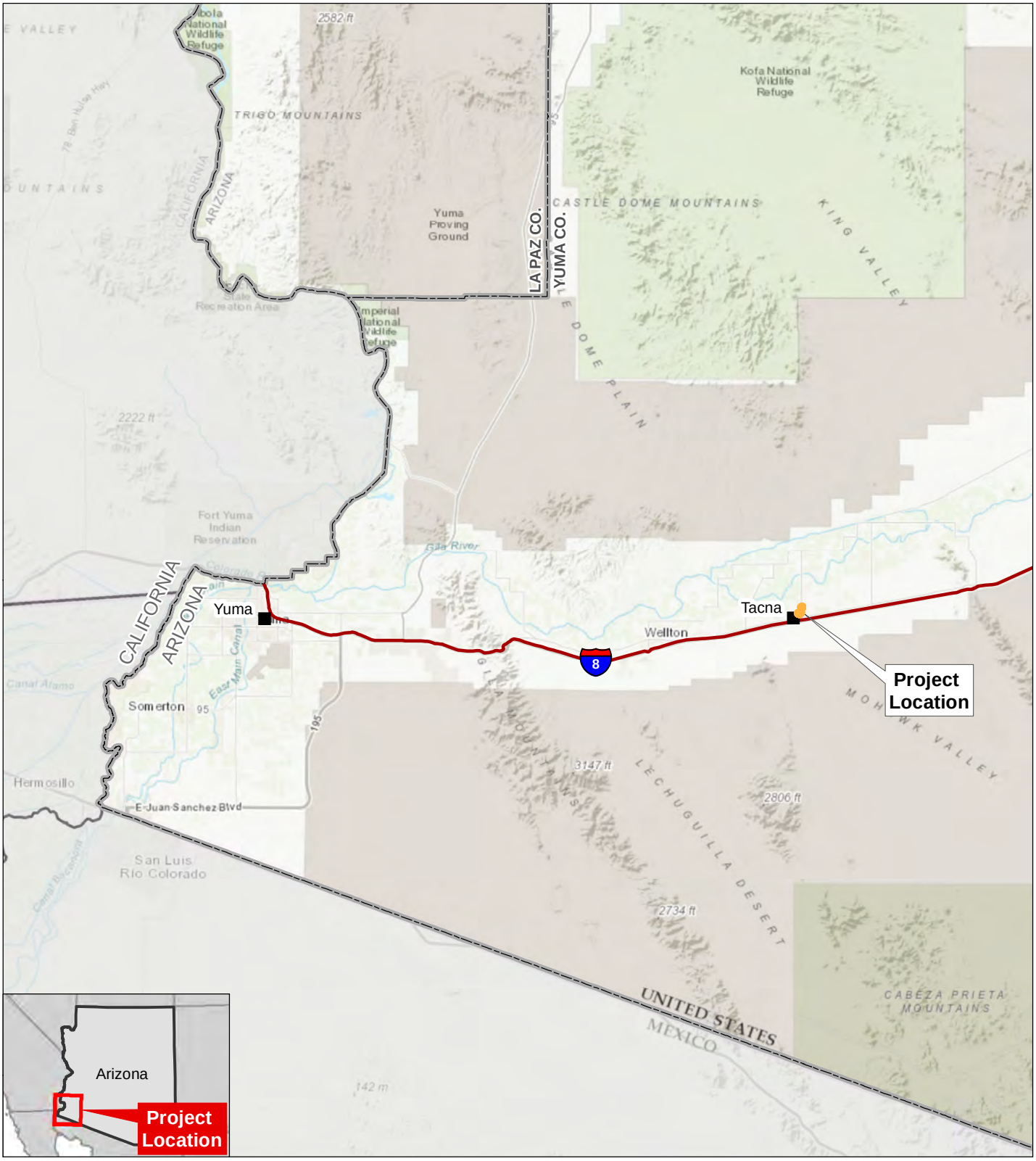
FIGURES



N

Stantec

0 5 10 Miles

1 in = 10 miles

Yuma County
Tacna Water Planning Project
Biological Survey Report

T16-17W, R8S Yuma County, NV
NAD 1983 State Plane Arizona West FIPS 0203 Feet

DRAWN BY: BT	1ST REVIEW: CJ	2ND REVIEW: NL
DATE: 1/15/2020	PROJECT NO: 181300937	

Figure 1
Project Location

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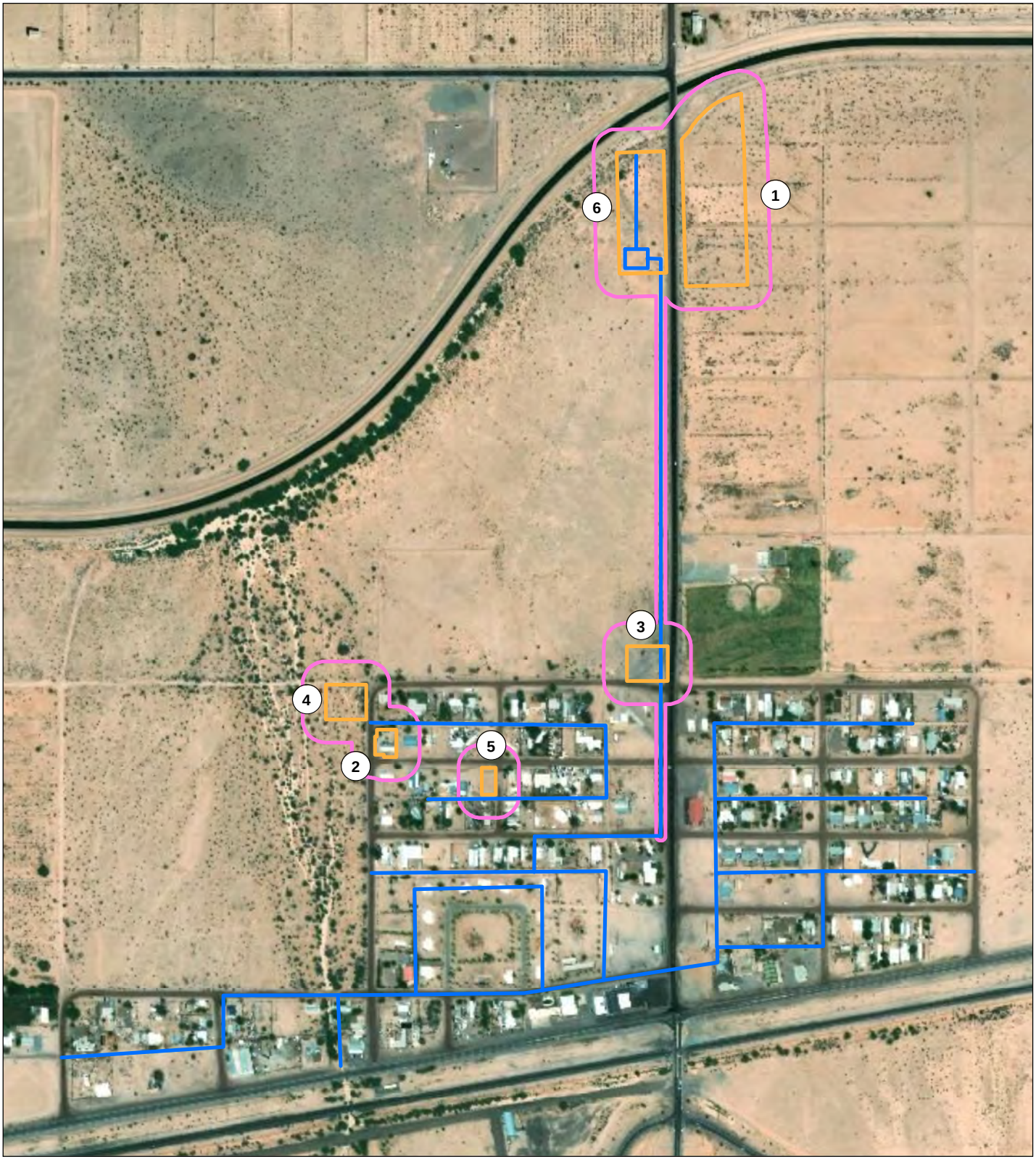
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Legend

- Pipeline Alignment
- Potential Treatment Sites
- Survey Area

N

Stantec

0 300 600 Feet

1 in = 600 feet

Yuma County
Tacna Water Planning Project
Biological Survey Report

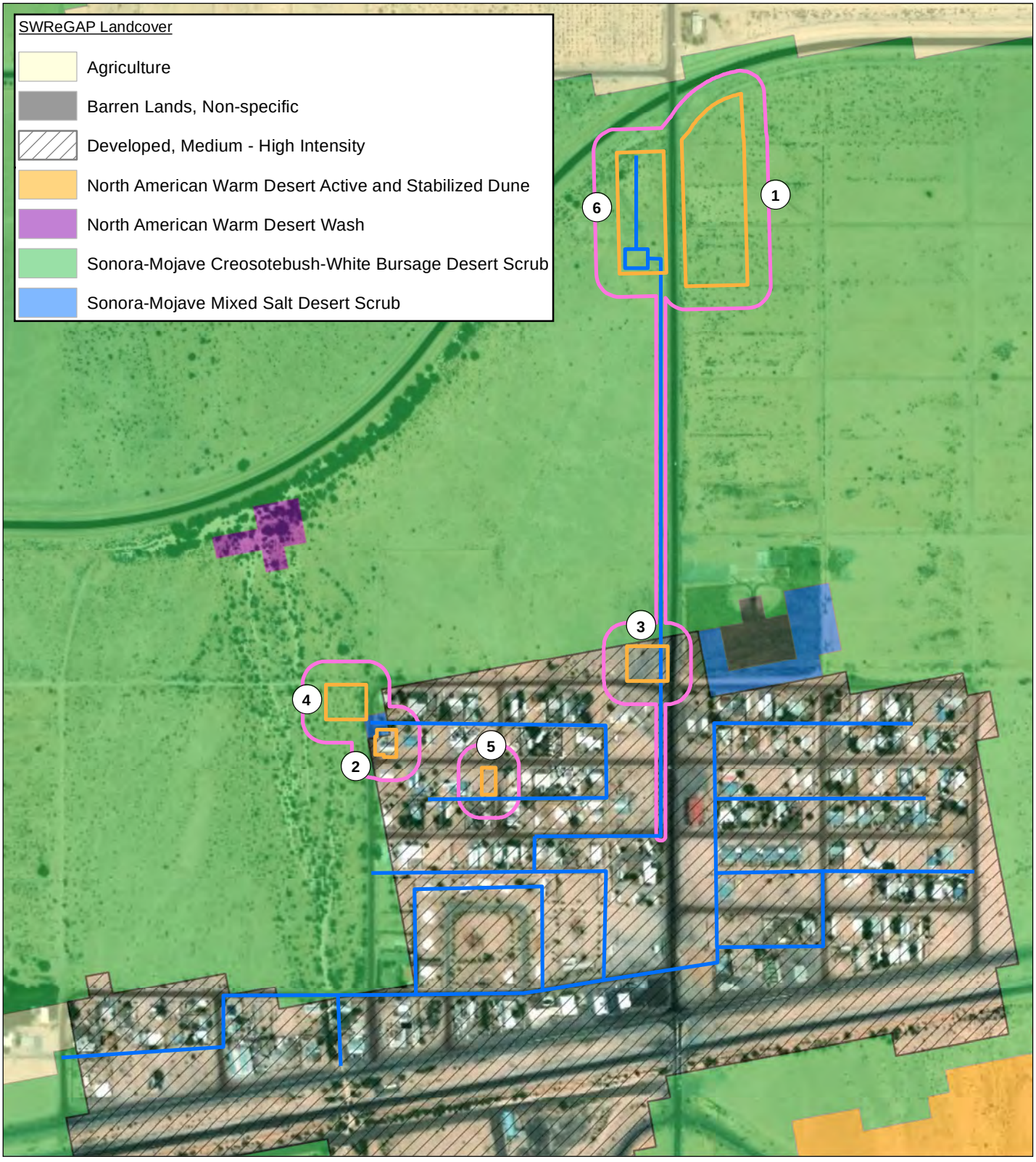
T16-17W, R8S Yuma County, NV
NAD 1983 State Plane Arizona West FIPS 0203 Feet

DRAWN BY: BT	1ST REVIEW: CJ	2ND REVIEW: NL
DATE: 1/15/2020	PROJECT NO: 181300937	

Figure 2
Survey Area

V:\2037\Active\181300937\03_data\gis_cad\gis\mxds\Bio_report\Fig2_Project_Area_8x11P.mxd Revised: 2020-01-15 By: botaylor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Pipeline Alignment
- Potential Treatment Sites
- Survey Area

N

Stantec

0 300 600 Feet

1 in = 600 feet

T16-17W, R8S Yuma County, NV
NAD 1983 State Plane Arizona West FIPS 0203 Feet

DRAWN BY: BT	1ST REVIEW: CJ	2ND REVIEW: NL
DATE: 1/15/2020	PROJECT NO: 181300937	

Yuma County
Tacna Water Planning Project
Biological Survey Report

Figure 3
Southwest ReGAP Vegetation Communities

V:\2037\Active\181300937\03_data\gis_cad\gis\mxds\Bio_report\Fig3_SWReGAP_8x11P.mxd Revised: 2020-01-15 By: bdaylor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix A

AGENCY CORRESPONDENCE

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.

Project Name:

Tacna Water System Replacement

Project Description:

The proposed Tacna replacement water system (Project) would consist of three components : 1) water supply and treatment; 2) water storage; and 3) a water distribution system.

Project Type:

Water Use, Transfer, and Channel Activities, Water delivery and supply line or effluent delivery line (operated by municipality or water company), New lines or expansion of existing lines

Contact Person:

Kim Carter

Organization:

Stantec

On Behalf Of:

YUMA

Project ID:

HGIS-09705

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

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. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), 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.

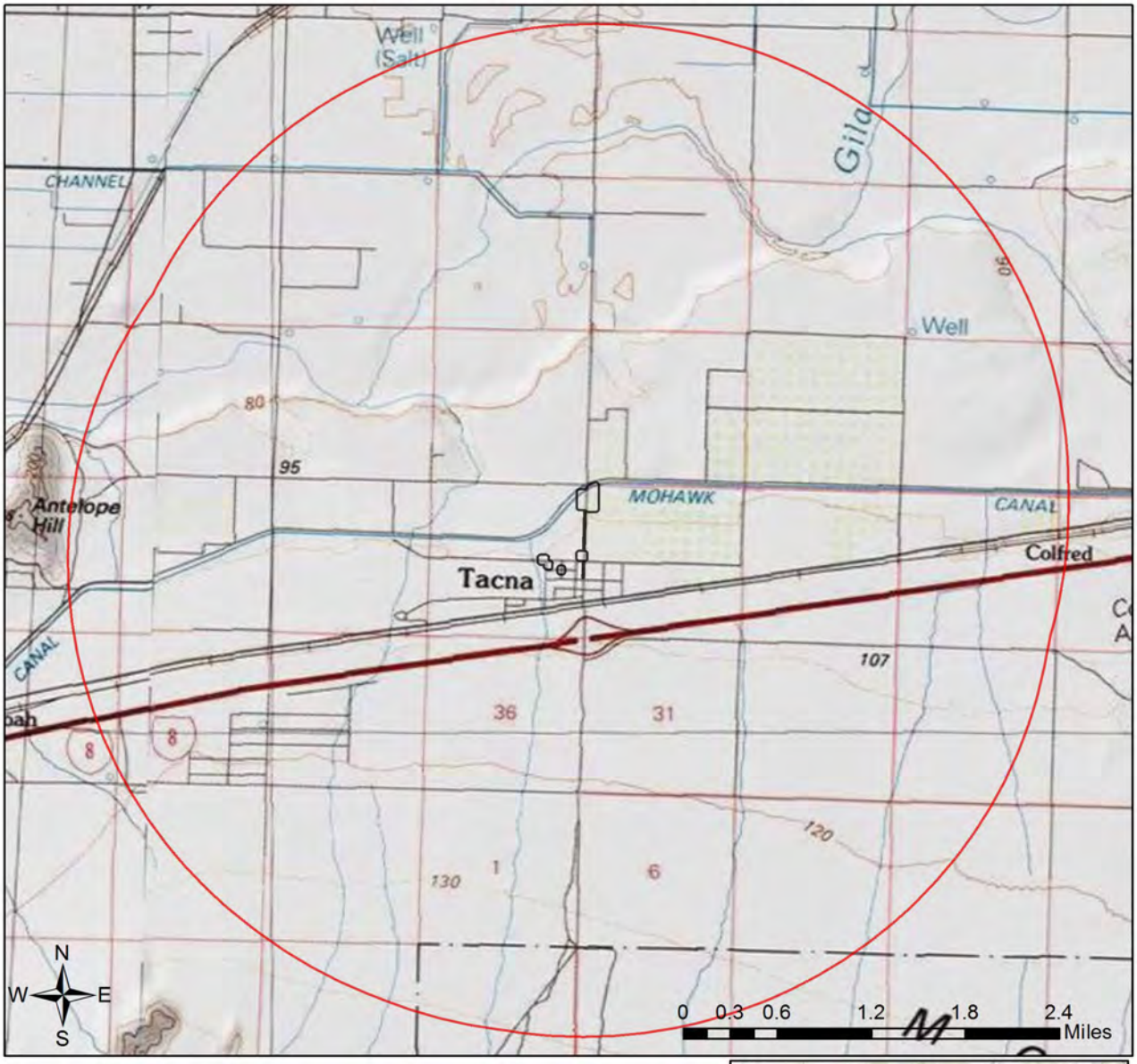
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

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
   PEP@azgfd.gov
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

Tacna Water System Replacement

USA Topo Basemap With Locator Map



Project Boundary

Buffered Project Boundary

Project Size (acres): 25.29

Lat/Long (DD): 32.7068 / -113.9526

County(s): Yuma

AGFD Region(s): Yuma

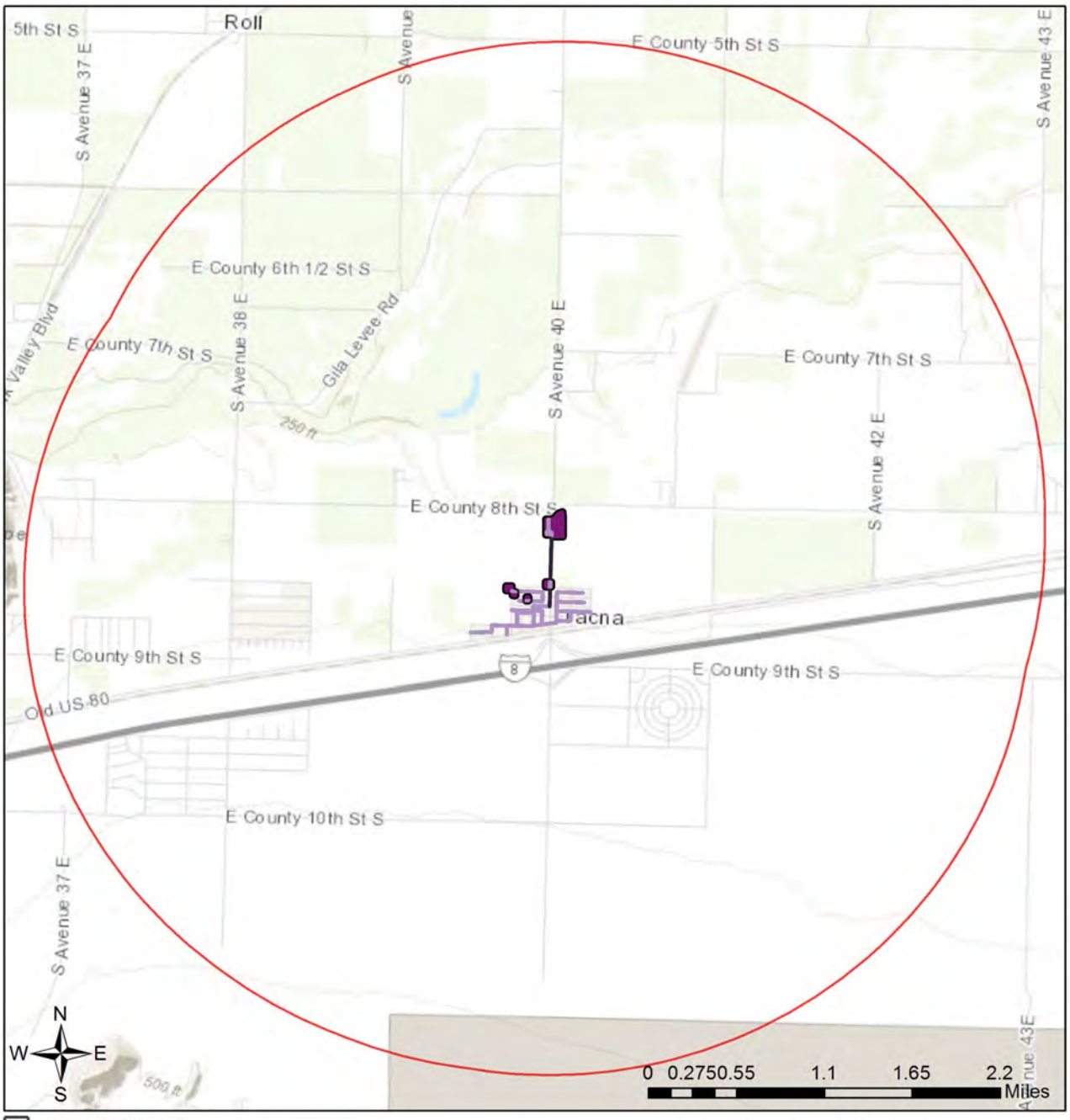
Township/Range(s): T8S, R16W; T8S, R17W

USGS Quad(s): TACNA

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap

Tacna Water System Replacement

Web Map As Submitted By User



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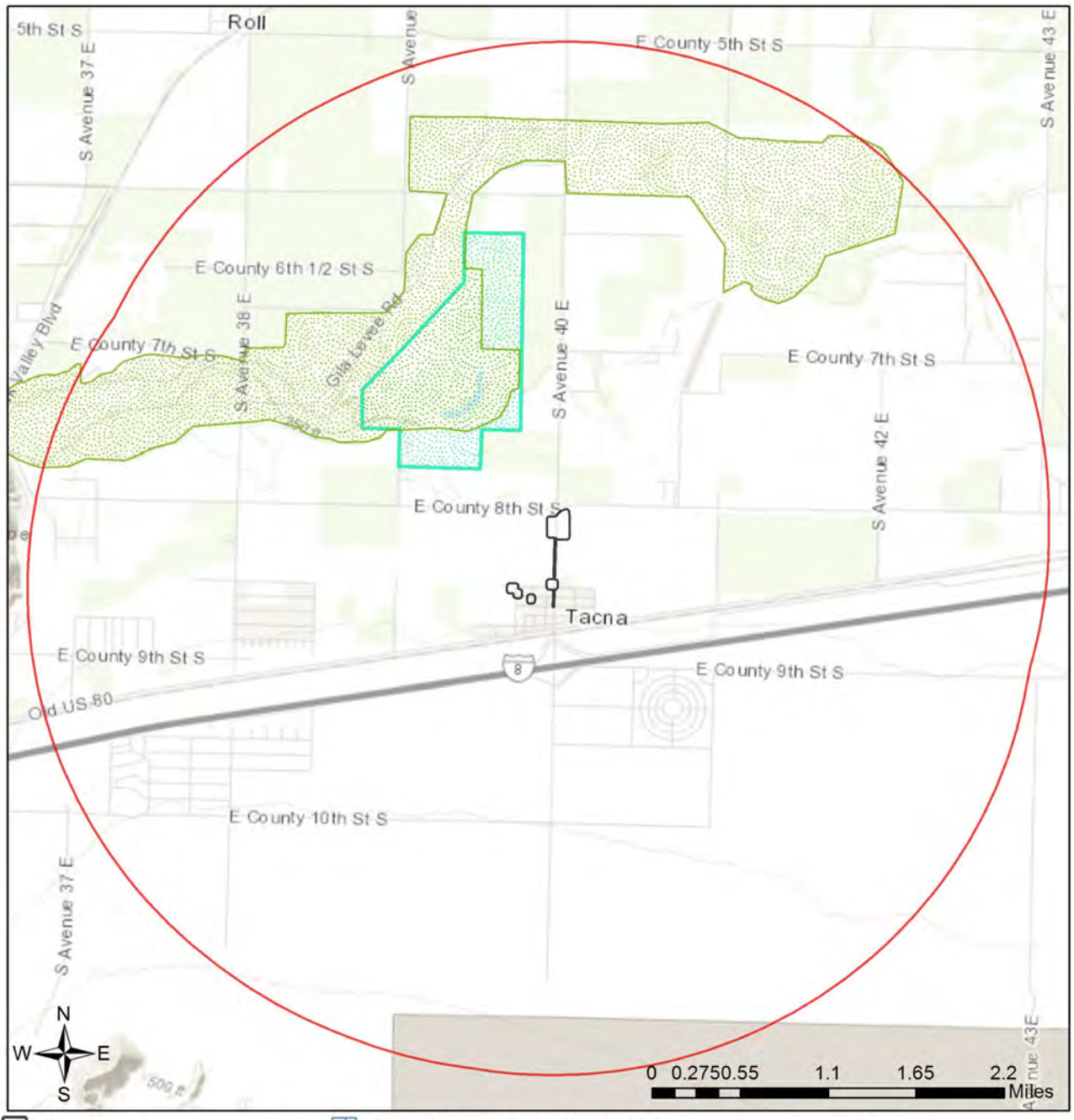
Tacna Water System Replacement

Important Areas



- Project Boundary
- Buffered Project Boundary

County Stakeholder Assessment

- Wildlife Crossing Area
- Wildlife Movement Area - Diffuse
- Wildlife Movement Area - Landscape
- Wildlife Movement Area - Riparian/Wash
- Wildlife Connectivity
- Important Connectivity Zones
- Pinal County Riparian
- Critical Habitat
- Important Bird Areas

Project Size (acres): 25.29

Lat/Long (DD): 32.7068 / -113.9526

County(s): Yuma

AGFD Region(s): Yuma

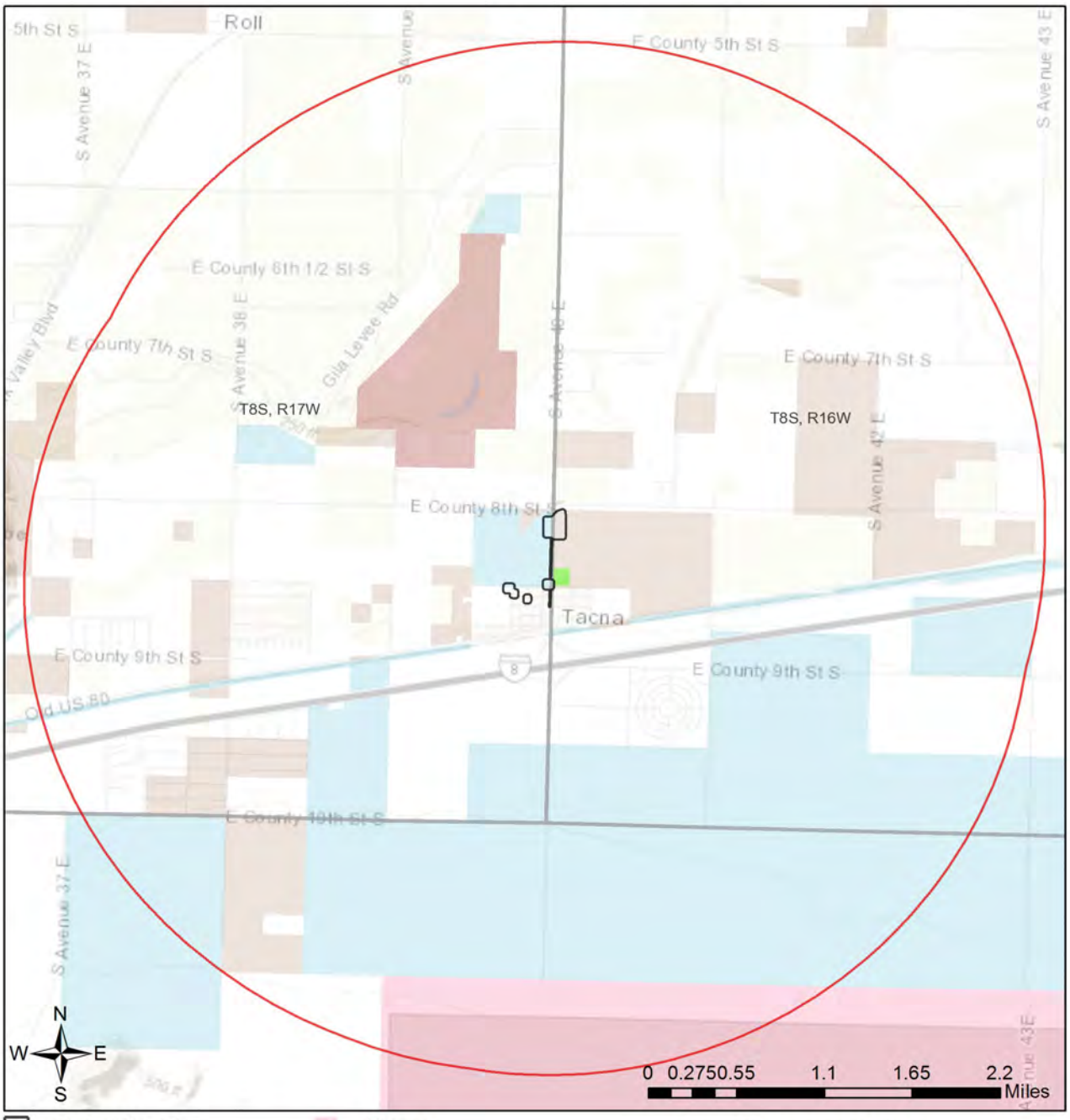
Township/Range(s): T8S, R16W; T8S, R17W

USGS Quad(s): TACNA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Tacna Water System Replacement

Township/Ranges and Land Ownership



- Project Boundary
- Buffered Project Boundary
- Township/Ranges

Land Ownership

- 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

Project Size (acres): 25.29

Lat/Long (DD): 32.7068 / -113.9526

County(s): Yuma

AGFD Region(s): Yuma

Township/Range(s): T8S, R16W; T8S, R17W

USGS Quad(s): TACNA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Antilocapra americana sonoriensis	Sonoran Pronghorn	LE,XN				1A
Antilocapra americana sonoriensis	Sonoran Pronghorn	LE				1A
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S			1A
Rallus obsoletus yumanensis	Yuma Ridgway's Rail	LE				1A

Note: Status code definitions can be found at https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/
.

No Special Areas Detected
No special areas were detected within the project vicinity.

Species of Greatest Conservation Need Predicted within the Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Aix sponsa	Wood Duck					1B
Ammospermophilus harrisii	Harris' Antelope Squirrel					1B
Anthus spragueii	Sprague's Pipit	SC				1A
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Botaurus lentiginosus	American Bittern					1B
Buteo regalis	Ferruginous Hawk	SC		S		1B
Calypte costae	Costa's Hummingbird					1C
Castor canadensis	American Beaver					1B
Charadrius montanus	Mountain Plover	SC				1B
Cistothorus palustris	Marsh Wren					1C
Colaptes chrysoides	Gilded Flicker			S		1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Euderma maculatum	Spotted Bat	SC	S	S		1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S		1A
Heloderma suspectum	Gila Monster					1A
Incilius alvarius	Sonoran Desert Toad					1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A
Macrotus californicus	California Leaf-nosed Bat	SC		S		1B
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolnii	Lincoln's Sparrow					1B
Melozone aberti	Abert's Towhee		S			1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Oreothlypis luciae	Lucy's Warbler					1C
Passerculus sandwichensis	Savannah Sparrow					1B

Species of Greatest Conservation Need Predicted within the Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Perognathus longimembris	Little Pocket Mouse	No Status				1B
Rallus limicola	Virginia Rail					1C
Rallus obsoletus yumanensis	Yuma Ridgway's Rail	LE				1A
Sigmodon hispidus eremicus	Yuma Hispid Cotton Rat	SC				1B
Sphyrapicus nuchalis	Red-naped Sapsucker					1C
Spizella breweri	Brewer's Sparrow					1C
Toxostoma lecontei	LeConte's Thrasher			S		1B
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox	No Status				1B

Species of Economic and Recreation Importance Predicted within the Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

Project Type: Water Use, Transfer, and Channel Activities, Water delivery and supply line or effluent delivery line (operated by municipality or water company), New lines or expansion of existing lines

Project Type Recommendations:
Minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g., microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g., livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before leaving the site. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants, https://agriculture.az.gov/. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control, http://www.usda.gov/wps/portal/usdahome. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information https://www.azgfd.com/hunting/regulations.

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (include spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Based on the project type entered, coordination with State Historic Preservation Office may be required (http://azstateparks.com/SHPO/index.html).

Trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptefauna (snakes, lizards, tortoise) from entering ditches.

Based on the project type entered, coordination with Arizona Department of Environmental Quality may be required (http://www.azdeq.gov/).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Project Location and/or Species Recommendations:
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 http://www.fws.gov/southwest/es/arizona/ 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

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
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

In Reply Refer To:
Consultation Code: 02EAAZ00-2019-SLI-0984
Event Code: 02EAAZ00-2019-E-02288
Project Name: Tacna Water System Replacement

September 09, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/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 one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. In some cases, a species does not currently occur within a quadrangle but occurs nearby and could be affected by a project. Please refer to the species information links found at:
http://www.fws.gov/southwest/es/arizona/Docs_Species.htm
http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf .

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 consult with us if their 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, we recommend preparing a biological evaluation similar to a Biological Assessment 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. You should request consultation with us 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 effects. If the Federal action agency determines that the action may jeopardize a proposed species or 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 considering them 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:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.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 1026 species of birds are protected by the MBTA, including species such as the western burrowing owl (Athene cunicularia hypugea). Protected western burrowing owls are often 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, you should evaluate your project to determine whether it is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles:
https://www.fws.gov/migratorybirds/pdf/management/
nationalbaldeaglenanagementguidelines.pdf
https://www.fws.gov/birds/management/managed-species/eagle-management.php.

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: https://www.fws.gov/birds/policies-and-regulations/incidental-take.php. 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/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php.

Activities that involve streams (including intermittent streams) and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). 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.
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.

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/HeritageFund/.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact our following offices for projects in these areas:

Northern Arizona: Flagstaff Office 928/556-2001
Central Arizona: Phoenix office 602/242-0210
Southern Arizona: Tucson Office 520/670-6144

Sincerely,
/s/ Steven L. Spangle Field Supervisor

Attachment

Attachment(s):

- Official Species List

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

Consultation Code: 02EAAZ00-2019-SLI-0984

Event Code: 02EAAZ00-2019-E-02288

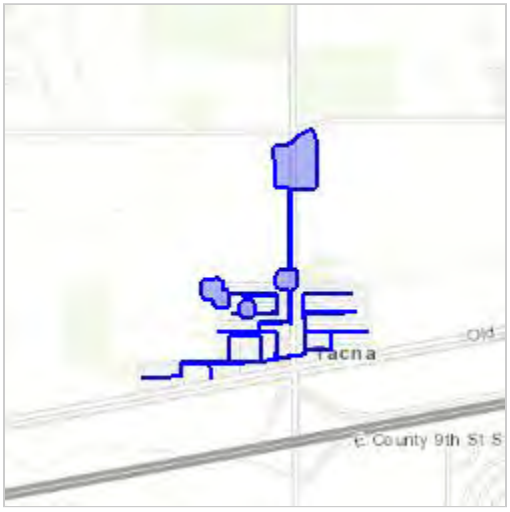
Project Name: Tacna Water System Replacement

Project Type: WATER SUPPLY / DELIVERY

Project Description: The proposed Tacna replacement water system would consist of three components : water
supply and treatment; water storage; and a water distribution system.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.70028718132691N113.95757682308042W



Counties: Yuma, AZ

Endangered Species Act Species

There is a total of 4 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.

---

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
Sonoran Pronghorn *Antilocapra americana sonoriensis* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4750	Endangered

Birds

NAME	STATUS
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location is outside 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 **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened
Yuma Clapper Rail *Rallus longirostris yumanensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3505	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix B

SITE PHOTOGRAPHS

Photograph 1 - Representative habitat in Site 1.

Photograph 2 - Abandoned home in Site 2.

Photograph 3 - Empty lot in Site 3.

Photograph 4 - Representative habitat in Site 4.

Photograph 5 - Empty lot in Site 5.

Photograph 6 - Representative habitat in Site 6.

Photograph 7 - Representative location of alleyway pipeline location.