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A Class III Cultural Resource Survey of Five Alternative Alignments in the South Mountain Freeway Corridor Study Area, Maricopa County, Arizona

by J. Andrew Darling

(with contributions by Brenda Randolph)

in support of the
Technical Studies to the
Environmental Impact Statement

South Mountain Transportation Corridor in Maricopa County, Arizona

Arizona Department of Transportation
Federal Highway Administration
in cooperation with
United States Army Corps of Engineers
United States Bureau of Indian Affairs

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FHWA Federal Aid Project No. NH-202-D( )

Abstract: This report presents the results of Class III survey in five alternative freeway corridors in the South Mountain Transportation Corridor Study Area. National Register eligibility and management recommendations are provided for all cultural properties examined.

SHPO REPORT ABSTRACT

AGENCY: Federal Highway Administration, Arizona Department of Transportation

PROJECT TITLE: A Class III Cultural Resource Survey of Five Alternative Alignments in the South Mountain Freeway Corridor Study Area, Maricopa County, Arizona

DATE OF REPORT: February 15, 2005

GRIC-CRMP REPORT NUMBER: CRMP Technical Report 2004-05

ADOT PROJECT NAME: South Mountain Transportation Corridor in Maricopa County, Arizona

ADOT TRACS No. 202L: MA 054 H5764 01L

PROJECT FUNDING: FHWA Federal Aid Project No. NH-202-D( )

LAND JURISDICTION: Land ownership includes Private, Bureau of Land Management (BLM), State Trust, and Parks and Recreation (South Mountain Park) (see Figures 4.2 –Figure 4.7).

ACRES BY LANDOWNER:

BLM: 35.12 acres
State Trust: 101.41 acres
Parks and Recreation (South Mountain Park): 62.32 acres
Private: 5160.74 acres

PROJECT DESCRIPTION: This report presents the results of Class III surface survey in five alternative freeway corridors for the proposed South Mountain Freeway. Descriptions of all cultural properties encountered in the field and evaluations of their significance, including National Register eligibility and management recommendations, are provided.

LOCATION: The Area of Potential Effect (APE) is comprised of five alternative (overlapping) freeway corridors (T01, T02, T03, T04, and T06) that extend from Interstate 10 west of Phoenix to Interstate 10 south of the greater Phoenix metropolitan area. Alternative corridors are 1000-ft (304.8-m) wide and range from 34.6 km (21.5 miles) to 38.0 km (23.6 miles) in length. A large portion of the project area falls on the northern edge of the Gila River Indian Community (GRIC). The entire study area is situated in the townships and ranges depicted on the following 7.5′ USGS topographic quadrangles: Fowler, Guadalupe, Laveen, Lone Butte, and Tolleson.

ALTERNATIVES:

The fieldwork for the Class III cultural resources survey was conducted between November 2003 and March 2004. The alternative designations used in this report reflect the naming convention in use at that time. Because the alternative nomenclature has evolved since then, we provide the

following table to show the correlations between the former naming convention and the current convention, which will be carried to the Draft Environmental Impact Statement (DEIS).

Previous Alternative Convention	Current Alternative Convention
T01	W55
T02	W101WPR, W101WFR
T03	W101CPR, W101CFR
T04	W101EPR, W101EFR
T06	W71
T01-T06	E1

NUMBER OF ACRES SURVEYED: 5359.59 acres (2168.95 hectares)

NUMBER OF SITES: 21 (see Table 5.1)

NUMBER OF ELIGIBLE SITES: 20 (see Table 5.1)

NUMBER OF INELIGIBLE SITES: 1 (see Table 5.1)

COMMENTS: The Arizona Department of Transportation (ADOT) is preparing a new Environmental Impact Statement and Location/Design Concept Report for the South Mountain Freeway Corridor, south and west of the greater Phoenix metropolitan area. This report documents the results of Class III survey in five proposed alternative corridors designated the Area of Potential Effect (APE). Twenty Register-eligible cultural properties and one ineligible property were updated or recorded in the field. A total of 6 prehistoric canals, 1 historic indigenous canal, and three historic American main-stem canals (with laterals) were documented. Twelve non-site areas revealed clustering of isolated occurrences and are identified as potentially indicative of past human behavior worthy of further investigation. Potential impacts to the southwestern terminal ridges and southern bajada of the South Mountain range will constitute serious adverse effects to this sacred mountain, the Park/Preserve, and associated Traditional Cultural Properties including trails, rock art, and shrines. While the majority of the archaeological sites identified are eligible for the National Register of Historic Places under Criterion D, Traditional Cultural Properties are considered eligible under Criterion A and perhaps secondarily under Criterion D. One active Akimel O'odham shrine, GR-2105, occurs within the proposed APE. Further consultation with relevant Indian and non-Indian communities is recommended. Based on the results of the alternative selection process, data recovery is recommended for all eligible sites, as well as further investigation of the prehistoric and historic canal systems affected by future construction.

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ACKNOWLEDGEMENTS

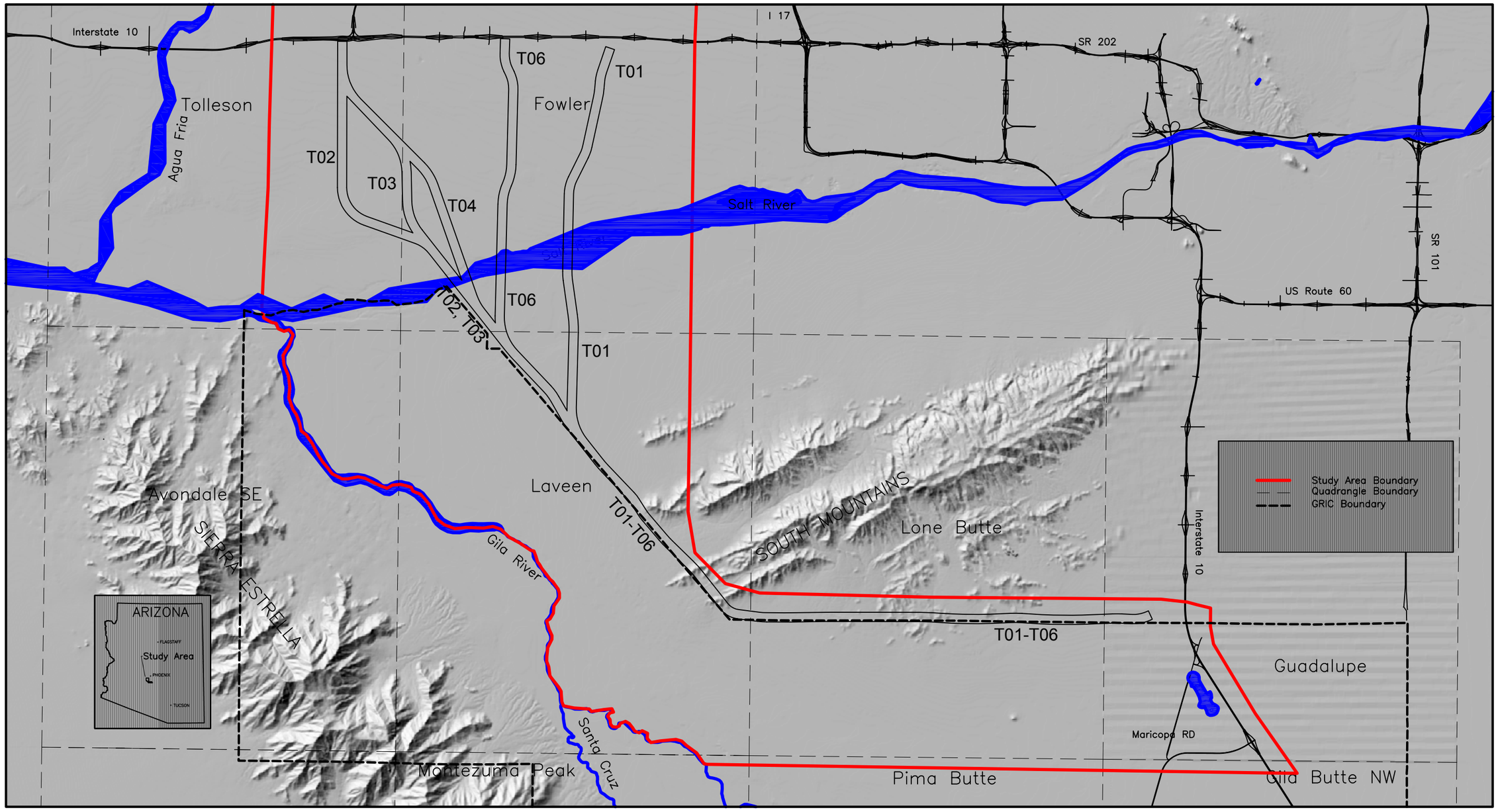
Special thanks are extended to members of the GRIC-CRMP staff who were instrumental in the completion of this study. During fieldwork, Ruth Greenspan served as Project Director and Brenda Randolph acted as Field Director. Lynn Simon, cartography manager, with Russell Talas, oversaw the production of the maps and figures. Tom Herrschaft supervised report production. John C. Ravesloot, Program Coordinator, made many useful comments and suggestions on the draft. Mark Brodbeck at HDR, Inc. provided useful assistance in all phases of the project.

1. Introduction

The following Class III cultural resource survey was completed by the Gila River Indian Community (GRIC) Cultural Resource Management Program (CRMP) for the Arizona Department of Transportation (ADOT) under subcontract to HDR Engineering, Inc. The Class III survey constitutes the second phase of archaeological investigations conducted as one of many technical studies prepared in support of the Environmental Impact Statement (EIS) for the South Mountain Transportation Corridor in Maricopa County, Arizona. The first phase of work consisted of a Class I Overview of the South Mountain Freeway Corridor study area (Burden 2002). The Class I report provided a detailed summary of previous archaeological investigations, information on the nature, distribution, and National Register of Historic Places (NRHP) eligibility of all previously recorded sites, as well as management recommendations. The current report presents the results of archaeological field survey within proposed alternative construction corridors for the South Mountain Freeway. The purpose of this survey is to identify cultural properties (archaeological sites) in the field that might be impacted by future highway construction within these corridors. This study provides NRHP eligibility recommendations for all sites encountered. Survey results will be used to guide design-decisions based on the potential impact or adverse effects of the proposed alternatives.

The South Mountain Freeway is planned as an outer loop connecting Interstate 10 west of Phoenix with Interstate 10 south of the greater Phoenix metropolitan area. The environmental study area covers a broad portion of the valley between the Estrella Mountains and South Mountain Park. As previously defined by ADOT, the north-south leg of the study area extends from the west Phoenix/Tolleson area through the community of Laveen (Figure 1.1). The central segment of the study area passes through the communities of St. Johns and Komatke, at the southwestern edge of South Mountain Park. The east-west leg of the study area passes through the southern portion of the Ahwatukee/Foothills community, ending in west Chandler. Much of this area includes reservation land on the GRIC. In all, the South Mountain Corridor study area encompasses approximately 362 km^2 (140 square miles).

Five alternative corridors or alignments for the future South Mountain Freeway have been selected and are the subject of detailed cultural resource investigation (Class III survey, Figure 1.1). All alternatives are situated outside the GRIC boundary thereby avoiding Tribal lands.



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0 .5 1 2 4 miles
0 3 6 km

Map of South Mountain Freeway Corridors

Figure 1.1

PROJECT HISTORY

The Arizona Department of Transportation (ADOT) initiated preparation of a new Environmental Impact Statement and Location/Design Concept Report in 2001 to consider alternatives to the findings of the 1988 South Mountain Freeway concept (SMCT 2001). In the summer of 2001, HDR Engineering, Inc. was contracted to provide services in connection with this project. The GRIC-CRMP was subcontracted to provide a Class I cultural resource overview of the study area (Burden 2002) and subsequently to perform a Class III cultural resource survey of any properties requiring archaeological coverage. As an integral part of this effort, the Class III survey was undertaken by the GRIC-CRMP to document cultural resources in the field that might be impacted by future highway construction in the alternative alignments (corridors) and to make management recommendations based on site eligibility.

PROJECT DELIVERABLES AND CLASS III SURVEY

This report presents the following results of Class III investigation:

1) Description of all cultural properties encountered in the field including in-field analysis of surface artifacts and features, site maps and eligibility recommendations for the National Register of Historic Places (NRHP).

2) A management summary table for all recorded cultural properties within the proposed Area of Potential Effect (APE) (Table 5.1)

3) Management recommendations for eligible cultural properties, historical properties, Traditional Cultural Properties (TCPs) or other cultural concerns protected under the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA).

REPORT ORGANIZATION

This report is presented in five chapters. Following an introductory chapter, Chapter 2 summarizes project background information provided in the Class I Overview (Burden 2002). Chapter 3 presents a summary of the methodology used in the Class III archaeological survey. Chapter 4 presents the results of the Class III cultural resource survey. Detailed site descriptions, and data tables for in-field artifact analysis as well as isolated occurrences (IOs) are presented in Appendices. A summary of results, including a management summary table (Table 5.1) and management recommendations, are presented in Chapter 5.

2. PROJECT BACKGROUND

PROJECT LOCATION AND AREA OF POTENTIAL EFFECT (APE)

The South Mountain Freeway Corridor study area includes approximately 36,259 ha. (89,600 acres) located to the south and west of the Phoenix metropolitan area (Figure 1.1). The study area crosses portions of 12 townships in Maricopa County, south-central Arizona, and can be found on the following USGS 7.5' maps: Avondale SE, Fowler, Gila Butte NW, Guadalupe, Laveen, Lone Butte, Montezuma Peak, Pima Butte, and Tolleson. The Class I overview (Burden 2002) provides detailed information regarding township boundaries, topographic quadrangle coverage, and land ownership status. The five alternative corridors, T01, T02, T03, T04, and T06, herein referred to as the area of potential effect (APE), are the subject of Class III survey and comprise a much smaller portion of the overall study area (~ 6% of the total).

Each corridor is 1000 feet wide (304.8-m) with an average length of 36.5 miles (58.7 km). As shown in Figure 1.1, the five corridors overlap considerably and share the same alignment for more than half their total length particularly on the east end of the project. Major differences in the alternatives occur in the northwest corner of the study area where they diverge and ultimately end at different locations along Interstate 10. In order to best evaluate potential impacts, each corridor will be considered individually in the summary and recommendations provided in Chapter 5 (see also Table 3.1, Table 5.2).

ENVIRONMENT

The South Mountain Freeway study area is located above the Gila-Salt River confluence in the Phoenix Basin, an area of south-central Arizona characterized by fault-block mountains and intervening sediment-filled basins. A detailed discussion of the environmental setting may be found in Burden (2002:2-6–2-9). The region is part of the Sonoran Desert subprovince of the larger Basin and Range physiographic province. The survey area is dominated by several flanking mountain ranges including the South Mountains and the Estrella Mountains. At its northwest end, the project's location at the intersection of the Lower Salt River Valley and the Middle Gila Valley is subject to the ecologies of both river systems; while the eastern half of the project area is dominated by an upland desert environment, which is characteristic of the southern bajada of the South Mountain Range. Vegetation falls primarily within the Lower Colorado subdivision, and is characterized by the creosote bush-white bur sage and saltbush series. At higher elevations along the bajadas, the palo verde-cacti-mixed scrub series appears in the transition to the Arizona Upland Subdivision, which also includes the creosote bush-crucifixion thorn series. Also, some sections located in the vicinity of both rivers still

support the Sonoran Riparian Woodland and Riparian Scrubland biomes. A wide variety of animals including birds, mammals, and reptiles presently inhabit, or formerly inhabited, the Salt and Gila River Valleys.

Human occupation has greatly impacted the local environment of the South Mountain Freeway study area and over several millennia this has served to shape and reshape the local landscape, including species diversity and distribution. This includes significant impacts from prehistoric and historic irrigation agriculture, dry field farming, historic ranching and trapping, and most recently urban expansion. Much of the current APE (the proposed alternative alignments) has been affected by agriculture during the last 150 years. However, industrial facilities and residential developments are rapidly replacing the farms as Tolleson, Laveen, Avondale and other nearby rural communities are transformed into bedroom communities serving the Phoenix metropolitan area.

CULTURE HISTORY

Human occupation and utilization of the Phoenix Basin spans the last 11,500 years comprising nine main chronological periods: Paleo-Indian, Archaic, Early Formative, Pioneer, Colonial, Sedentary, Classic, Protohistoric, and Historic. These periods apply generally across the project area. Figure 2.1 presents the chronological periods and phases for the Phoenix Basin, which includes the middle Gila and lower Salt valleys. The "Phoenix Basin," as a unit, is used to organize archaeological data in both a geographically and culturally meaningful way. The chronology was compiled using the most recently published evidence. The culture history of the study area is presented in detail in the Class I overview for the South Mountain Freeway project by Burden (2002: 2-10-2-24). It should be noted that in some cases this chronology differs from other published ones. Although it is felt that the current evidence supports the chronology presented here, it is recognized that ongoing research throughout southern Arizona will result in future modifications. For more detailed culture historical discussions, the reader is directed to summaries in Bayman (2001), Berry and Marmaduke (1982), Crown and Judge (1991), Gumerman (1991), Haury (1976), and McGuire and Schiffer (1982).

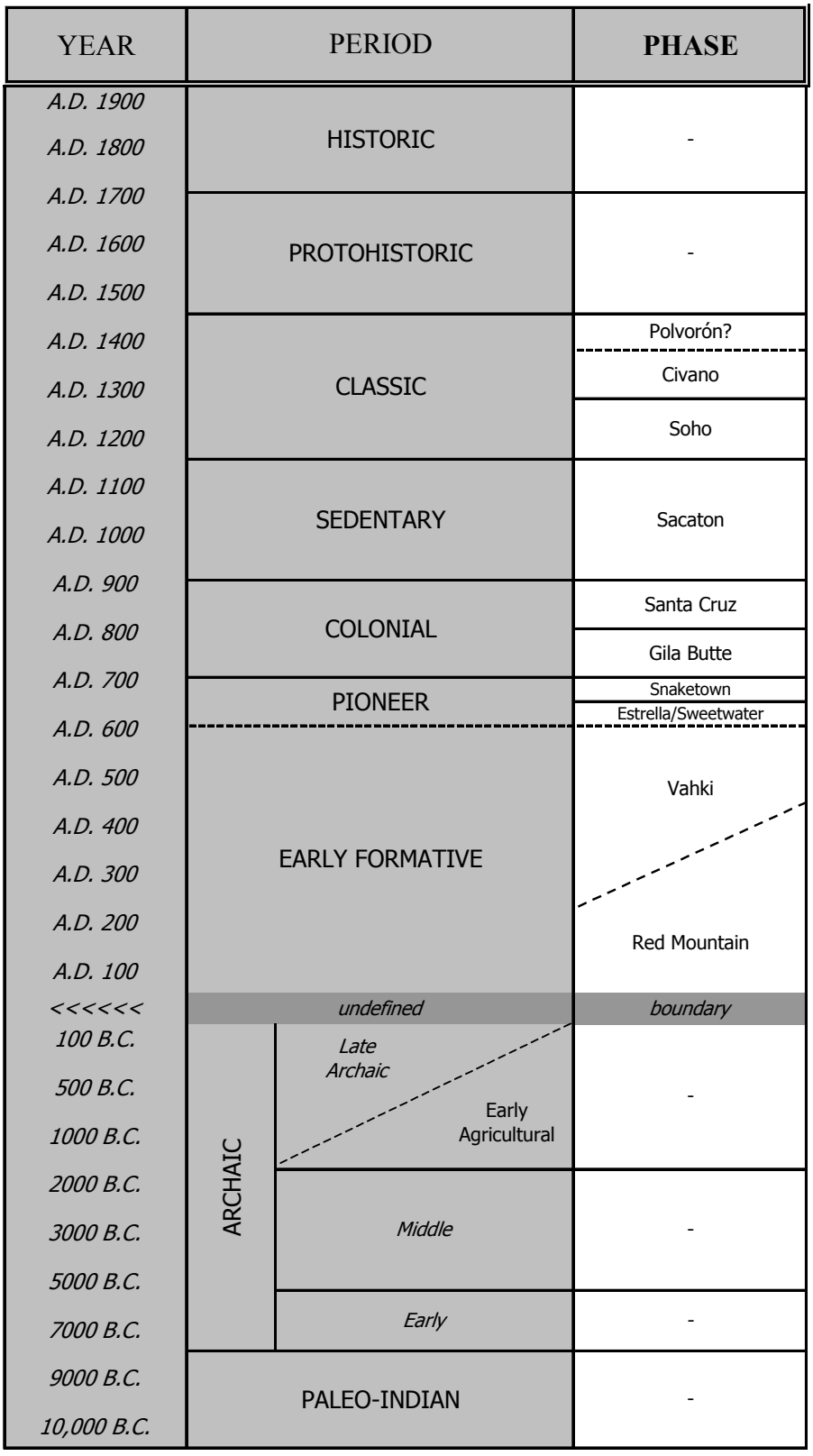


Figure 2.1. Chronological periods and phases in the Phoenix Basin

BRIEF HISTORY OF THE SOUTH MOUNTAIN FREEWAY PROJECT

In 1983, the South Mountain Freeway project was presented as part of a Regional Freeway System plan, which was approved by Maricopa County voters in 1985. In 1988, a state-level Location/Design Report and Environmental Assessment set a corridor alignment for the freeway, which followed the Pecos Road alignment and the northern border of the GRIC. From the boundary, the corridor turned north along 59th Avenue, and intersected I-10 between 55th and 63rd avenues (SMCT 2001). The 1988 assessment included a cultural resource inventory of the project corridor completed by the Office of Cultural Resource Management at Arizona State University (Bostwick and Rice 1987). In 1994, the South Mountain Freeway was dropped from immediate consideration due to a lack of funds. ADOT's intention to complete the entire Regional Freeway System by 2007 revived active interest in the project in 1999, and a study of transportation needs in the Awatukee/Foothills area was conducted the following year. This report is part of the 2001 South Mountain Freeway Environmental Impact Statement and Location/Design Concept Report designed to examine alternatives to the 1988 study.

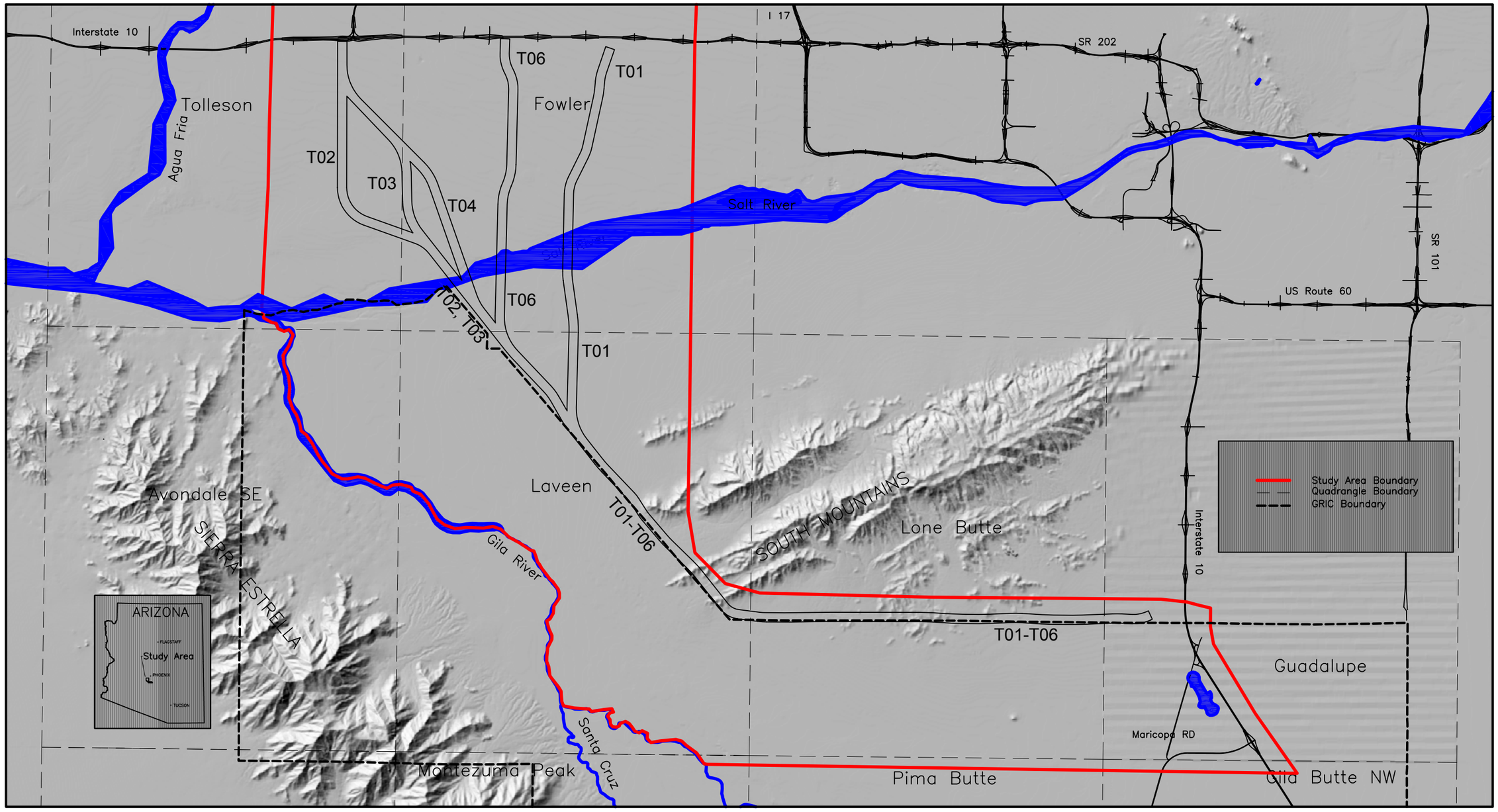
3. Field Methodology

Class III survey of the South Mountain Freeway Corridor was guided by the research design developed for surveys on the GRIC (Doyle and Green 1995), which outlines basic guidelines for archaeological reconnaissance, site-recording procedures, and isolated-occurrence recording. Since Class III cultural resource inventories were conducted under subcontract for ADOT, field investigations also were conducted according to ADOT guidelines. Specifically, survey was non-collection based. The entire survey was conducted on lands owned by private individuals or corporations, state, parks and recreation, and the Bureau of Land Management. Site and isolated occurrence reporting relied on observations made in the field in conjunction with site information from site records and reports currently on file at GRIC-CRMP (see Burden 2002).

All survey was conducted under Arizona Antiquities Act Blanket Permit No. 2003-047bl and No. 2004-077bl and Bureau of Land Management Cultural Resource Use Permit No. AZ-000246.

SURVEY METHODS

The Class III pedestrian survey was conducted between November 17, 2003 and March 8th, 2004, under the direction of Brenda Randolph (Field Director). The survey corridor or APE comprises five alternate alignments. Each alternative is 304.8-m (1000-ft.) wide and overlapping. Survey within the corridor was accomplished by walking parallel transects spaced 20-m apart to ensure 100 percent coverage of the APE. The three- to four-person crew systematically investigated 3,550.51 acres (1,436.84 hectares) or 66.24% of the total 5,359.59 acres (2,168.95 hectares) within proposed alternate alignments (see Figure 3.1). A variety of conditions limited or restricted survey in the field. Ground visibility varied from nonexistent to good throughout the APE. Approximately 24 percent of the survey corridors occurred in planted agricultural fields; 18 percent in industrial parks, dairy feed lots, housing developments, areas covered by individual buildings, and graded areas; 7.5 percent in areas that were previously surveyed less than 10 years ago; 2 percent in highly disturbed water treatment areas; and 1 percent in heavy vegetation areas (Figure 3.1, Table 3.1).



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0 .5 1 2 4 miles
0 3 6 km

Map of South Mountain Freeway Corridors

Figure 1.1

Table 3.1. South Mountain Freeway Corridors (previously surveyed areas were not reexamined, unsurveyed areas include cultivated land, developed areas, water treatment plants, or highly vegetated areas with no visibility)

Alternative Alignment	Length in kilometers (miles)	Area in hectares (acres)	Area Surveyed in hectares (acres)	Unsurveyed Area in hectares (acres)	Percent Surveyed
T01	34.6 (21.5)	1052.81 (2601.55)	642.41 (1587.45)	410.40 (1014.1)	61.02%
T02	38.0 (23.6)	1157.33 (2859.82)	469.12 (1159.22)	688.21 (1700.6)	40.53%
T03	37.2 (23.1)	1131.79 (2796.72)	471.20 (1164.37)	660.59 (1632.35)	41.63%
T04	37.1 (23.0)	1128.75 (2789.21)	501.13 (1238.33)	627.62 (1550.88)	44.40%
T06	35.6 (22.1)	1082.79 (2675.63)	483.80 (1195.49)	598.99 (1480.14)	44.68%

Aerial photographs with plots of the alternate alignments and UTM coordinates were used to place lathes ~100-m apart or more in an area where the alignment crossed agricultural fields. These fields were then surveyed and the lathes removed and used again. In some areas a lathe was placed on a point on the edge of the alignment based upon measurements from the corner of a street intersection using a metric tape. The angle and direction of the alignment was then shot using a Silva Ranger compass and lathes were placed along the edges of the alignment.

Sites found during the survey were marked on the aerial photographs. IOs and features, such as rock cairns or isolated historic trash dumps were similarly noted and located on the aerial photographs. A Global Positioning System (GPS) unit was used to record positions and the location of sites. No roadside memorials or crosses were observed within or outside of the alignments.

SITE-RECORDING PROCEDURES

Archaeological sites are defined according to guidelines presented in the Arizona State Museum (ASM) Site Recording Manual updated by Fish (1994). Based on these guidelines, a site consists of 30 or more artifacts of a single artifact type within a 15 m area, or 20 or more artifacts of at least two artifact types within a 15 m area, or one or more features in temporal association with artifacts, or two or more temporally associated features with no artifacts.

Areas meeting these definitions that are separated by greater than 100 m of intervening space are recorded as separate sites. Each new site is assigned an ASM number. Areas spaced less than 100 m apart generally are recorded as loci of the same site. Loci are defined as spatially or temporally discrete clusters of artifacts or features or both. They may also be arbitrarily defined using modern disturbances such as roads and canals to create boundaries, since separations in the distribution of artifacts and features often occur at such points.

When recording a site, artifacts are marked with pin flags and features are marked with flagging tape in order to assess their distribution across the site and to define site and locus boundaries, artifact concentrations, and other features. All features are numbered consecutively across a site. An ASM site form is completed for each site, along with a feature log and artifact diversity form. Site types are assigned based on 22 possible types previously outlined in the GRIC survey research design (Doyel and Green 1995). Photographs are taken at each site with black-and-white print film and color slide film. Site maps are drawn to scale using a compass and pacing method, and are oriented to true north. Site locations are plotted on the appropriate United States Geological Survey (USGS) 7.5' topographic quadrangle and aerial photograph.

Artifacts were not pinflagged for the majority of sites recorded for the South Mountain Freeway Corridor Survey except for the newly recorded sites. Instead, spacing between survey transects was reduced to 10- to 15-m (32.81- to 49.21-ft.) for the previously recorded sites that were extended or updated. Field crewmembers walked transects and called out the artifacts as they were encountered. The field director walked in the middle and recorded in tally form each artifact type. Based upon artifact densities across the survey area, the field director recorded site boundaries on the aerial photograph, as well as special or unusual artifacts.

In many instances, previously recorded sites were relocated and the same site recording procedures were used to update the existing record. As became apparent in the field,

rapid development in the current APE resulted in the modification or complete destruction of previously recorded cultural properties (Table 4.1).

IN-FIELD ANALYSIS AND SURFACE ARTIFACT DENSITY MEASURES

As noted above, field procedures did not include artifact collection. For this reason, artifacts and artifact types were tallied as they were encountered during transect survey. The results of in-field analysis are presented in Appendix D in tabular form for material categories including ceramics, flaked stone (lithics), and ground stone. In general, only those sites below the bajada of the South Mountain Range on either the north or south banks of the Salt River warranted in-field surface analysis. Bajada sites typically had much lower artifact diversity and surface density. As a result, the site descriptions provided in Appendix A were sufficient to record quantity and varieties of material present.

Surface artifact density estimates were used to characterize artifact scatters at all sites. Areas of differing density were then distinguished as Low (<1 artifact/m^2), Moderate (1 to 5 artifacts/m^2), or High (>5 artifacts/m^2) in the site descriptions. Wherever areas of differing surface artifact density were discernable, they were given a letter designation (for example Area A, B, or C) and tabulated separately as part of the in-field analysis. These areas are represented on the site maps provided.

ISOLATED OCCURRENCE RECORDING

IOs are defined as individual artifacts or features and dispersed non-site scatters with less than 30 artifacts that did not meet the ASM definition of a site. These finds could include more than one artifact type. IOs are numbered consecutively by township, range, and section, and then described on an IO form and plotted on the appropriate USGS 7.5' topographic map and aerial photograph. Each IO is listed in Appendix C.

Following Class III survey and during report preparation, it was observed that IOs would occur in clusters often in association with other cultural or landscape features. IO clustering is summarized in Chapter 4 and management recommendations are provided in Chapter 5. Detailed descriptions of each IO cluster appear in Appendix B.

LINEAR ALIGNMENTS

Linear alignments, like isolated occurrences, are features that did not meet the ASM definition of an archaeological site as applied during the current survey. Nevertheless, such features are cultural resources and may be eligible for the NRHP. Alignments were

recorded in the survey notes, located on the aerial photographs, and photographed where appropriate. Linear alignments may be the remains of trails, roadways, or historic and prehistoric canals or ditches.

4. Results of the Class III Survey

This chapter summarizes the results of the Class III intensive cultural resources survey. Six new archaeological sites were recorded, four previously recorded sites were extended, nine previously recorded sites were relocated and updated, and two previously recorded American-period canals were observed. Additionally 191 isolated occurrences (including isolated features and diffuse artifact scatters) were identified. Due to demolition by Pecos Road construction, one previously recorded site, AZ T:12:209 (ASM), could not be relocated during the present survey. Nine additional cultural properties reported in Burden (2002) were not identified in the field. All site descriptions are presented in Appendix A.

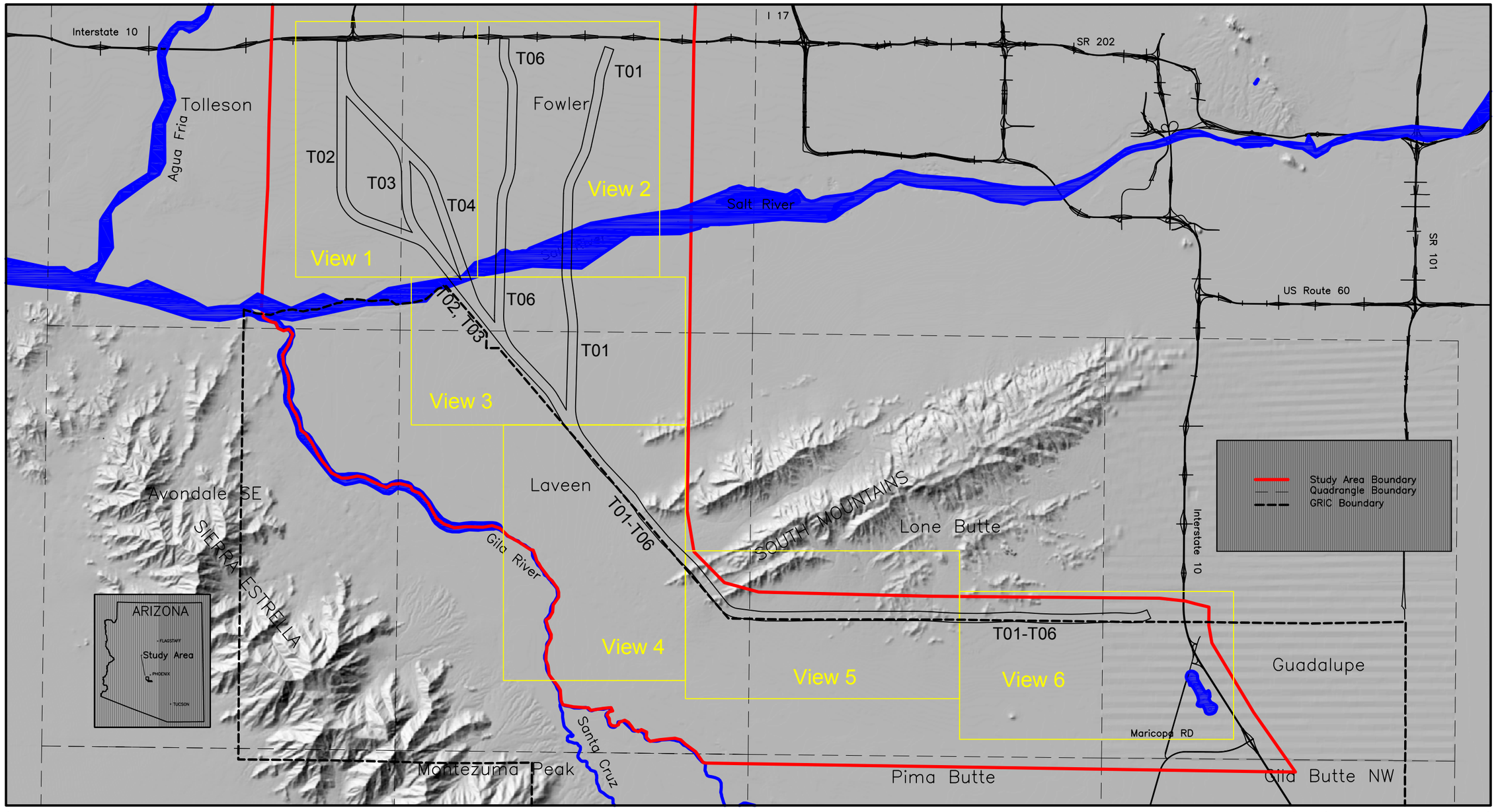
IOs were prevalent throughout the survey representing single or multiple artifact, low-density surface scatters, which do not qualify as archaeological sites. Several IO clusters occur along prehistoric canal alignments and may indicate the presence of subsurface archaeological sites or canals not evident in highly disturbed or modified surface contexts. In all, twelve IO clusters were identified as a result of the Class III survey (see below, see also Appendix B and Appendix C).

OVERVIEW OF SURVEY RESULTS

The following section provides an overview of survey findings. This discussion is organized according to six map views encompassing the current APE (Figure 4.1). Each view is summarized below with respect to sites and IO clusters present. The map views are appended at the end of this section.

VIEW 1 – TOLLESON AND FOWLER QUANDRANGLES (T02, T03, T04 ALIGNMENTS)

View 1 covers the northwest corner of the survey area encompassing portions of alignments T02, T03, and T04 and the I-10-Loop 101 interchange south to the Salt River (Figure 4.2). Residential and industrial developments as well as active agricultural fields (alfalfa) and a large water treatment facility limited archaeological survey coverage in the alignment. One newly recorded site, AZ T:11:164 (ASM), occurred on the T02 alignment. This site was a Classic period Hohokam occupation and artifact scatter, which extended south of the T02 boundary. Four prehistoric IO clusters also were identified, consisting of mixed ceramics, lithics, and groundstone. Two of these scatters (#1 and #2) fall potentially on



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0 .5 1 2 4 miles
0 3 6 km

Map of the South Mountain Freeway Study Area showing alternative alignments and map key for detailed Views 1-6.

Figure 4.1

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SUMMARY OF CLASS III SURVEY

Archaeological Sites

A total of 19 cultural properties were recorded or updated during the Class III survey of for the proposed South Mountain Freeway. One previously recorded petroglyph site, AZ T:12:209 (ASM), could not be relocated and appears to have been demolished by the construction of Pecos Road. AZ T:12:200 (ASM), was an historic O'odham habitation, also recorded in 1987 (Bostwick and Rice 1987). However, it has been significantly impacted by landscaping and residential development. In both cases, these sites, which initially may have been eligible for the NRHP under Criterion D, are no longer eligible.

Previously Recorded Sites

Ten previously recorded archaeological sites fall within the proposed corridors (including AZ T:12:209 (ASM)), but were not relocated during the current survey (refer to Burden 2002). As indicated in Table 4.1, four sites occur in unsurveyable areas, while five other sites were not detected on the ground, suggesting that they no longer exist. Of the latter group, four of these sites, located in the southern foothills of the South Mountains are petroglyph sites recorded by the Pueblo Grande Museum. These sites are listed in GRIC CRMP files as T:12:No # (Burden 2002:4-22).[1] Similar to AZ T:12:208 (ASM) and AZ T:12:209 (ASM), residential development, road construction, or vandalism may have resulted in the destruction of these sites.

Isolated Occurrences

A total of 191 IOs were identified during the current survey. These range from isolated prehistoric and historical period artifacts to small historic dumps, isolated rock cairns, and rock circles. The table in Appendix B provides a comprehensive listing of all isolated occurrences.

IO CLUSTERS

The term IO cluster is used here to identify areas where numerous artifacts co-occur but in concentrations less than would merit an archaeological site designation. In general they appear as groups of three or more IOs situated in relatively close proximity to each other. Such non-site occurrences may suggest prehistoric or historical period

[1] Note that the "No#" designation refers to the fact that these sites were never recorded.

occupations, the remnants of highly disturbed archaeological sites or the remains of cultural activities of limited duration (or cultural debris generation). They also may represent a contiguous or superficial artifact background in which the dispersion of surface artifacts at levels below site requirements are the result of the relative intensity of occupation in a given region. IO clusters may be particularly common in portions of the survey area where extensive surface disturbance from agriculture, dumping, industrial development, and other recent uses may obscure or reduce surface artifact densities without impacting subsurface features or deposits. Whatever the case may be, clustering is identified only to point out potential areas of interest for management and future planning. They are not considered sites and they are not eligible for the NRHP.

A total of twelve IO Clusters were identified and are described in detail in Appendix A (see Table 4.2 below). Low-density surface artifact scatters appear to concentrate towards the northwest end of the current survey area. This reflects the generally higher density (or frequency) of extensive archaeological sites in the vicinity of the Gila and Salt Rivers and known prehistoric canals. A second area where low-density scatters occur encompasses the terminal ridges (and narrow valleys) that form the southwestern end of the South Mountain Range (Figure 4.7, View 5). IO clusters are associated with several prehistoric trails and trail sites, which continue up the spine of the ridges extending into the mountains. Some of these trails continue to be used by the GRIC today. Prehistoric and historic activities in the uplands (bajada) were numerous and included dry-field farming (i.e. rockpile fields), upland resource gathering (including saguaro fruit, cholla buds, and other cactus products), and hunting. Rock outcrops and exposures also provided useful surfaces for rock art or raw material suitable for tool production.

IO clusters in the foothills reflect these activities, as suggested by a significant increase in the number of isolated ceramic artifacts and potbreaks on the bajada. Ceramic potbreaks along trails are common and may suggest water transport, possibly to resource collection areas (Darling and Eiselt 2003). In contrast, artifacts in the IO clusters in the valley near canals or other Hohokam sites exhibit a greater diversity of artifact types including lithic artifacts.

As summarized in Table 4.2, six out of the twelve (50%) clusters may be associated with a prehistoric canal alignment and two clusters (#4 and #8) may simply be extensions of prehistoric Hohokam sites located on the terraces above the Salt River floodplains. IO clusters #9-12 are associated with upland activities on the bajadas. Surface scatters such as these, which are also intermixed with rock cairns, rock circles, and prehistoric trails, present a highly fragile surface pattern (Hayden 1965), requiring detailed surface analysis beyond the scope of the current survey. The abundance of IOs on the north and south boundaries of the Villa Buena site, AZ T:12:9 (ASM), is also suggestive of IO clustering, although in this area it seemed obvious that these remains associate with the still intact portions of the site and may co-occur with an undocumented section of the Canal Laveen.

Table 4.1. Previously recorded sites that were not observed or relocated during the current survey.

Alignment(s)	Site Number/Name	Site Type	Culture/Time Period	Eligibility	Reference	Survey Condition
T06	Fowler Ruin	Mounds, Canal	Hohokam / Undefined	Undetermined	Bostwick and Rice 1987; Burden 2002:4-26; Midvale, (n.d.: Supplemental Papers, Book IV)	Unsurveyable, developed property
T01	Phoenix 1:2 (GR)	Scatter, Canal	Hohokam / Undefined	Undetermined	Bostwick and Rice 1987; Burden 2002:4-26	Unsurveyable, developed property
T04	AZ T:12:1 (ASU)	Mound	Hohokam / Colonial to Classic	Undetermined	Bostwick and Rice 1987; Grafil 2000	Unsurveyable, developed property
T04	AZ T:12:36 (ASU)	Artifact Scatter	Hohokam / Colonial to Sedentary	Eligible	ASU Site Files, Burden 2002:4-23	Unsurveyable, developed property
T01-T06	AZ T:12:39 (ASU)	Mining Campsite	Undefined / Historic	Undetermined	Bostwick and Rice 1987:65; Burden 2002	Plowed Under, IO3 may be associated
T01-T06	AZ T:12:209 (ASM), AZ T:12:47 (ASU)	Petroglyphs	Undefined / Prehistoric; American / Historic	Undetermined	Bostwick and Rice 1987; Burden 2002:4-24	Destroyed by Pecos Road construction
T01-T06	T:12:No #	Petroglyph	Unknown	Undetermined	Burden 2002:4-22, GRIC CRMP files -	Surveyed, not relocated
T01-T06	T:12:No #	Petroglyph	Unknown	Undetermined	Burden 2002:4-22, GRIC CRMP files -	Surveyed, not relocated
T01-T06	T:12:No #	Petroglyph	Unknown	Undetermined	Burden 2002:4-22, GRIC CRMP files -	Surveyed, not relocated
T01-T06	T:12:No #	Petroglyph	Unknown	Undetermined	Burden 2002:4-22, GRIC CRMP files -	Surveyed, not relocated

Table 4.2. Summary of IO Clusters

IO Cluster	View	IO Nos.[a]	Type of Scatter	Artifact Count	Association/Context
IO Cluster #1	View 1	6-10	lithics	5	Canal Colinas
IO Cluster #2	View 1	37-39, 42	ceramic/lithic	7	Canal Colinas
IO Cluster #3	View 1	80-91	ceramic/lithic	20	Canal Alamo/Canal Rio
IO Cluster #4	View 1	46-51	ceramic/lithic	6	AZ T:11:164 (ASM)
IO Cluster #5	View 2	25-29, 31-33	ceramic/lithic	9	Canal Alamo/AZ T:12:203 (ASM)
IO Cluster #6	View 2	52-60, 64-68	ceramic/lithic	16	Canal Alamo
IO Cluster #7	View 2	70, 72, 75-78	lithic/historic	8	Canal Rio
IO Cluster #8	View 3	97-118	ceramics/lithics/ groundstone	41	AZ T:12:127 (ASM)
IO Cluster #9	View 5	162-165	ceramics, 2 rock cairns, 1 rock ring	11	bajada, traditional ridge trail into the South Moutains
IO Cluster #10	View 5	166, 172-176	ceramics (some in potbreaks), groundstone	100(+)	bajada, traditional ridge trail into the South Moutains
IO Cluster #11	View 5	167-169, 177-179	ceramics (some in potbreaks)	80(+)	site with trail, AZ T:12:201 (ASM)
IO Cluster #12	View 5	180-185	ceramics, lithic	35	AZ T:12:198 (ASM), AZ T:12:199 (ASM) – trail, rock art, historic Pima occupation

[a]refer to Appendix B and Appendix C

Prehistoric and Historical-Period Canals

Burden (2002:5-13) identified a total of 14 named and/or recorded prehistoric and historical-period canals and canal segments in the South Mountain Freeway study area. Of these, eight cross the proposed alternative alignments (Table 4.3). With the exception of the Roosevelt Canal (AZ T:10:83 ASM) and possibly the Indian Ditch (Woodson

2003), these canals were not observed directly in the field. Two additional historical-period canals also were not identified by Burden (2002) but include the branches of the Western Canal (AZ T:12:154 ASM) and the Salt River Valley Canal (Andersen 1990; Salt River Project 1956). As regards prehistoric canals, the occurrence of archaeological sites as well as non-site clusters of IOs along the projected alignments strongly suggest or even confirm their likely presence subsurface.

Numerous other historical-period and modern laterals, waste-water ditches, and other canals (unlined and cement-lined) were observed during the course of archaeological survey. Most of these linear water conveyance features were associated with the Salt River Project system (Andersen 1990; Smith 1986, Salt River Project (SRP) 1987, 1997). The Salt River Valley Canal, which dates to the creation of the Swilling Irrigation and Canal Company in 1867, was not observed in the field (Andersen 1990:2; SRP 1956, 1997). However, the alignment of the Salt River Valley Canal appears to have crossed the South Mountain Alternatives T01, T06, and T02-T04 as it headed west. The later Roosevelt Canal constructed in 1928 (which contrary to Burden, 2002, was not an SRP canal) and the Western Canal, built in 1912-1913 both cross the South Mountain corridors at T01 and T06 and the overlapping T01-T06 alternatives (see Figure 5.1). SRP reports 924 miles of laterals and ditches operated by the Salt River Valley Water Users' Association (Andersen 1990:3; SRP 1997). Many of the laterals that take water from the canals located south of the Salt River are open ditches. These were observed during the course of fieldwork but were not recorded in detail (see Figure 5.2).

Table 4.3. Prehistoric and historical-period canals known to cross the Class III survey area.

Alignment(s)	Site Number/ Name	Site Type	Culture/Time Period	Eligibility	Reference	Survey Condition
T01, T06	Canal Tolleson	Canal	Hohokam / Undefined	Undetermined	Bostwick and Rice 1987; Burden 2002:4-25	Unsurveyable in Developed Areas, Unobserved in recent survey by Rodgers 2001
T01, T06	Roosevelt Canal, AZ T:10:83 ASM	Canal	American / Historic (built in 1928)	Eligible	Burden 2002:4-18; Harmon and Beyer 1994; Roy 1978	Observed in the field in T01,T06.
T01, T06	Canal Alamo	Canal	Hohokam / Undefined	Undetermined	Bostwick and Rice 1987; Burden 2002:4-25	Unobserved in the Pueblo del Alamo Site, IO Custer #3 may indicate presence of canal
T01, T06	Canal Rio	Canal	Hohokam / Undefined	Undetermined	Bostwick and Rice 1987; Burden 2002:4-25; Shepard and Rogge 1997	Unobserved in the Pueblo del Alamo Site, IO Custer #3 may indicate presence of canal
T01, T06, T02-04	Salt River Valley Canal	Canal	American / Historic (1867)	Undetermine	Salt River Project 1956	Unobserved in survey area
T01-T06	Canal Primero (Canal 3)	Canal	Hohokam / Undefined	Undetermined	Burden 202 4-25; Howard and Huckleberry 1991; Midvale 1966; Owens 1995; Patrick 1903; Shepard and Rogge 1997; Turney 1929	Unobserved in Baseline Ruin/AZ T:12:127, may pass through AZ T:12:204

Table 4.3. Prehistoric and historical-period canals known to cross the Class III survey area.

Alignment(s)	Site Number/ Name	Site Type	Culture/Time Period	Eligibility	Reference	Survey Condition
T01	Canal Laveen	Canal	Hohokam / Undefined	Undetermined	Burden 2002 4-25; Howard and Huckleberry 1991; Owens 1995; Patrick 1903; Shepard and Rogge 1997	Unobserved at Villa Buena /AZ T:12:9 or AZ T:12:91
T01-T06	Canal Los Muertos (Canal System 1)	Canal	Hohokam / Undefined	Undetermined	Howard and Huckleberry 1991; Midvale 1968; Turney 1929; Woodson and Neily 1998	Area largely disturbed, termination of Canal system 1
T01-T06	Indian Ditich (Maricopa)	Canal	Pee Posh / Historic	Undetermined	Burden 2002:4-26; Grafil 2000; Meskimons 1904; Olberg 1919:58: Southworth 1914, 1919:142-43	Observed as part of AZ T:12:127
T01-T06	Western Canal, AZ T:12:154 (ASM)	Canal	American	Eligible	Andersen 1990; Newsome and Berg 2001	Observed in the field in T01,T06

5. Summary Recommendations

PROJECT DETAILS

The Class III pedestrian survey was conducted between November 17, 2003 and March 8th, 2004. In all, a total of 3,550.51 acres (1,038.3 hectares) were systematically investigated within five proposed, 1000-ft, alternative freeway corridors by a three- to four-person crew. Twenty-one cultural properties were newly recorded or updated with the exception of the Roosevelt Canal and the Western Canal, which have been documented by recent surveys (Table 5.1; Andersen 1990; Newsome and Berg 2001). Of the 21 sites, 20 are eligible for the NRHP and one is no longer eligible. Ten previously recorded sites described in Burden (2002) were not relocated during the Class III investigation and likely have been destroyed by development or vandalism. Numerous other linear features including canals require further consideration and investigation to evaluate National Register eligibility and management needs. Finally, rock art sites, trail sites, shrines, and sites with intact prehistoric public architecture (such as ballcourts or mounds) are considered TCPs by the Gila River Indian Community and other tribes. These are discussed in a separate section below.

SITE SIGNIFICANCE

The following sections present information useful to evaluating site significance under the various NRHP criteria. Consistent with previous surveys of the western Salt River Valley and in the middle Gila River Valley (Burden 2002), the current study identified major occupational components pertaining to the Hohokam, the historic Akimel-Oodham and Pee Posh, and American. Sites pertaining to each component also were identified in the two contrasting environments that characterize the APE. These are the lowland valleys and the upland bajada of the South Mountain range (Figure 5.1).

Beginning with the Hohokam, valley sites included large villages, habitations, artifact scatters (with multiple artifact types), and numerous IOs, all of which were associated with a prehistoric canal or water source including the Salt River. Earliest occupations date to the Colonial period, or AD 750, but nearly all the Hohokam sites exhibit in part Classic period surface assemblages (AD 1150-1450). Two large village sites exhibit (or at one time exhibited), Preclassic and Classic period civic-ceremonial architecture, which served in the socio-political integration of large prehistoric populations. Numerous other sites presumably played a role in irrigation and food-production systems. This is especially apparent in terms of site distribution and settlement along canals but also in relation to local ecology and

geomorphology. Sites such as AZ T:12:204 (ASM), AZ T:12:9 (ASM) (Villa Buena), AZ T:12:91 (ASM) and IO Clusters #1, #2, #6, and #7 occur on or near the 1000 ft (asl) contour in areas above the Salt River floodplain. This distribution suggests a pattern of settlement along an ecotone, distinguishable as a boundary between lower lying Holocene terraces and upland Pleistocene terraces overlain with Holocene sands (Darling et al 2004; Onken et al 2003; Waters and Ravesloot 2000, 2001). Settlement in this area may have exploited higher ecological diversity in plants and animals while maintaining agricultural fields on the Holocene terraces below. Further research on the pattern of settlement in relation to ecotonal patterns and agriculture is needed to better understand intersite relationships and resource use.

The role of prehistoric settlement near the confluence of the Gila and Salt Rivers, a major crossroad within the Hohokam culture core, is also relevant to site significance. Sites in the South Mountain freeway study area, unlike others further upstream in either the middle Salt or Gila Valleys, will provide clues to intra-regional interaction between the two main branches of the core Hohokam region. Similar implications may apply to sites situated on the north and south banks of the Salt River. For example, the south bank sites like Baseline Ruin and Villa Buena may exhibit qualities that ally them with Gila River Valley populations, or with the villages and populations located on the north bank of the Salt River, such as Pueblo del Alamo. Additional work is needed to clarify these preexisting intra-regional sociopolitical relationships.

Another factor affected the prehistoric socio-politics of the region. From the confluence of the rivers to the west, the Gila River also afforded further Hohokam expansion into the Gila Bend area. This third branch of the Hohokam acted as a western frontier across which interaction and trade with pre- or proto-Yuman groups (Patayan) was possible (Bartlett et al 1986:50-51; McGuire and Schiffer 1982). Evidence for trade and exchange can be discerned through investigations of shell and obsidian trade, as well as ceramics.

On the bajada, Hohokam occupations were largely undefined chronologically. These included prehistoric rock art, trails, potdrops, and other ephemeral features. Prehistoric occupation of upland environments is currently understudied and requires different research methodologies from those used in large Hohokam settlements. Nevertheless, the resources provided by the uplands in the form of animal protein, plant products, and raw materials were essential to Hohokam survival. This includes the ideological support that comes from religious sites, shrines, and rock art found in these areas.

Table 5.1. Management Summary Table

USGS 7.5' Topo. Quad	Alignment	Ownership	Record Status	Site	Type	Culture	Time Period	Eligibility
Tolleson	T02	Private	New Site	AZ T:11:164 (ASM)	Artifact Scatter; Habitation	Hohokam	Classic	Eligible Criterion D
Laveen	T02, T03, T04, T06	Tribal and Private	Bostwick and Rice 1987; Ensor and Doyel 1997; Foster 2000a, 2000b; Foster and Ravesloot 1999; Kaler 1986a; Larson 1979; Morgan and Darling 2001; T. Sires 1986; Stafford 1979	AZ T:12:9 (ASM) Villa Buena	Village with canal, ballcourts	Hohokam	Pioneer to Classic	Eligible Criterion D (Probable TCP, Criterion A)
Fowler	T01	Incorporated Private and Private	Bostwick and Rice 1987; Effland 1984; Grafil 2000; Midvale n.d. (Supplemental Papers, Book V); Turney 1929	AZ T:12:52 (ASM) Pueblo del Alamo	Village with platform mounds and canal	Hohokam	Colonial to Classic	Eligible Criterion D (Probable TCP; Criterion A)
Fowler, Tolleson	T01, T06	Private, Roosevelt Irrigation District	Newsome and Berg 2001, AZSite Documentation	AZ T:10:83 ASM Roosevelt Canal	Canal	American	Built in 1928, Still in Use	Eligible Criterion D
Laveen	T01	Private	Bostwick and Rice 1987	AZ T:12:91 (ASM)	Village	Hohokam	Undefined	Eligible Criterion D
Laveen	T01-T06	SRP	Andersen 1990; Newsome and Berg 2001	AZ T:12:154 (ASM) Western Canal	Canal	American	Built in 1912-13, still in use	Eligible Criterion D

Table 5.1. Management Summary Table

USGS 7.5' Topo. Quad	Alignment	Ownership	Record Status	Site	Type	Culture	Time Period	Eligibility
Fowler	T02, T03, T04, T06	Private	Grafil 2000	AZ T:12:127 (ASM), Baseline Ruin	Artifact Scatter	Hohokam	Sedentary to Classic	Eligible Criterion D
Laveen	T01-T06	Private	Bostwick and Rice 1987	AZ T:12: 197 (ASM)	Trail, Rock Rings Sherd Scatter	Undefined	Undefined	Eligible Criterion D (Possible TCP, Criterion A)
Laveen	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:198 (ASM)	Petroglyph, Trail	Undefined; Akimel O'odham	Prehistoric; Historic	Eligible Criterion D (Possible TCP; Criterion A)
Laveen	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:199 (ASM)	Artifact Scatter; Rock Clusters	Akimel O'odham	Historic	Eligible Criterion D
Laveen	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:200 (ASM)	Artifact Scatter; Habitation	Akimel O'odham	Historic	Not Eligible
Laveen	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:201 (ASM)	Trail; Rock Circle	Undefined	Undefined	Eligible Criterion D (Possible TCP; Criterion A)
Fowler	T06	Private	New Site	AZ T:12:202 (ASM)	Artifact Scatter	Hohokam	Classic	Eligible Criterion D
Fowler	T06	Private	New Site	AZ T:12:203 (ASM)	Artifact Scatter	Hohokam	Classic	Eligible Criterion D

Table 5.1. Management Summary Table

USGS 7.5' Topo. Quad	Alignment	Ownership	Record Status	Site	Type	Culture	Time Period	Eligibility
Fowler	T01	Private	New Site	AZ T:12:204 (ASM)	Artifact Scatter	Hohokam	Colonial	Eligible Criterion D
Fowler	T01	Incorporated Private	New Site	AZ T:12:205 (ASM)	Artifact Scatter	Hohokam	Classic	Eligible Criterion D
Fowler	T01	Incorporated Private	Bostwick and Rice 1987	AZ T:12:206 (ASM)	Artifact Scatter Habitation	Hohokam	Classic	Eligible Criterion D
Laveen	T01-T06	Parks and Recreation	New Site	AZ T:12:207 (ASM)	Trail; Artifact Scatter	Hohokam; Akimel O'odham	Colonial; Historic	Eligible Criterion D (Possible TCP; Criterion A)
Lone Butte	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:208 (ASM)	Petroglyphs Quarry	Undefined; American	Prehistoric; Historic	Eligible Criterion D (Possible TCP; Criterion A)
Lone Butte	T01-T06	Private	Bostwick and Rice 1987	AZ T:12:210 (ASM)	Quarry	Undefined	Prehistoric	Eligible Criterion D
Laveen	T01-T06	State	Bostwick and Rice 1987	AZ T:12:211 (ASM)	Trail	Undefined	Prehistoric	Eligible Criterion D (Possible TCP; Criterion A)

Historical-period occupation in the Class III survey area appears as Native American (Akimel O'odham and Pee Posh) and American (non-Indian) sites. In both cases, no evidence of proto-historic or early historic occupations was found. In the valley, American sites dominate and represent the development of irrigation systems beginning with the Salt River Valley Canal in 1867 (Zarbin 1987) and culminating with the Salt River Project, which came into being after the Reclamation Act of 1902. The Indian Ditch (Maricopa) was an early 20th century effort by the Pee Posh to access irrigation water from the Salt River, the only such canal from the Salt that was meant to irrigate Indian lands on the Gila River reservation (Woodson 2003).

Upland historical period occupation also suggests both American and Indian participation. For the Akimel O'odham, the use of upland resources and the continued significance of religious sites and activities is consistent with prehistoric uses. Short-lived Pima settlements dating to the late 19th and early 20th centuries exhibit artifacts that are suggestive of Pima involvement in American markets and potentially wage labor. This may have included work in the mines located on South Mountain or in the farms located along the northern border of the reservation (see for example Eiselt 2003; Loendorf and Burden 2003). Since these small sites were situated outside the reservation, it is possible that they included O'odham migrant labor camps occupied by workers from other reservations such as the Ak-Chin Community or the Tohono O'odham Nation (Works by Darling et al (2004), McCarthy (1985), and Waddell (1969), among others, attest to O'odham mobility and migrant labor patterns in the late 19th and early 20th centuries).

Rock art sites in the APE are a significant part of the overall survey. Based on the overview by Burden (2002), at least seven rock art sites existed within the current APE (the overlapping T01-T06 portion). Of these sites only two remain, AZ T:12:198 (ASM) and AZ T:12:208 (ASM). However, all previously recorded rock art at AZ T:12:208 (ASM) has been destroyed by construction or vandalism. The remaining site (AZ T:12:198 (ASM)) exhibits an unusual combination of prehistoric and historic petroglyphs known only at one other site in the South Mountains. This includes prehistoric rock art in the Gila Style (cf. Loendorf and Loendorf 1995) and historic O'odham cattle brand rock art dating from the 1850s to the 1910s (Bostwick 2002:40; Martynec and Martynec 1995). Cattle brand petroglyphs could have religious significance dating to the development of Pima ranching and cowboy ideology, which continues today (Kozak and Lopez 1999). Cattle brand petroglyphs of this sort also are extremely rare and document a poorly understood era of O'odham history (e.g. Iverson 1994).

REVIEW OF ALTERNATIVES

Five alignments or alternative corridors have been proposed for the South Mountain Freeway. Each alternative overlaps with the others for more than half their length in the eastern part of the survey, where they pass near the foothills of the South Mountain Range. The five alternatives diverge in the northwest portion of the APE and follow different paths to the north where they intersect with Interstate 10. Each alternative shares a minimum of 8 eligible sites, 1 ineligible site, 4 IO Clusters, and 5 canals (4 historical-period canals and 1 prehistoric canal) (see Table 5.2). TCPs also are present in the overlapping portion of the alternatives. Additional sites and features are found in the areas where the corridors diverge and cover different areas. As a result, each corridor impacts a slightly different set of cultural properties. T01, for example, has the highest number of eligible sites and canals, whereas T03 and T04 are equivalent in the numbers of eligible sites present but have the fewest cultural properties present overall. Each of these alternatives is reviewed below.

Table 5.2: Summary of Cultural Property Distributions by Alternative.

Alternative	Eligible/ listed sites	Ineligible Sites	IO Clusters	Canal Alignments (Prehistoric and Historic)	TCPs Present
T01	13	1	4	13	Yes
T02	11	1	6	8	Yes
T03	10	1	7	8	Yes
T04	10	1	6	8	Yes
T06	12	1	5	12	Yes
T01-T06 (Overlapping Alternatives, eastern section only)	8	1	4	5	Yes

Alternative T01

Alternative T01 largely duplicates the survey by Bostwick and Rice (1987). In 1987 residential and industrial development within the proposed corridor limited survey in

certain areas and the same continues to be true. Specifically, the portion of the survey from the Roosevelt Canal north could not be surveyed due to development and some active cultivation. In spite of this finding, this portion of the survey is crossed by Canal Tolleson, and the potential for prehistoric occupation exists in its vicinity including the remnants of Phoenix 1:2 (GP), which was not relocated in 1987 or by the current survey (Burden 2002).

T01 also crosses the Roosevelt Canal (AZ T:10:83 ASM), which is an eligible historical-period site, followed by two prehistoric Hohokam village/habitations associated with the prehistoric Canal Alamo and Canal Rio and the north bank of the Salt River located to the south. These include the Pueblo del Alamo (AZ T:12:52 (ASM)) and AZ T:12:206 (ASM). On the south bank, T01 crosses very near the currently undocumented headgate of the Indian (Maricopa) Ditch, an historical-period canal used from approximately 1894-1914 (Woodson 2003:20). Here it also encounters a Hohokam artifact scatter before proceeding south through two additional eligible Hohokam sites associated with Canal Primero and Canal Laveen. From this point, the corridor overlaps with the other alternatives as summarized above.

Alternative T02

Alternative T02 is the westernmost alternative of the five. It overlaps with T03 and T04 at the north end and subsequently diverges. The T02 alternative travels south through surveyable areas and active fields along 99th avenue until it turns to the southeast just north of Broadway Road. Here it crosses an eligible Hohokam habitation site (AZ T:11:64 (ASM)) and an associated IO cluster before intersecting with alternative T03. Very close to this junction, T02-T03 passes through IO cluster #3, and likely crosses the prehistoric canals, Canal Rio and Canal Alamo. From here the alignment continues and joins with T04 before passing through AZ T:12:127 (ASM), an eligible Hohokam artifact scatter and extension of Baseline Ruin. T02-T04, intersects with T06 and the four overlapping alignments pass through the Villa Buena site (AZ T:12:9 (ASM)), a large Hohokam village. Also in this area, the corridor(s) cross prehistoric canal alignments including Canal Laveen, Canal Primero, and the historic Indian (Maricopa) Ditch. From this point the alternative joins T01 and continues to the east-southeast as T01-T06.

Alternative T03

On the west end, T03 terminates at the same location as T02 and T04 at Interstate 10, and together overlapping T03-T04 diverge from T02 approximately 1.5 mi south. Here T03-T04 pass through two non-site IO clusters, #1 and #2. The presence of prehistoric artifacts in this area may point to an extension of the Canal Colinas into the area from the

northeast. T03 diverges from T04 and eventually converges again with T02, and continues as described above.

Alternative T04

T04 also initiates at the same location as T02 and T03. As described in the previous alternative, T03-T04 pass through IO clusters #1 and #2 and a possible extension of the prehistoric Canal Colinas. T04 diverges from T03 and follows back to T02-T03 as described above for alternative T02.

Alternative T06

T06 intiates at the I-10, east of Tolleson running south across the historical Roosevelt Canal. At its northernmost point the corridor begins at site AZ T:12:202 (ASM), a newly recorded, eligible Hohokam artifact scatter. South of the Roosevelt Canal, the corridor passes through AZ T:12:203 (ASM), also a newly recorded Hohokam artifact scatter. It then continues through non-site IO clusters #5, #6, and #7, which may indicate the location of the prehistoric Canal Alamo and Canal Rio. T06 then proceeds due south through IO cluster #8, which is spatially associated with AZ T:12:127 (ASM) or Baseline Ruin. The prehistoric Canal Pimero alignment and the historic Indian (Maricopa) Ditch also occur in this area. T06 continues and joins T02-T04, which has been summarized above under alternative T02.

Summary and Comparison of Alternatives T01 through T06

Evaluation of the impacts of freeway construction to cultural properties per alternative is informative. It suggests that while each corridor may contain a slightly different set of cultural properties, the relative impacts of freeway construction may vary only slightly. As previously described, the overlapping portion of all five corridors encounters high site density where they pass over the southwest end of the South Mountain Range (see discussion of TCPs below). Where the alignments diverge, T02, T03, T04, and T06 all intersect major prehistoric sites including Baseline Ruin and Villa Buena. T06 may pass through a western extension of Pueblo del Alamo as suggested by IO clusters #6 and #7. T01 is the only alignment that clearly misses Baseline Ruin and Villa Buena. However, the T01 corridor will impact sites associated with prehistoric irrigation features on the south side of the Salt River and Pueblo del Alamo located north of the river.

As initially observed by Bostwick and Rice (1987), areas of higher site density will occur near the rivers and near prehistoric canal alignments particularly in the northwest portion of the South Mountain freeway study area. In addition, the frequency of sites will be relatively constant on or along the length of the canals, which tend to run east-west, or

roughly parallel to the course of the Salt River. Since the northwest portion of the proposed alternatives are oriented at a right angle to these canals, wherever prehistoric canal alignments are crossed there is a high probability that significant prehistoric cultural properties will be present.

In summary, while the northernmost portion of corridors T02, T03, and T04, appear to be free of cultural properties, they pass through major site areas to the south of the Salt River (Figure 5.1). T01 and T06 potentially pass through the greatest number of cultural properties. However, T01, which may avoid some of the larger sites south of the Salt River, encounters the site of Pueblo del Alamo on the north bank.

GENERAL RECOMMENDATIONS

Cultural Properties

A total of 21 archaeological sites, 20 of which are eligible, and one of which is ineligible, were found within the APE for the proposed alternative alignments (Table 5.1). Additional cultural properties include prehistoric and historical period canals, and TCPs, which will be discussed below. IOs or IO clusters are not considered cultural properties but where they occur in abundance the potential for subsurface materials undetected through surface reconnaissance is higher.

Site types include villages (n=3), habitations (n=3), artifact scatters (n=6), petroglyphs (n=2, one site with a trail associated), trails with features (n=4), a prehistoric quarry (n=1), and canals (n=2). Additional prehistoric and historic canals have been reported but were not recorded in the field (see below). AZ T:12:200 (ASM), a historical period Akimel O'odham habitation site, is no longer considered eligible due to extensive disturbance from landscaping and road construction. Several other recorded sites were not relocated in the current survey and may have been destroyed or removed in their entirety by development (Burden 2002). AZ T:12:154 (ASM), or the Western Canal, is a Salt River Project canal, which is eligible for the NRHP under criterion A for its association with agriculture and development in the region, but reportedly much of its historical setting has been lost (Newsome and Berg 2001). All other sites warrant consideration for the NRHP under Criterion D for their potential contribution to knowledge about the history and prehistory of the region.

Avoidance of all eligible cultural properties is recommended and should be considered in the selection process for the design of the South Mountain Freeway. Since none of the proposed alternatives is devoid of cultural resources, avoidance will not always be possible. Therefore, further investigation and data recovery is necessary to mitigate the adverse effects of highway construction.

Isolated Occurrence Clusters

IO clusters are in many cases indicative of prehistoric and historic cultural behavior. However, they do not qualify as sites under the ASM definition and they are not eligible for the NRHP. Many of these clusters occur in locations described by Wells et al (2004, in press) as "the land between the villages". As previously reviewed, a total of 12 IO clusters were recorded. Some of these have associations with sites or may be extensions of sites (see Appendix B). The rest are associated with trails or prehistoric canal alignments. Investigations of these non-site features can include detailed surface studies or subsurface investigations. Archaeological investigations of such features may prove informative particularly as they relate to known eligible sites nearby and as a means for the investigation of projected prehistoric canal systems.

Prehistoric and Historical-Period Native American Canals

Numerous overviews of prehistoric and indigenous canal irrigation in Arizona are available and include Masse (1981), Foster et al. (2002), Howard (1994), Woodbury (1961), Woodson (2003), among others. These studies demonstrate that prehistoric Hohokam canal systems along the Salt River extended well into the South Mountain Freeway study area. Most of these date to the period AD 700-AD 1400 (Foster et al 2002: 98-99). Among these is Canal System 2, which can be found in the northwest portion of the survey area, as well as the termination of Canal System 1 (the Los Muertos Canal System) located at the eastern end of the project area. Within Canal System 2, five prehistoric canals clearly cross the T01 through T06 corridors including Canal Tolleson, Canal Alamo, Canal Rio, Canal Primero, and Canal Laveen. Canal Colinas, if extended to the southwest may also pass through T03-04 as suggested by IO clustering (Figure 5.1). Subsurface testing might be used to examine this possibility. A single canal from the Los Muertos system also extends into the T01-T06 portion of the APE. No surface evidence suggesting the presence of this canal was observed on the surface in the field. Randolph and Woodson (1999:7-8) report the results of trenching to locate the mapped extension of the Los Muertos Canal System where it was estimated to enter the GRIC. Although evidence for a canal was not located, they suggest that an untested area occupied by an abandoned concrete canal traveling northeast-southwest may occupy the same prehistoric corridor. As suggested by Howard and Huckleberry (1991) historic re-use of prehistoric canal alignments is documented in the Phoenix area and attests to the similarity in engineering constraints on both prehistoric and historic systems.

In all, seven documented prehistoric canals are intersected by proposed South Mountain Freeway alternatives. The Indian (Maricopa) Ditch, with its headgate on the Salt River, is a historical-period canal built by the Pee Posh (Maricopa), which was initially constructed in the 1890s and in use until after 1914 (Woodson 2003:20). This canal also

crosses T01 through T06. Similar issues pertain to this canal. Unlike the American canals of the nineteenth and twentieth centuries, the Indian Ditch is a product of Native American irrigation and farming within the GRIC. As such, many of its features may prove to be analogous to other historic Native American or Hohokam gravity fed canals (Adams et al. 2002).

Construction of the South Mountain Freeway will have adverse effects on subsurface features associated with these prehistoric Hohokam and historical period indigenous irrigation systems. While only documented surficially in earlier studies, a great deal remains to adequately record their subsurface characteristics, integrity, and preservation. Woodson (2003: 71-80) has outlined general and specific methods for studying canals and canals systems, all of which are recommended here in order to adequately identify and document them prior to development of the South Mountain Freeway system. In brief, this methodology includes the following:

1) Documenting relict canal systems and irrigation features (using survey, excavation, and remote sensing techniques);

2) Analyzing relict canal systems and irrigation features (such as specialized geoarchaeological analyses including channel hydraulics, sedimentology, and stratigraphy; dating canals using relative and absolute techniques; and studying biological organisms preserved in canal sediments including pollen macrofossils, ostracodes, and mollusks, as outlined by Adams et al. 2002);

3) Interpreting canal systems and irrigation features within broader contexts (consideration of geomorphological, climatic, hydrological, and edaphic contexts as well as formation processes and cultural contexts within larger subsistence-settlement systems.

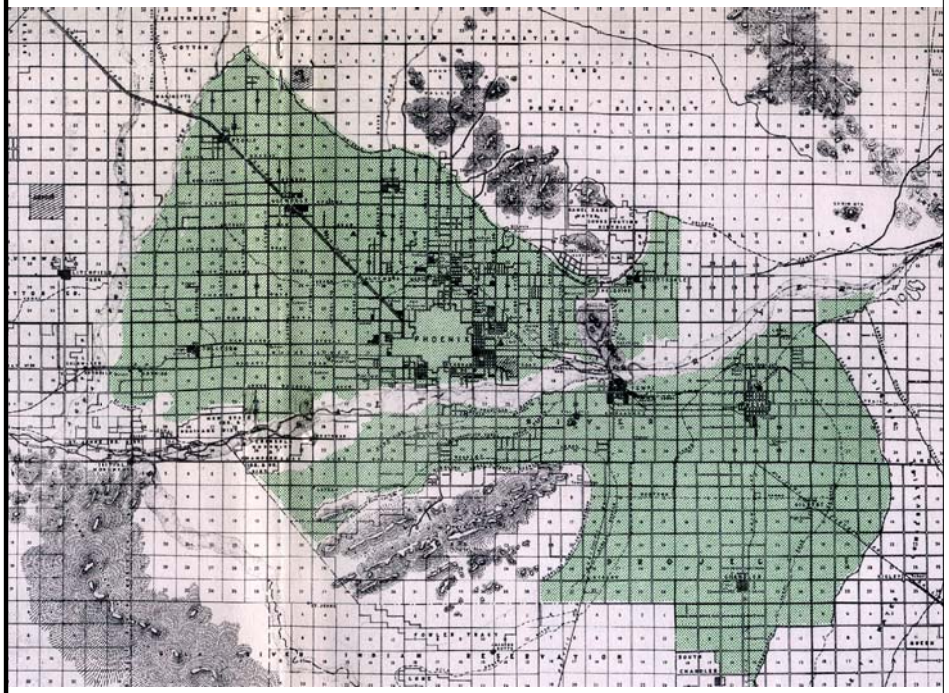
Historical-Period American Canals

As previously observed, numerous minor water conveyance features (laterals and ditches) functioned as part of the large irrigation system created by the Salt River Project (SRP) and its affiliates. Main canals also cross the current APE and include portions of the Western Canal (AZ T:12:154 (ASM), an SRP feature), and the Roosevelt Canal (AZ T:10:83 (ASM), a well-fed canal pertaining to the Roosevelt Irrigation District). Two other historical-period canals, the Salt River Valley Canal and the Indian (Maricopa) Ditch, also cross the current APE, but preexisted the creation of the SRP and were not incorporated into the larger SRP System.

A study of irrigation in the West Valley is beyond the scope of the current Class III study, or the cultural overview presented by Burden (2002). However, the significance of

irrigation in the Salt River Valley to the history of the Phoenix area should not be underestimated (Figure 5.2). Overviews of American irrigation and the role of SRP are available in several sources including Peplo (1970), Smith (1986), SRP (1944, 1956, 1987, 1997), and Zarbin (1987, 1997). In addition, several Historic American Engineering Record (HAER) documents address the architectural and engineering details of canals or dams of the SRP system (for example Andersen and Noland 1990; Dudley 1991). These include HAER AZ-22, which describes the Western Canal (Andersen 1990). Recent efforts by the Bureau of Reclamation (Reclamation) to assess NRHP eligibility of portions of the still existing irrigation system(s) of metropolitan Phoenix are currently underway (William Collins, personal communication 2004). Further research in coordination with this effort would be useful to examine the relative impact of the South Mountain Freeway project.

In summary, many canals and ancillary water conveyance features may be eligible for the NRHP under various criteria including Criterion A and D. It is also unavoidable that South Mountain Freeway construction will result in adverse effects to one or more of these large-scale historic features. Interpretive studies are recommended as a potential (or partial) mitigative solution. This is especially true of the Roosevelt Canal, which lacks any systematic study or HAER document.



South Mountain Transportation Corridor
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FHWA Federal Project No. HH-202-D( )

Map views of the Salt River Project (SRP 1944)

Figure 5.2

SUMMARY OF SITE ELIGIBILITY

The following summary recommendations are provided for the cultural properties identified by the current Class III survey:

1) Based on the results of the alternative selection process, all eligible properties present within the alignment selected will require some form of data recovery. Data recovery plans should be based on research themes and questions appropriate to individual sites and the nature and extent of disturbance, and may include surface and subsurface archaeological investigations.

2) Due to recent disturbance, AZ T:12:200 (ASM), is no longer considered eligible for the NRHP and no further investigation is recommended. Other previously recorded sites in the APE, which could not be relocated, also appear to have been destroyed by development or other activity. Further investigation at these sites also is not required (see Table 4.1).

3) The twelve non-site IO Clusters identified in this report are not cultural properties. They are only identified to establish better regional context and to suggest potential avenues for future investigation including archaeological testing for prehistoric canals and irrigation systems in the valley and the investigation of trails, upland resources, and human utilization of bajada environments.

4) Prehistoric canals have been shown to cross the proposed corridors for the South Mountain Freeway. Based on the corridor selected, canals occurring within affected eligible sites should be examined as part of data recovery at those sites. For canals occurring outside site areas, efforts to identify and archaeologically sample these features is recommended using a methodology like that outlined by Woodson (2003).

5) Historical-period American canals (the Salt River Valley Canal, the Roosevelt Canal and the Western Canal) and other features associated with irrigation in the West Valley were identified in the proposed alternative corridors. Further studies of their historical significance, preservation, and integrity is recommended including a comprehensive historical overview of these systems as well as more detailed treatments of the individual canals and laterals. This work should coordinate with on-going efforts by Reclamation to assess the historical context, integrity, and eligibility of these features as they occur within the current APE.

6) Traditional Cultural Properties (TCPs) include natural mountains, resource areas, rock art sites, trails, shrines, and Hohokam village sites. A major issue is the

impact of freeway construction to the southwest end of the South Mountain range and its southern bajada where all the alternative corridors (T01-T06) cross. Construction in this area will affect numerous Native American communities and non-Indian communities with current and historical ties to the South Mountain Park/Preserve. Further discussion and consultation is recommended to consider methods for avoiding or reducing impacts.

Unanticipated Discoveries

If previously unidentified cultural resources are encountered during activity related to the construction of the project, the contractor shall stop work immediately at that location and shall take all reasonable steps to secure the preservation of those resources. The Engineer will contact the ADOT Environmental Planning Group, Historic Preservation Team at (602) 712-7767, immediately and make arrangements for the proper treatment of those Resources.

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Table 10.2. Lithic Artifact Counts and Percentages

Site (ASM) Area	Primary		Secondary		Tertiary		Shatter		Core Fragments		Total
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	
AZ T:11:164 A	66	2	812	20	539	14	2,451	62	116	3	3,984
B	2	2	27	28	46	47	8	8	15	15	98
C	18	6	81	25	80	25	90	28	56	17	325
Site Totals	**86**	**2**	**920**	**21**	**665**	**15**	**2549**	**58**	**187**	**4**	**4407**
AZ T:12:52 A	10 +	15	20 +	30	30 +	45	5 +	8	1 +	2	66 +
B	45 +	9	110 +	22	105 +	21	20 +	4	211 +	43	491 +
Site Totals	**55 +**	**10**	**130 +**	**23**	**135 +**	**24**	**25 +**	**4**	**212 +**	**38**	**557 +**
AZ T:12:202 A	0	0	4	18	8	36	8	36	2	9	22
B	7	7	35	36	21	22	18	19	16	16	97
Site Totals	**7**	**6**	**39**	**33**	**29**	**24**	**26**	**22**	**18**	**15**	**119**
AZ T:12:203 A	4	10	6	15	20	49	8	20	3	7	41
B	6	3	42	21	80	15	47	24	22	11	197
Site Totals	**10**	**4**	**48**	**20**	**100**	**42**	**55**	**23**	**25**	**11**	**238**
AZ T:12:205											
Feature 1	0	0	18	23	11	14	33	42	16	21	78
A	0	0	4	27	3	20	5	33	3	20	15
B	3	7	9	22	10	24	14	34	5	12	41
Site Totals	**3**	**2**	**31**	**23**	**24**	**18**	**52**	**39**	**24**	**18**	**134**
AZ T:12:206	10 +	6	20 +	13	50 +	32	20 +	13	55 +	35	155 +
Site Totals	**10 +**	**6**	**20 +**	**13**	**50 +**	**32**	**20 +**	**13**	**55 +**	**35**	**155 +**
AZ T:12:9 A	150 +	11	400 +	30	410 +	30	330 +	24	60 +	4	1350 +
B	10 +	13	10 +	13	10 +	13	30 +	40	15 +	20	75 +
C	11 +	13	10 +	12	18 +	21	15 +	18	31 +	36	85 +
Site Totals	**171 +**	**11**	**420 +**	**28**	**438 +**	**29**	**375 +**	**25**	**106 +**	**7**	**1510 +**
AZ T:12:127	60 +	7	230 +	26	240 +	28	110 +	13	230 +	26	870 +
Site Totals	**60 +**	**7**	**230 +**	**26**	**240 +**	**28**	**110 +**	**13**	**230 +**	**26**	**870 +**
AZ T:12:204	2	2	21	21	36	36	34	34	8	8	101
Site Totals	**2**	**2**	**21**	**21**	**36**	**36**	**34**	**34**	**8**	**8**	**101**
Totals	**394**	**5**	**1789**	**23**	**1664**	**21**	**3168**	**40**	**823**	**11**	**7838**

Table 10.3. Lithic Material Type Counts and Percentages

Site (ASM)	Area	Basalt		Vesicular Basalt		Rhyolite		Quartzite		Metaquartzite		Diabase		Chert		Quartz		Chalcedony		Andesite		Greenstone		Obsidian		Schist		Ind. Igneous		Total
		N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	
AZ T:11:164	A	3,196	80	0	0	0	0	414	10	0	0	79	2	51	1	195	5	29	1	1	0	4	0	8	0	7	0.2	0	0	3,984
	B	74	76	0	0	0	0	13	13	0	0	1	1	2	2	4	4	1	1	0	0	0	0	0	0	3	3.1	0	0	98
	C	254	78	0	0	0	0	20	6	0	0	4	1	8	2	16	5	6	2	0	0	0	0	17	5	0	0.0	0	0	325
	Site Totals	**3524**	**80**	**0**	**0**	**0**	**0**	**447**	**10**	**0**	**0**	**84**	**2**	**61**	**1**	**215**	**5**	**36**	**1**	**1**	**0**	**4**	**0**	**25**	**1**	**10**	**0.2**	**0**	**0**	**4407**
AZ T:12:52	A	85 +	99	0 +	0	1 +	1	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	86 +
	B	460 +	94	0 +	0	0 +	0	25 +	5	0 +	0	0 +	0	0	0	1 +	0	5 +	1	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	491 +
	Site Totals	**545 +**	**94**	**0 +**	**0**	**1 +**	**0**	**25 +**	**4**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**1 +**	**0**	**5 +**	**1**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0.0**	**0 +**	**0**	**577 +**
AZ T:12:202	A	16	80	0	0	0	0	3	15	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2	10	20
	B	73	77	0	0	0	0	17	18	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0.0	2	2	95
	Site Totals	**89**	**77**	**0**	**0**	**0**	**0**	**20**	**17**	**0**	**0**	**4**	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**4**	**3**	**115**
AZ T:12:203	A	31	76	0	0	0	0	3	7	0	0	1	2	3	7	3	7	0	0	0	0	0	0	0	0	0	0.0	0	0	41
	B	0	0	2	67	2	67	2	10	2	67	2	10	3	15	3	15	0	0	2	10	2	0	3	15	3	15.0	3	15	20
	Site Totals	**31**	**51**	**2**	**67**	**2**	**67**	**5**	**8**	**2**	**67**	**3**	**5**	**6**	**10**	**6**	**10**	**0**	**0**	**2**	**3**	**2**	**3**	**3**	**5**	**3**	**4.9**	**3**	**5**	**61**
AZ T:12:205																														
	Feature 1	61	84	0	0	0	0	12	16	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	73
	A	3	30	0	0	0	0	3	30	5	50	1	10	1	10	2	20	0	0	0	0	0	0	0	0	0	0.0	0	0	10
	B	16	52	0	0	0	0	10	32	10	32	1	3	1	3	0	0	3	10	0	0	0	0	0	0	0	0.0	0	0	31
	Site Totals	**80**	**70**	**0**	**0**	**0**	**0**	**25**	**22**	**20**	**18**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0**	**0**	**114**
AZ T:12:206		150 +	97	0 +	0	0 +	0	5 +	3	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	155 +
	Site Totals	**150 +**	**97**	**0 +**	**0**	**0 +**	**0**	**5 +**	**3**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0.0**	**0 +**	**0**	**155 +**
AZ T:12:9	A	1000 +	74	0 +	0	0 +	0	340 +	25	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	10 +	1	0 +	0.0	0 +	0	1,350 +
	B	40 +	53	0 +	0	0 +	0	35 +	47	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	75 +
	C	70 +	82	0 +	0	0 +	0	10 +	12	0 +	0	0 +	0	4 +	5	1 +	1	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	85 +
	Site Totals	**1110 +**	**74**	**0 +**	**0**	**0 +**	**0**	**385 +**	**25**	**0 +**	**0**	**0 +**	**0**	**4 +**	**0**	**1 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**10 +**	**1**	**0 +**	**0.0**	**0 +**	**0**	**1510 +**
AZ T:12:127		750 +	86	0 +	0	0 +	0	90 +	10	0 +	0	10 +	1	20 +	2	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0	0 +	0.0	0 +	0	870 +
	Site Totals	**750 +**	**86**	**0 +**	**0**	**0 +**	**0**	**90 +**	**10**	**0 +**	**0**	**10 +**	**1**	**20 +**	**2**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0.0**	**0 +**	**0**	**870 +**
AZ T:12:204		93	92	0	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	101
	Site Totals	**93**	**92**	**0**	**0**	**0**	**0**	**8**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0**	**0**	**101**
Totals		**6372 +**	**81**	**2 +**	**15**	**3 +**	**23**	**1010 +**	**13**	**22 +**	**169**	**103 +**	**1**	**95 +**	**1**	**225 +**	**3**	**44 +**	**1**	**3 +**	**0**	**6 +**	**0**	**38 +**	**0**	**13 +**	**0.2**	**7 +**	**0**	**7910 +**

Table 10.4. Ground Stone Artifact Counts and Percentages

Site (ASM)	Area	Mano		Metate		Hand		Indeterminate Ground Stone		Total
		N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	
AZ T:12:52	A	3 +	23	2 +	15	2 +	15	6 +	46	13 +
	B	11 +	25	10 +	23	2 +	5	21 +	48	44 +
	Site Totals	**14 +**	**48**	**12 +**	**38**	**4 +**	**20**	**27 +**	**47**	**57 +**
AZ T:12:202	B	2	17	0	0	1	8	9	75	12
	Site Totals	**2**	**17**	**0**	**0**	**1**	**8**	**9**	**75**	**12**
AZ T:12:203	B	5	11	0	0	0	0	40	89	45
	Site Totals	**5**	**11**	**0**	**0**	**0**	**0**	**40**	**89**	**45**
AZ T:12:206		15 +	25	5 +	8	0 +	0	40 +	67	60 +
	Site Totals	**15 +**	**25**	**5 +**	**8**	**0 +**	**0**	**40 +**	**67**	**60 +**
AZ T:12:9	C	3 +	16	1 +	5	2 +	11	13 +	68	19 +
	Site Totals	**3 +**	**16**	**1 +**	**5**	**2 +**	**11**	**13 +**	**68**	**19 +**
AZ T:12:127		24 +	21	12 +	10	0 +	0	81 +	69	117 +
	Site Totals	**24 +**	**21**	**12 +**	**10**	**0 +**	**0**	**81 +**	**69**	**117 +**
Totals		**63 +**	**20**	**40 +**	**62**	**7 +**	**2**	**210 +**	**68**	**310 +**

Table 10.5. Ground Stone Material Type Counts and Percentages

Site (ASM)	Area	Vesicular Basalt		Basalt		Quartzite		Pumice		Rhyolite		Quartz		Granite		Total
		N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	
AZ T:12:52	A	8 +	62	1 +	8	4 +	31	0 +	0	0 +	0	0 +	0	0 +	0	13 +
	B	36 +	82	0 +	0	8 +	18	0 +	0	0 +	0	0 +	0	0 +	0	44 +
	Site Totals	**44 +**	**77**	**1 +**	**2**	**12 +**	**21**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**57 +**
AZ T:12:202	B	7	54	2	15	3	23	1	8	0	0	0	0	0	0	13
	Site Totals	**7**	**54**	**2**	**15**	**3**	**23**	**1**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**13**
AZ T:12:203	B	9	53	5	29	2	12	1	6	0	0	0	0	0	0	17
	Site Totals	**9**	**53**	**5**	**29**	**2**	**12**	**1**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**17**
AZ T:12:206		10 +	17	5 +	8	45 +	75	0 +	0	0 +	0	0 +	0	0 +	0	60 +
	Site Totals	**10 +**	**17**	**5 +**	**8**	**45 +**	**75**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**60 +**
AZ T:12:9	C	7 +	37	6 +	32	6 +	32	0 +	0	0 +	0	0 +	0	0 +	0	19 +
	Site Totals	**7 +**	**37**	**6 +**	**32**	**6 +**	**32**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**0 +**	**0**	**19 +**
AZ T:12:127		42 +	36	2 +	2	68 +	58	1 +	1	2 +	2	1 +	1	1 +	1	117 +
	Site Totals	**42 +**	**36**	**2 +**	**2**	**68 +**	**58**	**1 +**	**1**	**2 +**	**2**	**1 +**	**1**	**1 +**	**1**	**117 +**
Totals		**119 +**	**42**	**21 +**	**7**	**136 +**	**48**	**3 +**	**1**	**6 +**	**2**	**1 +**	**0**	**1 +**	**0**	**283 +**

11. Appendix E. Acronyms and Abbreviations

ACS	Archaeological Consulting Services, Ltd.
ADOT	Arizona Department of Transportation. The State agency responsible for state roads and highways.
APE	Area of Potential Effect or project area
APS	Arizona Public Service electric company
ARCO	Atlantic Richfield Petroleum/Chemical Products Company
ARS	Archaeological Research Services, Inc.
ASM	Arizona State Museum, University of Arizona
ASU	Arizona State University
BIA	Bureau of Indian Affairs
BOR	Bureau of Reclamation
BR	Bedrock. Refers to all unweathered outcrops of bedrock that have topographic relief (Waters 2001, 10).
Brped	Bedrock pediment. Weathered bedrock that has been beveled into a planar, low relief surface via mechanical and chemical weathering (Waters 2001, 11).
CAP	Central Arizona Project
CES	Cultural and Environmental Systems, Inc.
CPS	Cathodic Protection Station
CRMP	Cultural Resource Management Program, Gila River Indian Community
Cultural Resources	Archaeological and historic resources that could potentially be affected by a given project. Cultural resources include buildings, sites, districts, structures, or objects having historical, architectural, archaeological, cultural, or scientific importance (ADOT 2002).
D&M	Dames and Moore
EHV	extra-high voltage

EIS	Environmental Impact Statement. A federally mandated report that analyzes potential environmental affects of federally funded projects or projects involving land with federal jurisdiction.
EPNG	El Paso Natural Gas Company
GP	Gila Pueblo Archaeological Foundation, Globe, Arizona
GRIC	Gila River Indian Community
GRIC-CRMP	Cultural Resource Management Program, Gila River Indian Community
GRTI	Gila River Telecommunications, Inc.
ha	hectare
Hess	Holocene eolian sand sheet. A geologic unit consisting of a massive blanket of sand that covers large portions of the middle Gila Valley. This deposit is derived from sand blown out of dry streambeds of the Gila River and its tributaries (Waters, 2001:9).
Hf	Holocene alluvial piedmont. This geologic unit is composed of Holocene age fan sediments or bajadas extending from surrounding mountains and buttes (Waters, 2001:9).
Holocene	A geologic epoch dating from 10,000 yr. B.P. (years before present) to the present.
IO	isolated occurrence
km	kilometer
km^2	square kilometer
kV	kilovolt
LSD	Logan Simpson Design, Inc.
m	meter
MNA	Museum of Northern Arizona
NRHP	National Register of Historic Places. A federal listing of historic resources protected under the National Historic Preservation Act of 1966.
NRI	Northland Research, Inc.

OCRM	Office of Cultural Resource Management, Department of Anthropology, Arizona State University
Pf	Pleistocene alluvial piedmont. This geologic deposits consists of all Pleistocene age fan sediments extending from surrounding mountains and buttes (Waters, 2001:8).
PGM	Pueblo Grande Museum
Pleistocene	A geologic epoch dating from 2 million to 10,000 yr. B.P. (years before present).
P-MIP	Pima-Maricopa Irrigation Project
ROW	Right-of-way
SAS	Scientific Archaeological Services
SCIP	San Carlos Irrigation Project
SHPO	State Historic Preservation Office (Arizona)
SMCT	South Mountain Corridor Study Team
SRP	Salt River Project
SSI	Soil Systems, Inc.
SWCA	SWCA, Inc., Environmental Consultants
TCP	Traditional Cultural Property. Those places associated with cultural practices rooted in tribal histories that are essential for maintaining cultural identity.
URS	URS Corporation, Environmental Consultants
USGS	US Geological Survey
WAPA	Western Area Power Administration
yr. B.P.	Years before present