

APPENDIX E
MEMORANDUM: ENVIRONMENTAL

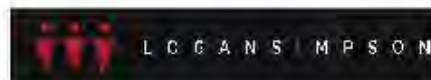
Reata Wash
Flood Control Improvement Study
Contract No. 2014-168-COS
Memorandum: Environmental
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LIST OF ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
ASM	Arizona State Museum
AZPDES	Arizona Pollutant Discharge Elimination System
AZSITE	Arizona Archaeological Site and Survey Database
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CAP	Central Arizona Project
CE/CATEX	Categorical Exclusion
CEC	categorical exclusion checklist
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGP	Construction General Permit
CLOMR	Conditional Letter of Map Revision
CLOMR-F	Conditional Letter of Map Revision based on Fill
CWA	Clean Water Act
DHS	U.S. Department of Homeland Security
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
JD	Jurisdictional Delineation
LEDPA	least environmentally damaging practicable alternative
MBTA	Migratory Bird Treaty Act
MS4	municipal separate storm sewer systems

NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OAW	Outstanding Arizona Waters
OHWM	ordinary high-water mark
PCN	Preconstruction Notification
RCRA	Resource Conservation and Recovery Act
Reclamation	Bureau of Reclamation
RIBITS	Regulatory In-Lieu Fee and Bank Information Tracking System
SHPO	State Historic Preservation Office
SR	State Route
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
SWPPP	stormwater pollution prevention plan
T&E	threatened and endangered
TPC	Tournament Players Club of Scottsdale
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service

1. EXECUTIVE SUMMARY

This Environmental Memorandum summarizes the results of background research and preliminary agency coordination conducted in support of the Reata Wash Flood Control Improvement Study (Reata Wash Study), and provides a review of environmental regulations and anticipated agency involvement relevant to the Reata Wash Study.

The flood control improvements being evaluated in the Reata Wash Study may result in federal actions (e.g., permit approvals, funding, etc.) by the U.S. Bureau of Reclamation (Reclamation), Federal Emergency Management Agency (FEMA), and/or the U.S. Army Corps of Engineers (USACE). Therefore, compliance with federal environmental regulations such as the National Environmental Policy Act (NEPA), Clean Water Act (CWA), Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA) is anticipated. For actions that involve multiple federal agencies, a common approach is for a single federal agency to act as a lead, or for the multiple agencies to act jointly or cooperatively with the lead federal agency. However, each agency that conducts a federal action will continue to require compliance with their agency-specific NEPA requirements. Each level of NEPA analysis for each agency varies in the magnitude of required documentation and evaluation, including agency scoping, public involvement, and technical resource studies (e.g., biological and cultural resource evaluations).

Based on previous and ongoing coordination between the City of Scottsdale (City) and the applicable federal agencies, as well as the site-specific environmental conditions and the flood control improvements as described in the Reata Wash Study, the following NEPA documentation is anticipated:

- Reclamation: a Reclamation Categorical Exclusion could be needed if flood control improvements occur within Reach 5. Preparation of a Reclamation Environmental Assessment (EA) or Environmental Impact Statement is not anticipated, but would be determined by Reclamation upon completion of the Categorical Exclusion Checklist (CEC).
- FEMA: if federal funds through FEMA are used for the design and/or construction of the flood control improvements, a FEMA EA would likely be required. If FEMA funding is not used, the FEMA NEPA process would not apply.
- USACE: A CWA Section 404 Individual Permit is anticipated to be needed for the proposed project due to the level of impacts to waters of the U.S. that would be caused by the installation of the proposed flood control improvements. USACE approval of an Individual Permit requires project compliance with USACE NEPA process. The USACE's CWA Section 404 Individual Permit application includes preparation of a *Department of the*

Army Environmental Assessment and Statement of Finding, which serves as the USACE's EA for compliance with the USACE NEPA process.

The City has met with Reclamation and the USACE to discuss potential environmental concerns within the Reata Wash Study Area and the agency-specific environmental documentation that should be anticipated for the potential flood control improvements. Based on these discussions, it should be anticipated that the USACE would be the lead federal agency for improvements within the overall Reata Wash Study Area. Reclamation, and potentially FEMA, would likely act as either a joint lead or cooperating agency, and the NEPA process would be documented according to the USACE's Environmental Assessment and Statement of Findings.

Since the proposed flood control improvements are anticipated to cause permanent and temporary impacts to waters of the U.S. under jurisdiction of the USACE, compliance with CWA Sections 401, 402, and 404 will be required. Based on the estimated level of impacts to waters of the U.S. from the proposed flood control improvements, a Section 404 Individual Permit and a Section 401 individual water quality certification are anticipated to be needed. Additionally, since more than 1 acre of land would likely be disturbed during construction activities, an Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit (CGP) with an associated stormwater pollution prevention plan would be required.

Based on the presence of potential waters of the U.S. within the Reata Wash Study Area and the anticipated need for a Section 404 permit, the submittal of a Preliminary or Approved Jurisdictional Delineation to the USACE would be required to document the locations and extent of potentially jurisdictional waters of the U.S. The Section 404 Individual Permit that is anticipated to be needed would require demonstration that the proposed improvements minimized or avoided impacts whenever practicable. Any impacts that cannot be avoided may be subject to compensatory mitigation as determined by the USACE.

Preparation of a Biological Evaluation (BE) is anticipated to be needed to support the agency-specific environmental compliance documents for the construction of flood control improvements within the Reata Wash Study Area. The BE should evaluate potential impacts to special status species, including those protected under the ESA. Improvements within the immediate channel bottom of Reata Wash (including those related to drop structures, culverts, dissipaters, and inlet/outlet structures) should also allow for continued wildlife movement upstream and downstream of any structure to maintain north-south wildlife movement through the Reata Wash corridor.

Based on a review of previous cultural resource survey documentation, the majority of the Reata Wash Study Area has been surveyed for cultural resources, and sites

determined eligible for inclusion in the National Register of Historic Places are present. If the City council authorizes the Reata Wash Study move forward into design, it is recommended that the location of potential improvements be reviewed with respect to the results of the Class I research to determine the need for additional cultural resource survey and reporting. Depending on the location of potential improvements and associated ground disturbance, a new Class III survey may be needed in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards or where survey has not yet been completed.

2. INTRODUCTION

The City of Scottsdale (City) is conducting the Reata Wash Flood Control Improvement Study (Reata Wash Study) for the purpose of identifying and recommending flood control improvements within the Reata Wash floodplain that will reduce flood risks to residents, property and public infrastructure. A secondary goal of the Reata Wash Study is to remove or reduce the size of the existing Federal Emergency Management Agency (FEMA)-designated Reata Wash floodplain.

Should the Reata Wash Study be approved as a project, the construction of the proposed flood control improvements is expected to include the issuance of a federal permit, approval for activities located on federal lands, and/or use of federal funding. Therefore, the proposed flood control improvements are anticipated to require compliance with the National Environmental Policy Act (NEPA), Clean Water Act (CWA), Endangered Species Act (ESA), National Historic Preservation Act (NHPA), and other federal and state environmental laws and regulations. This Environmental Memorandum summarizes the results of background research and preliminary agency coordination conducted in support of the Reata Wash Study, and provides a review of environmental regulations and anticipated agency involvement relevant to the Reata Wash Study.

2.1 Purpose of the Environmental Memorandum

An evaluation was completed that reviewed a variety of flood control options within each of the five designated Reata Wash Study reaches identified in the Reata Wash Study's Design Concept Report, the *Proposed Condition Hydraulic Capacity Memorandum*, and the *Construction Cost and Quantities Memorandum* to determine potential environmental requirements that may be necessary during a design process. Regulatory agencies responsible for the oversight of resources located within the Reata Wash Study Area were consulted to identify information needs and submittal requirements related to their specific environmental clearance processes.

This Environmental Memorandum provides a summary of current environmental regulations and agency-specific environmental resource surveys, reports, clearances, permits and/or concurrences anticipated to be necessary based on a review of the Reata Wash Study Area conditions, preliminary agency coordination, and a review of proposed reach improvement alternatives. Recommendations for environmental compliance with resource responsible agencies and the durations of their anticipated reports and clearances are also provided.

2.2 Reata Wash Study Area Description

The Reata Wash Study Area is located in north Scottsdale from north of Pinnacle Peak Road to the Central Arizona Project (CAP) Canal (Figure 1). Reata Wash, located on the eastern boundary, is the major drainage conveyance in the Reata Wash Study Area. Land ownership within the Reata Wash Study Area includes private, City, Arizona State Land Department, Bureau of Reclamation (Reclamation), and Bureau of Land Management (BLM). Key transportation corridors present in the Reata Wash Study Area include State Route Loop 101, Pima Road, Bell Road, and Thompson Peak Parkway. Land use within and adjacent to the Reata Wash Study Area is primarily residential, but also includes commercial, recreational, institutional (e.g., churches and schools), and undeveloped open space. Major commercial facilities with significance to the City include WestWorld and the Tournament Players Club (TPC) of Scottsdale.

The Reata Wash floodplain consists of an alluvial fan with a series of washes that only carry flows during and following storm events (ephemeral washes). Stormwater flow from the McDowell Mountains and surrounding desert landscape is funneled towards the apex of the fan in the upper portion of the Reata Wash Study Area. South of the Pinnacle Peak Road Bridge, stormwater flow diverges into multiple ephemeral waterways, including Dobson Wash to the west and Reata Wash to the east. Stormwater and sediment travel down irregular terrain and spread out unpredictably across the fan, depositing sediment and creating a potential flooding threat to residents, facilities, and structures throughout the Reata Wash floodplain. Within the Reata Wash Study Area, it is estimated that approximately 4,600 residential, public facilities and commercial structures have a potential risk of flooding in accordance with current FEMA guidelines. The hydraulic analysis conducted as part of the Reata Wash Study estimated that during a 100-year storm event, 13,015 cubic feet per second of stormwater will flow through Reata Wash at the existing Pinnacle Peak Road Bridge.

For the purpose of evaluating flood control options, Reata Wash has been divided into five reaches within the Reata Wash Study Area (Figure 2), including:

- Reach 1: Pinnacle Peak Road to 1,000 Feet North
- Reach 2: Pinnacle Peak Road to Cross Canyon Way
- Reach 3: Cross Canyon Way to Thompson Peak Parkway
- Reach 4: Thompson Peak Parkway to Bell Road
- Reach 5: Bell Road to East McDowell Mountain Ranch Road

Within each reach, the Reata Wash Study evaluated the construction of various flood control measures based on technical feasibility, compatibility with existing drainage infrastructure, land ownership, and ability to contain stormwater flow. Channel configurations, corridor widths, and types of materials for use in the new conveyance corridor were then evaluated according to the physical and land ownership constraints

of each reach, in order to determine potential design alternatives. Additionally, the Reata Wash Study considered the unique desert environment of the Reata Wash Study Area, and options evaluated within each reach considered environmental resource issues and the application of potential context-sensitive solutions in order to be compatible with the surrounding environment and compliant with applicable environmental laws and regulations.

2.3 Previous Environmental Documentation

A comprehensive data collection effort, including a Freedom of Information Act (FOIA) request with the U.S. Army Corps of Engineers (USACE), was completed by the City with the intent of supporting the Reata Wash Study with previously completed environmental resource and engineering documentation. The data collection effort resulted in various documents completed in support of previously constructed City infrastructure improvements and privately sponsored residential and commercial developments within the Reata Wash Study Area, such as:

- NEPA documentation
- Technical resource evaluations (e.g., biological and cultural reports)
- Applications for CWA Section 404 permits
- Correspondence and decision-making records, including coordination with USACE, Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), State Historic Preservation Office (SHPO), and other resource-responsible state and local agencies.

The data collection effort resulted in information associated with numerous planned and constructed projects located within the Reata Wash Study Area that have received USACE permit authorization. The City submitted a FOIA request to the USACE for file numbers associated with these projects and the information received which included Section 404 permit submittals, technical resource documentation, public feedback, and agency correspondence associated with the proposed improvements. The information received as part of the FOIA request will provide an additional data source for review and consideration in the event that planning and permitting efforts occur.

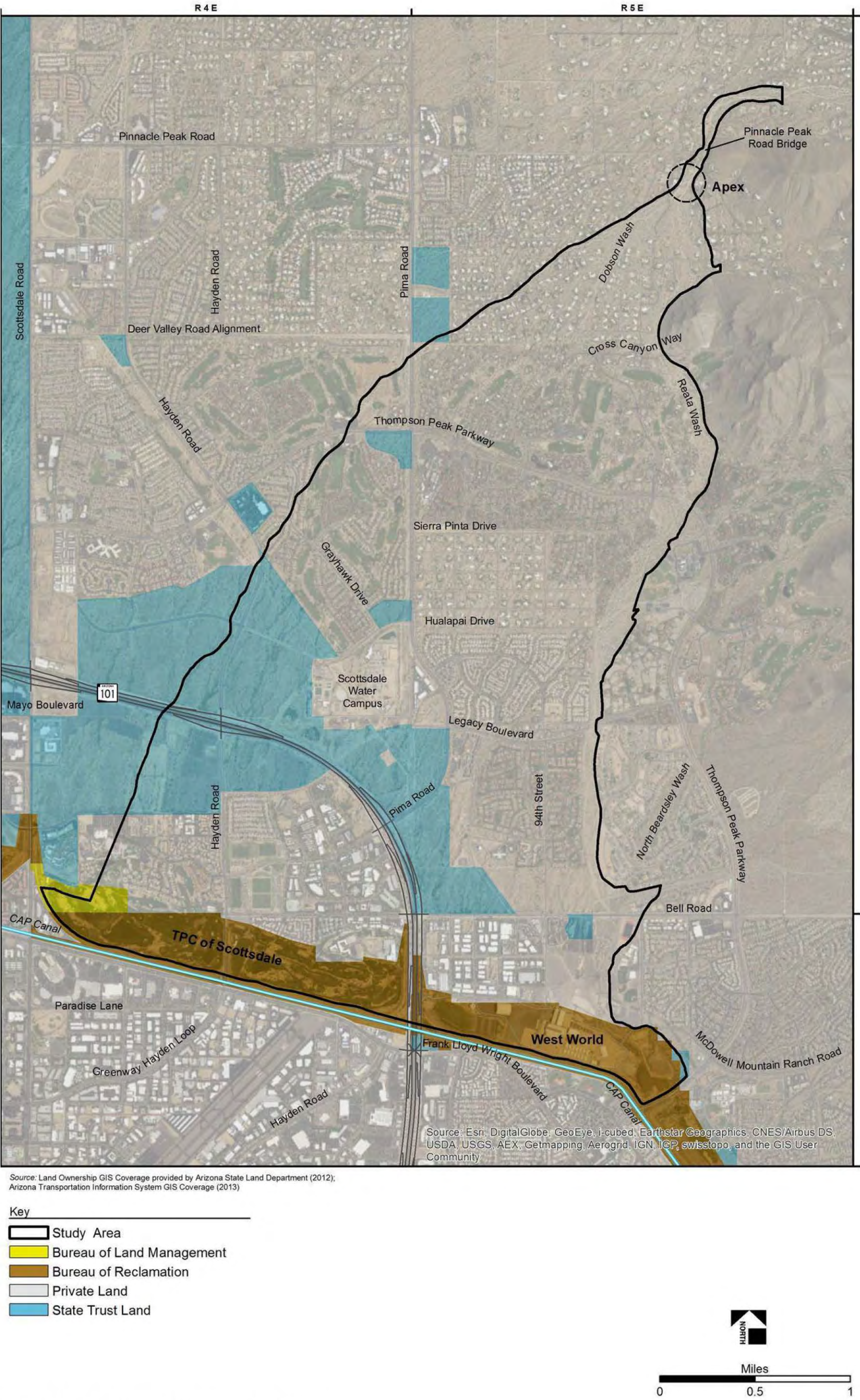
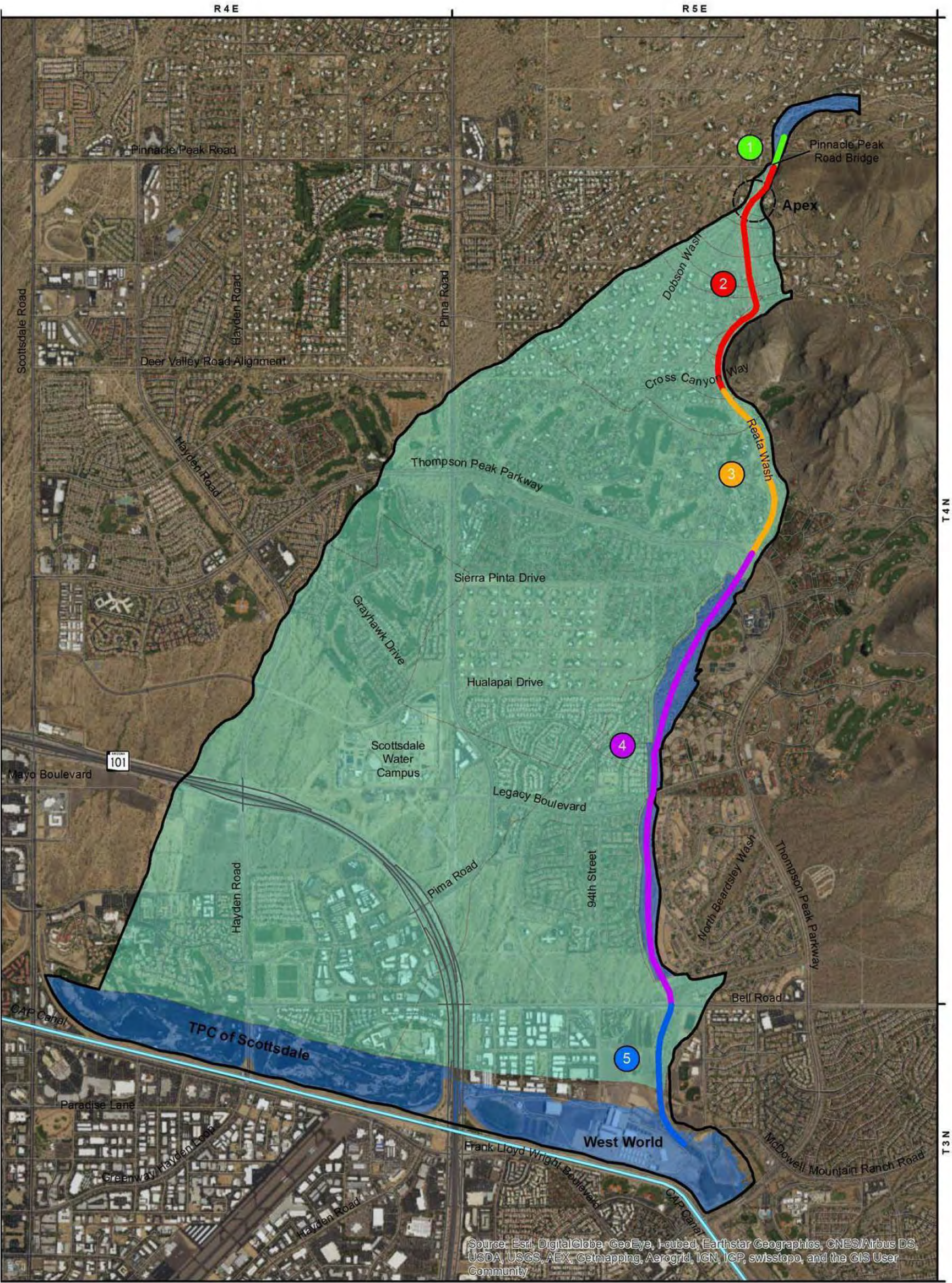


Figure 1. Reata Wash Study Area Vicinity Map



Source: Floodplain GIS Coverage provided by FEMA (2016);
Arizona Transportation Information System GIS Coverage (2013)

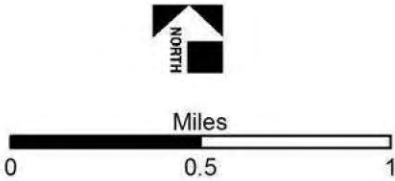
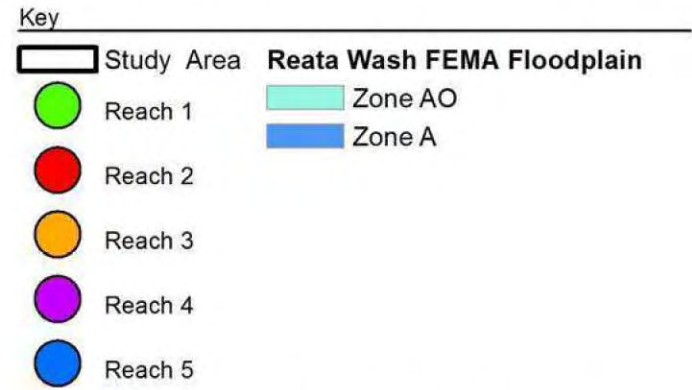


Figure 2. Reata Wash Flood Control Improvement Study Reaches

Based on land ownership, regulatory authority, and regulatory requirements that would be triggered during construction of new flood control improvements within the Reata Wash Study Area (e.g., permit approvals, funding, etc.), federal agencies that may have jurisdiction within the Reata Wash Study Area include: Reclamation, FEMA, the USACE, and BLM. Therefore, compliance with federal environmental regulations such as NEPA, CWA, ESA, and NHPA, may be required. The flood control improvements being evaluated in the Reata Wash Study may result in actions by Reclamation, FEMA, and/or the USACE. The following sections discuss current processes associated with these agencies and key regulations as they apply to the Reata Wash Study. The proposed improvements are not anticipated to require action from BLM; therefore, BLM regulatory requirements are not summarized in this memorandum.

3. NEPA OVERVIEW

The National Environmental Policy Act of 1969 (42 USC 4321 et seq.) establishes policy and goals for the protection, maintenance, and enhancement of the environment. NEPA requires federal agencies to consider the environmental impacts of their proposed discretionary actions during their decision-making processes and provides a mechanism for meeting many environmental reviews and approvals. Through the NEPA process, potential alternatives are identified and evaluated for their environmental effects.

Each federal agency has created and implements their own NEPA compliance procedures that fit their agency-specific mandates/missions, statutory requirements, decision-making authority, and the extent to which federal agencies use NEPA analyses to satisfy other review requirements. Consequently, NEPA procedures vary from agency to agency. Agency-specific NEPA processes relevant to the Reata Wash Study are summarized in Section 4. Agency-Specific NEPA Processes.

NEPA serves as a method for documenting compliance with other applicable environmental regulations, including but not limited to:

- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Endangered Species Act (ESA)
- Executive Order 11988 Floodplain Management, as amended
- Executive Order 11990 Protection of Wetlands (42 FR 26961)
- Fish and Wildlife Coordination Act (FWCA)
- Migratory Bird Treaty Act
- Section 106 of the National Historic Preservation Act (NHPA)
- Resource Conservation and Recovery Act
- Title VI of the 1964 Civil Rights Act

Compliance with these environmental regulations, including CWA, ESA, and NHPA, may require technical resource surveys and/or documentation, depending on the proposed action and the applicable federal agencies' requirements. See Sections 5. Clean Water Act, 6. Biological Resources and 7. Cultural Resources for more information on technical resource studies.

3.1 When is NEPA Compliance Required?

NEPA compliance is required for all discretionary federal actions (40 CFR 1508.18), such as:

- New and continuing activities, including projects and programs entirely or partly financed (i.e., funded), assisted, conducted, regulated, or approved by federal agencies (i.e., permitted)
- New or revised agency rules, regulations, plans, policies, or procedures
- Legislative proposals

NEPA does not apply to non-federal (i.e., state, local, tribal, and private) entities, unless a discretionary federal action is needed prior to the construction of the proposed activity.

The level of NEPA analysis and documentation required will vary, and exemptions may apply, depending on the particular action and the federal agency(ies) with jurisdiction or approval authority. Each applicable agency should be consulted before the decision is made that an action is exempt from NEPA documentation requirements. Section 4. Agency-Specific NEPA Processes discusses the anticipated agencies that will require coordination and their applicability to the Reata Wash Study Area.

It should be noted that in emergency situations, regulations allow for agencies to immediately take actions if necessary without following the usual NEPA procedures. However, the responsible agency must still consider environmental consequences and mitigate potential adverse effects to the extent practicable. Emergency situations are rare and documentation requirements will vary depending on the emergency action, so the applicable federal agency should be consulted prior to commencement of the action.

3.2 Role of Federal Agencies

The role of each applicable federal agency in the NEPA process depends on the agency's function and relationship to the proposed undertaking. For activities that involve actions from more than one federal agency, a lead agency is designated to supervise compliance with NEPA requirements. Federal agencies may also act as joint lead agencies with other federal, state, tribal or local agencies. In addition, one or more of the other applicable federal, state, tribal, or local agencies may be a cooperating

agency in the NEPA process if they have special expertise with respect to an environmental issue or jurisdiction by law. The lead agency has ultimate responsibility for the content of any NEPA document prepared, and a cooperating agency assists the lead agency throughout the NEPA process. When multiple agencies are involved, a memorandum of understanding (MOU) among all parties may be developed to define the roles, funding sources, assignments, staff commitments, and schedule.

Often, joint lead and/or cooperating agencies will adopt NEPA documents prepared by another agency if it meets their agency-specific NEPA requirements in order to avoid duplication of efforts. If needed, the cooperating and/or joint lead agency may augment the document to meet any additional agency-specific NEPA requirements.

The City met with Reclamation and the USACE to discuss potential environmental concerns within the Reata Wash Study Area and the agency-specific environmental documentation that should be anticipated for the potential flood control improvements. Based on these discussions, it should be anticipated that the USACE would be the lead federal agency for improvements within the overall Reata Wash Study Area. Reclamation, and potentially FEMA, would likely act as either a joint lead or cooperating agency during the NEPA process. It is possible that compliance with multiple agencies' NEPA requirements can be accomplished with a single NEPA document managed by the lead federal agency. For the Reata Wash Study, it is anticipated that NEPA compliance would be documented according to the USACE's Environmental Assessment (EA) process (i.e., Environmental Assessment and Statement of Findings).

The completion of multiple agency-specific NEPA documents may still be required if requested by a joint lead agency depending on that agency's assessment of the nature of the action, the relevant environmental issues, and the potential magnitude of the action's environmental impacts. Separate NEPA documentation for FEMA may be needed if FEMA funding is utilized. See Section 4. Agency-Specific NEPA Processes for details about the USACE, Reclamation, and FEMA NEPA processes.

3.3 Levels of NEPA Analysis

The appropriate level of NEPA analysis and documentation for a proposed action is determined by the lead or federal land-managing agency based on the nature of the action, the relevant environmental issues, and the potential magnitude of the action's environmental impacts. There are three major levels of NEPA documentation:

- **Categorical exclusion (CE; also known as a CATEX):** For types of actions that have generally been determined to have no significant effect on the human environment, unresolved conflicts with alternative uses of available resources, or extraordinary circumstances. A CE is the simplest level of NEPA documentation and environmental review, and does not require the

assessment of alternatives to the proposed action. Each federal agency has their own list of actions that may qualify for CE-level documentation, and coordination with each applicable agency should be conducted to confirm that a given action meets all associated agency-specific requirements.

- **Environmental assessment (EA):** If it is unknown whether the action would cause significant impacts, an EA would be prepared to determine the anticipated level of impacts. EAs require a greater level of analysis than a CE, but have a lower level of analysis and public involvement than an Environmental Impact Statement (EIS). An EA evaluates a proposed action and its alternatives, including a No Action alternative, for potentially significant environmental effects, including direct, indirect, and cumulative impacts. The EA will conclude with either a Finding of No Significant Impact (FONSI) or a determination that significant environmental effects are present (requiring the preparation of an EIS). Each agency has their own process for EAs and associated public involvement so the lead agency-specific guidelines should be followed.
- **Environmental impact statement (EIS):** If the action would cause significant environmental impacts to the quality of the human environment as determined by the lead federal agency, an EIS must be prepared and these potential impacts must be disclosed to the public. An EIS provides a more intensive discussion of potentially significant environmental effects of the proposed action and the reasonable alternatives that may avoid or minimize adverse impacts or enhance the quality of the human environment. The EIS process also requires a thorough agency scoping and public involvement process (40 CFR 1501.7). The determination that an EIS is needed may result from preparation of an EA or it may be apparent based on the nature of the action and its associated known environmental effects (see also 40 CFR 1502.4 and 40 CFR 1508.27).

For the lead or federal land managing agency to determine the appropriate level of NEPA analysis and documentation, the action must be clearly defined and take into account all directly related federal and nonfederal actions, including all connected actions. NEPA requires that all individual related components be evaluated in the same document to ensure that all connected actions have been appropriately considered. Dividing a large action into a series of smaller actions is not allowed, and the proposed action must be considered in context with other related actions taking place. Per 40 CFR 1508.25, actions are connected if they:

- 1) Automatically trigger other actions that may require environmental impact statements,
- 2) Cannot or will not proceed unless other actions are taken previously or simultaneously, or

- 3) Are interdependent parts of a larger action and depend on the larger action for their justification.

The improvements proposed under the Reata Wash Study would be a connected action if they do not have independent utility. For example, flood control options proposed within individual reaches may not have independent utility and could be considered a connected action. If the City council authorizes the Reata Wash Study move forward into design, improvements proposed under the Reata Wash Study should be reviewed to determine if there is a connected action.

3.4 Agency Scoping and Public Involvement

Potentially significant issues should be identified through the scoping process (40 CFR 1501.7). Scoping should be conducted as early as possible so that potential issues and concerns can be identified and taken into account during the NEPA process and during design. In order to properly identify all potentially significant issues, a variety of sources should be consulted (e.g., affected federal, state, and local agencies; affected tribes; proponent of the action; and other interested persons) as appropriate to the particular action. This may or may not include public involvement depending on the action, appropriate level of NEPA analysis, and agency-specific processes.

Requirements for public involvement in the NEPA process are outlined in 40 CFR 1506.6. Public involvement should include effective communication with all affected and interested individuals and/or groups, and all the various stakeholders. Methods may include direct mailings, public meetings, newspaper articles, project websites or internet postings, and/or other media broadcasts. Public notification and involvement during the NEPA process is required for EISs. Depending on the federal agency, public scoping may also be required for EAs and CEs. The lead federal agency should be consulted to determine if public involvement is appropriate for a given proposed action.

3.5 Technical Resource Studies

Technical resource studies are conducted to evaluate potential impacts from the proposed action to various resources and are commonly used as the basis of decisions rendered in the NEPA environmental document. The applicable technical resource studies will vary depending on the specific details of the proposed action, but may include surveys and/or reports for: biological and natural resources, historic and cultural resources, water resources, visual resources, recreational resources, etc. Coordination with other oversight agencies may also be needed in support of the technical resource studies (e.g., USFWS for potential impacts to ESA-listed species).

3.6 Environmental Commitments and Mitigation

When a proposed action has potential adverse environmental impacts, environmental commitments to monitor and/or mitigate for those impacts may be required. The purpose of environmental commitments is to reduce or avoid impacts and/or restore or enhance environmental quality. These commitments may also include conditions listed in applicable grants, permits, or other approvals for the proposed action. All environmental commitments are required to be funded as part of the proposed action. Construction of the environmental commitments may be delegated to a third-party contractor or required as a condition for a permittee, lessee, or loan recipient for individual actions, but compliance with the commitments remains the responsibility of the lead federal agency. This applies to actions at all levels of NEPA analysis, including CEs, EAs, and EISs. Future environmental commitments and mitigation measures which may be applicable for the construction of flood control improvements will be assigned by each respective resource management agency during a NEPA review process.

3.7 Record Keeping

Complete and accurate files must be kept and maintained throughout the NEPA process in an administrative record. The contents of the administrative record will vary depending on the specific proposed action, but should include all materials that were considered by the lead federal agency in reaching its decision under NEPA. For example: planning documents, notices, documentation of scoping meetings, public comments and agency responses, supporting technical resource documents and studies, correspondence (letters, memoranda, emails), draft and final versions of CE/EA/EIS documents, FONSI, Record of Decision, implementation/monitoring programs, environmental commitment plans, etc. as applicable.

A complete and well-organized administrative record facilitates FOIA requests on agency actions, is an information resource for preparation of future NEPA documents, and is a source for elements to be tiered to or incorporated by reference.

4. AGENCY-SPECIFIC NEPA PROCESSES

Reclamation, FEMA, and the USACE each have their own NEPA processes and procedures. Preliminary coordination with Reclamation, FEMA, and the USACE has been conducted to discuss each agency's anticipated NEPA requirements for the proposed action. As mentioned, it is currently anticipated that the USACE would act as the lead federal agency. Reclamation, and potentially FEMA, would be joint lead or cooperating agencies. However, it is recommended that the City continue coordination with each agency, as needed, if the City council authorizes the Reata Wash Study move forward into design. Reata Wash Study obligations and environmental compliance

recommendations for each management agency are provided below and are included in Appendix A. Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations. The following environmental resources were not evaluated: prime or unique farmland, hazardous materials, noise, air quality, social and economic impacts, land use, or visual resources.

4.1 Bureau of Reclamation

Reach 5 of the Reata Wash Study Area includes the Reach 11 Recreational Area, a Reclamation facility. Reclamation has an obligation to assure that public use of these areas is maintained in accordance with its land use policies, agreements, and investments. Any activities on these lands and their associated impacts to recreational uses and other existing resources must be coordinated with and approved by Reclamation. Therefore, the construction of flood control improvements within Reach 5 is anticipated to require compliance with Reclamation's NEPA process.

Reclamation falls under the purview of the Department of the Interior (DOI) and therefore follows DOI's NEPA regulations (43 CFR Part 46). The Reclamation NEPA process should be initiated if the proposed action is subject to Reclamation control and responsibility (e.g., the construction and/or disturbance on lands managed by Reclamation) and would cause effects on the human environment. If needed, Reclamation will determine the appropriate level of NEPA documentation (CE, EA, or EIS) required for the proposed Reclamation action and will work with applicants in preparing the necessary documentation and implementing a public involvement program, if appropriate.

The *Reclamation's NEPA Handbook* (Reclamation 2012) provides a thorough explanation of their NEPA processes and requirements. To initiate coordination with Reclamation, basic information such as the project name, purpose, location, nature of activity, any available maps and reports that have been completed, etc. will need to be provided to the regional Reclamation office.

4.1.1 Reclamation CEs

A Reclamation CE would be appropriate for actions that correspond to a specific exclusion category as established by DOI or Reclamation, and do not have any extraordinary circumstances. DOI's list of CEs is provided in 43 CFR 46.210, and the Reclamation-specific CEs are provided in DOI's Departmental Manual, Part 516, Section 14.5. Extraordinary circumstances specific to DOI are listed in 43 CFR 46.215; the list includes but is not limited to significant impacts on biological, cultural, and water resources.

Under Reclamation's NEPA process, the completion of a Categorical Exclusion Checklist (CEC) is recommended for actions that may qualify under an exclusion category to evaluate the action relative to the impacts it may cause. The evaluation criteria and exceptions of a CEC ensures that sufficient review of the action is undertaken to verify that the action qualifies for the CE and no extraordinary circumstances are present. Refer to Chapter 5 of Reclamation's NEPA Handbook for additional information the CE process, listing of evaluation criteria and exceptions, and example CEC checklist.

4.1.2 Reclamation EAs

Preparation of an EA will be required for all Reclamation actions except for:

- Actions exempted from NEPA
- Actions covered by a DOI CE
- Actions that qualify for a Reclamation CE based upon the CEC
- Actions which have been sufficiently addressed by an earlier environmental document (generally an EA or EIS)
- Actions for which it is obvious that an EIS will be needed (Reclamation 2012)

An EA may also be used for proposed actions in which small changes have been made and an EIS has already been prepared (i.e., "tiering"; refer to 43 CFR 46.140[c] and 40 CFR 1508.28). In these cases, the EA must include a finding that the conditions and environmental effects in the previously completed EIS are still valid or address any exceptions.

The required content of a Reclamation EA includes a description of the proposed action and need for the proposal; alternatives to the proposed action; the affected environment; environmental consequences of the proposed action and alternatives; a list of agencies and persons consulted; and environmental commitments, as needed (refer to Section 6.4 of Reclamation's NEPA Handbook (Reclamation 2012). The timeframe for completion of a Reclamation EA is highly variable (e.g., a few weeks to several months or more) and depends on the complexity of the action, extent of potential environmental effects, and level of public involvement and controversy. A Reclamation EA for a simple action may be a short document prepared by Reclamation and approved with a public Notice of Availability without a formal public review process; however, consultation with relevant agencies and affected parties should be conducted. A Reclamation EA for a complex action may require substantial agency and public involvement.

Scoping for Reclamation EAs typically involves intra-agency contacts (i.e., relevant groups or staff within Reclamation) and interagency contacts (e.g., USFWS, the USACE, and SHPO, as applicable) to define the potentially significant issues and the scope of analysis. Reclamation does not necessarily require public scoping for an EA, but may

determine based on the action that it would be beneficial to conduct a public review and/or public meetings as well. Public notice of the availability of the EA is required (40 CFR 1506.6[b]). However, public involvement for an EA may only consist of the public notice of availability with no formal 30-day public review.

The EA and the FONSI, as applicable, must be distributed to appropriate agency and public entities that were involved in the preparation of or had commented on the EA. For proposed actions that are without precedent or would typically require an EIS, the FONSI must be published for a 30-day public review as required by the Council on Environmental Quality. Otherwise, the NEPA process is complete with the issuance of the FONSI. Refer to Chapter 6 of Reclamation's NEPA Handbook for additional information on the EA process, including an example EA.

4.1.3 Reclamation EISs

An EIS will need to be prepared if Reclamation determines that a proposed action has the potential for significant environmental impacts, either during the EA process or because it is an action that typically requires an EIS. Reclamation actions normally requiring the preparation of an EIS are listed in 516 DM 14. Preparation of a Reclamation EIS is not anticipated for the Reata Wash flood control improvements, and is therefore not detailed here. Refer to Chapter 7 of Reclamation's NEPA Handbook for additional information on their EIS process.

4.1.4 Agency Scoping and Public Involvement

For proposed actions where a CE or EA is anticipated to be the appropriate level of analysis, Reclamation typically scopes intra-agency contacts (i.e., relevant groups or staff within Reclamation) and interagency contacts (e.g., USFWS, the USACE, and SHPO) as applicable to define the potentially significant issues and the scope of analysis. Reclamation does not necessarily require public scoping for a CE or EA, but may determine based on the action that it would be beneficial to conduct a public review and/or public meetings as well. Public notice of the availability of the EA is required (40 CFR 1506.6[b]). However, public involvement for an EA may only consist of the public notice of availability with no formal 30-day public review.

For Reclamation CEs, relevant environmental resources and potential impacts from the proposed action must be evaluated during preparation of the CEC, but formal reports or documentation may not be needed. As a general rule, preparation of a CEC should involve research, a few coordination telephone calls, and/or short face-to-face discussions to get information, as needed, to fill out the checklist. Some internal and external scoping of issues and documentation may also be required.

Reclamation EAs and EISs should integrate any technical resource surveys and studies required by other applicable environmental laws and executive orders (e.g., CWA, NHPA, FWCA, ESA, etc.). The CEC template should be used to provide a preliminary scope of the environmental issues that will need to be addressed during the NEPA clearance process, but other resources may also need to be examined depending on the nature of the proposed action. It should be noted that an EA can be used as Reclamation's biological assessment for compliance with the ESA, so a separate biological report may not be necessary.

4.1.5 Reata Wash Study Obligations and Recommendations

The Reclamation Lower Colorado Region Phoenix Area Office oversees actions within the Reata Wash Study Area. According to Reclamation's *Guidelines for Road Crossings and Development within Dike Drainage Basins Hayden/Rhodes Aqueduct–Reach 11*, Reclamation and the cities of Scottsdale and Phoenix have entered into land use and management agreements for public recreational use and development of Recreational Area lands located north of the CAP canal between Cave Creek Road and 108th Street. Various public recreational facilities and uses have already been developed on these lands, including TPC and WestWorld, both of which are City-managed facilities that hold leases with Reclamation.

The City met with the Reclamation environmental, engineering and operational staff on February 23, 2016 and again on April 4, 2016 to discuss the Reata Wash Study. The City provided an overview of the Reata Wash Study, discussed its goals, and received feedback regarding future NEPA and engineering requirements for consideration if improvements include encroachment into the Reach 11 Recreational Area.

Based on this coordination, it is currently anticipated that a CE would be the appropriate level of Reclamation NEPA analysis for flood control improvements within Reach 5. Reclamation's CEC process would need to be completed to assess resource impacts for improvements such as channelization, new sediment basins, and/or installation of drop structures within Reach 5. It is not anticipated that Reclamation would be the lead federal agency for the overall improvements. Reclamation's jurisdiction is only applicable within Reach 5, however, it is recommended that the City keep Reclamation informed on the status of other Reata Wash Study related improvements and provide completed environmental and engineer information. This will allow Reclamation to respond to public inquiries and confirm compliance with related Reclamation requirements.

4.2 Federal Emergency Management Agency

FEMA is an agency of the U.S. Department of Homeland Security (DHS) and was created with the enactment of the Robert T. Stafford Disaster Relief and Emergency Assistance

Act (Stafford Act). As mentioned, FEMA has designated a 100-year floodplain within the Reata Wash Study Area. The construction of the flood control improvements that are being evaluated in the Reata Wash Study may qualify for FEMA funding due to the purpose and nature of the activity. If FEMA funding is obtained by the City to implement options or recommendations of the Reata Wash Study, the FEMA NEPA process would need to be initiated.

If the FEMA process is initiated, FEMA will review the proposed action to determine the appropriate level of NEPA documentation and public involvement needed. FEMA NEPA regulations (44 CFR Part 10) include the following levels of review under NEPA: Statutory Exclusions, CEs, EAs, and EISs. FEMA's *NEPA Desk Reference* (FEMA 1996) is an informal guidance document that includes FEMA's policies, requirements, guidance, and sample documents related to NEPA and other applicable environmental laws and executive orders. Additionally, the DHS' March 26, 2015 *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* (DHS 2015) provides current information related to DHS NEPA requirements for actions under the authority of FEMA.

4.2.1 Federal Emergency Management Agency Statutory Exclusions

Certain FEMA programs or activities, such as emergency actions or actions that have no or little potential to affect the environment, are exempted from NEPA compliance per Section 316 of the Stafford Act as amended (42 USC 5159). No NEPA documentation or memorandum to the file is required under the regulations for actions that qualify as a statutory exclusion (FEMA 1996).

4.2.2 Federal Emergency Management Agency CEs

Per 40 CFR 1508.4, FEMA CEs apply to actions that have been identified by FEMA to not individually or cumulatively have a significant effect on the environment (i.e., small, routine undertakings).

Many FEMA actions fit under one of their CE categories. FEMA's *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* includes the full list of categories that qualify for NEPA clearance under a CE (refer to category N, pages A-23 through A-27). If the proposed action fits under one of FEMA's CE categories (also referred to as CATEX categories), the next step is to determine if there are any Extraordinary Circumstances present. Additionally, a proposed action must not be a part of a larger action or a connected action and no extraordinary circumstances exist.

4.2.3 Federal Emergency Management Agency EAs

FEMA actions will require the preparation of an EA if the action does not fit under a statutory exclusion or CE category, or involves an extraordinary circumstance, and does

not involve known significant impacts to the environment. An EA is FEMA's mechanism to evaluate the likelihood of significant impacts or controversy involved in a FEMA funded or proposed action. For FEMA's review, it is required that an EA include the purpose and need, a description of all components of the proposed action and alternatives (including a no-action alternative), affected environment, environmental consequences, and mitigation of impacts. Agency and public scoping should be initiated during or immediately following project formulation to identify potential issues, concerns, and permitting needs. Applicants should be directly involved during scoping activities. Depending on the action, the methods and extent of scoping and public involvement will vary. At a minimum, public release of the draft EA is recommended and advertising the availability of a draft EA is standard practice. It should also be noted that Executive Orders 11988 and 11990 require public notice for an action that is proposed in a floodplain or wetland.

Following a thorough scoping process, a description of the affected environment should be developed that includes the full extent of the resources of concern. It is essential that resource data be current and supplemented by field reviews, data from reliable sources, and relevant information from resource responsible agencies. At a minimum, FEMA requires the following resources to be evaluated for impacts in an EA review:

- Wetlands
- Threatened and Endangered Species
- Historical and Cultural Resources

Impacts to additional resource categories may also require consideration depending on the nature and location of the proposed action and the results of public and agency scoping efforts. Based on a proposed action's environmental consequences, mitigation measures may be necessary to protect environmental resources and reduce impacts below the level of significance. If no significant impacts or controversy exist following the analysis or application of mitigation measures, then a FONSI will be issued for the proposed action. Otherwise, the FEMA EIS process must be followed.

4.2.4 Federal Emergency Management Agency EISs

If a proposed action has been determined to cause significant impacts or to be controversial, then an EIS will be required. For some actions it is not necessary to prepare an EA to determine the significance of impacts if it is readily apparent that the action will cause significant environmental impacts. FEMA has identified criteria for actions that normally require an EIS, with or without the preparation of an EA; these actions are listed in 44 CFR 10.8(b)(2).

Preparation of a FEMA EIS is not anticipated for the Reata Wash flood control improvements, and is therefore not detailed here. For additional information related to

FEMA's EIS process and requirements, refer to Chapter 4 of the NEPA Desk Reference (FEMA 1996) and Section D of the *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* (DHS 2015).

4.2.5 Reata Wash Study Obligations and Recommendations

FEMA's Region IX Office would be the contact for future FEMA NEPA actions within the Reata Wash Study Area, if needed. The Reata Wash Study has not been approved to advance to a project and funding has not been authorized at the time of this memorandum. If FEMA funding is not used for the flood control improvements, the FEMA NEPA process would not apply.

Should the Reata Wash Study be authorized to proceed, FEMA's approval and issuance of a Conditional Letter of Map Revision (CLOMR)/Conditional Letter of Map Revision will be required. The CLOMR process will require the submittal of ESA documentation. See Section 6, Biological Resources below for more information.

4.3 U.S. Army Corps of Engineers

The USACE administers Section 404 of the CWA, including jurisdictional determinations and authorization of Section 404 permits. The construction of the flood control improvements that are being evaluated in the Reata Wash Study will require a Section 404 permit due to the required work with Reata Wash, which is a potential waters of the U.S. under jurisdiction of the USACE. Activities that require a Section 404 permit must comply with NEPA. NEPA requirements as they apply to Section 404 permit approvals are discussed below.

Depending on the action and proposed impacts to waters of the U.S., the action may fit under a USACE CE category or the USACE may require preparation of an EA or an EIS. The USACE's Engineer Regulation 200-2-2: Procedures for Implementing NEPA (ER 200-2-2; USACE 1988) provides guidance for implementation of the procedural provisions of NEPA for the Civil Works Program of the USACE.

4.3.1 U.S. Army Corps of Engineers CEs

USACE CEs apply to actions that have been identified by the USACE to not individually or cumulatively have a significant effect on the environment or have any extraordinary circumstances. Although the action may be exempted from NEPA compliance, it is not exempted from other applicable environmental laws and Executive Orders (e.g., ESA, CWA, NHPA, CAA, etc.). USACE CE categories include a series of non-ground disturbing administrative actions and actions with only minor disturbances to the environment; a full list is included in ER 200-2-2.

4.3.2 U.S. Army Corps of Engineers EAs

As listed in ER 200-2-2, actions that normally require an EA include USACE regulatory actions, such as issuing a Section 404 permit. For actions that require a Section 404 permit due to impacts to waters of the U.S., the USACE' Section 404 permitting process satisfies NEPA compliance requirements. USACE guidance should be followed to determine if the proposed improvements meet the requirements for a Nationwide Permit (NWP) with or without USACE notification, or if an Individual Permit will be needed. Documentation requirements for a proposed action will differ depending on whether a NWP or an Individual Permit applies.

For actions with impacts to waters of the U.S. that do not meet the conditions of any NWP, an Individual Permit would be needed. The USACE' Individual Permit application is titled *Department of the Army Environmental Assessment and Statement of Finding* and serves as the USACE EA. The Individual Permit application must include a statement of the purpose and need for requiring a USACE permit, a description of the proposed action and alternatives, an evaluation to determine the action's compliance with applicable environmental laws, assessment of direct, indirect, and cumulative impacts, and a requirement for public review. The discussion of alternatives must comply with the USACE's *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredge and Fill Material* (40 CFR 230). An Individual Permit will be reviewed by the USACE for NEPA adequacy and must result in a FONSI determination prior to authorization. The Individual Permit process is dependent on completion of the associated technical resource assessments (e.g., biological and cultural resource documentation).

Refer to Section 5.3 below for more information about the Section 404 permitting process, including NWPs and Individual Permits.

4.3.3 U.S. Army Corps of Engineers EISs

A USACE EIS would be required for certain actions that require an Individual Permit if they would or could result in significant impacts to the human environment. In many cases the decision that an EIS is needed is made by the USACE after their review of the completed Individual Permit application, which also serves as an EA. Some actions have been identified by the USACE to typically require an EIS, including:

- Feasibility reports for authorization and construction of major projects;
- Proposed changes in projects which increase size substantially or add additional purposes; and
- Proposed major changes in the operation and/or maintenance of completed projects.

District's may consider the use of an EA on these types of actions if early studies and coordination show that a particular action is not likely to have a significant impact on the quality of the human environment.

4.3.4 Reata Wash Study Obligations and Recommendations

Based on the Reata Wash Study Area, coordination with the USACE, and anticipated level of impacts to waters of the U.S., a CWA Section 404 Individual Permit and associated EA will likely be needed. The USACE' Arizona Branch (Phoenix office) of the Los Angeles District Regulatory Division is responsible for all Section 404 reviews and approvals that may be needed within the Reata Wash Study Area. Preliminary coordination with the USACE, Reclamation, and FEMA has indicated that the USACE is anticipated to be the lead federal agency for the flood control improvements being evaluated under the Reata Wash Study. Refer to Section 5. Clean Water Act for information related to the CWA documentation and submittal requirements anticipated to be necessary for the construction of flood control improvements in the Reata Wash Study Area.

5. CLEAN WATER ACT

The CWA is the primary federal statute governing discharge of pollutants into jurisdictional waters of the U.S., including perennial, intermittent, and ephemeral watercourses, their tributaries, and adjacent wetlands and special aquatic sites. The goal of the CWA is to establish water quality standards to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources. The EPA and the USACE share administration of the CWA Section 404 permitting program and the Arizona Department of Environmental Quality (ADEQ) has been delegated authority over Section 401 and 402 of the CWA for all non-tribal lands in Arizona. The flood control improvements being evaluated in the Reata Wash Study will need to comply with CWA Sections 401, 402, and 404. Therefore, summaries of these regulations are provided below.

5.1 Section 401

Actions that require a Section 404 permit must also comply with Section 401. The Section 401 water quality certification verifies that the prospective permit complies with the ADEQ's applicable effluent limitations and water quality standards. Section 404 permits cannot be issued until the Section 401 certification is obtained. There are two types of Section 401 water quality certification: conditional and individual. Many actions that require a Section 404 NWP are conditionally certified if they comply with the Section 401 General Conditions and there are no ADEQ designated impaired waters or their tributaries, Outstanding Arizona Waters, or lakes present in the vicinity. Actions must

be individually certified by ADEQ if they require a Section 404 Individual Permit, are located one-mile upstream or one-half-mile downstream of an ADEQ designated impaired water or Outstanding Arizona Waters (OAW), occur on a tributary to an impaired waters or OAW within one-mile from its mouth, or would impact lakes or reservoirs. The Section 401 General Conditions and NWP-specific conditions are outlined in the March 16, 2012 ADEQ letter titled *Clean Water Act 401 Certification for Nationwide Permits–March 18, 2012* (ADEQ 2012), which is included as an attachment to the USACE's 2012 Special Public Notice Nationwide Permits for Arizona (USACE 2012b).

An application for certification under CWA Section 401 is required for actions requiring individual certification, but not for actions that comply with conditional Section 401 certification.

5.2 Section 402

The National Pollutant Discharge Elimination System (NPDES) Program is authorized under Section 402 of the CWA. NPDES provides the statutory basis and structure for regulating the discharge of pollutants from any point or nonpoint sources into waters of the U.S., including sediment and construction debris-related pollutants generated during ground-disturbing activities that can be transported by storm water runoff. In 2002, the EPA delegated ADEQ the authority to implement a state level program, the Arizona Pollutant Discharge Elimination System (AZPDES) Program, for nontribal lands.

The AZPDES program offers two different types of permits: general and individual. General AZPDES permits allow for coverage under one permit for similar activities within a specific category, industry, or area. For example, the AZPDES Construction General Permit (CGP) (Permit No. AZG2013-001) covers all construction sites that disturb 1 acre or more, and the AZPDES Phase II municipal separate storm sewer systems (MS4) stormwater permit covers small). If an action meets the requirements for an available general permit, it must comply with the conditions of that permit in order to be covered under that permit. For example, as a condition of the AZPDES CGP, the proposed action must be designed to protect waters of the U.S. through the implementation of erosion control best management practices (BMPs), a Stormwater Pollution Prevention Plan (SWPPP) must be prepared, a Notice of Intent (NOI) must be filed before beginning ground disturbance activities, and a Notice of Intent (NOT) should be filed at the completion of construction activities. If the action does not fall within the coverage of a general permit, an individual AZPDES permit with specialized conditions will be required. More information regarding ADEQ's AZPDES program can be found on their website (ADEQ 2016b).

5.3 Section 404

Section 404 of the CWA regulates the discharge of dredged material and the placement of fill material within waters of the U.S. and authorizes the USACE to issue permits for such actions. Any activity that discharges dredged or fill material into waters of the U.S. would require a Jurisdictional Delineation (JD) to identify the limits of potential waters of the U.S. and a Section 404 permit from the USACE. Common types of activities that may require a Section 404 permit include, but are not limited to, geotechnical activities, channelization, construction or extension of bridges or culvert crossings, and the installation of drainage structures and bank protection features.

5.3.1 Jurisdictional Determinations

The first step in the Section 404 process is to determine the presence or absence of waters of the U.S. that may be impacted by the proposed action. Waters of the U.S. are formally defined by the CWA as "rivers, creeks, streams, and lakes extending to their headwaters and any associated wetlands." Wetlands are defined by the CWA as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." It should be noted that the EPA and USACE are currently working to update implementation of the CWA and clarify the term "waters of the United States." The Clean Water Rule, originally implemented on August 28, 2015, was the latest update to the CWA. However, it is currently under a nationwide court-ordered stay issued by the U.S. Court of Appeals for the Sixth Circuit as of October 9, 2015. Until the stay is lifted, the EPA and USACE are operating under the definition of "waters of the United States" prior to the Clean Water Rule (EPA 2016).

If potential waters of the U.S. are present, a field survey should be completed to identify the jurisdictional limits of those waters of the U.S. and either a Preliminary JD or an Approved JD would need to be prepared and submitted to the USACE for their review. Both the Preliminary JD and the Approved JD evaluate the potential for the existence of waters of the U.S. by assessing the presence or absence of an ordinary high-water mark (OHWM) and other specific physical characteristics associated with waters of the U.S. according to current USACE guidance. An OHWM is defined by 33 CFR Part 328.3 as a "line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris".

A Preliminary JD must claim all waterbodies that have one or more OHWM indicators as under the USACE's jurisdiction, without consideration of a significant hydrological nexus. An Approved JD considers both the presence of OHWM indicators and the presence of

a significant hydrological nexus of each waterbody to a downstream traditional navigable waters of the U.S. An Approved JD typically requires a hydrological analysis to establish whether there is a significant nexus. Following the USACE's acceptance of the Preliminary JD or Approved JD, the limits of waters of the U.S. as defined in the JD should be overlaid on the disturbance footprint of the proposed action to determine if any dredged or fill material will be discharged into waters of the U.S. and whether a NWP or Individual Permit would be necessary. It should be noted that the submittal of a JD is required by the USACE if the action requires notification under a NWP or preparation of an Individual Permit. If notification is not required, the JD does not need to be submitted to the USACE for review and acceptance.

5.3.2 Nationwide Permits

Certain activities involving the discharge of dredged or fill material into waters of the U.S. are authorized by the USACE under the Section 404 NWP program in Arizona. For activities to be authorized under any NWP, the action and all associated activities must comply with the applicable NWP General and Regional Conditions. Refer to the Special Public Notice Nationwide Permits for Arizona (USACE 2012b) for detailed information about each of the available NWPs in Arizona and their associated General and Regional Conditions.

The proposed action must be clearly defined and all associated activities must be taken into consideration when determining the applicable NWP. The term "single and complete project" is defined as "the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers." (33 CFR 330.2[i]). For linear projects, the "single and complete project" applies to each crossing of a given waters of the U.S. For non-linear projects, the impacts to all waters of the U.S. are considered collectively as a "single and complete project" unless one or more activities or phases have "independent utility." Portions of a multi-phased project that depend upon completion of other phases of the project do not have independent utility and must be permitted together. As a rule, single and complete non-linear projects may not be "piecemealed" to avoid exceeding the limits of an appropriate NWP.

Actions that meet the conditions of a NWP and do not exceed the notification thresholds for that given NWP are authorized to proceed without notification to the USACE. If the action exceeds one or more of the notification conditions for the applicable NWP, notification to the USACE in the form of a Preconstruction Notification (PCN) is necessary. When needed, the PCN must be submitted to the USACE for review and authorization must be obtained before construction can commence. A PCN application package must include, at a minimum:

- Completed Form ENG 4345 application
- Statement of Compliance with NWP General Conditions

- Project design plans
- Profile and cross-section exhibits of impacted waters of the U.S.
- Recent ground photos of impacted waters of the U.S.
- Illustrations depicting temporary and permanent impacts to waters of the U.S.;
- Demonstration of compliance with ESA and NHPA; and
- ADEQ Section 401 individual water quality certification (if necessary).

Following submittal of a PCN, the USACE will notify the applicant within 30 days that the package is complete or that additional information is needed. If the PCN is complete, the USACE will provide an authorization letter that may include project-specific special conditions for the proposed action. Authorization of a PCN is contingent upon a complete submittal to the USACE and receipt of concurrences from other applicable state and federal regulatory agencies, including those from Section 401 certifications from ADEQ and those related to biological and cultural resources, as applicable.

5.3.3 Individual Permit

An Individual Permit is required for actions that will involve discharging dredged or fill material into waters of the U.S. but that do not meet the conditions of a NWP. An Individual Permit application includes the completion of a USACE EA (i.e., a *Department of the Army Environmental Assessment and Statement of Finding*), which will require a public interest review and must adhere to the Section 404(b)(1) guidelines established under 40 CFR 230. A public interest review by the USACE is used to evaluate an action's impact on areas including, but not limited to, conservation, historic properties, fish and wildlife values, floodplain values, and water quality.

The Section 404(b)(1) guidelines require the action be the least environmentally damaging practicable alternative (LEDPA). This is demonstrated through an alternative analysis, which evaluates the proposed action, a No Action alternative, and other alternative(s) that meet the purpose and need. The alternative analysis should evaluate each alternative based on potential impacts to waters of the U.S. and other resources as well as cost, existing technology, and logistics. Alternatives that completely avoid Waters should be included, and both on-and off-site alternatives should be considered when feasible. The alternative that minimizes or avoids impacts to waters of the U.S. and other resources, meets the purpose and need, and is not cost prohibitive would be the preferred alternative. If impacts to waters of the U.S. cannot be avoided, the USACE may require compensatory mitigation in the form of mitigation banking, payment of in-lieu fees, or completion of permittee-responsible mitigation (refer to Compensatory Mitigation discussion below for more information). The Section 404(b)(1) guidelines also require the Individual Permit application to demonstrate that the action will not cause or contribute to the violation of other applicable state or federal environmental laws (ESA, NHPA, etc.) and will not cause any significant adverse effects on the aquatic system or

human environment. The application should demonstrate that any appropriate and practicable steps have been taken to minimize the adverse impacts on waters of the U.S. Following acceptance of a complete application, the USACE will publish a public notice. A public notice includes a mandatory 30-day comment period and is the primary method of advising all interested parties of a proposed activity for which a permit is sought. The public notice is intended to solicit public comments and information regarding potential foreseeable beneficial and detrimental impacts from the action that may not otherwise be known by the USACE or the applicant. Following the comment period, the USACE will review the application and any public comments received to determine if a FONSI is appropriate for the action. If a FONSI determination is made, the USACE will authorize the Individual Permit.

5.4 Reata Wash Study Obligations and Recommendations

It is anticipated that the construction of the potential flood control improvements associated with the Reata Wash Study would cause temporary and permanent impacts to waters of the U.S. and therefore require compliance with the CWA. The results of the preliminary review are summarized below.

5.4.1 Section 401

A review of Arizona's 2012/2014 Impaired Waters list (ADEQ 2014) indicated that no waters of the U.S. identified by ADEQ or EPA as impaired pursuant to CWA Section 303(d) are present within 1-mile of the Reata Wash Study Area. A review of the current list of OAWs indicated that no OAWs are present within 1 mile of the Reata Wash Study Area. Additionally, no tributaries to impaired waters or OAWs are present. No lakes or reservoirs are located within the vicinity of the Reata Wash Study Area.

However, since the potential flood control improvements being evaluated in the Reata Wash Study are anticipated to require a Section 404 Individual Permit, a Section 401 individual water quality certification is also anticipated. If the EPA and ADEQ update the Section 303(d) list of impaired waters or list of OAWs prior to construction, those updated lists should be reviewed to confirm that no newly listed impaired waters or OAWs are present.

5.4.2 Section 402

It is anticipated that more than 1 acre of land would be disturbed during construction activities and an AZPDES CGP would be required. Therefore, the preparation of a SWPPP would be required and should incorporate temporary control measures during construction and permanent control measures when the proposed improvements are completed. The City is an operator of a small MS4 and has an approved Stormwater Management Program through ADEQ. The SWPPP should be consistent with the MS4

General Permit requirements and conditions. The SWPPP must be completed before filing a NOI with ADEQ, which is required before beginning construction activities. Upon completion of construction activities, an NOT should be submitted to ADEQ.

5.4.3 Section 404

To evaluate the presence of potential waters of the U.S. and anticipated CWA Section 404 permitting requirements for the potential flood control improvements within the Reata Wash Study Area, aerial imagery, topographic maps, USFWS National Wetlands Inventory maps, the Arizona Department of Water Resources Water Atlas, online resource viewers, historic CWA documentation relevant to the Reata Wash Study Area, and applicable USACE guidance documents were reviewed.

Based on this review of available documentation, numerous ephemeral washes are present in the Reata Wash Study Area that are anticipated to be waters of the U.S. regulated under Section 404 of the CWA (Figure 3). These washes are identified as possessing an OHWM and other specific physical characteristics, and therefore, could be considered potential waters of the U.S. under the jurisdiction of the USACE. No intermittent or perennial waterbodies are present within the Reata Wash Study Area, and no potential wetlands or other special aquatic sites are anticipated to occur.

Reata Wash and Dobson Wash are the major drainage features within the Reata Wash Study Area. Of the total estimated 158 to 168 acres of potential waters of the U.S. within the Reata Wash Study Area, approximately 68 acres is attributed to Reata Wash and approximately 50 acres is attributed to Dobson Wash. Remaining acres consist of small, unnamed washes throughout the Reata Wash Study Area. Table 2 provides the approximate acres of potential waters of the U.S. in the Reata Wash Study Area.

Table 2. Approximate Acres of Potential Waters of the U.S. in Reata Wash Study Area

Study Area Location	Approximate Acres
Reach 1: North of Pinnacle Peak Road	7
Reach 2: Pinnacle Peak Road to Cross Canyon Way	12
Reach 3: Cross Canyon Way to Thompson Peak Parkway	6
Reach 4: Thompson Peak Parkway to Bell Road	28
Reach 5: Bell Road to the CAP Canal	15
Dobson Wash	50
Unnamed Ephemeral Washes	40 to 50

Reata Wash is an ephemeral wash that originates at the northern boundary of Reach 1 (approximately 1,700 feet north of Pinnacle Peak Road) and flows south to Reach 5 where it discharges into a stormwater basin located immediately north of the CAP Canal between WestWorld of Scottsdale and Thompson Peak Parkway. Existing drainage

infrastructure along Reata Wash includes a culvert crossing of Pinnacle Peak Road, at-grade roadway crossings of Foothills Drive and Cross Canyon Way, and modern bridge crossings of Thompson Peak Parkway, Legacy Boulevard, Bell Road, and McDowell Mountain Ranch Road. Within the limits of Reach 4, improvements completed by adjacent, private landowners include bank protection along a channelized section of Reata Wash.

Dobson Wash consists of a series of braided, ephemeral branches that break west beginning at the apex of Reata Wash floodplain, approximately 900 feet south of Pinnacle Peak Road. The limits of Dobson Wash are generally located between the Reata Wash floodplain apex and the Deer Valley Road alignment, with minor tributaries continuing downstream through the Reata Wash Study Area. Numerous single lot homes are located adjacent to the braided channels of Dobson Wash, limited flood control improvements exist.

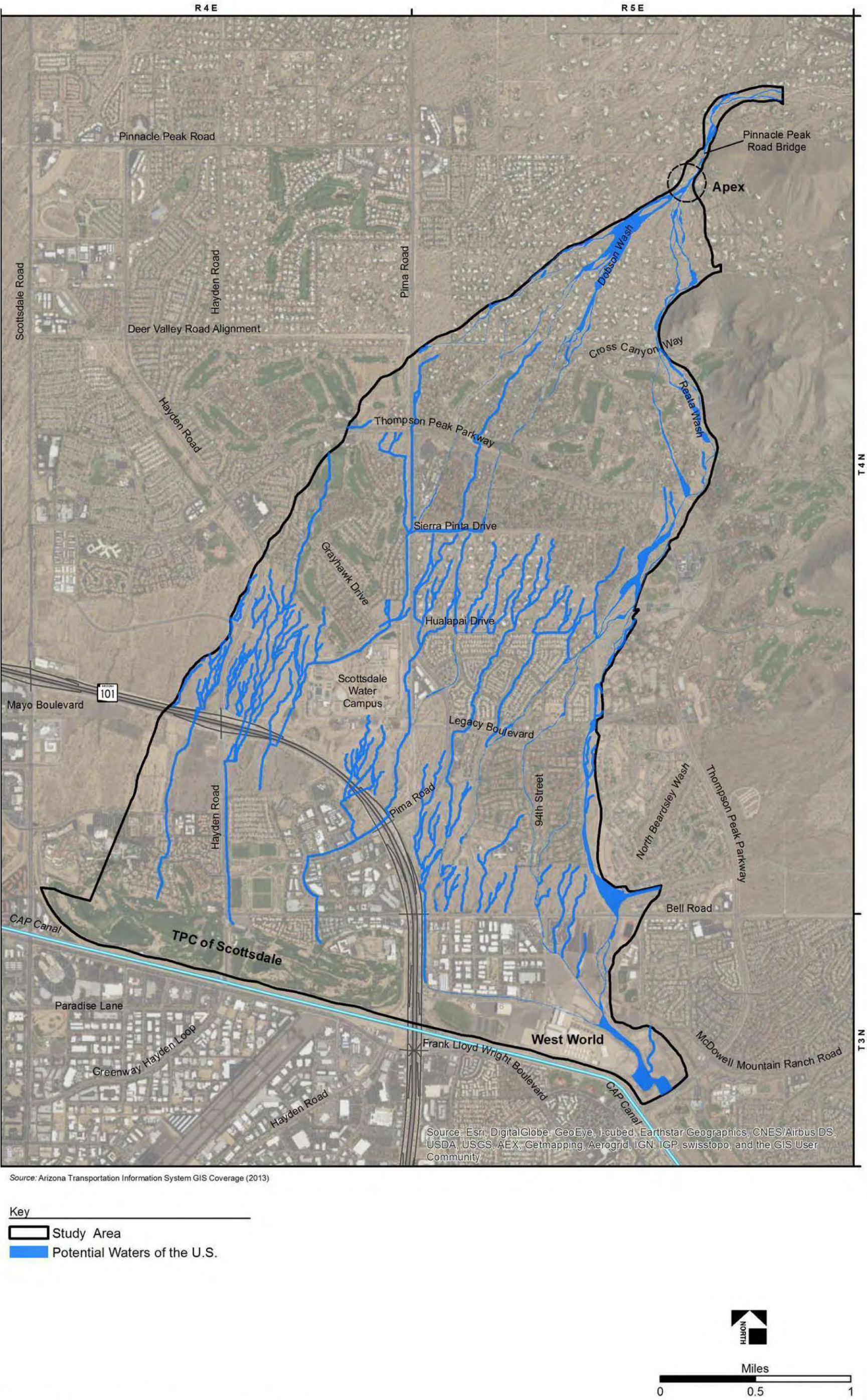


Figure 3. Location of Potential Waters of the U.S.

5.4.3.1 Jurisdictional Delineation

Based on the presence of potential waters of the U.S. within the Reata Wash Study Area and the anticipated need for a Section 404 permit, the submittal of a Preliminary or Approved JD to the USACE would be required to document the locations and extent of potentially jurisdictional waters of the U.S. At a minimum, the JD should assess the anticipated limits of disturbance (which may or may not include the entire Reata Wash Study Area), as well as the full extent of downstream waters of the U.S. that may potentially be impacted due to the proposed improvements. Following review and acceptance by the USACE, the results of the JD would be used in conjunction with the future design and disturbance footprint to determine the precise amount of anticipated impacts to waters of the U.S. and the applicable Section 404 permit.

5.4.3.2 Permitting

The City met with the USACE's Arizona Branch (Phoenix office) of the Los Angeles District Regulatory Division on February 11, 2016 and presented an overview of the Reata Wash Study, discussed the Reata Wash Study goals, and asked for feedback related to potential Clean Water Act Section 404 permitting and supporting environmental resource documentation that may be required. A second meeting occurred on June 15, 2016, at which the USACE was updated on the status of the Reata Wash Study and the USACE provided the City additional feedback regarding anticipated Section 404 requirements. While the precise level of impacts to waters of the U.S. is not known at this time, the USACE confirmed that the submittal of a Section 404 permit would likely be necessary to authorize flood control improvements in Reata Wash and/or other potential waters of the U.S. in the Reata Wash Study Area. The type of Section 404 permit (NWP or Individual) that would apply would be dependent on the location and limits of flood control improvements. In addition, the inclusion of design features that minimize impacts to waters of the U.S., including those to downstream waters of the U.S., would be a key component for consideration during the USACE review. Based on information developed as part of the Reata Wash Study and presented at the meetings, the USACE confirmed that the need for an EIS is not anticipated. The USACE stated that they would likely be the lead federal agency regardless of the level of USACE NEPA analysis or other federal agency involvement.

Authorization from the USACE would be required prior to construction activities involving discharges within waters of the U.S. If the flood control improvements are completed as one single and complete project, an Individual Permit would likely be needed due to the estimated level of impacts to waters of the U.S.

Individual Permit

An Individual Permit for the flood control improvements will require a Section 404(b)(1) alternative analysis that reviews the proposed action, a No Action alternative (i.e., alternative with no impacts to waters of the U.S.), and any other on-site alternatives that meet the purpose and need in order to identify the LEDPA. The LEDPA must minimize or avoid adverse impacts to waters of the U.S. Compensatory mitigation may also be required to offset the proposed action's overall impact to waters of the U.S. if adverse impacts cannot be avoided. Due to the nature of the proposed flood control improvements, off-site alternatives would not be feasible and would therefore not need to be evaluated in detail. The description of alternatives and associated analysis should specify the configurations, structure types, and materials (i.e., soil, concrete, riprap, etc.) considered that would, in combination, achieve the purpose and need. For example, if channelization activities occur within reaches of Reata Wash, the Section 404(b)(1) alternative analysis should include alternatives with different channel configurations that allow for the desired conveyance, the types of structures and materials used for construction, as well as costs, existing technology, and logistics. Design options that could potentially minimize or offset impacts on waters of the U.S. through reestablishing existing functions (e.g., hydrologic, geomorphic, biological, etc.) and values (i.e., ecological and societal) will be an important aspect to evaluate for the Section 404(b)(1) alternatives analysis.

Minimization and Avoidance

During the course of the Reata Wash Study, the City identified and evaluated alternative solutions that could significantly reduce potential impacts to waters of the U.S. and preserve the existing environmental conditions of the Reata Wash Study Area. These alternative solutions include:

- Installation of a covered box culvert
- Construction of wider, earthen channels
- Installation of a flow release structure at the apex of Reata Wash and Dobson Wash

The covered box culvert option would include the installation of a buried culvert structure (Figure 4; Covered Box Culvert Illustration). The culvert structure would be covered with native material at a minimum depth of 2 feet and Reata Wash could be reestablished on the surface as a natural channel along the new conveyance corridor. Landscaping consisting of native plants endemic to the Reata Wash Study Area could be planted along the banks of the reconfigured Reata Wash and within the new conveyance corridor. Once installed, a combination of the buried culvert structure and the reconfigured Reata Wash channel would be used to provide the required drainage capacity. The buried culvert structure would act to convey flows through the reaches

within the Reata Wash Study Area, and Reata Wash would continue to provide the habitat and ecological value as it currently offers.

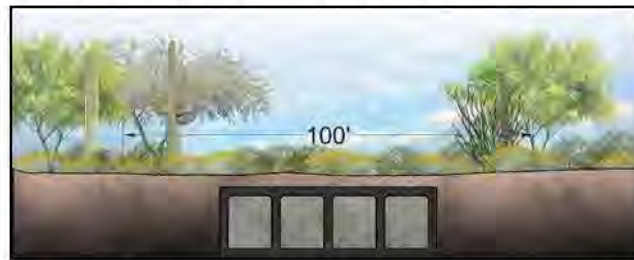


Figure 4. Covered Box Culvert Illustration

Feedback received from the USACE during the June 15, 2016 meeting indicated that a covered box culvert option that includes a reconfigured Reata Wash channel may be considered by the USACE to be a temporary impact to waters of the U.S. Depending on the extent of use, the construction of covered culvert structures could significantly reduce the amount of permanent impacts to waters of the U.S. and associated compensatory mitigation that may be required, compared to other options being reviewed (e.g., "U" channel or channel widening).

Improvements within Reata Wash or other potential waters of the U.S. that result in the establishment of wider channels could result in an increase in jurisdictional area in the Reata Wash Study Area. An increase in the acreage of waters of the U.S. within Reata Wash may help minimize impacts to potential waters of the U.S., which could result from improvements if the functions and values of the watercourse(s) or overall Reata Wash Study Area are not degraded. Options such as the grouted rock and earthen channel corridors (Figure 5) could provide an opportunity to reduce potential impacts under a Section 404 permit. An earthen channel would be the preferred option with respect to waters of the U.S. because it would provide a more natural condition.

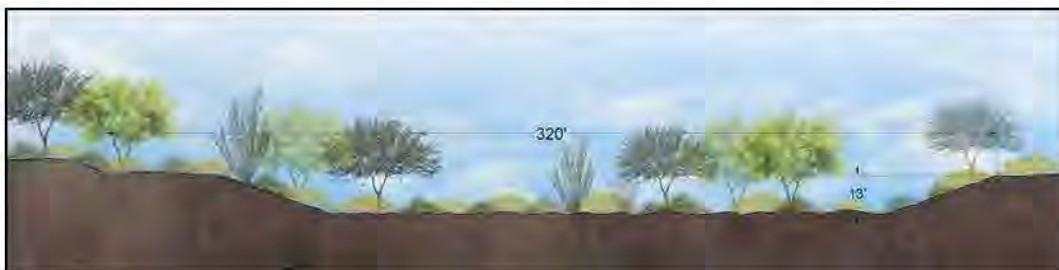


Figure 5. Earthen Channel Corridor Illustration

The Reata Wash Study concluded that it is critical to address the irregular and unpredictable nature of flows that are inherent to the alluvial fan that makes up the Reata Wash floodplain. As part of this Reata Wash Study, the City reviewed the inclusion of a release structure at the Reata Wash Study Area apex at Dobson Wash (See Figure 2). The intent of the flood control release structure would be to reduce flood risks within

the Reata Wash Study Area, but also allow for an adequate amount of flows to continue downstream within Dobson Wash and other nearby waters of the U.S. The intent would be to allow for "ordinary" flows to be released. By releasing flows through the structure, downstream impacts would be minimized or avoided because Dobson Wash and other ephemeral waters of the U.S. within the Reata Wash Study Area would continue to receive flows and incur bankfull conditions during storm events. The flood control improvements, including the release structure will be designed to ensure that downstream flows through Dobson Wash and other potential waters of the U.S. are not eliminated or significantly limited.

In addition to impacts to waters of the U.S., eliminating or significantly limiting flows to downstream waters of the U.S. would result in negative biological and ecological impacts within the Reata Wash Study Area and possibly downstream of the Reata Wash Study Area. Xeroriparian vegetation that is currently located within and adjacent to Dobson Wash is an important ecological resource in the Reata Wash Study Area, and a full diversion of downstream flows could negatively affect its health. The release structure would be designed to maintain downstream flows and therefore maintain vegetation along waters of the U.S. within and downstream of the Reata Wash Study Area. The continued release of flows through Dobson Wash and other waters of the U.S. is anticipated to leave downstream vegetation unaffected by the flood control improvements, preserving the habitat and aesthetic qualities in the Reata Wash Study Area.

The City discussed the potential for a release structure at the June 15, 2016 meeting with the USACE. The USACE agreed that the continuation of flows downstream would be an important consideration for any future permit authorization associated with the proposed flood control structures.

Compensatory Mitigation

Compensatory mitigation is anticipated to be required for the flood control improvements as a condition of a Section 404 Individual Permit. The purpose of compensatory mitigation would be to offset impacts to waters of the U.S. as a result of dredge and fill activities. The USACE's *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division USACE* (USACE 2015) defines the standardized approach and procedures for compensatory mitigation. Per the guidelines, three different forms of compensatory mitigation are available (listed in order of preference hierarchy): mitigation banks, in-lieu fee programs, and permittee-responsible mitigation. Mitigation banks and in-lieu fee programs are similar in that they sell compensatory mitigation credits to permittees (e.g., the City) whose obligation to provide compensatory mitigation is then transferred to the in-lieu fee program sponsor. However, mitigation banks and in-lieu fee programs have different rules governing their

operation and use. A list of Los Angeles District approved mitigation banks and their service area can be found on the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS; USACE 2016). All forms follow a watershed-based approach whenever possible. Coordination with the USACE should occur during the Section 404 permit process to determine the appropriate form of compensatory mitigation and the associated requirements, if necessary.

Based on the June 15, 2016 meeting with the USACE, payment to an in-lieu fee program is the locally preferred mitigation method, but that permittee-responsible mitigation would also be acceptable. In-lieu fee programs typically involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through the payment of funds to a USACE-approved governmental or non-profit natural resources management entity. The in-lieu fee amount is based on a set per acre cost of the selected program and a ratio assigned by the USACE, which ranges from 1:1 to 1:3 and is based on site characteristics. Currently, the preferred in-lieu fee program for compensatory mitigation in the Reata Wash Study Area is the Arlington Wildlife Area project which is located on the Gila River approximately 15 miles southwest of Buckeye, AZ and includes a cost of approximately \$80,000 per acre of permanent impacts to waters of the U.S.

Permittee-Responsible Mitigation consists of on- or off-site mitigation (including establishment, enhancement, and/or preservation of aquatic resources) that is undertaken by a permittee to provide compensatory mitigation for which a permittee retains full responsibility. On-site mitigation is the recommended approach in the event that Permittee-Responsible Mitigation is used. However, if an off-site location is pursued, improvements to sites within the same watershed as the impacted waters of the U.S. subject to the Section 404 permit is strongly encouraged. This compensatory mitigation method must include a plan that documents the baseline conditions within the potential mitigation area, recommends the methods and locations where mitigation will occur, and outlines an approach for monitoring the success of the mitigation.

On-site mitigation should include the salvaging of suitable vegetation that would be disturbed by construction and the selective planting of new vegetation. This will help to ensure that similar types and densities of vegetation are provided back to the Reata Wash Study Area and along natural wash corridors. Additionally, low impact development techniques, such as the use of microbasins for water harvesting, and the use of seeding should be considered to promote vegetation growth or to improve upon areas with limited vegetation growth.

When preparing the revegetation plan, which is anticipated to occur, consideration should be made to incorporate any on-site compensatory mitigation needs which may be needed as part of a Section 404 permit. This will provide an opportunity to utilize

planned revegetation activities to off-set impacts to waters of the U.S. and potentially reduce in-lieu fee requirements.

6. BIOLOGICAL RESOURCES

Federal actions require compliance with federal laws and regulations, including those protecting biological resources such as the ESA. Furthermore, documentation of ESA compliance is needed for compliance with NEPA. This section summarizes the ESA and other biological resource considerations that may be applicable to the flood control improvements being evaluated under the Reata Wash Study.

6.1 Endangered Species Act

The ESA protects threatened and endangered (T&E) species and their designated critical habitats by prohibiting take of any listed species and protecting habitats that are determined to be critical to the survival and recovery of listed species. To evaluate ESA compliance for a given federal action, a review of the action's potential effects to listed species and designated critical habitats located in the "action area" (i.e., the overall area where direct or indirect effects may occur) must be conducted. This may include informal or formal consultation with the USFWS. The USFWS's Arizona Ecological Services Field Office would be the point of contact for future coordination related to the Reata Wash Study Area.

Section 7 of the ESA [16 USC 1531 et seq.] outlines the procedures for federal interagency cooperation to conserve federally-listed species and designated critical habitats. Section 7(a)(1) requires Federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. ESA compliance is typically documented in a Biological Evaluation (BE) or Biological Assessment (BA) that is prepared by the lead federal agency to evaluate the presence of listed T&E species and their habitats within an action area and the effects of a proposed action. The preparation of a BE or BA can also be delegated to a project proponent or non-federal representative, though the lead federal agency is ultimately responsible for making determinations of effect with regard to listed species and critical habitats.

Federal agencies are not required to consult with the USFWS for actions that are determined to have "no effect" on listed species and critical habitats. When a federal agency determines that a proposed action "may affect" listed species or their designated critical habitats, consultation with the USFWS is required to ensure that the action will not jeopardize the continued existence of a listed species or result in the

destruction or adverse modification of any designated critical habitat. If it is determined that an action may affect, but is not likely to adversely affect a listed species or designated critical habitat, the federal agency submits the BE or BA to the USFWS for their concurrence; the USFWS reviews the BE or BA and, if they agree with the determination, provides a letter stating their concurrence within 30 days. If it is determined that an action may affect and is likely to adversely affect a listed species or designated critical habitat, the federal agency is required to enter into a formal consultation with the USFWS. Formal consultation is a more involved and lengthy process that results in the issuance of a Biological Opinion and, if needed, an Incidental Take Statement that allows for the take of a listed species in accordance with prescribed terms and conditions that must be implemented by the federal agency. Formal consultation with the USFWS can take up to 135 days to complete and the project proponent may be required to conduct species-specific protocol surveys to determine the status of a species within the action area.

6.2 Preliminary Review of the Reata Wash Study Area

6.2.1 Ecological Setting

The Reata Wash Study Area occurs within the Arizona Uplands subdivision of the Sonoran Desertscrub Biotic Community (Turner and Brown 1994), which is characterized by high temperatures, generally low precipitation, and an assemblage of plant and wildlife species that is specifically adapted to these conditions. Vegetation on the small hillsides in the Reata Wash Study Area is diverse and consists of a variety of trees, shrubs, subshrubs, and cacti that are native to the Sonoran desert and indicative of the Paloverde-Cacti- Mixed Scrub Series. Foothills paloverde (*Parkinsonia microphylla*), creosotebush (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), ephedra (*Ephedra* spp.), desert buckwheat (*Eriogonum deserticola*), brittlebush (*Encelia farinosa*), crucifixion thorn (*Canotia holacantha*), ocotillo (*Fouquieria splendens*), and banana yucca (*Yucca baccata*) are common in these upland areas, along with cacti including buckhorn cholla cacti (*Cylindropuntia acanthocarpa*), chainfruit cholla cacti (*Cylindropuntia fulgida*), Christmas cacti (*Cylindropuntia leptocaulis*), California barrel cacti (*Ferocactus cylindraceus*), hedgehog cacti (*Echinocereus* spp.), fishhook pincushion cacti (*Mammillaria grahamii*), saguaros (*Carnegiea gigantea*). Within major ephemeral washes, including Reata Wash and Dobson Wash, xeroriparian vegetation consisting of blue paloverde (*Parkinsonia florida*), velvet mesquite (*Prosopis velutina*), ironwood (*Olneya tesota*), catclaw acacia (*Acacia greggii*), wolfberry (*Lycium* sp.), desert hackberry (*Celtis pallida*), desert broom (*Baccharis sarothroides*), and canyon ragweed (*Ambrosia ambrosioides*). Other, smaller washes in the Reata Wash Study Area typically have a mix of upland and xeroriparian plant species.

Wildlife species observed in the survey area includes desert cottontails (*Sylvilagus audubonii*), whitethroated woodrats (*Neotoma albigula*), and many bird species including Abert's towhees (*Melospiza aberti*), house finches (*Haemorrhous mexicanus*), cactus wrens (*Campylorhynchus brunneicapillus*), curve-billed thrashers (*Toxostoma curvirostre*), verdins (*Auriparus flaviceps*), Gambel's quail (*Callipepla gambelii*), Gila woodpeckers (*Melanerpes uropygialis*), and northern cardinals (*Cardinalis cardinalis*).

6.2.2 Wildlife Movement

The Reata Wash Study Area is located in an urban fringe area and the lower density developments in the vicinity of Reaches 1 through 3 provide open space that supports live-in habitat for wildlife. As a result, there is more permeability for wildlife movement in the northern portion of the Reata Wash Study Area as compared to the southern portion. Between Thompson Peak Parkway and Bell Road (Reach 4) there are constraints to east-west wildlife movements due to the existing developments on both sides of Reata Wash. However, the wash itself provides a corridor for north-south movements, and bridged crossings at Legacy Boulevard and Thompson Peak Parkway currently accommodate such north-south movements. Within Reach 5 there is little wildlife habitat remaining adjacent to Reata Wash and this reach lacks connectivity to the McDowell Mountains or other natural habitat areas except through the Reata Wash corridor.

6.2.3 Special Status Species

The USFWS Information, Planning and Conservation (IPaC) system was accessed to obtain a list of threatened, endangered, proposed, and candidate species occurring in the Reata Wash Study Area at the time of this memorandum. The species distribution information and habitat requirements for each species on the list were reviewed in relation to the Reata Wash Study Area. Based on the review of the IPaC species list, it was determined that there is no suitable habitat present for any listed T&E species, or candidate species in the Reata Wash Study Area or in the immediate vicinity (i.e., within 0.25 mile of the Reata Wash Study Area) and no listed species are anticipated to be affected by activities within the Reata Wash Study Area. In addition, a list of special status species occurring in the vicinity of the Reata Wash Study Area was obtained using the Arizona Game and Fish Department's (AGFD) On-line Environmental Review Tool. The AGFD On-line Environmental Review Tool indicated that the Sonoran desert tortoise (*Gopherus morafkai*) has been documented as occurring within the Reata Wash Study Area. The Sonoran desert tortoise is considered a Species of Greatest Conservation Need in Arizona's State Wildlife Action Plan. The southern portion of the Reata Wash Study Area contains habitat for the Sonoran desert tortoise. The northern portion of the Reata Wash Study Area includes some tortoise habitat as well, and is in close proximity to habitat on the slopes of the McDowell Mountains and tortoises may use these adjacent habitats for foraging. If the City council authorizes the Reata Wash Study move forward into design,

the USFWS IPaC list and AGFD On-line Environmental Review Tool should be re-evaluated to confirm that no additional species have been listed that may be affected by the action.

6.2.4 ESA Compliance During a CLOMR Review

Per FEMA's Procedure Memorandum 64-Compliance with the Endangered Species Act (ESA) for Letters of Map Change (FEMA 2010) and their Overview Endangered Species Act Compliance for Conditional Letters of Map Change (FEMA 2016), all CLOMR and CLOMR-F applicants are responsible for providing documentation that demonstrates to FEMA that ESA compliance has been achieved prior to FEMA approval. Applicants are requested to provide documentation and concurrences received from the USFWS as part of a Section 7 process, such as a "not likely to adversely affect" determination, or a statement of "no effect" on proposed or listed species or their designated critical habitat, as applicable.

For actions where FEMA is not the lead federal agency, the applicant should coordinate with the applicable lead federal agency regarding Section 7 ESA compliance and provide the applicable documentation to FEMA. Once completed, it is recommended that the biological document (e.g., BE or BA) be forwarded to FEMA to support the CLOMR review.

For actions that do not require consultation with the USFWS, FEMA recommends providing responses to the following questions:

- A description of the action to be considered;
- A description of the specific area that may be affected by the action;
- A description of all federally listed (T&E) species and critical habitat that may be affected by the action;
- A description of the manner in which the action may affect each of the listed species or critical habitat and an analysis of any cumulative effects;
- Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment prepared; and
- Any other relevant available information on the action, the affected listed species, and critical habitat.

6.3 Reata Wash Study Obligations and Recommendations

Preparation of a BE is anticipated to be needed to support the agency-specific environmental compliance documents (e.g., CE, EA, Section 404 permit application) for the implementation of flood control improvements within the Reata Wash Study Area. The BE should provide a description of the proposed action, a summary of any ESA-listed species and designated critical habitat present within the Reata Wash Study Area, a

summary of any species of concern for applicable state and federal agencies within the action area, and an evaluation of potential impacts to each species in the action area. While species-specific protocol surveys are not anticipated to be necessary, a qualified biologist should complete a reconnaissance level site survey and obtain photographs of the Reata Wash Study Area in support of the analysis.

The analysis of potential impacts to T&E species from the flood control improvements should also include an assessment of direct, indirect, and cumulative effects to each, and appropriate conservation strategies and mitigation measures should be developed for each species, as needed. Following a thorough evaluation of an action's affect to biological resources, the lead federal agency should determine if the action has "no effect" on listed species and designated critical habitats, or that the action "may affect" listed species or their designated critical habitats. Based on preliminary biological resource information and the proposed flood control improvements being evaluated in the Reata Wash Study, it is anticipated that the proposed improvements would have "no effect" to listed species or their designated critical habitats. However, if the action is determined to have a "may affect" finding, the City would need to initiate the Section 7 consultation with the USFWS through the designated lead federal agency to obtain concurrence on the affect determination and to confirm any additional conservation strategies and mitigation measures. While the appropriate lead federal agency cannot be determined at this time, it is currently anticipated that the USACE will act as the lead agency and would be responsible for Section 7 consultation with the USFWS, if needed. Although not anticipated, Reclamation and/or FEMA could elect to complete separate consultation as part of their agency-specific NEPA process.

In order to reduce impacts to wildlife, including special status species, any design for the flood control improvements within Reata Wash should take into consideration the continued permeability of wildlife across Reata Wash, as well as the continued egress along its existing or modified channel bottom. Improvements within the immediate channel bottom of Reata Wash, including those related to drop structures, culverts, dissipaters, and inlet/outlet structures should also allow for continued wildlife movement upstream and downstream of any structure to maintain north-south wildlife movement through the Reata Wash corridor. The *AGFD Guidelines for Culvert Construction to Accommodate Fish & Wildlife Movement and Passage* (AGFD 2006) provides guidelines to assist in the design, planning, and placement of culverts to minimize impacts to wildlife passage and movement.

Any implementation of flood control improvements that require the reconfiguration of the Reata Wash cross-sections should consider the ability for wildlife to access the channel and to move along/across it within the each of the Reata Wash Study reaches. Channel slopes at 2:1 or greater appear to be favorable for ingress and egress by wildlife, including the Sonoran desert tortoise. However, the use of large angular rock for

rip-rap can be difficult for some species to traverse. The use of closed or covered culverts would also reduce impacts to wildlife movement since the ground surface would remain generally level without steep slopes. The inclusion of concrete or soil-cement paths (Figure 6) designed to allow for the movement of the Sonoran desert tortoise and other small mammal could also be implemented to assist in the ingress and egress of this species through the Reata Wash channel and Reata Wash Study Area reaches, such as Reaches 1 through 3. These features are provided at more frequent intervals to provide wildlife access through rip-rapped segments. In general, the use of animal or tortoise fencing throughout the Reata Wash Study Area is not recommended because it would decrease the ability for wildlife movement across the channel.



Figure 6. Example Concrete Path for Wildlife Movement
Photograph courtesy of Arizona Department of Transportation

Configurations to the Reata Wash channels that create steep slopes, such as a concrete “U” channel (Figure 7), would be less favorable for wildlife attempting to cross the channel. The construction of a “U” channel within the Reata Wash Study Area could potentially create a hazard to wildlife. In situations where a “U” channel is the proposed solution, fencing or other measures to restrict access and guide wildlife to more accessible portions of the channel could be included to reduce or eliminate the potential hazard to wildlife. Due to the likelihood of the Sonoran desert tortoise occurring within the Reata Wash Study Area, the use of tortoise-proof fencing is recommended for any locations where a “U” channel is required.

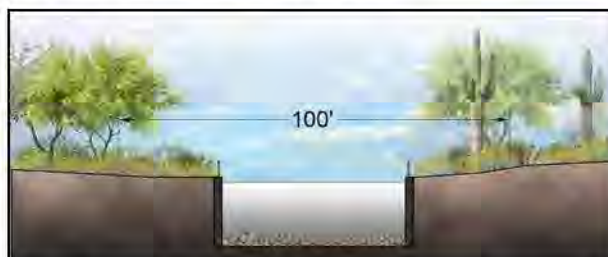


Figure 7. “U” Channel Illustration

Bridged crossings can be implemented to maintain connectivity across the wash. Ideally these crossings would have a natural substrate and could support growing plants such as shrubs or grasses to encourage their use by wildlife. The AGFD has published recommended mitigation measures for the Sonoran desert tortoise, which include the construction of culverts at every mile of new roads or railroads but that may also be applicable for an impassible "U" channel corridor. Given the linear nature of the Reata Wash channel in the Reata Wash Study Area, the installation of bridged crossings at a minimum of one-mile intervals could be beneficial for promoting wildlife movement across the Reata Wash, especially in Reaches 1 through 3 where there is greater connectivity to adjacent wildlife habitats.

The AGFD's *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* (Appendix B) should be followed to ensure safe handling in the event that a Sonoran desert tortoise is encountered during construction. Additional measures that could be implemented to minimize and avoid conflicts with the Sonoran desert tortoise include the implementation of construction worker awareness training, the use of a biological monitor during construction, and the installation of temporary and/or permanent fencing.

7. CULTURAL RESOURCES

Federally funded actions or actions that require federal permits or clearances must comply with Section 106 of the NHPA. Section 106 dictates the need for federal agencies to identify National Register of Historic Places (NRHP)-eligible and listed properties, consider any effects the action may have to historic properties, and conduct consultation with the SHPO, Native American Tribes, land-managing agencies, and other interested parties.

7.1 Reata Wash Study Obligations and Recommendations

A Class I cultural resource inventory was completed to research the extent of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and surrounding one-mile wide buffer. Records were gathered from the SHPO and the Arizona State Museum (ASM) via AZSITE, the statewide electronic inventory of cultural resources. Electronic copies of General Land Office and historic U.S. Geological Society topographical maps available for the Reata Wash Study Area, as well as the National Register Information System was accessed to collect information on historic buildings and structures NRHP-listed properties that may be located within the Reata Wash Study Area. The results of the review are provided in "*A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona*" (Appendix C).

Research indicates that approximately 71 percent of the Study Area has been previously surveyed for cultural resources. In all, 17 sites have been recorded within the Reata Wash Study Area; of these, 4 have been determined eligible for nomination to the NRHP by SHPO.

If the City council authorizes the Reata Wash Study move forward into design, it is recommended that the location of potential improvements be reviewed with respect to the results of the Class I research to determine the need for additional cultural resource survey and reporting. Depending on the location of potential improvements and associated ground disturbance, a new Class III survey may be needed in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards or where survey has not yet been completed.

8. SUMMARY

Appendix A. Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations includes a list of applicable agencies and their corresponding environmental compliance requirements as well as:

- estimated review timeframes
- appropriate agency contact
- associated fees
- applicable agency publication and guidance

Recommendations provided in this Environmental Memorandum are based on a preliminary review of available information and are intended for planning purposes during the Reata Wash Study. If the City council authorizes the Reata Wash Study move forward into design, this information should be reevaluated due to the potential for future regulatory changes and modifications to proposed flood control improvements. This Environmental Memorandum is not intended to be a comprehensive summary of all environmental resources, but only those resources and their managing agencies that have been identified in preliminary reviews to be potential requirements.

9. REFERENCES

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10. RELEVANT LAWS, REGULATIONS, POLICIES, AND EXECUTIVE ORDERS

Table 3. Summary of Primary Federal and State Laws, Regulations, Policies, and Executive Orders Relevant to the Reata Wash Flood Control Improvement Study Area

Authority	Description
American Indian Religious Freedom Act of 1978 (42 USC 1996)	This act is intended to protect Native American religious practices, ethnic heritage sites, and land uses.
Antiquities Act of 1906 (16 USC 431-433)	Provides for the protection of historic or prehistoric remains and sites of scientific value on federal lands, establishes criminal sanctions for unauthorized destruction or removal of antiquities, authorizes the President to establish national monuments by proclamation, and authorizes the scientific investigation of antiquities on federal lands, subject to permit and regulations.
Arizona Native Plant Law (ARS 3-904)	The Arizona Department of Agricultural requests that landowners provide a Notice of Intent to Clear Land prior to the removal of State protected native plants.
Arizona State Land Department (A.R.S. § 37-461)	Grants of rights-of-way and sites for public uses of ASLD land will require the submittal of a Right-of-Way application and environmental documentation to review impacts to resources.
Bald and Golden Eagle Protection Act (16 USC 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.
Clean Air Act (42 USC 7401 et seq., as amended)	The CAA regulates air emissions and pollutants from area, stationary, and mobile sources to improve air quality. The CAA authorized the EPA to establish national ambient air quality standards to protect public health and the environment.
Clean Water Act (33 USC 1251 et seq.)	The CWA requires states to set standards to protect water quality, including regulation of storm water and wastewater discharges during construction and operation of a facility. Section 404 authorizes the USACE to regulate the discharge of dredged or fill material to waters of the U.S. and adjacent wetlands. The USACE issues Individual site-specific or general (Nationwide) permits for such discharges. Section 404 Permits are not granted without prior 401 certification.

Authority	Description
CWA Section 401 – Water Quality Certification	The Section 401 water quality certification program administrated by ADEQ is required for any action subject to Section 404 of the CWA. Section 401 of the CWA requires any applicant requesting a federal permit or license for activities that may result in discharge into waters of the U.S. of the US to first obtain a Section 401 certification from the state in which the discharge originates. Section 303(d) of the CWA requires states to develop a list of impaired waters that do not meet water quality standards, establish priority rankings, and develop action plans, called "total maximum daily loads" to improve water quality.
CWA Section 402	The NPDES Program is authorized under Section 402 of the CWA and provides the statutory basis and structure for regulating the discharge of pollutants from any point or non-point sources into waters of the U.S., including sediment and construction debris-related pollutants that can be generated during ground-disturbing activities and transported by storm water runoff. ADEQ is the authority to implement at a State level, the AZPDES Program. AZPDES permits require the project be designed to protect waters of the U.S., the implementation of erosion control BMPs, and a SWPPP for construction activities exceeding 1 acre of ground disturbance.
Endangered Species Act of 1973 (16 USC 1531 et seq. and 50 CFR 17.1 et seq., as amended)	The ESA provides for the federal protection of threatened plants, invertebrates, fish, and wildlife. The USFWS administers the ESA. The ESA provides for the listing of T&E species, requires consultation with the USFWS on federal projects, prohibits the taking of listed T&E species, and provides for permits to allow the incidental taking of T&E species.
EO 11988, Floodplain Management, as amended May 24, 1977	This Executive Order requires each federal agency to avoid, to the extent possible, impacts associated with the occupancy and modification of floodplains and to avoid supporting floodplain development when there is a practicable alternative.
EO 11990 Protection of Wetlands (42 FR 26961) May 24, 1977	This Executive Order directs each federal agency to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out its responsibilities.

Authority	Description
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994	This Executive Order directs each federal agency to achieve environmental justice as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.
EO 13112, Invasive Species, February 3, 1999	This Executive Order requires federal agencies to take actions to prevent the introduction and spread of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts of invasive species.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001	The Executive Order makes it unlawful to take or possess any migratory nongame bird or any part of such bird as designated in the Migratory Bird Treaty Act.
EPA Section 404(b) (1) guidelines (40 CFR 230 et seq.)	Section 404(b) (1) requires the EPA to analyze alternatives to consider the avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge to waters of the U.S. of the United States can be authorized.
Federal Noxious Weed Act of 1974, as amended	This act established a federal program to control the spread of noxious weeds. The Secretary of Agriculture is authorized to designate plants as noxious weeds. The movement of all such weeds in interstate or foreign commerce is prohibited except under permit.
Migratory Bird Treaty Act (16 USC 703–711)	This act makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated unless permitted by regulation (for example, duck hunting).
National Historic Preservation Act of 1966 (16 USC 470, as amended)	The NHPA provided for the establishment of the NRHP to include historic properties that are significant in American history, architecture, archeology, and culture. Section 106 of the NHPA requires federal agencies to take into account the effect of a proposed undertaking on resources listed or eligible for listing on the NRHP.
National Environmental Policy Act of 1969 (NEPA)	NEPA (42 USC 4321 et seq.) establishes policy and goals for the protection, maintenance, and enhancement of the environment. NEPA requires federal agencies to consider the environmental impacts of their proposed discretionary actions during their decision making processes and provides a mechanism for meeting many environmental reviews and approvals.

Authority	Description
Native American Graves Protection and Repatriation Act of 1990	The Native American Graves Protection and Repatriation Act (NAGPRA) provides a process for museums and federal agencies to return Native American cultural items to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. NAGPRA Also includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items, and penalties for noncompliance and illegal trafficking. The excavation and inadvertent discovery provisions of NAGPRA apply only to federal and tribal lands
Maricopa County Rule 310 - Fugitive Dust from Dust-Generating Operations	Establishes limits for the emissions of particulate matter into the ambient air from any property, operations, or activity that may serve as a fugitive dust source within Maricopa County.
City of Scottsdale Native Plant Ordinance - Article V, Chapter 46, Sections 105–120 of the Scottsdale Revised Code	The Native Plant Ordinance requires any project that affects plants from the specified protected plant list is required to submit a native plant program detailing the existing location and proposed treatment of each protected plant impacted.

APPENDIX A

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act	U.S. Army Corps of Engineers	Waters of the U.S.	Environmental Assessment and Statement of Findings	9 to 12 Months	Section 404(b)(1) Guidelines	- Activities must demonstrate that discharges to waters of the U.S., either individually or cumulatively, will not result in unacceptable adverse effects on the aquatic ecosystem. - Activity must demonstrate that discharges within waters of the U.S. are the least environmentally damaging practicable alternative.	No agency review fee	- Preliminary coordination with the USACE, has indicated that the USACE is anticipated to be the lead federal agency for the flood control improvements being evaluated under the Reata Wash Study. The NEPA process would therefore be documented according to the USACE's Environmental Assessment and Statement of Findings. - It is anticipated that a Section 404 Individual Permit will be necessary for the proposed flood control improvements, therefore, a Section 404(b)(1) Alternative Analysis that reviews the least environmentally damaging practicable alternative would be necessary.	Coordination with the USACE' Arizona Branch (Phoenix office) is recommended to discuss the potential improvements, to review lead federal agency responsibilities, and to identify resources of concern for evaluation during the NEPA process.	Los Angeles District US Army Corps of Engineers: http://www.spl.usace.army.mil/Missions/Regulatory.aspx

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Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act (Continued)	Bureau of Reclamation	Public Land	Categorical Exclusion	3 to 6 Months	Reclamation's NEPA Handbook	The Reclamation NEPA process is initiated if the proposed action would cause effects on the human environment and the action is subject to Reclamation control and responsibility, such as the construction of a project on lands managed by Reclamation, obtaining or granting of a permit, or federal funding provided via Reclamation.	No agency review fee	- Reclamation lands are located within Reach 5 of the Reata Wash Study Area. - Improvements within Reach 5 which must utilize Reclamation managed lands would require coordination with the Reclamation and the preparation of NEPA documentation to support the proposed action.	- Coordination with the Reclamation Phoenix Area Office is recommended to discuss the potential improvements, to review preliminary design, and to identify resources of concern for evaluation during the NEPA process. - The City should refer to the <i>Reclamation's NEPA Handbook</i> for information related to Reclamation's NEPA process and associated technical resource requirements. - It is recommended that the City keep Reclamation informed on the status of other Reata Wash Study related improvements outside of Reach 5 and provide completed environmental and engineer information to allow Reclamation to respond to public inquiries and confirm compliance with related Reclamation requirements.	Reclamation's NEPA Handbook: http://www.usbr.gov/nepa/
			Environmental Assessment	9 to 12 Months						

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act (Continued)	Federal Emergency Management Agency	Floodplains	Categorical Exclusion	3 to 6 Months	- FEMA's NEPA Desk Reference <i>Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"</i>	Any action that FEMA initiates or funds whether through program funds (such as mitigation, public assistance, flood insurance, etc.), funds provided to states or municipalities, or internal administrative or construction expenditures must undergo environmental review pursuant to NEPA unless that action is statutorily excluded from NEPA.	No agency review fee	In the event that FEMA funding is utilized for the implementation of floodplain mitigation, NEPA compliance and the completion of supporting environmental resource documentation will be necessary.	The City should refer to the FEMA's NEPA Desk Reference for information related to the FEMA NEPA process and associated technical resource requirements and Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act".	NEPA Reference Desk: http://www.fema.gov/media-library/assets/documents/13165 <i>Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act".</i> https://www.dhs.gov/sites/default/files/publications/DHS_Instruction%20Manual%20023-01-001-01%20Rev%2001_508compliantversion.pdf
			Environmental Assessment	3 Months to 1 Year						

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Reata Wash Flood Control Improvement Study

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Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
Clean Water Act Section 401 Water Quality Certification	Arizona Department of Environmental Quality	Waters of the United States	CWA Section 401 Individual Water Quality Certification	• Approved within 90 days. • Section 404 Individual Permits, request cannot occur until Public Notice is issued.	Clean Water Act 401 Certification for Nationwide Permits-March 18, 2012	Activities are conditionally certified unless: • Do not meet General Conditions • Located in or within 1 mile upstream or 1/2 mile downstream from an impaired or Outstanding Arizona Waters • Project requires a CWA Section 404 Individual Permit	No fee is required by ADEQ.	• No impaired or Outstanding Arizona Waters are located within or 1/2 mile of the Reata Wash Study Area. • If a Section 404 permit is necessary for the implementation of flood control improvements a Section 401 individual water quality certification will be required.	• The City should review compliance with the General Conditions of ADEQ's Clean Water Act 401 Certification for Nationwide Permits— March 18, 2012 to determine the need for Section 401 individual water quality certification for any proposed improvements within potential waters of the U.S. • The City should review the current EPA and ADEQ CWA Section 303(d) list of impaired Waters and OAW to determine the need for Section 401 individual water quality certification for proposed improvements within listed Waters of the U.S.	ADEQ Water Quality Division: CWA 401 Water Quality Certification Program https://azdeg.gov/enviro/water/permits/cwa401.html Impaired and OAW https://gisweb.azdeg.gov/arcgis/emaps/?topic=impaired

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Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
CWA Section 402 Arizona Pollutant Discharge Elimination System Construction General Permit	Arizona Department of Environmental Quality	Waters of the United States	Notice of Intent	Within 7 Days	Arizona Pollutant Discharge Elimination System Construction General Permit (Permit No. AZG2013-001)	Submittal of a Notice of Intent to ADEQ is required if coverage under the AZPDES CGP is applicable.	NOI fees are assessed annually as follows: • Less than or equal to 1 acre of ground disturbance=\$250.00 • Greater than 1 acre of ground disturbance=, but less than or equal to 50 acres of ground disturbance= \$350.00 • Greater than 50 acres of ground disturbance=\$500.00	• No impaired or Outstanding Arizona Waters are located within or 1/4 mile of the Reata Wash Study Area. • Ground disturbing activities to occur within the Reata Wash Study Area and exceed 1 acre should produce a SWPPP and submit the necessary NOI and NOT to ADEQ.	• The City should review the conditions of the current AZPDES CGP and implement BMPs to control sediment and stormwater run-off which could result from construction activities. If necessary, the City should prepare a SWPPP that meets the requirements of the CGP and should submit an NOI to ADEQ prior to the start of improvements. Following completion of improvements a NOT should be submitted to ADEQ.	Water Quality Division: Stormwater Construction General Permit https://azdeq.gov/enviro/water/permits/cgp.html
			Notice of Termination	NA		Submittal of a Notice of Termination is required once the site is stabilized (> than 70% coverage) and in a condition that no longer requires stormwater controls.	No agency review fee			
			Stormwater Pollution Prevention Plan	Within 30 Days		Projects which exceed 1 acre of ground disturbance are required to prepare and maintain a SWPPP for a project. Submittal of a SWPPP to ADEQ is required if 1) Any portion of a construction site is located within 1/4 mile of a receiving water listed as impaired under section 303(d) of the Clean Water Act, 2) Any portion of the construction site is located within 1/4 mile of a receiving water listed as an OAW in A.A.C. R18-11-112(G), 3) ADEQ requests a copy of the site SWPPP for review.	If ADEQ review is required, agency review fee is \$1,000			

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August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
CWA Section 404	U.S. Army Corps of Engineers	Waters of the United States	Section 404 Jurisdictional Determination	1 to 3 Months	• <i>A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States</i>, August 2008 • Ordinary High Flows and the Stage– Discharge Relationship in the Arid West Region • Regulatory Guidance Letter No. 08-02, June 26, 2008 • Corps of Engineers Wetland Delineation Manual, January 1987 • Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), September 2008	Completion of a Section 404 Jurisdictional Delineation (Preliminary or Approved) is considered necessary for determining future permitting requirements and is a prerequisite for a permit applications.	No agency review fee.	• Several known and potential Waters of the U.S., including Reata Wash and Dobson Wash, are anticipated to exist with the Reata Wash Study Area. • Evaluation could be completed via the Corps' Preliminary or Approved jurisdictional delineation process.	• It is recommended that the City complete CWA Section 404 Preliminary or Approved JD to document the locations and extent of potentially jurisdictional Waters of the U.S. which could be affected by future improvements. The City should submit a JD to the Corps for acceptance or approval of potential waters of the U.S. within the survey area of the JD. Prior to the preparation of a JD, it is also recommended that the City coordinate with the Corps to confirm an appropriate survey boundary and any survey area specific information which should be included in a submittal. • The City should review the Corps' Ordinary High Flows and the Stage– Discharge Relationship in the Arid West Region manual for consideration when determining appropriate release volumes at the Reata Wash/Dobson Wash apex.	Jurisdictional Determinations: http://www.spl.usace.army.mil/Missions/Regulatory/JurisdictionalDetermination.aspx

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CWA Section 404 (Continued)	U.S. Army Corps of Engineers	Waters of the United States	Section 404 Nationwide Permit No. 43 (Stormwater Management Facilities)	1 to 3 Months	Nationwide Permits for Arizona	Section 404 Nationwide Permit Preconstruction Notification is needed if activity does not meet the conditions of a respective NWP, the specific NWP requires a PCN, or necessary per the General Conditions.	No agency review fee.	Impacts to Waters of the U.S. will require compliance with a Section 404 permit and potential authorization from the Corps.	- The City should review the Corps' Special Public Notice Nationwide Permits for Arizona to evaluate the appropriate Section 404 permit for improvements within potential waters of the U.S. and to determine if authorization from the Corps is necessary. - If necessary, the City should prepare and submit a Section 404 permit application to the Corps to authorize improvements within potential waters of the U.S.	Nationwide Permits for Arizona: http://www.spl.usace.army.mil/Portals/17/docs/regulatory/Permit_Process/SPN_AZ_NWP(withAppendix).pdf
			Section 404 Individual Permit	6 to 9 Months	CFR 40 Part 230 Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material	- Section 404 Individual Permit is needed if activity 1) is not covered under the NWP Program 2) does not meet the conditions of a respective NWP 3) exceeds the NWP thresholds. - Inclusion of the Environmental Assessment and Statement of Findings would be necessary.	No agency review fee			Los Angeles District US Army Corps of Engineers: http://www.spl.usace.army.mil/Missions/Regulatory.aspx
			Compensatory Mitigation	4 to 6 Months	<i>Regional Compensatory Mitigation and Monitoring Guidelines for US Army Corps of Engineers South Pacific Division</i>	Compensatory mitigation is required to offset impacts to Waters of the U.S. as a result of dredge and fill activities.	Mitigation Banks: Cost of credits is set by the bank sponsor. In-lieu fees: \$80,000 per acre at a ratio of 1:1 to 3:1 (Arlington Wildlife Area). Permittee Responsible Mitigation: Dependent upon site conditions and extent of mitigation required.	The requirement for the need and type of compensatory mitigation will be determined by the need for a Section 404 permit and coordination with the Corps.	Coordination with the Corps should occur during the Section 404 permit process to determine the appropriate form of compensatory and the associated requirements, if necessary.	<i>Regional Compensatory Mitigation and Monitoring Guidelines for US Army Corps of Engineers South Pacific Division:</i> http://www.spd.usace.army.mil/Portals/13/docs/regulatory/mitigation/MitMon.pdf <i>Regulatory Guidance Letter08-03, Minimum Monitoring Requirements for Compensatory Mitigation Projects</i> http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/r gl08_03.pdf

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Endangered Species Act	U.S. Fish & Wildlife Service	Biological Resources	Section 7 Consultation	• Within 30 days for Informal Consultation • Up to 135 days for Formal Consultation	Endangered Species Consultation Handbook	• ESA Section 7 consultation with the USFWS is necessary if a proposed activity is likely to jeopardize the continued existence of a listed threatened or endangered species, or adversely modify or destroy critical habitat. • ESA Section 7 consultation is also necessary to support other environmental compliance processes, including those related to Section 404 and NEPA.	No agency review fee.	• It is not anticipated that listed threatened or endangered species or critical habitat is located within the Reata Wash Study Area. • The Reata Wash Study Area contains habitat associated with the Sonoran desert tortoise.	• The AGFD's <i>Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects</i> should be followed to ensure safe handling in the event that a Sonoran desert tortoise is encountered during construction. • The City should review the <i>AGFD Guidelines for Culvert Construction to Accommodate Fish & Wildlife Movement and Passage</i> to assist in the design, planning, and placement of culverts or bridge structures to minimize impacts to wildlife passage and movement.	USFWS Arizona Ecological Services: http://www.fws.gov/southwest/es/arizona/ Information for Planning and Conservation: http://ecos.fws.gov/ipac/

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Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
Endangered Species Act (Continued)	Federal Emergency Management Agency	Biological Resources	Endangered Species Act	30 days	<i>Guidance for Compliance with the Endangered Species Act for Letters of Map Change Procedure Memorandum 64- Compliance with the Endangered Species Act (ESA) for Letters of Map</i>	CLOMR and CLOMR-F applicants are responsible for demonstrating to FEMA that ESA compliance has been achieved prior to FEMA's review of a CLOMR or CLOMR-F application.	- Report preparation and coordination efforts consistent with overall biological resources efforts. - Reporting completed and USFWS concurrence received as part of overall Reata Wash Study can be utilized.	FEMA coordination and floodplain revisions requests to be completed in the Reata Wash Study Area will require the preparation of biological resource documentation and consultation with the USFWS to support a CLOMR/CLOMR-F process.	The City should review FEMA's <i>Procedure Memorandum 64- Compliance with the Endangered Species Act (ESA) for Letters of Map Change</i> and their <i>Overview Endangered Species Act Compliance for Conditional Letters of Map Change</i> if a CLOMR or CLOMR-F is requested for the Reata Wash Study Area.	<i>Compliance with the Endangered Species Act for Letters of Map Change:</i> http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/compliance-endangered-species-act-letters-map Regional Environmental Officer FEMA R IX-U.S. Department of Homeland Security 1111 Broadway, Suite 1200 Oakland, California 94607-4052 Phone: 510-627-7284
National Historic Preservation Act	Arizona State Historic Preservation Office	Historic Properties	Section 106 Consultation	Agency concurrence of cultural resource report typically completed within 30 to 45 days.	Protection of Historic Resources (36 CFR Part 800)	Section 106 of the NHPA, as amended, requires all federal agencies to consider the effects of their undertakings on historic properties. The regulation requires consultation with the State Historic Preservation Office (SHPO) as well as with tribal communities and other interested parties.	No agency review fee.	A Class I inventory indicates that seventeen sites have been recorded within the Reata Wash Study Area; of these, four have been determined eligible for nomination to the NRHP by SHPO.	Should the Reata Wash Study be approved as a project, the location of potential improvements should be reviewed with respect to the results of the Class I research to determine the need for additional survey and reporting.	State Historic Preservation Office: http://azstateparks.com/SHPO/index.html Advisory Council on Historic Preservation: http://www.achp.gov/106summary.html

APPENDIX B

Arizona Game and Fish Department Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40° Celsius (105° Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40° Celsius (105° Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department's tortoise adoption program. *Managers of projects likely to affect desert tortoises should obtain a [scientific collecting license](#) from the Department to facilitate handling or temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department's [Environmental On-Line Review Tool Department](#) during the planning stages of any project that may affect desert tortoise habitat.
- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.
- Take is prohibited by state law.
- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department.

APPENDIX C

**Class I cultural resource inventory “A Class I Cultural Resources Inventory for the
Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa
County, Arizona”**

A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona

Prepared for:

City of Scottsdale

On behalf of:

Wood, Patel & Associates

Prepared by:

Justin P. Rego, M.A., RPA



L O G A N S I M P S O N

Logan Simpson
51 West Third Street, Suite 450
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July 2016 (Submittal 1)

Logan Simpson Technical Report No. 145219

ABSTRACT AND MANAGEMENT SUMMARY

Report Title	A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona		
Report Date	July 2016		
Logan Simpson Project Name	Reata Wash Flood Control Improvement Study		
Agency Nos.	To be determined.		
Agencies Involved	City of Scottsdale (COS), Arizona State Land Department (ASLD), US Army Corps of Engineers (USACE), US Bureau of Reclamation (Reclamation), US Fish and Wildlife Service (USFWS), Federal Emergency Management Agency (FEMA), and Flood Control District of Maricopa County (FCDMC)		
Land Ownership	ASLD, Reclamation, Bureau of Land Management (BLM), and private land.		
Funding	COS		
Logan Simpson Project No.	145219		
Project Description	The City of Scottsdale Reata Wash Flood Control Improvement Study (Reata Wash Study) is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. The Reata Wash Study Area and one-mile buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east.		
Project Location	Within portions of Sections 24–26, 35, and 36 of T4N, R4E; Sections 8, 17–20, 29–32 of T4N, R5E; Sections 1 and 2 of T3N, R4E; and Sections 5, 6, and 8 of T3N, R5E; Gila and Salt River Baseline and Meridian (G&SRB&M) [USGS 7.5' Quadrangles, Curry's Corner, Ariz. (1964, 1984); McDowell Peak, Ariz. (1965, 1982)].		
Methods	Records search/site files check and literature review		
Number of Previously Recorded Sites	Total: 42 sites		
Sites Determined NRHP Eligible	Total: 5		
	AZ U:5:37(ASM)	AZ U:5:149(ASM)	AZ U:5:150(ASM)
	AZ U:5:151(ASM)	AZ U:5:152(ASM)	
Sites Determined NRHP Ineligible	Total: 6		
	AZ T:8:65(ASM)	AZ U:5:30(ASM)	AZ U:5:99(ASM)
	AZ U:5:100(ASM)	AZ U:5:101(ASM)	AZ U:5:142(ASM)

Sites Recommended NRHP Eligible	Total: 8		
	AZ U:5:69(ASU)	AZ U:5:80(ASU)	AZ U:5:156(ASM)
	AZ U:5:159(ASM)	AZ U:5:161(ASM)	AZ U:5:162(ASM)
	AZ U:5:266(ASM)	AZ U:5:278(ASM)	
Sites Recommended NRHP Ineligible	Total: 5		
	AZ U:5:141(ASM)	AZ U:5:245(ASM)	AZ U:5:273(ASM)
	AZ U:5:274(ASM)	AZ U:5:275(ASM)	
Sites Not Evaluated For NRHP Eligibility	Total: 18		
	AZ U:5:11(ASM)	AZ U:5:13(ASM)	AZ U:5:14(ASM)
	AZ U:5:28(ASM)	AZ U:5:64(ASU)	AZ U:5:102(ASM)
	AZ U:5:153(ASM)	AZ U:5:154(ASM)	AZ U:5:157(ASM)
	AZ U:5:158(ASM)	AZ U:5:160(ASM)	AZ U:5:163(ASM)
	AZ U:5:224(ASM)	AZ U:5:239(ASM)	AZ U:5:8(REC)
	IHCRS90-10	AZ U:5:352(ASM)	#4 ARS

Summary and Recommendations

Logan Simpson's research indicates that approximately 78 percent of the cultural resources Reata Wash Study Area and the surrounding one-mile buffer, has been previously surveyed for cultural resources. Approximately 71 percent of the Reata Wash Study Area has been previously surveyed. In all, 42 sites have been previously recorded in the Reata Wash Study Area and one-mile buffer, including five sites determined eligible for inclusion in the National Register of Historic Places (NRHP) by the State Historic Preservation Office (SHPO). Seventeen sites have been recorded within the Reata Wash Study Area; of these, four have been determined eligible for nomination to the NRHP by SHPO.

Logan Simpson recommends that a new survey be conducted in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards. A pedestrian survey should also be conducted for unsurveyed portions of the Reata Wash Study Area. Seven of the 17 sites within the Reata Wash Study Area were recorded before April 1994, and should be reevaluated for their NRHP-eligibility as they were recorded under an outdated site definition. Ten sites have been recorded using the current site definition. These sites should be re-visited to document their current condition.

Upon the completion of a Class III survey and site relocation and recordation, recommendations should be made for the treatment, preservation, or avoidance of sites, as appropriate. Based on current research, it is known that five NRHP-eligible sites are located within the Reata Wash Study Area and buffer. Of these, four are within the Reata Wash Study Area. If federal funds are involved, and it is subsequently determined that one or more NRHP-eligible cultural resources cannot be avoided by project activities, a Memorandum of Agreement or Programmatic Agreement should be developed to resolve the adverse effect of the project to historic properties.

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INTRODUCTION

The City of Scottsdale Reata Wash Flood Control Improvement Study (Reata Wash Study) is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The 1-mile Reata Wash Study Area buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east (Figures 2-4). The Reata Wash Study Area encompasses portions of Sections 24–26, 35, and 36 of T4N, R4E; Sections 8, 17–20, 29–32 of T4N, R5E; Sections 1 and 2 of T3N, R4E; and Sections 5, 6, and 8 of T3N, R5E; Gila and Salt River Baseline and Meridian (G&SRB&M) (Table 1; Figure 2-4). The Reata Wash Flood Control Improvement Reata Wash Study Area buffer encompasses State Trust land under the administration of the Arizona State Land Department (ASLD), federal land under the jurisdiction of the Bureau of Reclamation (Reclamation) and Bureau of Land Management (BLM), and private land.

Table 1. Reata Wash Study Area legal description.

Location ¹	Map reference
T4N, R4E, Secs. 24, 25, 26, 35, 36	Curry's Corner, Ariz. (1964, 1982)
T4N, R5E, Secs. 18, 19, 30, 31	Curry's Corner, Ariz. (1964, 1982)
T3N, R5E, Sec. 6	Curry's Corner, Ariz. (1964, 1982)
T3N, R4E, Secs. 1, 2	Curry's Corner, Ariz. (1964, 1982)
T4N, R5E, Secs. 8, 17, 20, 29, 32	McDowell Peak, Ariz. (1965, 1982)
T3N, R5E, Sec. 5	McDowell Peak, Ariz. (1965, 1982)

¹G&SRB&M

PHYSICAL SETTING

The Reata Wash Study Area buffer is situated at an average elevation of 1,900 ft above mean sea level and is located in the Basin and Range physiographic province, which is characterized by low desert surrounded by fault-block mountain ranges (Chronic 1983). Within this region, the Reata Wash Study Area buffer traverses two subdivisions of the Sonoran Desertscrub biotic community; the Lower Colorado River Valley subdivision, and the Arizona Uplands subdivision (Turner and Brown 1994). The Sonoran Desertscrub biotic community is characterized by high temperatures and low precipitation. Prior to Euro-American settlement and development of the region, the native vegetation communities were probably dominated by bursage and creosotebush with a mix of saguaro, prickly pear, cholla cactus, saltbush, grasses, ocotillo, and palo verde. The largest drainage in the vicinity is the Salt River, located approximately 10 miles to the southeast of the Reata Wash Study Area. Topographic features adjacent to the Reata Wash Study Area buffer include McDowell Mountains to the east. The local geology consists of Early Pleistocene to Late Miocene basin deposits, composed of poorly sorted, variably consolidated gravel

and sand. A review of aerial imagery indicates that the Reata Wash Study Area buffer has largely been developed, and is characterized by residential communities and businesses.

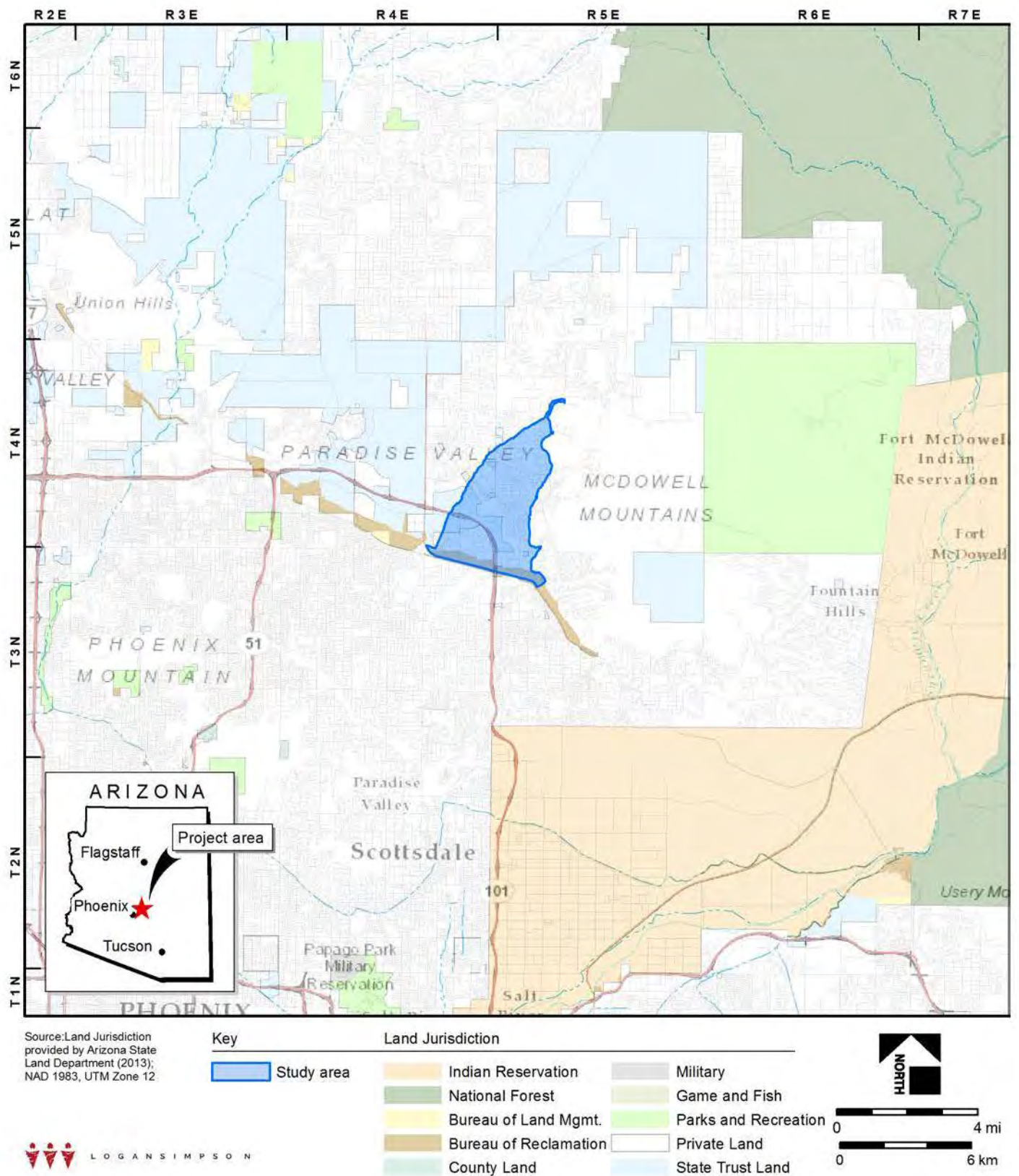


Figure 1. Reata Wash Study Area location.

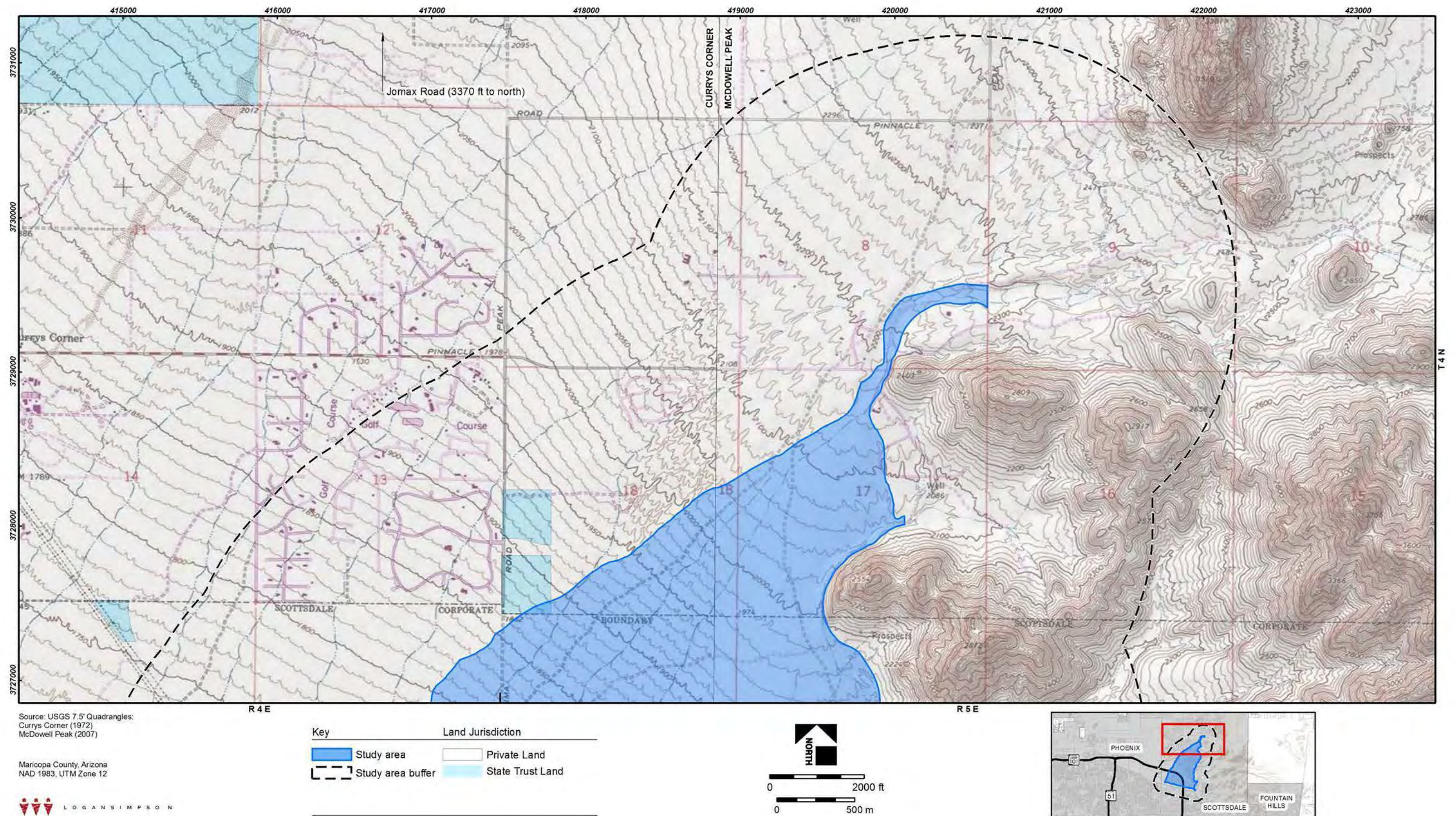


Figure 2. Land jurisdiction and Reata Wash Study Area buffer limits

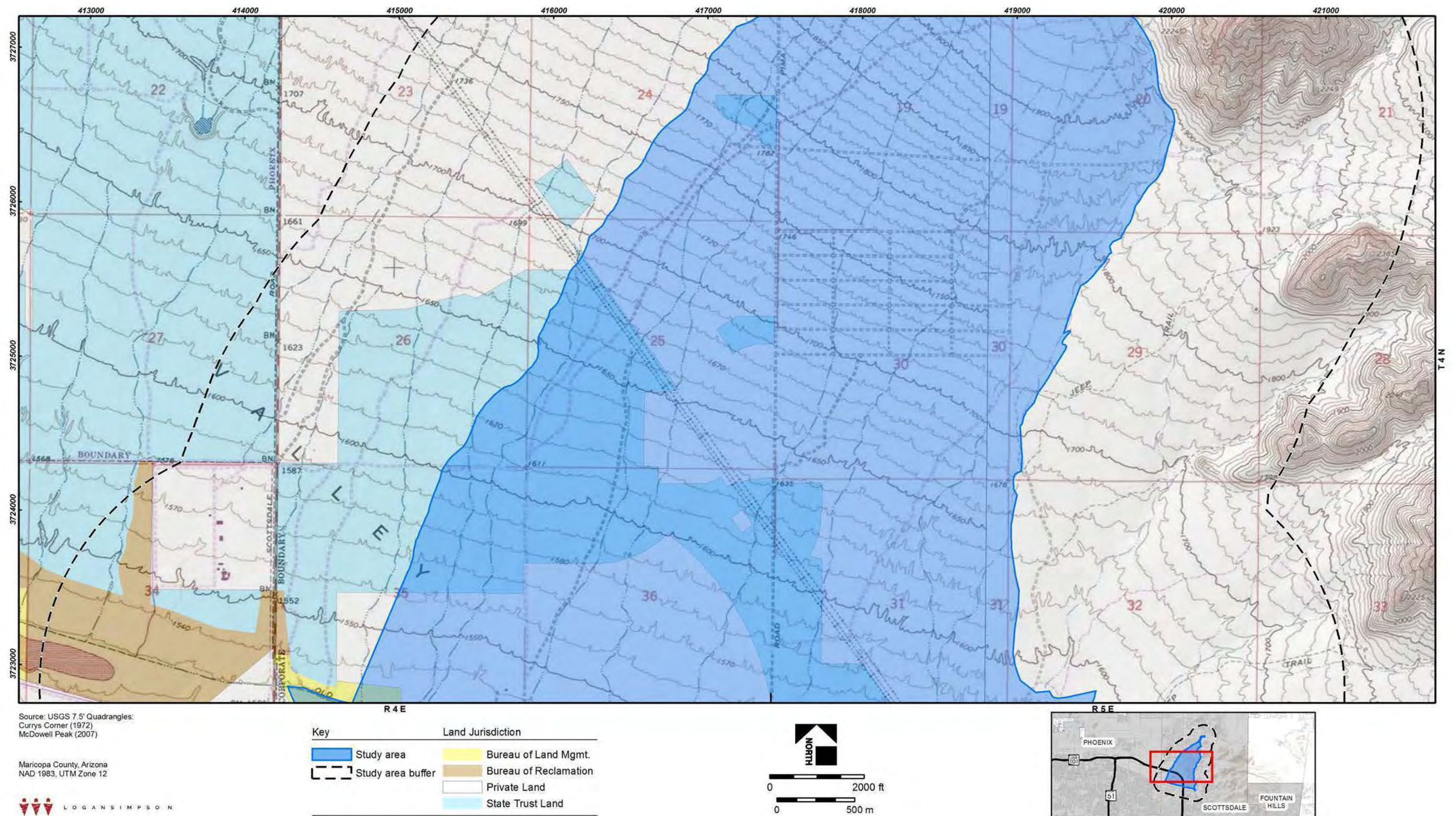


Figure 3. Land jurisdiction and Reata Wash Study Area buffer limits

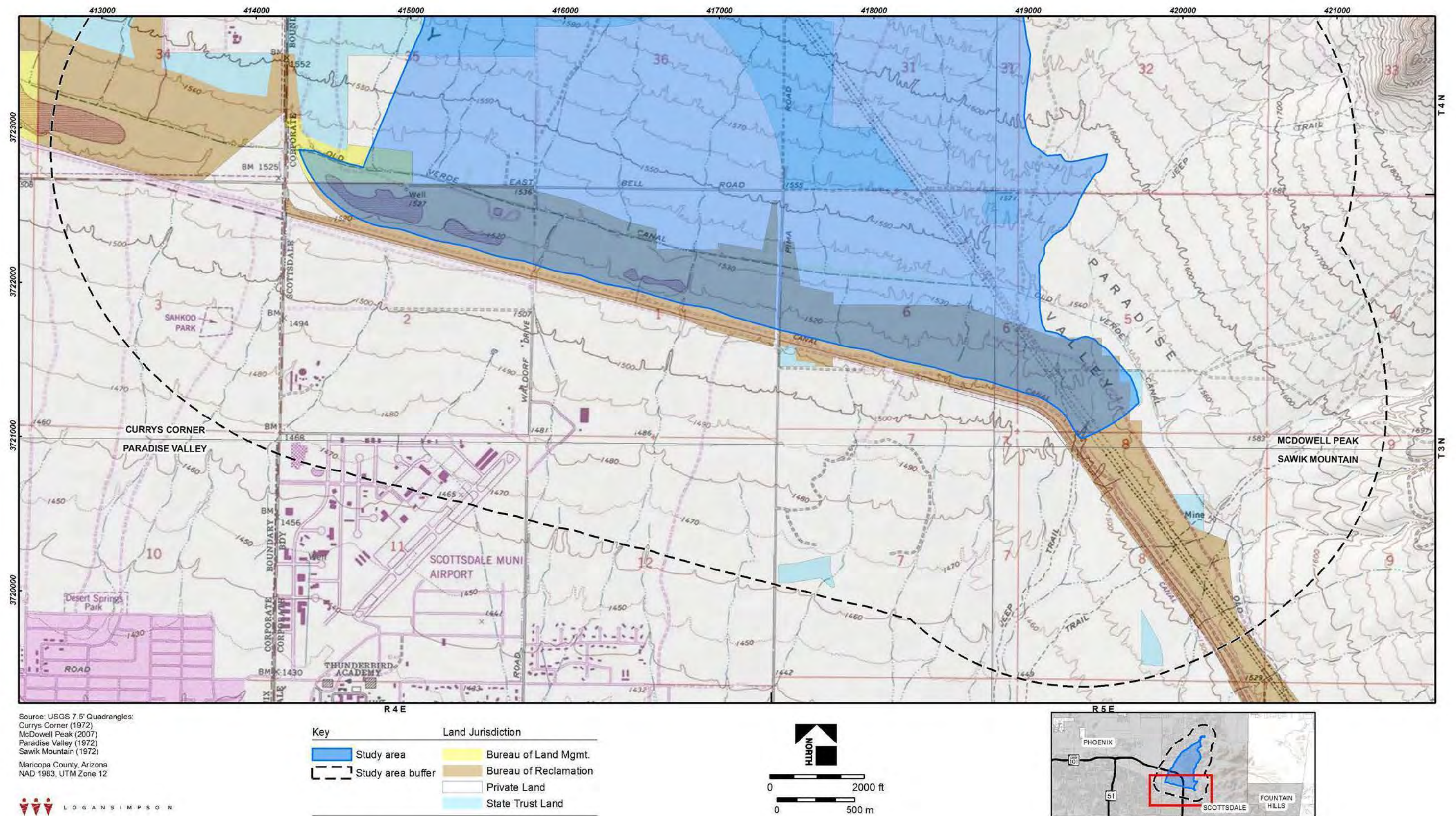


Figure 4. Land jurisdiction and Reata Wash Study Area buffer limits

CULTURE HISTORY

Human presence in the Southwest began as long as 11,000 years ago (Table 1). The initial period of occupation, during the Paleoindian period dating from approximately 10,000 B.C. to 8500 B.C., appears to have been intermittent, given the limited amount of recovered evidence. The evidence consists primarily of isolated surface finds of Clovis points, as well as buried megafaunal kill sites in alluvial contexts that have yielded associated lithic assemblages (Haynes 1980, 2011). Based on these scant data, the period appears to be characterized by dispersed mobile groups that primarily hunted now-extinct megafauna and possibly supplemented their diet with collected wild plant materials (Waters 1986). Although until recently only a few artifactual surface finds have been reported in the general region (Agenbroad 1967; Huckell 1982), it is likely that most Paleoindian period remains are currently buried by substantial Holocene alluvial deposits. Three isolated points have been found in the northern periphery of the Phoenix Basin (Crownover 1994; Huckell 1982; North, Lindly, and Schmidt 2004; North et al. 2005), representing the only known evidence, to date, of Paleoindian occupation or use of the Phoenix Basin.

Following climatic amelioration and the extinction of the previously exploited fauna, a new cultural pattern emerged, the Southwestern Archaic, manifested by small, mobile, residential groups that hunted medium- and small-size game and foraged for a diversity of floral resources. This adaptive pattern persisted through the Early (8500 B.C. to 5000 B.C.) and Middle (5000 B.C. to 2000 B.C.) Archaic periods, although there was a trend toward an increased reliance on migratory patterns based on seasonally available foodstuffs, as evidenced by the increased prevalence of grinding tools in the artifact assemblage. By the Early Agricultural period (2000 B.C. to A.D. 50), groups occupying well-watered upland locations or locales along primary or secondary stream courses adopted maize horticulture, regularly constructed small-scale canal irrigation systems, maintained substantial storage facilities, and established a semi-sedentary subsistence-settlement pattern (Huckell 1995; Mabry 1998, 2000). Around 500 B.C. large, seasonally occupied villages, some with communal structures, were established in southern Arizona (Mabry 1998). These villages focused around floodplains where maize agriculture and riparian resources were available, but also continued the exploitation of upland bajada resources. In non-riverine desert areas, however, the tradition of hunting and foraging appears to have persisted at least through the end of the Archaic period (Halbirt and Henderson 1993).

Early Agricultural semi-sedentary settlements, such as those identified in upland and riverine areas to the south in the Tucson Basin and parts of southeastern Arizona (Huckell 1995; Mabry 1998; Roth 1992), have only recently been identified in the Phoenix Basin. Other settlements may be situated in floodplains or along river terraces and, if preserved, may be deeply buried in alluvium.

The succeeding Early Formative period (Early Ceramic period), dating between A.D. 50 and approximately A.D. 450, is characterized primarily by the introduction and development of plainware ceramics and the bow and arrow. This period can be considered a period of transition, during which sedentism and the reliance on horticulture increased throughout the general region. In specific

Table 1. Phoenix Basin Phase Sequence.

PERIOD		PHASE
A.D. 1900— A.D. 1800— A.D. 1700— A.D. 1600— A.D. 1500—	HISTORIC	
A.D. 1400— A.D. 1300— A.D. 1200— A.D. 1100— A.D. 1000—	PROTOHISTORIC	
A.D. 1400— A.D. 1300— A.D. 1200—	CLASSIC	Polvorón A.D. 1450 Civano Soho A.D. 1300
A.D. 1100— A.D. 1000—		Sacaton A.D. 1150
A.D. 900— A.D. 800— A.D. 700—		Santa Cruz A.D. 900 Gila Butte A.D. 800
A.D. 700— A.D. 600— A.D. 500— A.D. 400— A.D. 300— A.D. 200— A.D. 100—	PIONEER	Snaketown A.D. 700 Estrella/Sweetwater Vahki
A.D. 400— A.D. 300— A.D. 200— A.D. 100—		Red Mountain A.D. 450
100 B.C.— 500 B.C.— 1000 B.C.—		?
2000 B.C.— 3000 B.C.— 5000 B.C.— 7000 B.C.— 9000 B.C.— 10,000 B.C.—	ARCHAIC	2000 B.C.
		5000 B.C.
		8500 B.C.
		10,000 B.C.
	PALEOINDIAN	

areas, such as the Tucson Basin where both Late Archaic and Early Formative villages have been recorded, settlement location reflects a general continuity from the earlier villages. Current understanding of the initial phase of the Early Formative period in the Salt River area, the Red Mountain phase (A.D. 50 to 450), however, is limited to data derived from a few sites and site components in the Phoenix Basin (Mabry 2000). The Red Mountain phase is represented by the earliest component at Pueblo Patricio, which is composed of small semi-sedentary farmsteads (Cable and Doyel 1987; Hackbarth 2010; Henderson 1995), La Escuela Cuba (Hackbarth 1992), the Red Mountain site (Morris 1969), and limited activity sites (Brown and Crespin 2009; Kenny 1987; Hackbarth 1998; Phillips et al. 2001, Rogge 2009). The mortuary pattern is characterized principally by flexed inhumations, although secondary cremations have also been documented (Mabry 2000).

The Vahki, Estrella, Sweetwater, and Snaketown phases traditionally make up the Pioneer period in Hohokam cultural chronology (Gladwin et al. 1937; Haury 1976). The Pioneer period has undergone some recent reevaluation regarding the origins and development of the Hohokam (Dean 1991; Wallace et al. 1995). The placement of these phases (A.D. 450 to 700) is based on the available limited excavation and artifact data and can best be characterized as a continuation of the broad regional Early Formative-period cultural development, with the beginnings of a cultural pattern that was developing in the Phoenix Basin.

During the Vahki phase, micaceous plainware along with redware ceramics were produced and a figurine complex developed. Other characteristics of this phase include settlements with plaza-oriented layouts, the construction of large Type P-3 and P-4 houses that were first identified at Snaketown (Gladwin et al. 1937; Haury 1976:68; Wilcox et al. 1981), and a mortuary pattern that incorporated both pit and trench cremations and flexed and semi-flexed inhumations (Doyel 1991). The following Estrella and Sweetwater phases are characterized primarily by the production of grooved and decorated red-on-gray ceramics. Although the square P-3 and P-4 houses continued to be constructed, they were smaller in size than those of the Vahki phase and co-occurred with the smaller structures (Hackbarth 2011; Henderson 1989, 1995). The presence of some intrusive elements, including evidence of macaws and parrots, shell, and turquoise at principal settlements such as Snaketown, suggests the development of regional interaction patterns.

The emergence of the Hohokam as an integrated cultural pattern occurred possibly as early as A.D. 700 during the Snaketown phase, although a much earlier origin beginning in the Vahki phase originally had been proposed (Gladwin et al. 1937). Recent assessments have suggested that the suite of cultural traits and developments that marked the beginnings of regional cultural differentiation and that characterized the Hohokam does not appear to be fully established until the Snaketown phase or possibly as late as the middle of the Gila Butte phase of the Colonial period, beginning around A.D. 750 (Dean 1991; Doyel 1991; Wallace et al. 1995; Wilcox 1979; Wilcox and Sternberg 1983). These traits, which reflect the development of an integrated belief and ritual system and the inception of a regional system, include the adoption of public architectural forms, such as ballcourts, into the settlement structure and the development of a characteristic mortuary complex, large-scale irrigation agriculture, and naturalistic iconography in decorated ceramics.

Throughout the pre-Classic period, between A.D. 700 and approximately A.D. 1150, the Phoenix Basin can be considered the primary focus of Hohokam regional development. During the Snaketown phase of the Pioneer period, the emerging Hohokam cultural pattern was manifested by the first documented construction of canals (Wilcox and Shenk 1977) and urn burials (Haury 1976). Trash mounds appeared during this period, and one at Snaketown was capped with caliche, possibly a precursor to the later platform mounds (Haury 1976). Evidence of Hohokam occupation or interaction is first identified outside the Phoenix Basin in locations such as the lower Verde River and in the Tucson Basin (Crown 1991).

The establishment of numerous villages throughout the region, including peripheral areas along secondary drainages where canal irrigation was not feasible, characterizes the Colonial period. Habitation sites consisting of courtyard groups focused on a common living or workspace represented a frequent pattern of settlement organization during this period (Howard 1985; Wilcox et al. 1981). At smaller hamlets and villages consisting of one or two courtyard groups, trash mounds, cemetery areas, and roasting pits tended to be arrayed around the margins of the courtyard. At larger villages composed of clusters of courtyard groups, central plazas and communal cemeteries and work areas were probably incorporated into the village structural layout (Howard 1985; Wilcox and Sternberg 1983). The introduction of ballcourts at some of these villages, at least by the Gila Butte phase, suggests the beginnings of site functional differentiation and intercommunity integration. Ballcourts, as a widespread form of public architecture, increased in number and expanded in areal extent throughout the Colonial period. By the Sedentary period, ballcourts were represented not only in the Phoenix Basin but in surrounding areas as well.

The Santa Cruz phase of the Colonial period and the Sacaton phase of the Sedentary period were times of substantial growth in the number and size of Hohokam settlements and ballcourt villages and in the extent of the canal networks in the Phoenix Basin (Doyel 1991). In peripheral drainage areas, the number of villages, hamlets, and farmsteads also increased. Non-irrigation agricultural intensification and the intensive use of agricultural rock piles for the cultivation of crops, such as agave and cholla, appear to have developed at least by the late Sedentary or early Classic periods (Fish et al. 1992; Masse 1991).

By the beginning of the early Classic period, change in the structure of Hohokam communities is evidenced by a shift in burial practices from primarily cremations to inhumations, a change in regional exchange networks as reflected by the shift in the production and distribution of ceramic types and exotic materials, and the development of new domestic and public architectural forms, including post-reinforced and adobe-walled structures and walled compounds. The decline and eventual collapse of the ballcourt system and the development of the platform mound also occurred during this period (Gregory 1987). The platform mound architectural form, developed during the late Sedentary period, represented an important architectural component of a new community organization that was manifested in Hohokam settlements not only in the Phoenix Basin but also in other settlements over a much wider region, including the Tonto and Tucson basins and along the lower San Pedro River. The platform mound apparently evolved in function from an initial nonresidential, special-purpose facility to a residence used by a specific residential group (Gregory 1991). More recent study of the Pueblo Grande platform mound directly challenges the idea that the Civano-phase mounds were the full-time residences of elite households and further supports the proposition that power was diffuse at that time (see Downum and Bostwick 2003).

In conjunction with this Classic-period community restructuring, a hierarchy of settlement types also emerged. These included villages with only one or a few walled residential compounds; villages with one or more platform mound compounds as well as other compounds; and large settlements, such as Casa Grande, with a platform mound and numerous compounds, a ballcourt, and a Great House (Wilcox 1991). These various Classic-period settlements may have composed distinct irrigation communities: sociopolitical organizations consisting of a number of integrated villages that included one or more platform mound villages serving as administrative centers and distributed along a single canal or canal system (Howard 1987). One view of the terminal period of prehistoric occupation in the Phoenix Basin is the tentatively defined and dated Polvorón phase (Doyel 1995; Sires 1983). As originally defined, occupation during the Polvorón phase is represented by dispersed ranchería settlements, consisting of individual pit structures or jacal rooms arranged in clusters. In some cases, however, late Classic-period compounds were reoccupied (Crown and Sires 1984; Doyel 1995; Sires 1983). This perspective treats the phase as a period of abrupt change in community organization and integration in the aftermath of the collapse of the late Classic-period platform mound communities. The end of the Hohokam is explained as following a period of drought and flood conditions that substantially reduced or destroyed the irrigation systems on which these communities relied (Doyel 1995; Nials et al. 1989). However, researchers continue to debate whether the phase is valid. For example, Henderson and Hackbarth (2000), on the basis of overlapping dates between the Civano and Polvorón phases, argue that the characteristics of the latter are not temporally discrete but rather a reflection of cultural variability within the Classic period. Alternatively, Chenault (2000:277) argues "... that not to separate Polvorón from the Civano phase obscures variability and change at the end of the cultural sequence that may relate to the nature and causes of the Hohokam collapse." Hill and colleagues (2004), on the other hand, take a broader perspective of regional Hohokam settlement change and suggest that population decline over multiple generations was intertwined with immigration and community coalescence.

Historic Period

By the time of Spanish contact in the mid- to late sixteenth century, the Pima and Maricopa occupied the middle portion of the Gila River. The Pima have been traditionally considered the descendants of the Hohokam in the Phoenix Basin (Doyel 1991; Haury 1976), although the validity of this particular prehistoric-historic connection has been debated (Doelle 1981; Masse 1991). The mountainous areas north and west of the Salt River were largely occupied by the Yavapai. Gifford (1932, 1936) considered the Yavapai most closely aligned in terms of cultural traits with the upland Yuman, Walapai and Havasupai of northwestern Arizona.

Euro-American incursion into the area occurred after 1846 as a result of the Mexican-American War and its aftermath, with incursions of the military, explorers, surveyors, immigrants, and finally settlers. The war ended in 1848 with the signing of the Treaty of Guadalupe Hidalgo. The American era (A.D. 1853–1950) began with the Gadsden Purchase of 1853, when modern-day southern Arizona became part of the United States. The late 1800s saw an influx of settlement into the Salt River Valley, encouraged by a series of national public land laws, such as the National Homestead Act (1862), Timber Culture Act (1873), Desert Land Act (1877), and Enlarged Homestead Act (1909). The majority of homesteads filed in Arizona during this period were along the Salt River (Stein 1990). By the 1870s, many settlers in the area were extensively

cultivating land (Arizona Board of Regents 1989). President Roosevelt signed the Reclamation Act of 1902, creating the first national effort to build large-scale irrigation projects in the western United States. Two dams along the Salt River (Granite Reef and Roosevelt) and an extensive canal network in the Phoenix Basin became our nation's flagship reclamation project. The irrigation and electricity provided by this, the Salt River Project, was instrumental in the development of Phoenix during the twentieth century (Zarbin 1986, 1997).

RESEARCH METHODS AND RESULTS

A Class I inventory, consisting of a literature review and site records search, was undertaken to assess the status of previous surveys and to identify known cultural resources and archaeological sites within the Reata Wash Study Area and a surrounding one-mile radius. Records from the Arizona State Historic Preservation Office (SHPO) and the Arizona State Museum (ASM) were accessed using AZSITE, the state's electronic inventory of cultural resources. The Scottsdale Historic Register and National Register Information System (NRIS) were accessed to collect information on historic buildings and structures and National Register of Historic Places (NRHP) listed properties potentially located within the Reata Wash Study Area and one-mile Reata Wash Study Area buffer. Additionally, available Bureau of Land Management (BLM) General Land Office (GLO) maps were accessed electronically to identify features documented historically.

PREVIOUS CLASS III CULTURAL RESOURCES SURVEYS

The results of the records search indicate that 191 projects have been previously conducted within the Reata Wash Study Area and Reata Wash Study Area buffer (Table 2; see Figures 5–7). Most of these were surveys completed for various residential and business developments and infrastructure projects including private development, cellular towers, rights-of-way, road construction, and electric utility structures.

Table 2. Previous research in the study area and buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
1964-4.ASM	Ayres (1965)	5	1986-46.ASM	Myers (1986)	6, 7
1972-5.ASM	Kemrer et al. (1972)	7	1988-109.ASM	Ritz (1988)	7
1978-64.ASM	Brown (1978)	6, 7	1988-192.ASM	Curtis and Stone (1988)	6
1981-156.ASM	Green (1981)	7	1989-45.ASM	Macnider (1989)	6, 7
1982-36.ASM	Lange (1982)	7	1989-96.ASM	Stone (1989)	6, 7
1982-195.ASM	Foster (1982)	7	1989-208.ASM	Breternitz (1989)	5, 6
1983-130.ASM	Madsen (1983)	6	1990-94.ASM	Damron (1990)	5
1985-11.ASM	ASM (1985a)	6, 7	1990-125.ASM	Stone (1990)	6, 7
1985-30.ASM	ASM (1985b)	6	1991-129.ASM	Hackbarth (1991)	6
1985-50.ASM	Rozen (1985)	5	1993-110.ASM/ SHPO-2000-2428	Woodall (1993)	6, 7

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
1994-23.ASM	Roth (1994)	7	2000-405.ASM	Aguila (2000b)	7
1994-51.ASM/ 7.3360.SHPO	Douglas (1994)	7	2000-427.ASM	Webb (2000)	6
1994-64.ASM	Schroeder (1994)	5	2000-394.ASM	DeMaagd (2000)	6, 7
1994-91.ASM	Gifford (1994a)	6, 7	2000-444.ASM	Schroeder (2000)	7
1994-230.ASM	Gifford (1994b)	6, 7	2000-507.ASM	Lindly (2000a)	6, 7
1994-437.ASM	Foster and Werner (1994)	5, 6	2000-514.ASM	Lindly (2000b)	5
1994-442.ASM	Foster (1995)	7	2000-523.ASM	Ryden and Lindly (2000)	7
1995-18.ASM/ 7.3305.SHPO	Gifford (1995)	7	2000-559.ASM	Stephen (2001)	7
1995-239.ASM/ 7.3379.SHPO	Kramer (1995)	7	2000-729.ASM	Larkin (2000)	7
1995-259.ASM	Owens (1995a)	5	2001-23.ASM	Boloyan (2001)	7
1995-297.ASM	Owens (1995b)	6, 7	2001-59.ASM	Webb (2001b)	6, 7
1996-214.ASM	DeMaagd (1996)	6	2001-61.ASM	Winter and Rogge (2001)	7
1996-348.ASM	Lincoln (1996)	7	2001-76.ASM	Lonardo (2001a)	7
1997-30.ASM	Greenaker (1997)	7	2001-77.ASM	Lonardo (2001b)	7
1997-55.ASM	Schroeder (1997)	5	2001-116.ASM	Marshall (2001a)	7
1998-109.ASM	Adams (1998)	7	2001-122.ASM	Hackbarth (2001a)	7
1998-223.ASM	Stubing (1998a)	6	2001-123.ASM	Marshall (2001b)	7
1998-225.ASM	Stubing (1998b)	7	2001-160.ASM	Frison (2001)	7
1999-64.ASM	Wenker (1999a)	5	2001-175.ASM	Lundin (2001a)	5
1999-66.ASM	Wenker (1999b)	5	2001-280.ASM	Foster and Mitchell (2001)	7
1999-128.ASM	Moreno (1999)	6	2001-303.ASM	Hackbarth (2001b)	7
1999-259.ASM	Montero (1999)	7	2001-330.ASM	Webb (2001a)	7
1999-305.ASM	Aguila (1999)	6	2001-337.ASM	Lundin (2001b)	7
1999-368.ASM	Schaafsma (1999)	7	2001-442.ASM	Hart (2001)	7
1999-381.ASM	Hurlbut (1999)	6	2001-480.ASM/ SHPO-2001-2210	Slawson (2001a)	6
2000-85.ASM	Schmidt (2000a)	7	2001-599.ASM	Lundin (2001c)	5
2000-86.ASM	Schmidt (2000b)	7	2001-640.ASM	Foster (2001)	7
2000-93.ASM	Courtright (2000a)	7	2001-687.ASM	Lundin (2001d)	5, 6
2000-122.ASM	Walsh (2000)	5	2001-691.ASM	Schmidt (2001)	7
2000-145.ASM	Courtright (2000b)	5	2001-707.ASM	Lundin (2001e)	7
2000-205.ASM	Aguila (2000a)	6, 7	2001-730.ASM	Webb (2001c)	7
2000-235.ASM	Courtright (2000c)	7	2001-732.ASM/ SHPO-2002-947	Webb (2001d)	7

2000-260.ASM	Kober (2000)	7	2002-26.ASM	Kober (2002)	7
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Continued

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
2002-140.ASM	Coriell (2002)	7	2005-84.ASM	Mitchell and Schmidt (2004c)	7
2002-221.ASM	Hart (2002)	7	2005-262.ASM	Shaw (2002b)	7
2002-297.ASM	Robinson and Copeland (2002)	6	2005-263.ASM	Shaw (2002c)	7
2003-233.ASM	Lundin (2003)	7	2005-270.ASM	Gage (2004)	7
2003-587.ASM	Rapp (2003)	5	2005-261.ASM	Shaw (2002a)	6, 7
2003-695.ASM	Davis and Hohmann (2001)	7	2005-425.ASM	Bellavia et al. (2005)	6, 7
2003-777.ASM	Davis (2000)	7	2005-427.ASM	Bellavia and Mitchell (2005a)	7
2003-918.ASM	Hathaway (2000)	7	2005-476.ASM	Marshall (2004)	7
2003-996.ASM	Hackbarth (2003)	6	2005-746.ASM	Shaw (2002d)	7
2003-1012.ASM	Mitchell (2002)	6, 7	2005-876.ASM	Rainey (2005a)	7
2003-1098.ASM	Lonardo (2002)	7	2005-936.ASM	Marshall (2005)	7
2003-1127.ASM	Breen (2002)	7	2005-1078.ASM	Rainey (2005b)	5
2003-1134.ASM	Rapp (2002)	6, 7	2006-26.ASM	Lonardo (2006a)	7
2003-1388.ASM	Cogswell (2003)	7	2006-159.ASM	Lonardo (2006b)	7
2003-1570.ASM	Santos and Walsh (2003)	6, 7	2006-213.ASM	Stahman (2005)	7
2004-173.ASM	Hohmann and Davis (2003)	5	2006-262.ASM	Rowe (2006)	6
2004-288.ASM	Schmidt et al. (2004)	7	2006-459.ASM	Mitchell and Caldwell (2006)	7
2004-289.ASM	Schmidt and Mitchell (2004b)	7	2006-493.ASM	Wilcox (2006)	6
2004-456.ASM	Hackbarth (2004a)	7	2006-802.ASM	Bellavia and Mitchell (2005b)	5
2004-459.ASM	Hackbarth (2004b)	7	2006-835.ASM	Bellavia and Mitchell (2005c)	7
2004-485.ASM	Alter and Dobschuetz (2004)	6	2006-944.ASM	Rapp (2007)	5
2004-528.ASM	Erickson and Rogge (2004)	7	2007-399.ASM	Peters (2007)	7
2004-634.ASM	North, Ryden, and Schmidt (2004)	6, 7	2007-536.ASM	Archual (2007)	7
2004-644.ASM	North, Schmidt, and Ryden (2004)	7	2008-55.ASM	Luhnnow (2008)	6, 7
2004-671.ASM	Lausten (2004a)	6	2008-291.ASM	Darby (2008)	6, 7
2004-735.ASM	Lausten (2004b)	7	2008-523.ASM	Tremblay (2007)	7
2004-757.ASM	Ruble (2004)	6	2008-524.ASM	Bellavia and Mitchell (2007a)	6, 7
2004-785.ASM	Mitchell and Schmidt (2004a)	7	2009-478.ASM	Rayle and Fangmeier (2009a, 2009b, 2009c, 2009d, 2009e, 2009f, 2009g, 2009h)	7
2004-786.ASM	Mitchell and Schmidt (2004b)	7	2009-549.ASM	Bellavia and Mitchell (2007b)	7
2004-1719.ASM	Cogswell (2004)	7	2009-795.ASM	Luchetta and Moses (2009a)	5
2004-1794.ASM	Schmidt and Mitchell (2004a)	5	2009-796.ASM	Luchetta and Moses (2009b)	5
2004-1877.ASM	Baker (2002)	6	2009-797.ASM	Luchetta and Moses (2009c)	5

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
2009-800.ASM	Luchetta and Moses (2009e)	5	2014-80.ASM	Walsh (2014)	7
2009-809.ASM	Luchetta and Moses (2009f)	5	7.230.SHPO	Opfenring (1965)	5
2009-811.ASM	Luchetta and Moses (2009g)	5	7.3001.SHPO	Unknown	3
2009-812.ASM	Luchetta and Moses (2009h)	5	7.3006.SHPO	Unknown	2, 3
2009-837.ASM	Luchetta and Moses (2009i)	5	7.3047.SHPO	Unknown	3
2010-80.ASM	Luchetta and Moses (2010a)	6	7.3439.SHPO	Unknown	3
2010-81.ASM	Luchetta and Moses (2010b)	6	7.3007.SHPO	Unknown	6, 7
2010-82.ASM	Luchetta and Moses (2010c)	5	7.3322.SHPO	Unknown	6, 7
2010-323.ASM	Luchetta and Moses (2010d)	5	7.3121.SHPO	Recon (1993)	7
2010-358.ASM	Luchetta and Moses (2010e)	5	SHPO-2001-1736/ SHPO-2001-2291/ SHPO-2001-2545	Ryden and Mitchell (2001)	6, 7
2010-359.ASM	Luchetta and Moses (2010f)	6, 7	SHPO-2001-3166	Slawson (2001b)	5
2010-378.ASM	Luchetta and Moses (2010g)	6	SHPO-2000-3191	Barnes (2000)	7
2010-428.ASM	Luchetta and Moses (2010h)	6	SHPO-2001-3269	Slawson (2001c)	6
2011-8.ASM	Stubing (2011)	5	SHPO-2002-36	Howard (2001)	7
2011-237.ASM	Stone (2011)	6	11-08.BLM	Unknown	7
2011-287.ASM	Luchetta and Moses (2011)	6	11-42-16B.BLM	Unknown	6
2011-631.ASM	Breternitz (2000)	7	Northland's Task 22	Unknown	6, 7
2011-652.ASM	Condrey and Breternitz (2003)	6, 7	Mesoamerican Mining Project/ Rainbow Bridge-Monument Valley Expedition	Unknown	6, 7
2012-30.ASM	Breternitz (2006)	7	SSI-96-6	Hansen (1996)	7
2014-26.ASM	Luchetta and Moses (2014)	7			

As these data from Table 2 (and Figures 5–6) illustrate, 10,895 acres (or approximately 78 percent) of the Reata Wash Study Area buffer has been previously surveyed. 4,146 acres (or approximately 71 percent) of the Reata Wash Study Area has been previously surveyed. Most survey work accomplished within the Reata Wash Study Area occurred within the southern and central portions. The northern portion of the Reata Wash Study Area buffer (south of Jomax Road and east of North Pima Road) has had less extensive investigations. However, this area has also largely been developed into private residences. The small portions that remain undeveloped have been previously surveyed (for example, see Foster and Werner 1994; Rapp 2003; Rozen 1985; and Schroeder 1994); however, SHPO Guidance Point No. 5 (April 2004) suggests that surveys conducted more than 10 years previously may not meet current professional standards, resulting in the need for new survey.

GLO MAPS

The data compiled from the GLO maps are presented in Table 3 (see Figures 8–10) for the Reata Wash Study Area and Reata Wash Study Area buffer. The earliest of the historic surveys was recorded in 1916. Almost all of the early-recorded historic features were identified as roads. One of several roads depicted on GLO plat 00175 is named the “Road to Frazier Spring”. A small segment of this road was identified during survey and recorded as site AZ U:5:274(ASM) by EcoPlan Associates, Inc., in 2002. This site was recommended not eligible for listing to the NRHP (Baker 2002). One canal was also identified, the Rio Verde Canal. This canal was once considered the “largest storage irrigation enterprise in the United States” and was built in 1891 by the Rio Verde Canal Company in order to provide irrigation to desert land in north Scottsdale and Paradise Valley (San Francisco Chronicle [SFC], 23 April, 1893). This canal has previously been recorded as site AZ T:8:65(ASM) and has been determined ineligible for listing to the NRHP by the Arizona SHPO.

Table 3. Historic GLO maps and identified features within the Reata Wash Study Area and Reata Wash Study Area buffer.

Plat	Date Filed	Township	Range	Section	Features
00134	9-5-1916	T3N	R4E	1, 2	Rio Verde Canal
00142	9-18-1916	T3N	R5E	5, 6	Rio Verde Canal and 7 unnamed roads
00175	9-18-1916	T4N	R4E	24, 25, 26, 35, 36	3 unnamed roads, the Road to Frazier Spring, and the Rio Verde Canal
00177	2-26-1921	T4N	R5E	8, 17–19, 29–32	The Road to Frazier Spring, and 3 unnamed roads

PREVIOUS CLASS III CULTURAL RESOURCES SITES

Logan Simpson's research indicates that 42 sites—11 historic, 24 prehistoric, and 7 of unknown age and affiliation—have been recorded within the combined Reata Wash Study Area and one-mile buffer. Of these sites, 17 are located within the Reata Wash Study Area (Table 4; see Appendices Figures A.1–A.3). Historic-era cultural resources include the Rio Verde Canal, a habitation site, a possible mining claim, a possible campsite associated with construction of the Rio Verde Canal, the Road to Frazier Spring depicted on the 1916 GLO plat 00175, and various small artifact scatters, some with associated features. The canal and other historic-era resources attest to the Euro-American occupation and development of the region, primarily from the latter half of the nineteenth century to the mid-twentieth century. Of the prehistoric sites, most are affiliated with the Hohokam culture (A.D. 1–1450), although several have Archaic expressions. These sites include artifact scatters, temporary and permanent habitation sites, domestic and agriculture features, and petroglyphs.

In summary, approximately 78 percent of the Reata Wash Study Area buffer has been previously surveyed. Approximately 71 percent of the Reata Wash Study Area has been surveyed. Forty-two sites were previously recorded within the Reata Wash Study Area buffer; seventeen of these sites are located within the Reata Wash Study Area.

Table 4. Previously recorded sites in the study area buffer for the Reata Wash Flood Control Improvement Study.

Site number	Figure¹	Site type²	Affiliation/Age	NRHP eligibility	Location relative to the Reata Wash Study Area
AZ T:8:65(ASM)/ Rio Verde Canal	A.2, A.3	H-canal	Euro-American; A.D. 1894–1902	Determined not eligible	Inside, outside
AZ U:5:8(REC)	A.3	Unknown	Unknown	Unknown	Inside
AZ U:5:11(ASM)	A.1	P-feature	Prehistoric	Not evaluated	Inside, outside
AZ U:5:13(ASM)	A.3	P-artifact scatter	Hohokam	Not evaluated	Outside
AZ U:5:14(ASM)	A.3	H-feature	Historic; A.D. 1850–1950	Not evaluated	Inside
AZ U:5:28(ASM)	A.3	P-artifact scatter	Hohokam	Not evaluated	Inside
AZ U:5:30(ASM)	A.2, A.3	P-artifact scatter with feature	Hohokam; A.D. 900–1100	Determined not eligible	Outside
AZ U:5:37(ASM)	A.2	P-artifact scatter with feature	Prehistoric 8000 B.C.–A.D. 1500	Determined eligible (Criterion unknown)	Inside
AZ U:5:64(ASU)	A.3	Unknown	Unknown	Not evaluated	Outside
AZ U:5:69(ASU)	A.3	P-artifact scatter	Hohokam	Recommended eligible (Criterion unknown)	Inside, outside
AZ U:5:80(ASU)	A.1	P-petroglyphs	Prehistoric; 8000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:99(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Determined not eligible	Outside
AZ U:5:100(ASM)	A.3	U-feature	Unknown	Determined not eligible	Outside
AZ U:5:101(ASM)	A.3	U-feature	Unknown	Determined not eligible	Outside
AZ U:5:102(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Not evaluated	Outside
AZ U:5:141(ASM)	A.1	H-feature and artifact scatter	Historic; A.D. 1500–1950	Recommended not eligible	Outside
AZ U:5:142(ASM)	A.1	H-feature	Historic; A.D. 1500–1950	Determined not eligible	Outside
AZ U:5:149(ASM)	A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criteria C, D)	Outside
AZ U:5:150(ASM)	A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:151(ASM)	A.2	P-artifact scatter	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:152(ASM)	A.1, A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:153(ASM)	A.2	P-artifact scatter	Hohokam	Not evaluated	Inside
AZ U:5:154(ASM)	A.3	P-feature	Hohokam	Not evaluated	Outside
AZ U:5:156(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 800–1300	Recommended eligible (Criterion unknown)	Inside

Table 4. Previously recorded sites in the study area buffer for the Reata Wash Flood Control Improvement Study.

Site number	Figure¹	Site type²	Affiliation/Age	NRHP eligibility	Location relative to the Reata Wash Study Area
<i>Continued</i>					
AZ U:5:157(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 800–1000	Not evaluated	Inside
AZ U:5:158(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 1100–1400	Not evaluated	Outside
AZ U:5:159(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:160(ASM)	A.2	P-habitation	Prehistoric; 8000 B.C.–A.D. 1500	Not evaluated	Outside
AZ U:5:161(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:162(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1300	Recommended eligible (Criterion unknown)	Outside
AZ U:5:163(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Not evaluated	Outside
AZ U:5:224(ASM)	A.3	H-artifact scatter with feature	Historic; A.D. 1500–1950	Not evaluated	Outside
AZ U:5:239(ASM)/ Herberger Site/ Pinnacle Peak Village	A.1	P-habitation	Hohokam; A.D. 450–1100	Not evaluated	Outside
AZ U:5:245(ASM)	A.3	P-artifact scatter	Hohokam; A.D. 1000–1300	Recommended not eligible	Inside
AZ U:5:266(ASM)	A.3	P-artifact scatter	Prehistoric; 12000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:273(ASM)	A.3	H-habitation	Historic; A.D. 1500–1950	Recommended not eligible	Inside
AZ U:5:274(ASM)	A.2	H-road	Historic; A.D. 1500–1950	Recommended not eligible	Inside, outside
AZ U:5:275(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Recommended not eligible	Inside
AZ U:5:278(ASM)	A.1	H-artifact scatter	Historic; A.D. 1500–1950	Recommended eligible (Criterion D)	Outside
AZ U:5:352(ASM)	A.1	Unknown	Unknown	Unknown	Outside
#4 ARS	A.2	Unknown	Unknown	Unknown	Outside
IHCRS90-10	A.3	Unknown	Unknown	Unknown	Outside

¹ Map figures can be found within the appendices of the report. ² P = Prehistoric; H = Historic; U = Unknown

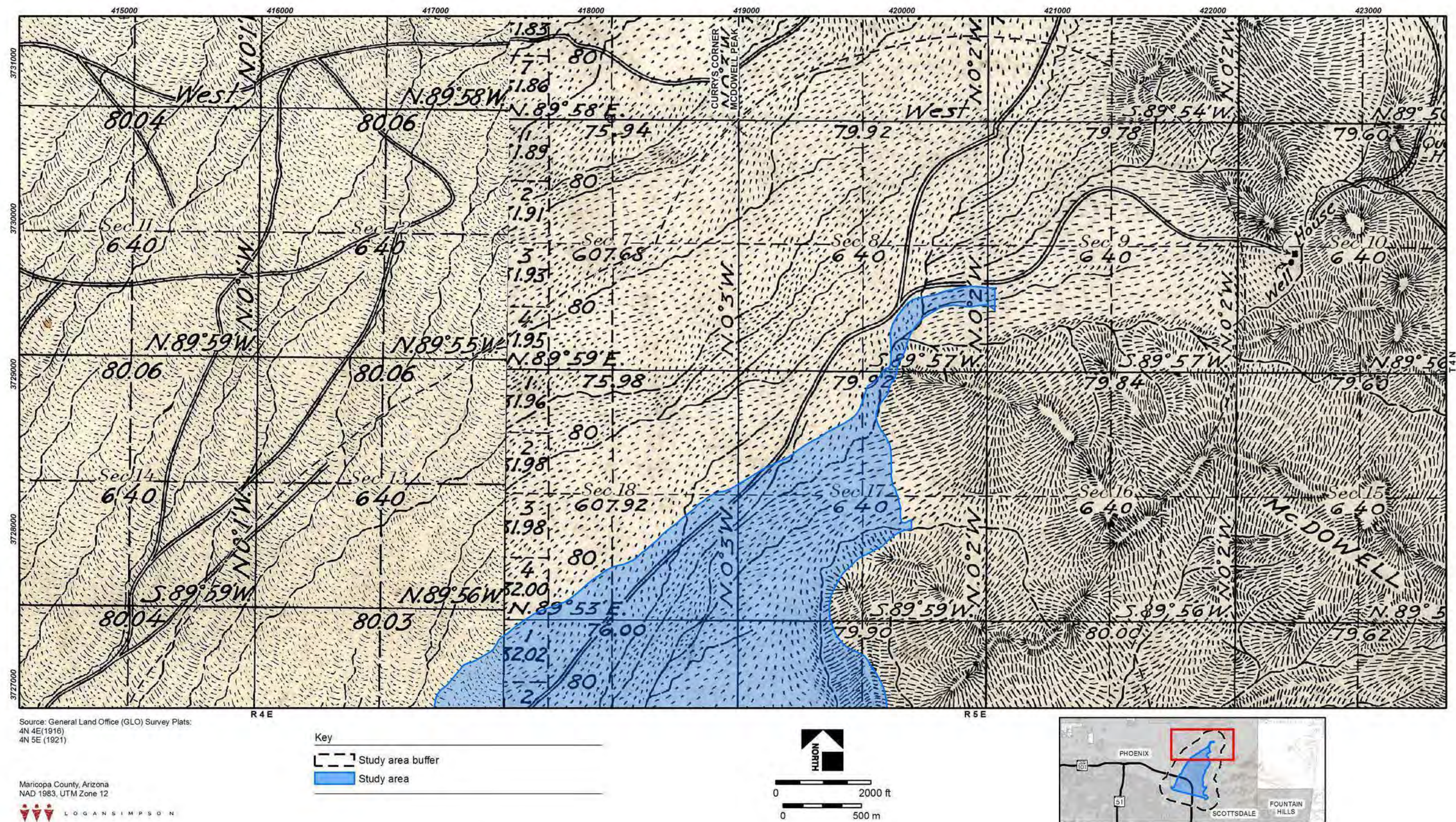


Figure 8. General Land Office features in the Reata Wash Study Area buffer limits.

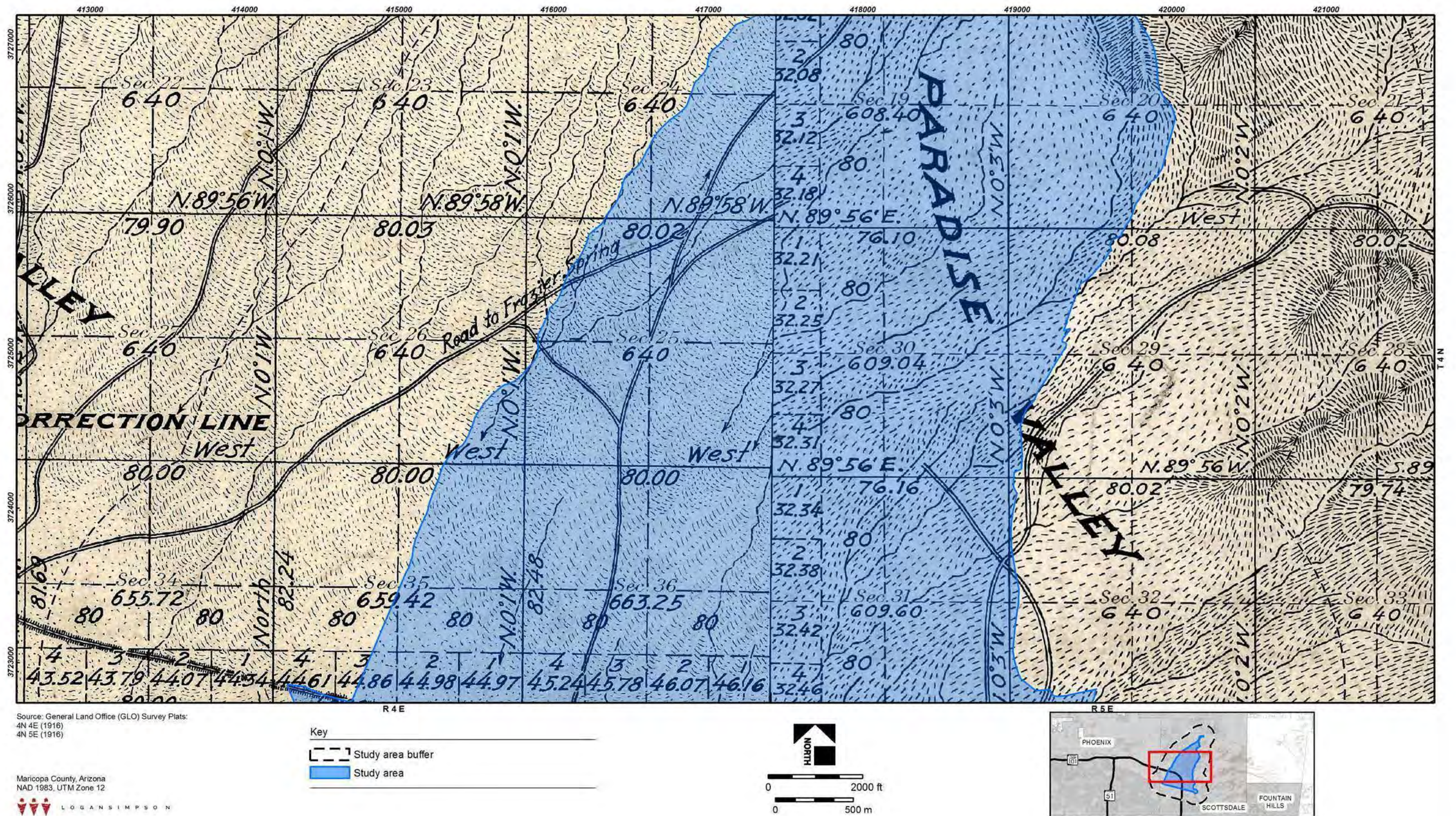


Figure 9. General Land Office features in the Reata Wash Study Area buffer limits.

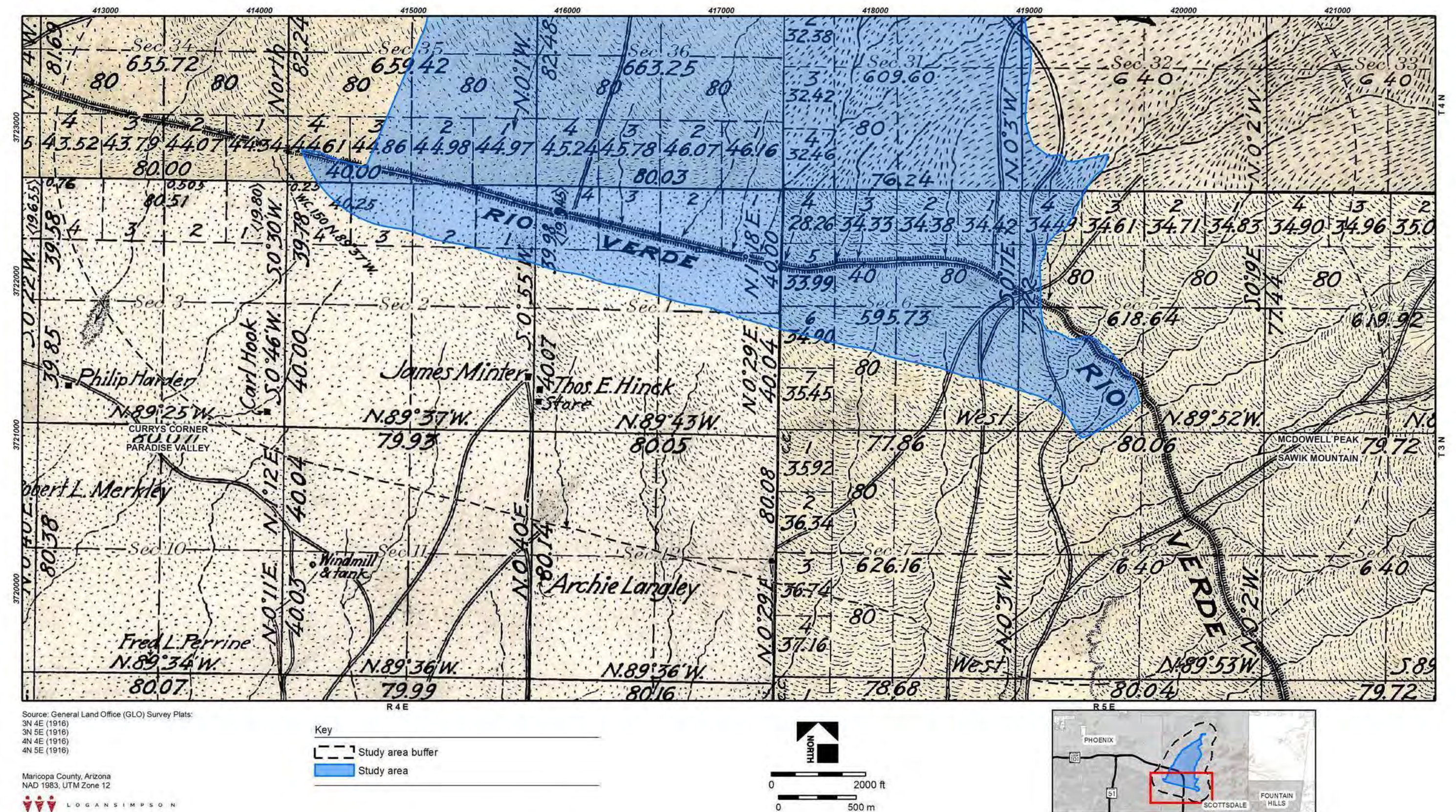


Figure 10. General Land Office features in the Reata Wash Study Area and Reata Wash Study Area buffer limits.

NATIONAL REGISTER OF HISTORIC PLACES AND SCOTTSDALE HISTORIC REGISTER-LISTED RESOURCES

The National Park Service's NRHP is the official list of historic places worthy of preservation, authorized by the National Historic Preservation Act of 1966. Historic properties determined eligible for inclusion in the NRHP must be at least 50 years old and possess integrity of location, design, setting, materials, workmanship, and association; and meet one of the following criteria:

- Association with events that have made a significant contribution to the broad patterns of our history (Criterion A); or
- Association with the lives of people of past significance (Criterion B); or
- Embodiment of the distinctive characteristics of a type, period or method of construction, or represent the work of a master or possess high artistic value (Criterion C), or;
- Has yielded or has the potential to yield information important to the prehistory or history of the area (Criterion D).

Five sites (all prehistoric) recorded in the Reata Wash Study Area and one-mile buffer have been determined eligible for inclusion in the NRHP. The prehistoric sites consist mainly of artifact scatters with associated features (AZ U:5:37[ASM], AZ U:5:149[ASM], AZ U:5:150[ASM], and AZ U:5:152[ASM]). One of the prehistoric sites is an artifact scatter (AZ U:5:151[ASM]).

Of these sites determined eligible for the NRHP by SHPO, four are located within the Reata Wash Study Area (AZ U:5:37[ASM], AZ U:5:150[ASM], AZ U:5:151[ASM] and AZ U:5:152[ASM]). AZ U:5:37(ASM) was recorded by Archaeological Research Services in 1990 and is a likely Hohokam site of unknown temporal affiliation consisting of two small concentrations of angular granite and basalt rocks spaced 75-ft apart. One concentration is 3.5 ft in diameter and contains 18-20 2- to 3-in-diameter rocks and a broken one-handed granite mano. The second concentration is approximately 6 ft in diameter and consists of 50-75 2- to 6-in-diameter rocks. These rock concentrations have been interpreted as the remains of prehistoric roasting pits. No ceramics were observed during site recording (Stone 1990).

AZ U:5:150(ASM), AZ U:5:151(ASM) and AZ U:5:152(ASM) were recorded by Soil Systems, Inc. in 1994, during the DC Ranch Survey. AZ U:5:150(ASM) is a likely Hohokam site of unknown temporal period composed of several possible rooms and two small sherd clusters. The best preserved structure is composed of a roughly circular room, 6 m in diameter, constructed of a cobble and boulder wall and cleared interior. It contains a circular central hearth or storage feature without charcoal. An amorphous aggregation of cobbles and boulders (3 m. in diameter), possibly representing a second room, abuts the first structure to the north. A possible third structure may be located to the east of the first structure. No artifacts were observed within the structures, but a pecked basalt ground stone fragment was identified to the southwest of the structure. The small sherd clusters were observed 75 m to the southwest and 30 m to the northeast of the structures. These clusters consisted of quartzite-tempered plainwares, likely from isolated pot breaks (Foster and Werner 1994).

AZ U:5:151(ASM) consists of a dispersed low density lithic and sherd scatter with no surficial features. Lithics consist of three vesicular basalt metate fragments and chert flakes. Ceramics observed included of Salado White-on-red, Gila polychrome and quartzite-tempered, mica schist-tempered and phyllite-tempered plainwares (Foster and Werner 1994). The presence of Salado White-on-red indicates association with the Salado Culture centered on the Tonto Basin of central Arizona, and was most abundant during the Classic period (A.D. 1270–1450) (Simon et al. 1998).

AZ U:5:152(ASM) is a likely Hohokam site of unknown temporal period consisting of a small “L”-shaped alignment of cobbles that may form part of a room or foundation. Artifacts found in association with this feature included 10 prehistoric phyllite-tempered plainware sherds, and 3 mica schist- and quartz-tempered plainware sherds (Foster and Werner 1994).

The NRHP-eligibility status of the remaining sites within the Reata Wash Study Area buffer identified during this research are as follows: 6 sites were determined not eligible for inclusion in the NRHP, 8 sites were recommended eligible, 5 sites were recommended not eligible, and 18 sites were unevaluated.

The Scottsdale Historic Register was established in 1999 by the Scottsdale Historic Preservation Ordinance No. 3242. For a property or district to be eligible for listing, the resource must be linked to a time and a place, to historical events, and/or to the accomplishments of prominent people. No historic resources are listed within the Scottsdale Historic Register or the NRHP within the Reata Wash Study Area or Reata Wash Study Area buffer.

SUMMARY AND RECOMMENDATIONS

The City of Scottsdale Reata Wash Study is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. Considerations include the methods and coverage or extent of past surveys, and the number of identified cultural resources that have been recommended or determined eligible for inclusion in the NRHP. The Reata Wash Study Area and buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east.

Logan Simpson's research identified 191 previously conducted projects in the Reata Wash Study Area and one-mile buffer. Background research results indicate that approximately 78 percent of the cultural resources Reata Wash Study Area and Reata Wash Study Area buffer has been surveyed. Approximately 71 percent of the Reata Wash Study Area has been previously surveyed. Overall, 42 cultural resources sites have been recorded in the Reata Wash Study Area and the buffer, including 17 within the Reata Wash Study Area. Of the 42 cultural resources sites, 5 sites within the Reata Wash Study Area and Reata Wash Study Area buffer have been determined eligible for inclusion in the NRHP. Four of these sites

determined eligible for the NRHP are located within the Reata Wash Study Area. Seven of the 17 sites within the Reata Wash Study Area were recorded before April 1994 and should be reevaluated for their NRHP-eligibility because they were recorded under an outdated site definition, per SHPO Guidance Point No. 5 (April 2004). Ten sites have been recorded using the current site definition. These sites should be revisited to document their current condition.

SHPO Guidance Point No. 5 (April 2004) suggests that surveys conducted more than 10 years previously may not meet current professional standards, resulting in the need for new survey. Based on this, Logan Simpson recommends that new survey be conducted in areas of the Reata Wash Study Area in which previous surveys do not meet current standards (approximately 700 acres) (Table 5; see also Figures 11 & 12). Pedestrian survey should also be conducted for unsurveyed portions of the Reata Wash Study Area (approximately 1700 acres).

Upon the completion of a Class III survey and site relocation and recordation, recommendations should be made for the treatment, preservation, or avoidance of sites, as appropriate. Based on current research, it is known that four sites within the Reata Wash Study Area have been determined NRHP-eligible by SHPO. If federal funds are involved and it is subsequently determined that one or more NRHP-eligible cultural resources cannot be avoided by project activities, a Memorandum of Agreement or Programmatic Agreement should be developed to resolve the adverse effect of the project to historic properties.

Table 5. Survey Recommendation Summary for the Reata Wash Flood Control Improvement Study.

Township	Range	Section	Acres Surveyed	Acres Unsurveyed	Total Acres	Acres needing survey/ resurvey	Figure	Recommendation
3N	4E	1	51.39	228.43	279.82	226.37	12	All portions of the PA within T3N, R4E, Sec. 1 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3305.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.
3N	4E	2	4.08	110.31	114.39	109.93	12	All portions of the PA within T3N, R4E, Sec. 2 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3322.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.
3N	5E	5	70.68	64.29	134.97	64.02	12	All portions of the PA within T3N, R5E, Sec. 5 not surveyed should be surveyed. Area surveyed by 7.3121.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as this project does not meet current ASM guidelines.
3N	5E	6	251.19	168.17	419.36	164.07	12	All portions of the PA within T3N, R5E, Sec. 6 not surveyed should be surveyed. Area surveyed by Northland's Task 22 (excluding areas surveyed by any other projects) should be re-surveyed as this project does not meet current ASM guidelines.
3N	5E	8	0.49	0.58	1.07	0.58	12	All portions of the PA within T3N, R5E, Sec. 8 not surveyed should be surveyed using current ASM guidelines.
4N	4E	24	216.80	0.00	216.80	199.54	11	All portions of the PA within T4N, R4E, Sec. 24 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	25	581.76	0.00	581.76	473.83	11, 12	Portions of the PA within T4N, R4E, Sec. 25 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	26	42.62	0.00	42.62	19.88	11, 12	All portions of the PA within T4N, R4E, Sec. 26 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	35	156.01	193.53	349.54	202.83	12	All portions of the PA within T4N, R4E, Sec. 35 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3007.SHPO, 7.3322.SHPO and the Mesoamerican Mining Project (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.

continued

Table 5. Survey Recommendation Summary for the Reata Wash Flood Control Improvement Study.

Township	Range	Section	Acres Surveyed	Acres Unsurveyed	Total Acres	Acres needing survey/ resurvey	Figure	Recommendation
4N	4E	36	663.14	0.00	663.14	43.42	12	Portions of the PA within T4N, R4E, Sec. 36 previously surveyed by project 1982-36.ASM, 1989-208.ASM and Northland's Task 22(excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	5E	8	2.02	23.79	25.81	25.81	11	All portions of the PA within T4N, R5E, Sec. 8 not surveyed should be surveyed. Area surveyed by project 1964-4.ASM should be re-surveyed as this project does not meet current ASM guidelines.
4N	5E	17	20.12	224.79	244.91	224.79	11	All portions of the PA within T4N, R5E, Sec. 17 not surveyed should be surveyed using current ASM guidelines.
4N	5E	18	7.48	141.78	149.27	149.20	11	All portions of the PA within T4N, R5E, Sec. 18 not surveyed should be surveyed. Area surveyed by project 1985-50.ASM should be re-surveyed as this project does not meet current ASM guidelines.
4N	5E	19	605.14	1.27	606.40	1.25	11	No further survey required.
4N	5E	20	351.11	0.00	351.11	0.00	11	No further survey required.
4N	5E	29	121.12	2.43	123.55	2.45	11, 12	All portions of the PA within T4N, R5E, Sec. 29 not surveyed should be surveyed using current ASM guidelines.
4N	5E	30	54.72	553.99	608.71	554.05	11, 12	All portions of the PA within T4N, R5E, Sec.30 not surveyed should be surveyed using current ASM guidelines.
4N	5E	31	604.19	5.33	609.52	3.05	12	All portions of the PA within T4N, R5E, Sec. 31 not surveyed should be surveyed using current ASM guidelines.
4N	5E	32	42.59	0.18	42.76	0.49	12	All portions of the PA within T4N, R5E, Sec. 32 not surveyed should be surveyed using current ASM guidelines.

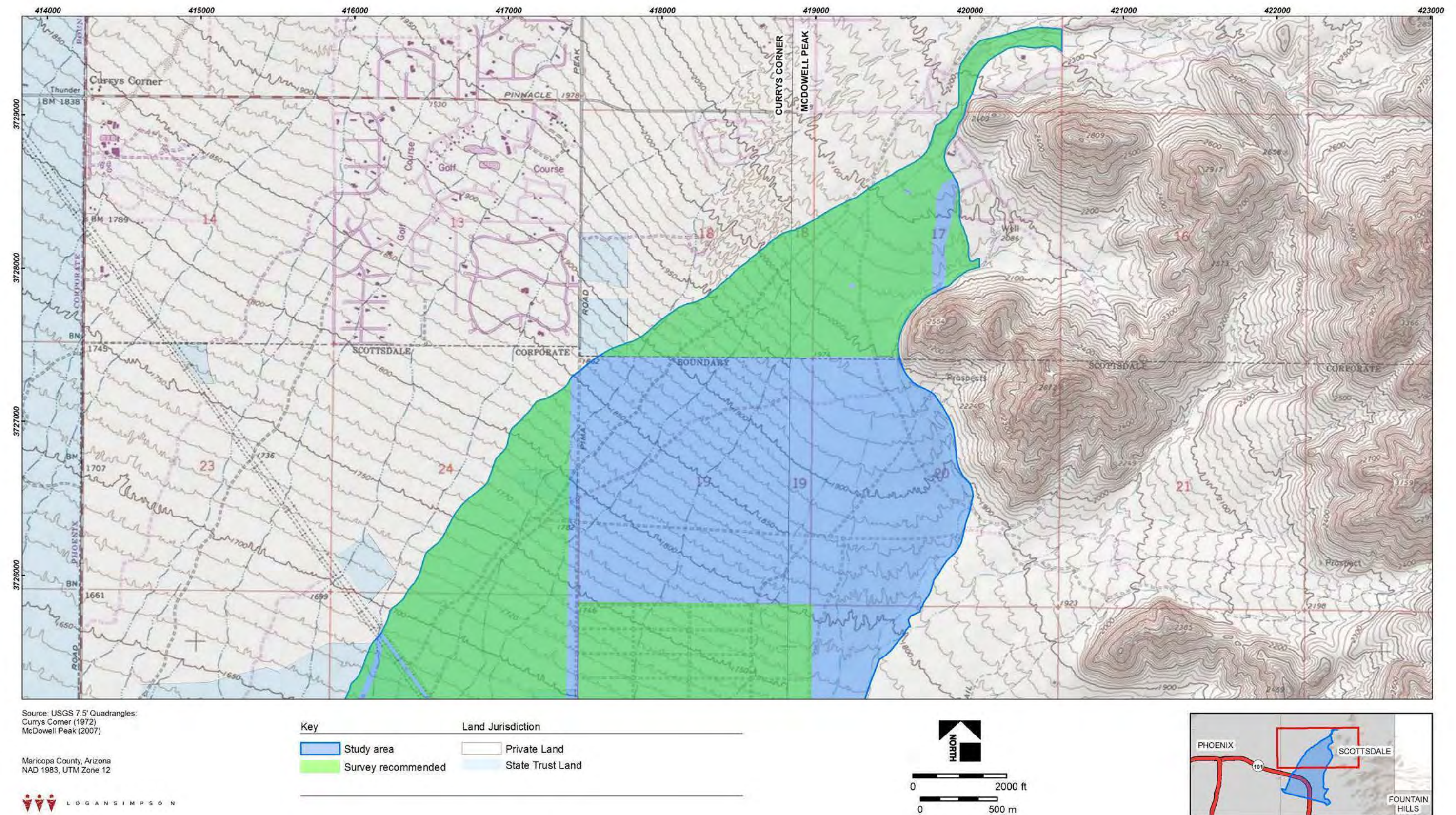


Figure 11. Areas within the Reata Wash Study Area recommended for new survey.

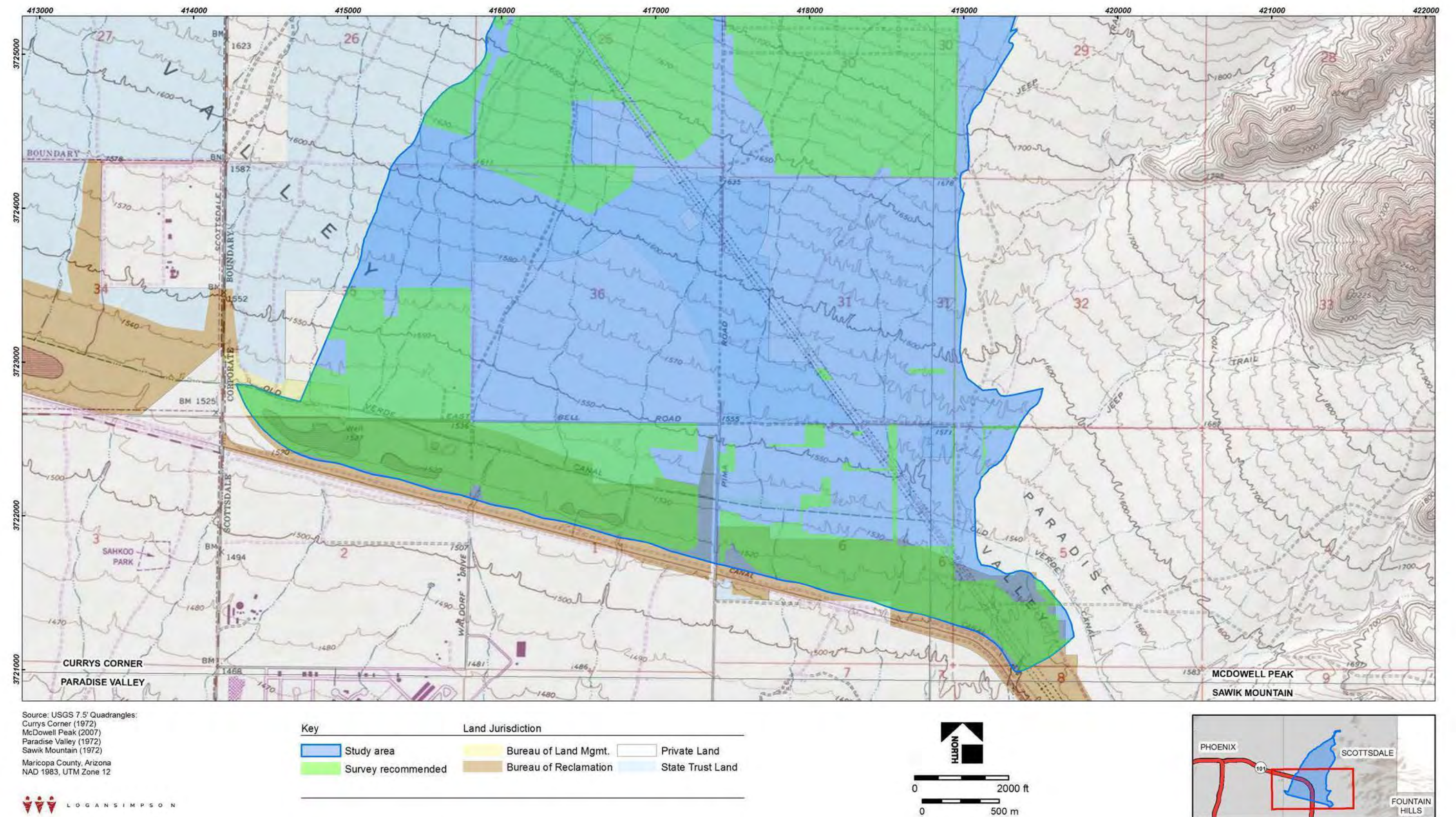


Figure 12. Areas within the Reata Wash Study Area recommended for new survey.

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Appendices

Confidential Information

Appendix A. Previous Research Maps

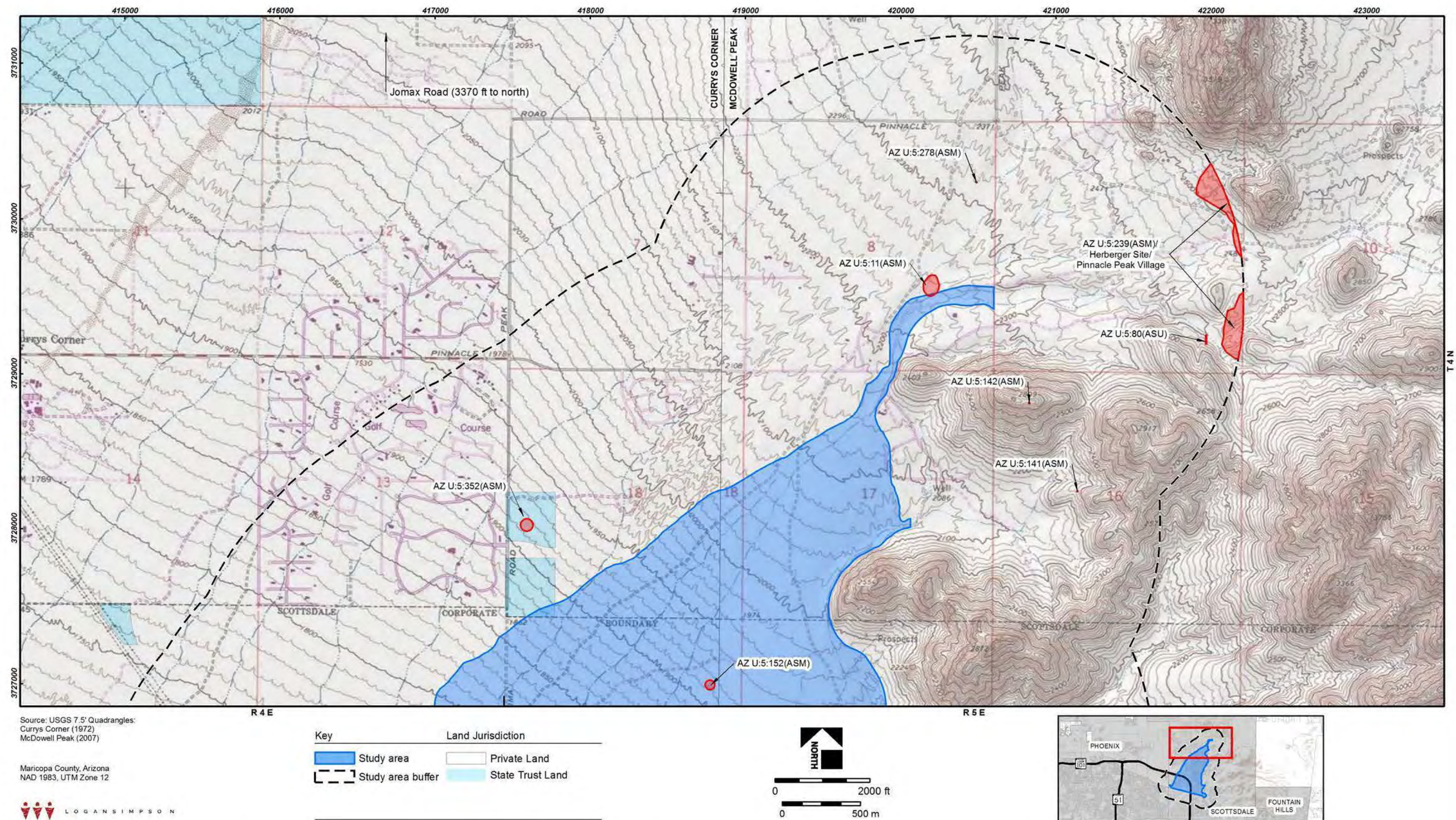


Figure A. 1. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

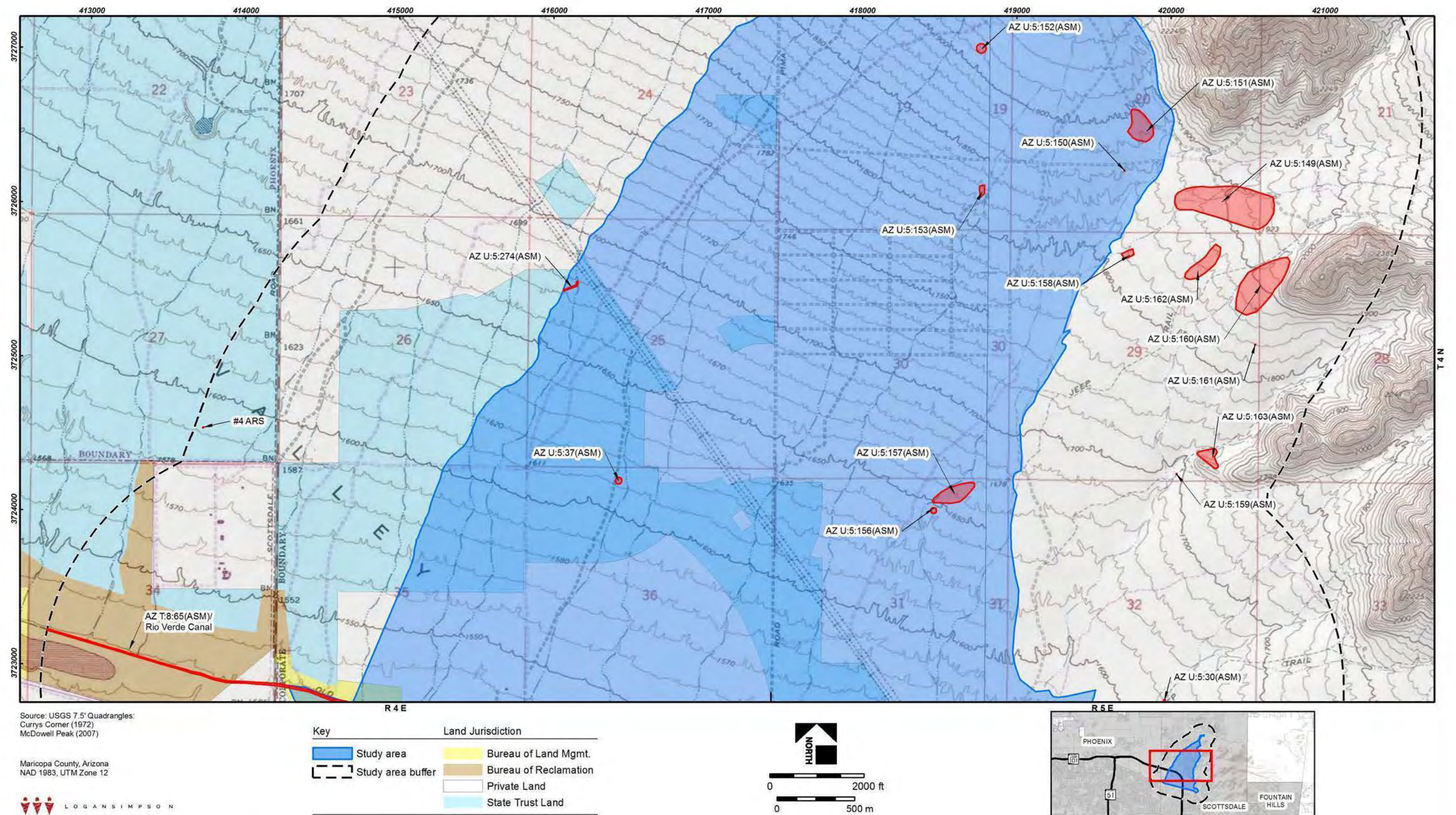


Figure A. 2. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

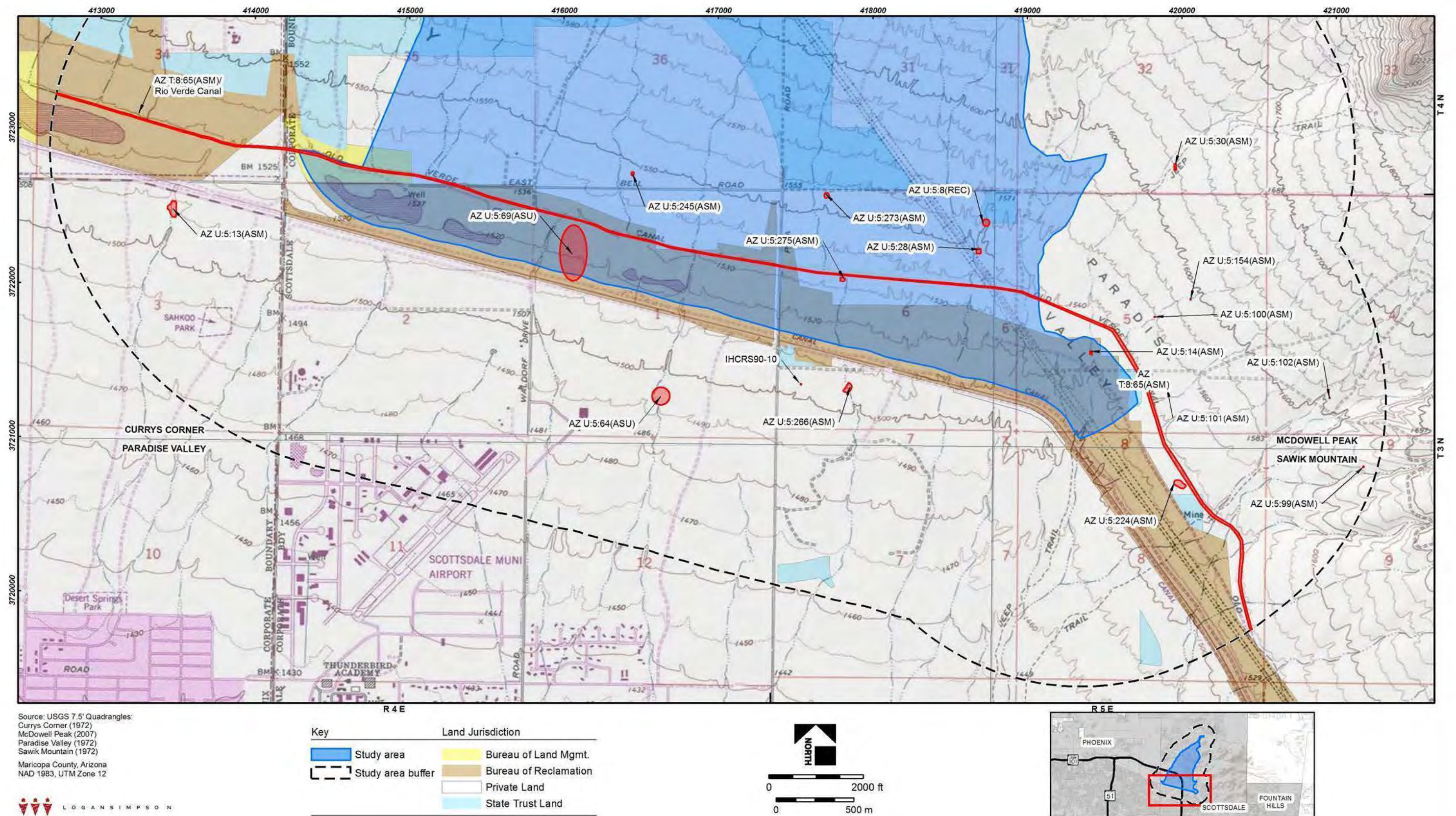


Figure A. 3. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

Appendix B. Site Summary Table

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ T:8:65(ASM)/ Rio Verde Canal	A.2, A.3	H-canal	Private, BOR and BLM	Euro-American; A.D. 1894–1902	Determined not eligible	417363	3721882
AZ U:5:8(REC)	A.3	Unknown	State Trust	Unknown	Not evaluated	418733	3722385
AZ U:5:11(ASM)	A.1	P-feature	Private	Prehistoric	Not evaluated	420197	3729566
AZ U:5:13(ASM)	A.3	P-artifact scatter	Private	Hohokam	Not evaluated	413464	3722475
AZ U:5:14(ASM)	A.3	H-feature	Private	Historic; A.D. 1850–1950	Not evaluated	419413	3721542
AZ U:5:28(ASM)	A.3	P-artifact scatter	Private	Hohokam	Not evaluated	418684	3722200
AZ U:5:30(ASM)	A.2, A.3	P-artifact scatter with feature	Private	Hohokam; A.D. 900–1100	Determined not eligible	419959	3722746
AZ U:5:37(ASM)	A.2	P-artifact scatter with feature	State Trust	Hohokam	Determined eligible (Criterion unknown)	416418	3724186
AZ U:5:64(ASU)	A.3	Unknown	Private	Unknown	Not evaluated	416626	3721262
AZ U:5:69(ASU)	A.3	P-artifact scatter	BOR	Hohokam	Recommended eligible (Criterion unknown)	416059	3722189
AZ U:5:80(ASU)	A.1	P-petroglyphs	Private	Prehistoric; 8000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	421968	3729219
AZ U:5:99(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Determined not eligible	421177	3720801
AZ U:5:100(ASM)	A.3	U-feature	Private	Unknown	Determined not eligible	419824	3721774
AZ U:5:101(ASM)	A.3	U-feature	Private	Unknown	Determined not eligible	419905	3721313
AZ U:5:102(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Not evaluated	420957	3721249
AZ U:5:141(ASM)	A.1	H-feature and artifact scatter	Private	Historic; A.D. 1500–1950	Recommended not eligible	421138	3728239
AZ U:5:142(ASM)	A.1	H-feature	Private	Historic; A.D. 1500–1950	Determined not eligible	420828	3728809

Continued

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ U:5:149(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criteria C, D)	420378	3725979
AZ U:5:150(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criterion unknown)	419700	3726199
AZ U:5:151(ASM)	A.2	P-artifact scatter	Private	Hohokam	Determined eligible (Criterion D)	419804	3726482
AZ U:5:152(ASM)	A.1, A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criterion D)	418771	3726991
AZ U:5:153(ASM)	A.2	P-artifact scatter	Private	Hohokam	Not evaluated	418775	3726069
AZ U:5:154(ASM)	A.3	P-feature	Private	Hohokam	Not evaluated	420057	3721889
AZ U:5:156(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 800–1300	Recommended eligible (Criterion unknown)	418461	3723992
AZ U:5:157(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 800–1000	Not evaluated	418596	3724101
AZ U:5:158(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 1100–1400	Not evaluated	419723	3725658
AZ U:5:159(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	420037	3724229
AZ U:5:160(ASM)	A.2	P-habitation	Private	Prehistoric; 8000 B.C.–A.D. 1500	Not evaluated	420582	3725453
AZ U:5:161(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	420548	3725069
AZ U:5:162(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1300	Recommended eligible (Criterion unknown)	420216	3725593
AZ U:5:163(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Not evaluated	420250	3724339
AZ U:5:224(ASM)	A.3	H-artifact scatter with feature	Private	Historic; A.D. 1500–1950	Not evaluated	419987	3720689

Continued

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ U:5:239(ASM)/ Herberger Site/ Pinnacle Peak Village	A.1	P-habitation	Private	Hohokam; A.D. 450–1100	Not evaluated	422087	3729740
AZ U:5:245(ASM)	A.3	P-artifact scatter	Private	Hohokam; A.D. 1000–1300	Recommended not eligible	416443	3722702
AZ U:5:266(ASM)	A.3	P-artifact scatter	Private	Prehistoric; 12000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	417839	3721313
AZ U:5:273(ASM)	A.3	H-habitation	Private	Historic; A.D. 1500–1950	Recommended not eligible	417700	3722562
AZ U:5:274(ASM)	A.2	H-road	State Trust	Historic; A.D. 1500–1950	Recommended not eligible	416113	3725444
AZ U:5:275(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Recommended not eligible	417803	3722017
AZ U:5:278(ASM)	A.1	H-artifact scatter	Private	Historic; A.D. 1500–1950	Recommended eligible (Criterion D)	420487	3730234
AZ U:5:352(ASM)	A.1	Unknown	State Trust	Unknown	Not evaluated	417590	3728022
#4 ARS	A.2	Unknown	State Trust	Unknown	Not evaluated	413721	3724531
IHCRS90-10	A.3	Unknown	Private	Unknown	Not evaluated	417533	3721338

¹ Map figures can be found within the appendices of the report. ² P = Prehistoric; H = Historic, U = Unknown