

Monitoring of Sandstone Stair Removal at the San José Grist Mill, San Antonio, Bexar County, Texas



by
Clinton M. M. McKenzie

Principal Investigator
Raymond P. Mauldin

Texas Antiquities Permit No. 6956

Prepared for:
Los Compadres de San Antonio Missions
National Historical Park
6701 San José Drive
San Antonio, Texas 78214



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Technical Report, No. 42

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Abstract:

In August 2014, the Center for Archaeological Research (CAR) at The University of Texas at San Antonio (UTSA) conducted monitoring of the removal of sandstone flagstone steps at the Grist Mill at Mission *San José y San Miguel de Aguayo* in San Antonio, Bexar County, Texas. The work was funded by *Los Compadres* on behalf of the San Antonio Missions National Historic Park and under the review of the Texas Historical Commission. The work was conducted pursuant to Texas Antiquities Permit No. 6956, with Dr. Raymond P. Mauldin serving as Principal Investigator and Clinton M. M. McKenzie as Project Archaeologist. CAR monitored the removal of the WPA era steps and treads in an effort to determine if Spanish Colonial deposits or structural elements underlay the later work. No Colonial elements were identified, and the step refurbishment project proceeded following approval from both the National Park Service and the Texas Historical Commission.

No artifacts were collected. Records generated during the project were prepared for curation according to Texas Historical Commission guidelines. They are permanently curated at CAR at UTSA.

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Chapter 1: Introduction

Project Summary

The Center for Archaeological Research (CAR) at the University of Texas at San Antonio (UTSA) was contracted by *Los Compadres de San Antonio Missions* National Historic Park in August of 2014 to provide archaeological services to the National Park Service (NPS) to monitor the deconstruction of the grist mill upper steps at Mission *San José y San Miguel de Aguayo*. The project area is located on the Southton 7.5-minute series USGS quadrangle map (Figure 1-1). The CAR conducted on-site monitoring of all demolition, swept down and probed all exposed surfaces to determine if any structure lay beneath the current steps, and inspected the back dirt for any signs of Spanish Colonial material culture.



Figure 1-1. Location of project area on the San Antonio East 7.5-minute series USGS quadrangle map.

The land is owned by the NPS, a federal entity, and required to comply with Section 106 of the National Historic Preservation Act of 1966. The work reported herein was coordinated by and through the Texas Historical Commission (THC) and services were performed under Texas Antiquities Permit No. 6956 with Dr. Raymond P. Mauldin, CAR Acting Director, serving as Principal Investigator and Clinton M. M. McKenzie serving as Project Archaeologist.

This document, UTSA CAR Technical Report, No. 42, presents the results of the investigations. In addition to the brief summary of the work conducted, this chapter includes an overview of the Area of Potential Effect and the environmental setting. Chapter 2 presents the cultural setting of the project and reviews previous archaeological investigations in the area. Chapter 3 discusses the methods employed by CAR during field monitoring. Chapter 4 addresses the results of the field investigations followed by a project summary and recommendations in Chapter 5.

Area of Potential Effect (APE)

The Area of Potential Effect (APE) is designated as the limits of the proposed reconstructed stair within the Grist Mill area (Figure 1-2). For convenience sake, this area was designated as 3-x-4-meters (m) though the actual affected area consisted solely of the stairway that was effectively 1.5-x-3-m. The anticipated depth of impact is no greater than 0-5 centimeters (cm) below the bottom of each stair tread removed.



Figure 1-2. *The APE overlaid on an aerial image of the Grist Mill complex.*

Environmental Setting

The project area is located approximately 0.8 kilometers (km) west of the San Antonio River in south central San Antonio. The Mission grounds are bordered by San José Drive on the north and Mission Road on the south and front on Roosevelt Avenue (see Figure 1-1). The APE lies on the north side of the mission compound, outside the walls, and adjacent to the *San José Acequia*.

Climate in Bexar County is defined as “subtropical-subhumid, with mild winters and hot summers. Temperatures in January range from an average low of 39°F to an average high of 62° and in July from 73° to 96°. The average annual rainfall is thirty-one inches.... The growing season averages 265 days a year, with the last freeze in early March and the first freeze in late November” (Long, C. 2010).

The topography in the vicinity of the APE is flat and alluvial with slopes of three to five percent. The project area itself lies within Patrick series soils, specifically designated as PaC (Figure 1-3). Patrick series soils of three to five percent are described as “shallow, dark colored, nearly level and gently sloping soils. These soils occur as terraces along streams that drain the limestone prairies of the county. The surface is a very dark grayish-brown to dark brown, calcareous clay loam about 12 inches thick...the subsurface is brown, calcareous, granular clay loam about 5 inches thick...[and] the substratum consists of water worn, lime-coated limestone gravel” (Taylor et al. 1966:26-27).

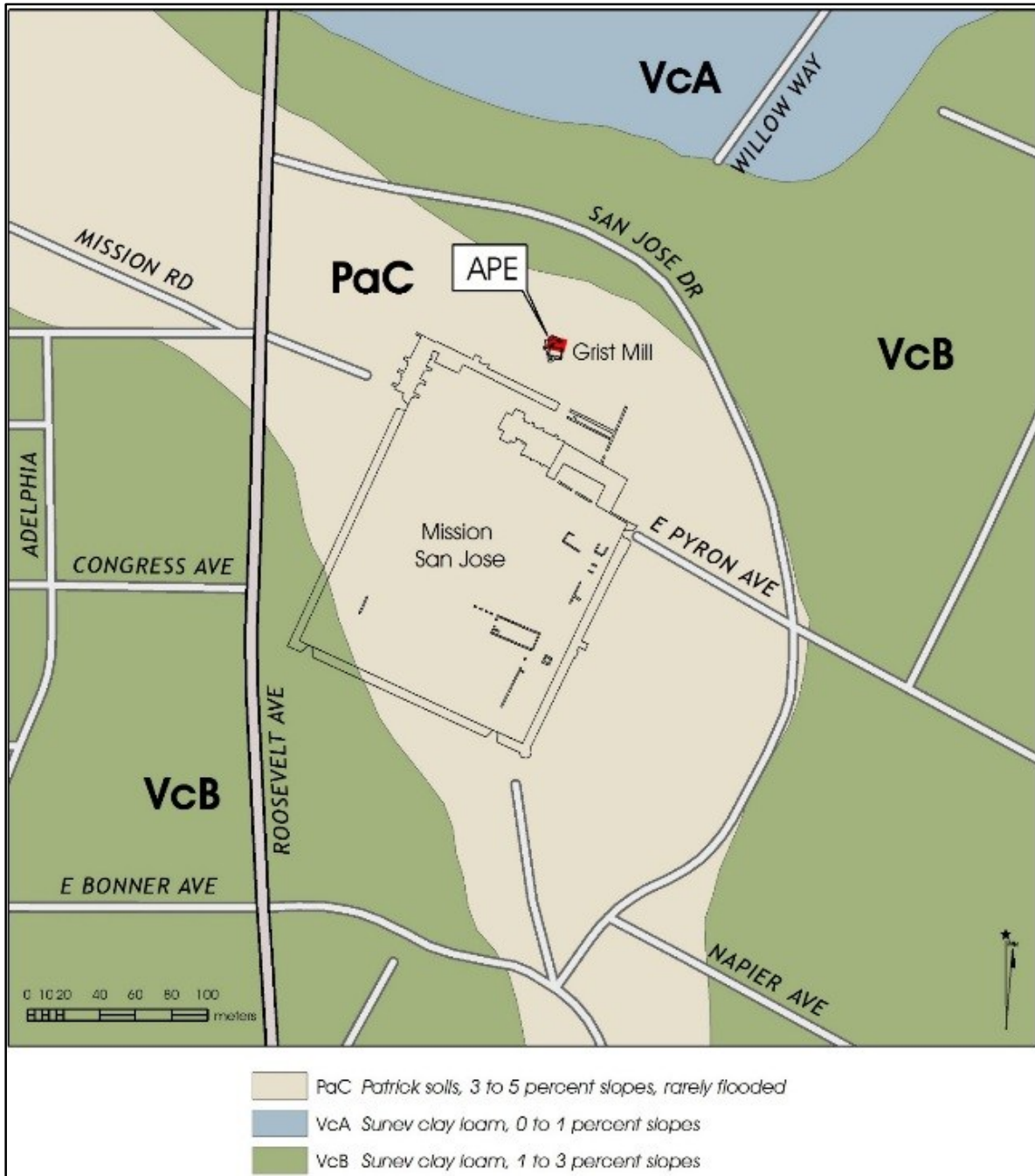


Figure 1-3. Soil series map of project area.

Chapter 2: Culture History and Previous Archaeological Investigations

Culture History

San Antonio and Bexar County are located in the Central Texas archaeological region. Cultural chronology for this region is divided into five broad culture periods: Paleoindian, Archaic, Late Prehistoric, Protohistoric, and Historic. This chapter broadly addresses the first four periods with a greater emphasis on the historic period, an overview of the history of Mission San José, and then a brief history of the Grist Mill.

Paleoindian Period (11,500-8800 BP)

This period coincides with the earliest documented presence of humans in Texas. The Paleoindian period is divided into early and late phases, and Bexar County contains numerous sites that date to these periods. Paleoindian populations consisted of highly mobile bands who hunted both large and small game and, in the early phase Pleistocene, megafauna. In addition to faunal resources, evidence from sites, such as Wilson-Leonard, suggest that Paleoindian populations utilized various flora resources (Bousman et al. 2004; Collins 1998).

The early Paleoindian period (12,000-10,000 BP) is typified by fluted Clovis and Folsom tool kits and the hunting of megafauna (Bousman et al. 2004). Clovis tool kits are found throughout Texas, ranging from High Plains sites, like Lipscomb, to inundated Coastal sites, such as McFadden Beach.

The late Paleoindian period (10,000-9000 BP) is typified St. Mary's Hall, Plainview, Golondrina, and Barber lanceolate projectiles, and associated tool kits (Bousman et al. 2004; Prewit 1981; Turner et al. 2011). Like early Paleoindian period sites, late Paleoindian sites are widely distributed across Texas. The type-site for St. Mary's Hall is located in San Antonio, Bexar County, Texas, and all of the identified forms of late Paleoindian artifacts are found in the San Antonio area. The late Paleoindian period demonstrates a shift in subsistence from megafauna to smaller game animals (Bousman et al. 2004).

Archaic Period (9000-1200 BP)

The Archaic is divided into three periods: Early, Middle, and Late (Black 1989; Bousman et al. 2004; Mauldin et al. 2013). The period is characterized by a profusion of projectile point types and the adoption of ground and pecked stone tools. The profusion of tools demonstrates diffusion within the landscape and a greater reliance on and exploitation of local environments (McGraw and Hinds 1987; Story 1985).

Early Archaic (9000–6800 BP)

Early Archaic sites are usually small, suggesting that populations were highly mobile and of low density (Peter et al. 2006; Prewit 1985; Weir 1976). The Richard Beene site (Thoms et al. 1996) is a notable Early Archaic site in Bexar County. Another notable Early Archaic site is Wilson Leonard (Collins ed. 1998) located in Williamson County. Burned rock and hearth features, as well as lithic procurement sites and lithic caches, become more common during the latter part of the period (Collins ed. 1998). Food resources include bison, deer, rabbit, turtle, fish, and fresh water mussel (Collins 2004). The period exhibits a greater utilization of plants, such as prickly pear, sotol, and agave, as evidenced by the use of ground stone.

Middle Archaic (6800–4200 BP)

In common with both the Early and Late Archaic periods, a profusion of new projectile point styles define the Middle Archaic in Central Texas. These include Bell, Andice, and Taylor for the early Middle Archaic and Nolan, La Jita, and Travis during the late Middle Archaic (Turner et al. 2011). Notable Middle Archaic sites include the Granberg site (Munoz et al. 2011) located in Bexar County, as well as the Gatlin site (Houk et al. 2009; Oksanen 2008), and the Jonas Terrace site in Medina County (Johnson 1995).

Subsistence during the early portion of the Middle Archaic is presumed to be associated with the exploitation of bison, along with a variety of plant resources (Black 1989; Collins 2004; Johnson and Goode 1994). Black and Creel (1997) note that burned rock middens begin to accumulate in the Central Texas region during this period. These earth oven features were used to bake a broad range of plants, including nuts, bulbs, and roots, as well as animal resources (Mauldin et al. 2013).

Late Archaic (4200–1200 BP)

This period is sometimes divided into both a Late Archaic I and Late Archaic II (Johnson and Goode 1994). For the purposes of this culture history, the period will be discussed as a whole. The Late Archaic exhibits diffuse varieties of projectile points such as Pedernales, Marshall, Castroville, Montell, Marcos, Fairland, Frio, Ensor, and Darl (Collins 2004). In addition to these point styles, corner-tanged knives, biface caches, marine shell ornaments, and cylindrical stone pipes characterize the sub-period (Collins 2004; Hall 1981; Hester 2005). The Late Archaic period is represented by a number of notable sites, including Panther Springs (Black and McGraw 1985) in Bexar County, Onion Creek (Ricklis and Collins 1994) in Hays County, as well as sites in the Lower Pecos (Turpin 2004), such as Bonfire Shelter (see Dibble 1967; an Dibble and Lorrian 1968).

Large cemeteries are increasingly common in Central and South Texas during this period, including Olmos Dam (Lukowski 1988) in Bexar County and Loma Sandia in Live Oak County (Taylor and Highley 1995). The relative abundance of recovered human remains during this sub-period has provided isotopic data on human subsistence in Central Texas. A review by Munoz et al. (2011) of 32 burials in the Central Texas

area (41KR241, 41BX1, 41BX26, and various Hayes County sites) were divided temporally into groups for comparison. Early Late Archaic averages compared to those from the close of the Middle Archaic suggest a similar overall diet, with a slight increase in C₄/CAM proteins that may reflect an increased use of C₄ feeding bison. The late Late Archaic isotopic data reflect an increased dependence on C₃ resources, such as deer, relative to C₄/CAM protein sources, such as bison (Munoz et al. 2011). In addition to the potential shift from C₄ to C₃ protein resources, subsistence in the Late Archaic continued to include reliance on plant resources (Black 1989).

Prehistoric Period (1200-450 BP)

The Late Prehistoric is divided into two main periods: Late Prehistoric I and Late Prehistoric II. The Late Prehistoric period is characterized by the introduction of the bow and arrow (replacing the atlatl, or spear thrower, after 10,000 years as the primary hunting tool) and the introduction of ceramic technology. The Late Prehistoric I period (1200-800 BP) is associated with Scallorn and Edwards arrow points and tools, such as Pipe Creek bifaces (Hester et al. 2011). During this period the focus appears to shift from bison to deer, and this is assumed to be a presence/absence choice due to the decline in bison populations (Collins 2004). There are indications of conflict and stress between communities as evidenced by burials with embedded or closely associated Edwards and Scallorn arrow points (Prewitt 1974). The Late Prehistoric II is typified by Perdiz, Cuney, and Fresno arrow points, bone tempered ceramics, and formal tools, such as end scrapers, beveled knives and Gahagan bifaces (Hester et al. 2011). The latter portion of this period is referred to as the Toyah Phase and is closely associated with an increase in predation on bison (Kenmotsu and Boyd eds. 2012).

Proto-historic Period (500–325 BP)

The Proto-historic period is antecedent to the formal Historic period in Texas. Essentially, it represents the time period from first European contact to formal exploration and/or colonization (circa 500 to 300 BP for Texas and the San Antonio area). The Proto-historic period is not static and varies temporally across the state based on when interactions between Native American's and Europeans actually occurred. For example, in the Galveston area the Proto-historic dates to 1528 and the shipwrecked survivors of the Narváez Expedition (Bolton 1916). In west Texas and the Texas Panhandle the dates range from 1541 to 1581 bracketing the Coronado *entrada* of 1540-1542 that includes the area around modern Pecos, Texas, and north through the *Llano Estacado* to the Arkansas River, and the Chamuscado-Rodriguez *entrada* of 1581 into the El Paso area (Bolton 1916). Likewise, the end of the Proto-historic also varies across the state. For San Antonio, the Proto-historic ends around 1650 to 1700. The first formal *entrada* into the valley of San Antonio was that by Domingo Terán de los Ríos in June of 1691 (Foster 1995). The expedition of Isidro Félix de Espinosa, Antonio de San Buenaventura y Olivares, and Pedro de Aguirre of 1709 passed

through San Antonio on the way to search for the Tejas, who were believed to be living on the Colorado River (Chipman 1992).

A significant source of information for the early Proto-historic period comes from the *La Relación* of Alvar Núñez Cabeza de Vaca who was shipwrecked on the Texas coast in 1528, most likely on Galveston Island. *La Relación* is Cabeza de Vaca's firsthand account of his captivity and subsequent escape from the Karankawa on the Texas coast during the years 1528-1536. During this time, it is probable that Cabeza de Vaca passed through the San Antonio area. Cabeza de Vaca's account provides information on the cultural practices and lifeways of Native Americans during the early Proto-historic period in Texas and the desert southwest.

The reports of the numerous *entradas* and other Spanish explorations of the sixteenth and seventeenth century document interactions with Native Americans, their geographic associations, and some of their lifeways, languages, and material culture. The Proto-historic is characterized by interactions with the Spanish and to a much lesser degree the French; however, indigenous cultures maintained their own economies (Arnn 2012; Hester 1995). Europeans were present during these two centuries but did not otherwise directly impact the lives of most Native Americans. The greatest impacts of Europeans on native cultures was through disease and the introduction of old world domesticates such as cattle, horses, and pigs.

Colonial Historic Period (ca. 1690 to 1821)

The Colonial Period in San Antonio runs from 1690 to 1821, the year Mexico gained independence from Spain. Following the de los Ríos *entrada* of 1691 and the Espinosa, Olivares, Aguirre expedition of 1709, the formal decision to found a mission and presidio at San Antonio was made (Habig 1968). The Spanish subsequently created the civil settlement of *San Fernando de Béxar* and the religious settlement of *San Antonio de Valero* in June of 1718. By 1732, five more missions were located or re-located along the San Antonio River: *San José y San Miguel de Aguayo*, *Nuestra Señora de la Purísima Concepción de Acuña*, *San Francisco de Nájera*, *San Juan de Capistrano*, and *San Francisco de la Espada* (Habig 1976). While five of these six missions persisted, *San Francisco de Nájera* was dissolved, and its neophytes distributed between *Concepción* and *San José*.

During the period from 1718 to 1790, the five Spanish Missions located in San Antonio took in numerous Native American tribes and dramatically altered their culture and way of life through assimilation and domination (Cargill 1996). The Spanish altered the landscape through land clearance and by the construction of canals and diversion dams. These canals, known as *acequias*, expanded the arable land and provided drinking water (Cox 2005). The *suertes* of land (so named because they were drawn by lottery or "luck") surrounded the town with cropland to support both the civil and religious settlements. By the early

1790s, the Missions were secularized, and their lands were distributed chiefly among the remaining missionized Native Americans.

History of Mission *San José y San Miguel de Aguayo*

For the purposes of this technical report only a brief history of Mission *San José y San Miguel de Aguayo* will be provided. Those interested in a more comprehensive history of the Mission are referred to M. A. Habig's *San Antonio's Mission San José, State and National Historic Site 1720-1968* (1968).

Mission San José's first foundation was established in 1720 approximately five and a half kilometers south from Mission *San Antonio de Valero* (also known as the Alamo) and on the east bank of the San Antonio River. Father President Antonio Margil de Jesús, of the Franciscan College of *Nuestra Señora de Guadalupe de Zacatecas* requested the founding of a second mission at San Antonio in late 1719 (Habig 1970). This was deemed necessary to accommodate the numerous Native Americans who had swelled the population of Mission *San Antonio de Valero*. These neophytes resettled to San Antonio following Spanish abandonment of the east Texas presidios and missions in 1719 as a result of French invasion. The new mission was named for Saint Joseph and for the Marqués de San Miguel de Aguayo. José de Azlor y Virto de Vera, Marqués de San Miguel de Aguayo, was then Spanish Governor of Coahuila and Texas. The Marqués de San Miguel de Aguayo subsequently led the successful expedition to reclaim East Texas from the French in 1721 (Habig 1968). Originally founded on the east bank of the San Antonio River, Mission San José removed to its present location sometime between 1724 and 1727. The mission continued in existence as a functioning polity until partial secularization under Spanish Governor Manuel Muñoz in 1794 and final secularization in 1824. The lands of the mission were parceled out to missionized Native Americans, and the church was transferred to the control of the Church of *San Fernando de Béxar*. Despite the dome collapse in 1868 and the bell tower steps collapse in 1903, the mission church continued in intermittent use throughout the remainder of the nineteenth century (Habig ed. 1983). In the first quarter of the twentieth century, efforts were made by both the Archdiocese and the San Antonio Conservation Society to repair and maintain the old church. These efforts culminated in the early 1930s with the selection of the site as a Works Progress Administration (WPA) project. A significant portion of the church and ancillary structures of Mission San José today are the fruits of the WPA labors of the 1930s (Rock and Chavez 1997).

History of the Grist Mill Complex

The Grist Mill is considered a Norse or Northern style mill. These mills were given the appellation of Norse from their early and extensive use in Norway, and they are typified by the use of horizontal water wheels. While they were common throughout northern Europe, Norse mills are predicated on ancient Greek forms also found in Southern Europe, Asia Minor, and into Mesopotamia (Neely 1999; Rock and Chavez 1997).

The selection of this location for the Grist Mill is presumed to relate to at least three constraining functions: access to water power via the *San José Acequia*, ease of access, and ease of construction. The mill could have been sited along any suitable stretch of the *acequia*, i.e. anywhere an elevation difference would have facilitated the construction of a gravity-driven Norse style mill. The most likely explanation for the placement of the mill is the fact that, in addition to being close to the *acequia* and to the mission compound, the site had already been largely excavated to intrude lime kilns and a lime slaking pit into the face of the sloping terrace. These lime kilns produced the lime for mortar and lime wash for the developing mission. Choosing to erect the mill at this location would have obviated the need for major additional excavations and commitment of labor.

The precise date of the Grist Mill's initial construction and operation is ambiguous in the archival record. Adding to the confusion are extant reports that inadvertently posited incorrect early dates for the mill, and these have been promulgated in the historical record and reporting on San José. The principal error stems from attributing earlier sugar mills as grist mills and the conflation of the two (Rock and Chavez 1997). As the sugar mill at San José was the earlier (mid-1750s), some authors have used the reference to a mill of any kind as evidence for the Grist Mill. Regardless, there are two key archival sources that bracket the date of the Grist Mill's probable construction, the first being the date at which a grist mill is mentioned for San José, and the second being the date at which a grist mill first appears in an inventory (Neely 1999; Rock and Chavez 1997). The first mention of the intention to build a water powered mill at San José is in the correspondence of the Commandant General, Teodoro de Croix, to Governor Domingo Cabello in 1779 (de Croix 1779; Neely 1999; Rock and Chavez 1997). The first mention of a water powered mill, or *molino*, is found in an inventory of the Mission in 1794, attributed to Governor Don Manuel Muñoz (Muñoz 1983; Neely 1999). From these known facts, coupled with additional archival references, it is adduced that the mill at San José dates to sometime between 1790 and 1794.

The terminal date for the mill's use is similarly ambiguous. The *terminus post quem* date is 1809 when it is specifically mentioned by the Alcalde de San José A. S. Mandujano (1983; Neely 1999). It is probable that the mill continued in operation beyond that date. There is also documentation, albeit from a fictional account, that the mill structure was extant until circa 1859-1864. Father Alto S. Hoermann, the German Benedictine Prior of a nascent school at San José from 1859 to 1864, penned a novel, *The Daughter of Tehuan; or, Texas of the Past Century*, in which he describes the mill in considerable detail (Neely 1999; Rock and Chavez 1997):

It was situated on the opposite of the ditch [*Acequia Madre de San José*]. The reservoir [forebay] was built of rough hard rock, plastered with common mortar, and perfectly waterproof. It was supplied with water from the ditch. Next to the reservoir there was a vault built of solid tufa, which opened towards the field. The mill was erected directly over this vault, which contained the turbine. An opening near the bottom of the reservoir allowed the water to fall on the turbine, from a height of about ten feet. After having furnished power for the turbine, the water flowed in a deep ditch to the fields. The mill stood on the ridge of the prairie... [Hoermann 1932:95-96].

Hoermann's novel is certainly fictional, but it must have some basis in fact to have accounted for as much detail as is present. It provides additional, albeit colorful, ambiguity to an already vague chronology. From these accounts and the known initiation and termination dates, it appears certain that the mill was in operation at least fifteen years, 1794-1809, and that the longest conjectural span of operation is 1790 to 1864.

Irrespective of the mill's date of termination, no structural elements were standing by the time of the WPA project in 1933-1937. Only during the course of that work was the grist mill rediscovered and redeveloped. The current structure is in large measure a creation of Ernst Schuchard, the engineer employed for the project, as very little is known about the physical appearance of the original mill (Rock and Chavez 1997). Schuchard conducted in-depth research and travelled to California to investigate and make drawings of similar Spanish Colonial mill structures to aid in his restoration of the Grist Mill at San José. In viewing the reconstruction, it is important to separate the original features from those built by the WPA. The original Spanish Colonial materials remaining include the forebay on the south side of the mill and the lower wheel room. These are constructed of tufa, which was then lime-washed. The WPA work is clearly identified by the use of sandstone in the upper room and veneer on the lower wheel room. Figure 2-1 is a photograph of the mill as excavated in 1934 and clearly shows the original Colonial construction. Figure 2-2 is a present day photograph showing the WPA reconstruction.

Previous Archaeological Investigations

Two archaeological projects have taken place at the grist mill. The earlier excavations took place in 1996 and were performed by CAR. The second set of excavations took place in 2000 under auspices of the NPS.

1996 CAR Excavations

In December of 1996, the CAR undertook investigations of the Grist Mill and the adjacent areas in advance of plans to make the mill operational (Scese and Gross 1998). These investigations focused on six areas,

designated as Areas A through F in the immediate vicinity of the grist mill (Figure 2-3), which were further divided into alphabetically designated excavation blocks. These locales were chosen in an attempt to determine the functional and temporal affiliations of extant constructions. Table 2-1 lists the excavated areas by alphabetical designation, the justification for excavation, and the results of the excavation. The investigators concluded that several staircases were associated with the WPA; that Spanish Colonial deposits remain beneath the lower flagstone floor; and that much of the upper area had been heavily disturbed by the WPA excavations (Scease and Gross 1998).

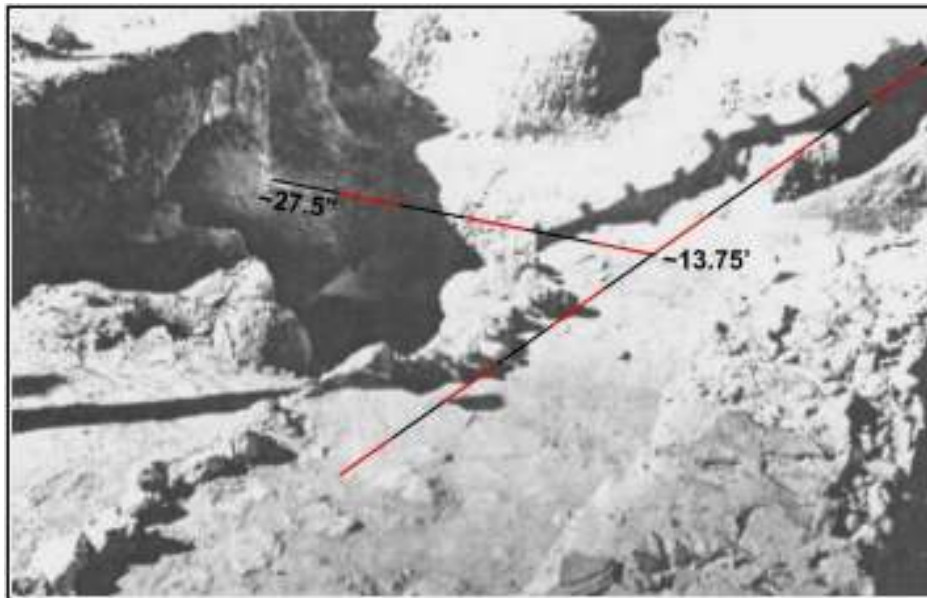


Figure 2-1. Photograph of mill as excavated in 1934.

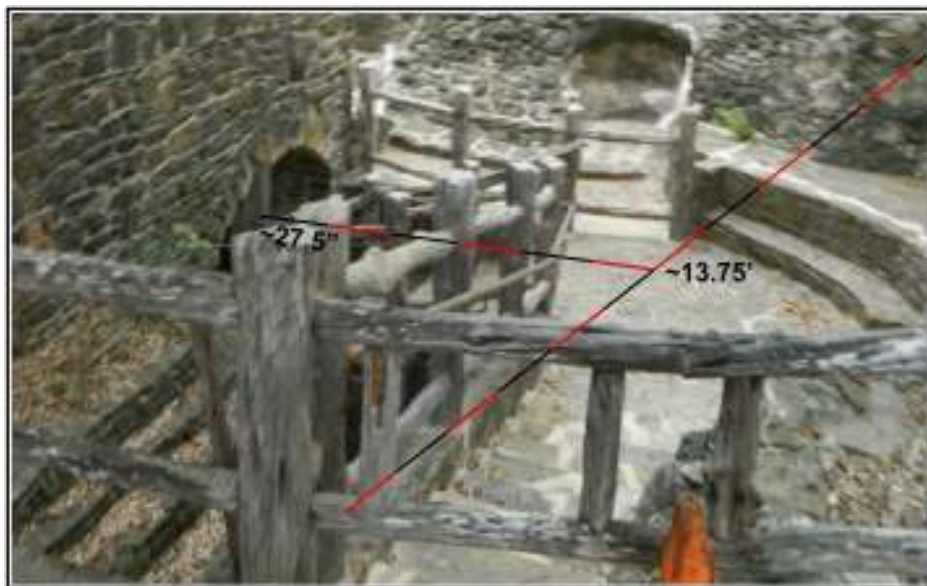


Figure 2-2. Present-day photograph showing WPA reconstruction.

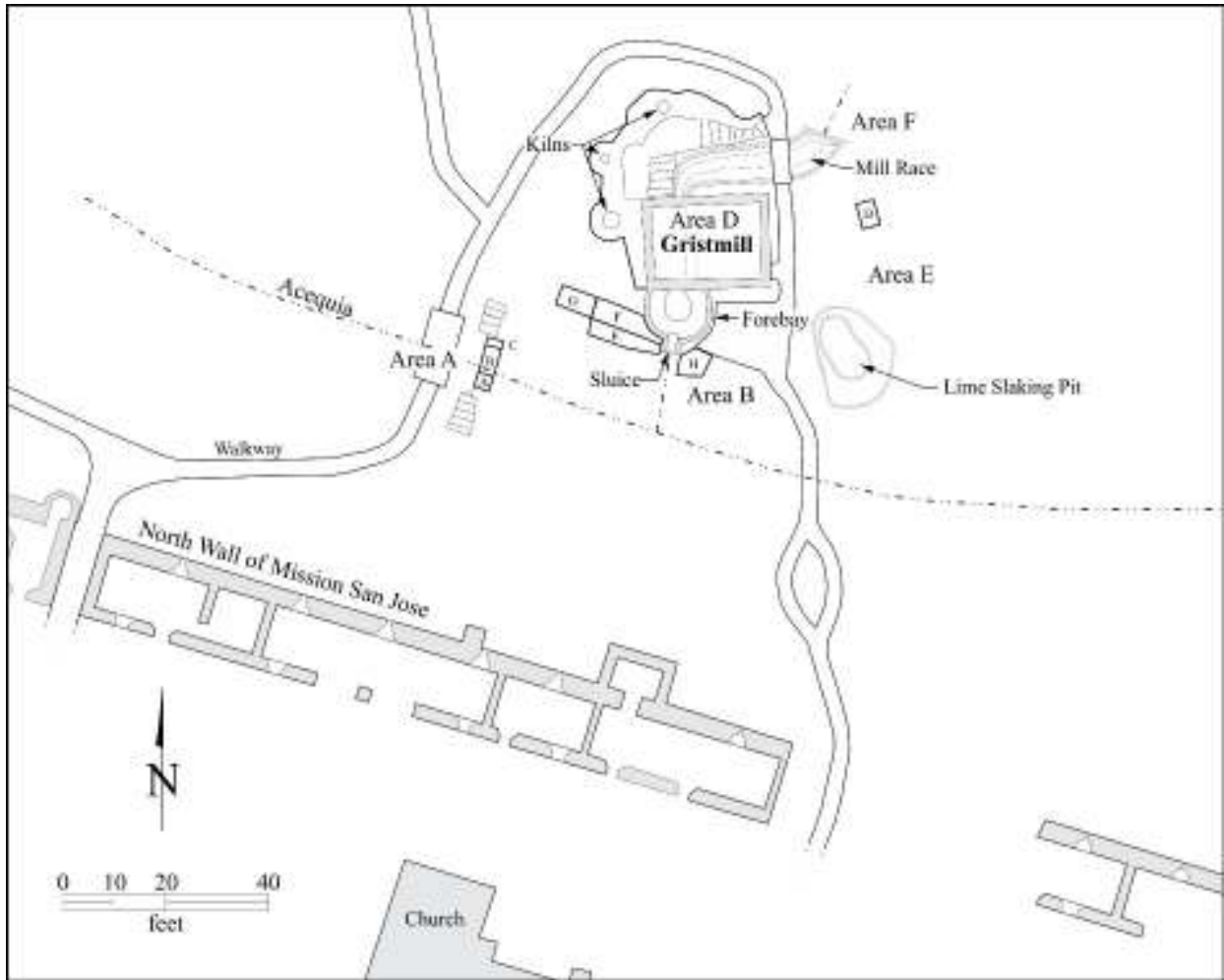


Figure 2-3. Previous excavations within the APE. The 1996 (Sease and Gross 1998) excavations are marked as A through H.

Table 2-1. 1996 Grist Mill Excavations and Results (Scease and Gross 1998)

AREA/UNIT	FOCUS	RESULT
Area A-South Stairs	Determine temporal affiliation and condition.	Stairs appear to be WPA construction. No direct Colonial association or attribution; stairs may be reconstructions.
Area A, Unit A	Determine profile and temporal affiliation of <i>acequia</i> channel between N & S stairs	20th century fill in upper deposits. 18th & 19th century materials present from 18" to 42" below datum.
Area A, Unit B	Determine profile and temporal affiliation of <i>acequia</i> channel between N & S stairs	20th century fill in upper deposits. 18th & 19th century materials present from 18" to 42" below datum.
Area A, Unit C	Determine profile and temporal affiliation of <i>acequia</i> channel between N & S stairs	20th century fill in upper deposits; however, no earlier cultural material identified. Deposits shallower in Unit C.
Area A, North Stairs	Determine temporal affiliation and condition.	Stairs appear to be WPA construction. No direct Colonial association or attribution; stairs may be reconstructions.
Area B, Sluice	Determine association with <i>acequia</i> and identify any unknown structures	Associated but of WPA era construction. No evidence of Colonial structures. Three features were noted: Feature 3 (see Area B, Unit E); Feature 4 (See Area B, Unit G); and Feature 5 (see Area B, Units F & H).
Area B, Unit E	Determine affiliation of Feature 3 - a buried wall running perpendicular to west wall of sluice.	Temporal affiliation not determined.
Area B, Unit F	Determine affiliation of Feature 5 - a buried low semi-circular wall abutting east side of sluice.	Temporal affiliation not determined.
Area B, Unit G	Determine affiliation of Feature 4 - an alignment of limestone cobbles adjacent to Units E & F	Feature 4 was a single layer of cobbles and appears to be a walkway boundary dating to the WPA or later.
Area B, Unit H	Determine affiliation of Feature 5 - a buried low semi-circular wall abutting east side of sluice.	Temporal affiliation not determined - presumed Spanish Colonial. Deposits mixed.
Area D, Turbine Room	Determine if original Colonial floor is extant.	Determined. Colonial floor present.
Area E, Tanning Vat/Sugar Processing	Remove post 1930s fill from feature.	Feature cleared of fill.
Area E, Unit D	Determine temporal affiliation of a sandstone wall.	Determined that wall is of WPA or later construction.
Area F	Determine if sandstone lining of mill race continued past the wall.	Determined that sandstone lining terminates three feet from the north wall.

2000 National Park Service Excavations

Excavations were undertaken by the NPS in 2000 (Snow 2000) to provide archaeological clearance in advance of the installation of an overflow pipe running from the forebay to the WPA Mill Race (see Figure 2-4). In addition to the excavations along the alignment of the proposed overflow pipe, a single 50-x-70-cm unit was excavated in the floor of the forebay. A total of 14 units were excavated and designated as Test Units 1 to 14, respectively, and the generalized results of these excavations are tabulated in Table 2-2. The excavations identified two new Spanish Colonial features in addition to reinvvestigating Area B, Unit H of the 1996 CAR excavations (related to the Spanish Colonial semi-circular wall adjacent to the eastside of the sluice/forebay).

The two new features included the documentation of the presence of the original Spanish Colonial floor of the forebay beneath the current WPA construction and the discovery of a Spanish Colonial midden deposit in Test Units 11 and 12 ranging from 50-70 cm below the surface (cmbs). The midden deposit predates the construction of the grist mill. The reinvvestigating of Area B, Unit H, corresponded with Test Unit 2 and determined that the semi-circular wall is Spanish Colonial in age, which possibly represents a double wall construction schema for the forebay. The space between these two walls (the forebay proper and the semi-circular wall) is composed of gravel and mortar fill arguing for simultaneous construction (Snow 2000).

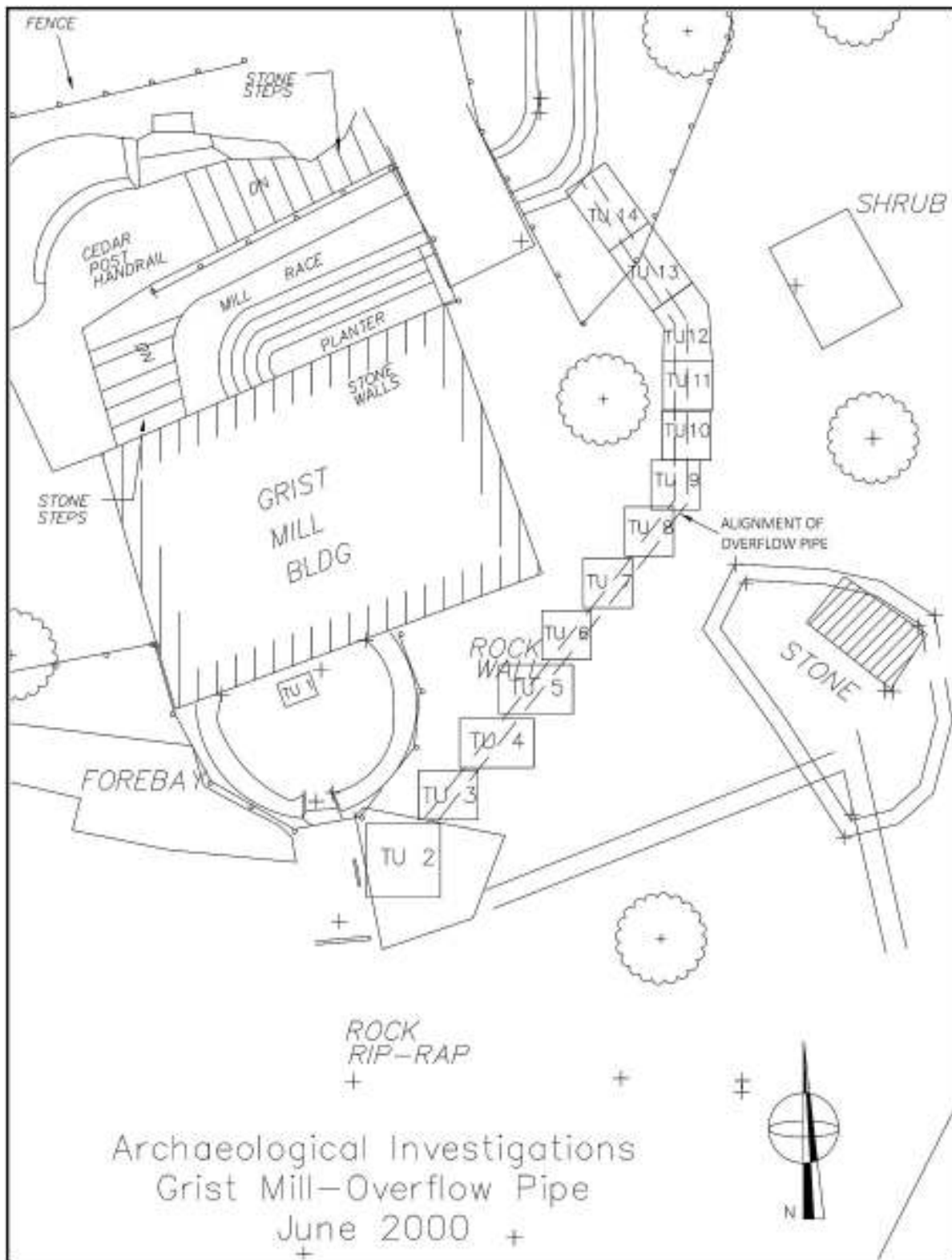


Figure 2-4. Previous excavations within the APE. The 2000 (Snow 2000) excavations are marked as Test Units (TU) 1 to 14 (Map courtesy of San Antonio Missions National Historic Park).

Table 2-2. 2000 Grist Mill Excavations and Results (abstracted from Snow 2000)

AREA/UNIT	FOCUS	RESULT
Forebay Floor Test Unit 1 50-x-70 cm	Determine presence/absence and condition of Spanish Colonial floor.	Spanish Colonial floor revealed ranging from 9.5-14 cmbs. Floor consists of pebbles packed in mortar. Floor slopes downward from south to north. Preservation is greater in the southern portion. Area back-filled with sand and soft mortar.
Adjacent to Sluice Test Unit 2 1.5-x-1.5 m	Re-expose and expand Area B, Unit H, from 1996 excavations to determine temporal affiliation and stabilize masonry wall.	Wall exposed and stabilized. Stabilization determined presence of packed mortar fill between this curtain wall and the forebay wall possibly indicating double wall construction of the forebay.
Overflow Pipe Path Test Unit 3 1.2-x-1.03 m	Excavate proposed path of new overflow pipe and determine presence/absence of Spanish Colonial features or deposits.	Cobble and mortar pathway identified 20-25 cmbs and adjacent to Spanish Colonial wall. No excavation below feature.
Overflow Pipe Path Test Unit 4 1.5-x-1 m		Cobble and mortar path continue across unit. No excavation below feature.
Overflow Pipe Path Test Unit 5 1.5-x-1 m		Cobble and mortar path continues but was truncated by a later trench. Path dates to WPA or later based on mixed deposits within trench and in profile below cobble path.
Overflow Pipe Path Test Unit 6 1-x-1 m		Cobble and mortar path terminates in this unit. A PVC electrical conduit cuts across at 30 cmbs. Disturbed/mixed deposits.
Overflow Pipe Path Test Unit 7 1-x-1 m		The PVC electrical conduit in TU 6 continues diagonally across the unit. Disturbed/mixed deposits.
Overflow Pipe Path Test Unit 8 1-x-1 m		The PVC electrical conduit in TUs 6 & 7 cuts across the SE corner. The PVC trench cut a pre-existing cloth-covered electrical line in the NE corner of the unit.
Overflow Pipe Path Test Unit 9 1-x-1 m		The cloth-covered wire in TU 8 persists across the SW quadrant of TU 9 at 20 cmbs. Beneath this abandoned line is another tar-covered copper line at 30 cmbs.
Overflow Pipe Path Test Unit 10 1-x-1 m		Soil mixed with cobbles and mixed/disturbed artifacts.
Overflow Pipe Path Test Unit 11 1-x-1 m		Cobble fill (similar to TU 10) to 40 cmbs. Intact Spanish Colonial midden deposit extending west to Grist Mill at 50 cmbs.
Overflow Pipe Path Test Unit 12 1-x-1.7 m		Small gravel fill to 40 cmbs. Midden from TU 11 persists and deepens to 70 cmbs. Deposit is beneath roots of existing Live Oak tree.
Overflow Pipe Path Test Unit 13 1-x-1 m		Soil and gravels with mixed/disturbed artifacts.
Overflow Pipe Path Test Unit 14 1-x-1.5 m		Unit abuts WPA Mill Race wall. Fill composed of construction debris. A water pipe transects the northern portion of the unit.

Chapter 3: Field and Laboratory Methods

Field Methods

The scope of work (SOW) was prepared to accompany the Antiquities Permit Application submitted to the Texas Historical Commission's Department of Antiquities Protection. The APE consists solely of the Grist Mill complex on the north side of the Mission. The scope and permit were specifically related to proposed stair improvements at the Mission *San José y San Miguel* Grist Mill.

The APE was 4-x-3-m in maximum dimension. The proposed improvements to the sandstone stairs required the removal of deteriorated WPA era stone treads and facings leading to the wheel room observation area. The area of archaeological concern was the potential for Spanish Colonial structural elements, and/or associated artifacts, to remain beneath the WPA stair construction. Photographic evidence from the time of the WPA work demonstrated that the original Colonial stairs were possibly extant at that time (see Figure 2-1). Further, the Grist Mill Historic Structures Report (Scease and Gross 1998) posited that the WPA stairs possibly overlay the original Colonial construction. CAR conducted archaeological monitoring of the demolition work and minor (less than 5 cm) excavation below the steps. All deposits were screened through ¼-inch mesh, and any artifacts noted and, if significant, collected. Any evidence of the original Colonial stairs were to be photo-documented and hand drawn. A draft version of this report will be submitted to the THC for review and approval, and copies of the final version of the report will be provided to the owner and sponsor.

Laboratory Methods

All records obtained and/or generated during the portion of the project that occurs on public property have been prepared in accordance with federal regulations 36 CFR Part 79 and THC requirements for State Held-in-Trust collections. Field forms are printed on acid-free paper and completed with pencil. No artifacts were collected or brought to the CAR laboratory. Project documentation, such as field notes, forms, photographs, drawings, will be placed in labeled archival folders. Digital photographs will be printed on acid-free paper and labeled with archival-quality page protectors to prevent accidental smearing due to moisture.

Chapter 4: Results of Field Investigations

In preparation for the monitoring, CAR staff compared WPA era and present-day photographs in an attempt to determine the historic alignment and elevation of the stairs uncovered during the WPA (see Figures 2-1 and 2-2). The present-day photograph attempted to maintain the same angle and perspective as the WPA photograph. The comparison of the photographs is instructive, although it should be noted that these are close approximations and not perfect comparisons. The images when viewed comparatively clearly demarcate the original from the new construction both spatially and materially. They also indicate that the sandstone veneer on the lower course is approximately 70 cm in thickness. The lines superimposed on these photographs approximate the same measurements and indicate that the original steps appear to have been truncated by subsequent construction.

CAR staff met on-site with representatives of Frisch Construction each morning at 11:00 am from August 19 to 21, 2014. During these three days, the Frisch crew removed all of the existing steps, beginning at the landing that lies between the upper steps to the upper walk and the lower steps to the waterwheel room. Frisch personnel continued the careful hand removal of the steps by working their way progressively up the flight until the treads and facings were all removed (Figures 4-1 and 4-2). As each step was removed, CAR staff swept down the face of the contact surface to determine if there was any underlying structure. In a few cases, stones were found, but in every case, these stones had WPA mortar adhering and were removed.



Figure 4-1. *Stairs prior to initiation of demolition work by Frisch.*



Figure 4-2. *APE following stair and tread removal.*

The majority of the stones utilized by the WPA are sandstone from the south Bexar County and surrounding southern counties. There are a few fragments of tufa that most likely represent reuse of earlier Colonial building materials. Frisch personnel saved all large pieces of stone for reuse in the new steps.

Beneath the WPA steps was a packed fill consisting predominantly of flinty gravel, which is common in the immediate area and typical of the Patrick soils series (Figure 4-3). This gravel and caliche fill constituted approximately 90-95 percent of the substrate beneath the steps. In a few areas, the substrate was mixed with darker soils with negligible amounts of cultural material (Figure 4-4). A smattering of Spanish Colonial materials were encountered near steps 2 and 3 and consisted of a crumb of terra cotta brick and 5-mm-x-1-cm fragment of Goliad Ware – neither of which were in primary context and neither of which were collected. It is important to make the distinction between “fill” and the naturally occurring substrate composed of Patrick soils, flinty gravel, and caliche. The two deposits are distinguishable only on the basis of the presence or absence of cultural materials and/or humic soil. When encountering this substrate elsewhere in the vicinity it is not safe to assume, a priori, that it is automatically an intact, natural deposit. Care should be taken to determine the substrate contains no cultural material or darker, humic soil.

After the three days of demolition and monitoring, CAR staff elected to utilize a metal probe to determine if there were any buried steps not evident from surface inspection. These probes failed to identify any buried construction.

During the course of the monitoring, no evidence of the pre-existing Spanish Colonial steps was encountered.

Frisch personnel hand drew and photo-documented all of the existing stonework on the stairs and provided copies of the same to CAR staff (Figure 4-5).



Figure 4-3 *Underlayment of steps 2 and 3. North arrow is lying on top of mixed deposits containing Spanish Colonial materials.*



Figure 4-4. *Close-up of mixed deposit containing minimal Spanish Colonial materials and charcoal.*

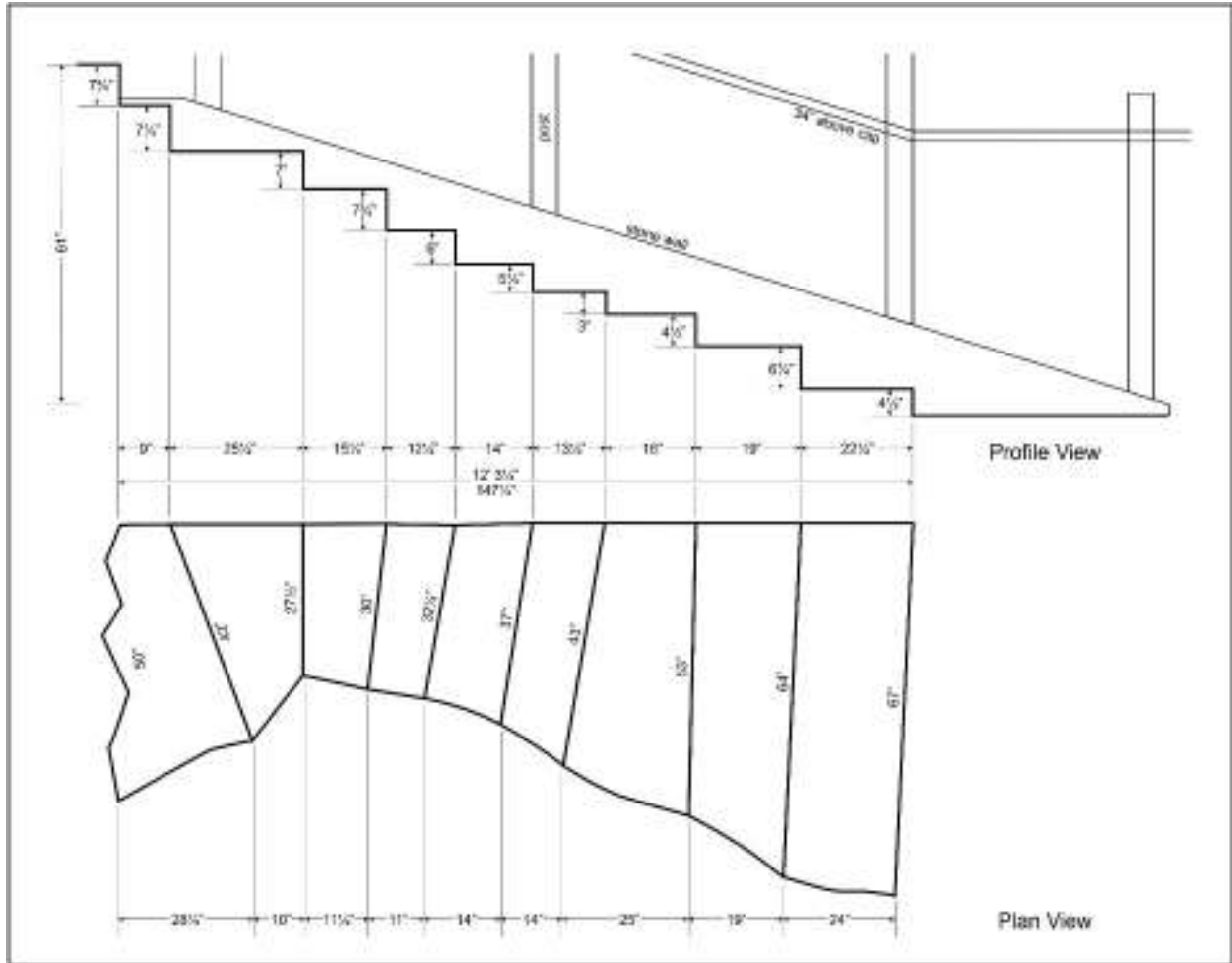


Figure 4-5. Line drawing of new stair plan.

Summary and Recommendations

CAR staff, in consultation with NPS and the THC Divisions of Archeology and Architecture, recommended at the conclusion of fieldwork that the project be allowed to immediately proceed as no intact Spanish Colonial constructions or features were encountered. NPS and THC concurred with this recommendation.

CAR staff recommends that any future work in the vicinity of the mill be monitored or investigated prior to inception of construction activity. The various and ephemeral nature of remaining Spanish Colonial deposits warrants vigilance of these finite resources.

References Cited:

- Arnn, J.W., III
2012 *Land of the Tejas*. University of Texas Press, Austin.
- Black, S.L.
1989 Central Texas Plateau Prairie. In *From the Gulf Coast to the Rio Grande: Human Adaptation in Central, South, and Lower Pecos Texas*, edited by T.R. Hester, S.L. Black, D.G. Steele, B.W. Olive, A.A. Fox; K.J. Reinhard, and L.C. Bement, pp. 17-38. Research Series No. 33, Arkansas Archeological Survey, Fayetteville.
- Black, S.L., and D.G. Creel
1997 The Central Texas Burned Rock Midden Reconsidered. In *Hot Rock Cooking on the Greater Edwards Plateau: Four Burned Rock Midden Sites in West Central Texas*, edited by S.L. Black, L.W. Ellis, D.G. Creel, and G.T. Goode, pp. 446-515. Studies in Archeology No. 22, Texas Archeological Research Laboratory, Austin.
- Black, S.L., and A.J. McGraw
1985 *The Panther Springs Creek Site: Culture Change and Continuity in the Upper Salado Creek Drainage, South-Central Texas*. Archaeological Survey Report, No. 100. Center for Archaeological Research, The University of Texas at San Antonio.
- Bolton, H.E.
1916 *Spanish Exploration in the Southwest, 1542-1706*. Charles Scribner's Sons, New York.
- Bousman, C.B., B.W. Baker, and A.C. Kerr
2004 Paleoindian Archeology in Texas. In *Prehistory of Texas*, edited by T.K. Pertulla, pp. 15-97. Texas A&M Press, College Station.
- Campbell T.N., and T.J. Campbell
1985 *Indian Groups Associated with Spanish Missions of the San Antonio Missions National Historical Park*. Special Report, No. 16. Center for Archaeological Research, The University of Texas at San Antonio.
- Cargill, D.
1996 Stable Isotope Analysis at Mission San Juan de Capistrano, San Antonio, Texas. Unpublished Master's thesis, Department of Anthropology, The University of Texas at San Antonio.
- Chabot, F.C.
1937 *With the Makers of San Antonio*. Privately published, San Antonio.
- Chipman, D.E.
1992 *Spanish Texas, 1519-1821*. University of Texas Press, Austin.
- Collins, M.B.
2004 Archeology in Central Texas. In *The Prehistory of Texas*, edited by T.K. Pertulla, pp. 205-265. Texas A&M University Press, College Station.

- Collins, M.B. (editor)
 1998 *Wilson-Leonard: An 11,000 Year Archaeological Record of Hunter-Gatherers in Central Texas*. 5 vols. Studies in Archeology No. 31, Austin: Texas Archeological Research Laboratory, University of Texas at Austin.
- Cox, I.W.
 1991 *Excavations at the McDonald Site, 41BX794, San Antonio, Bexar County, Texas*. Archaeological Survey Report, No. 191. Center for Archaeological Research, The University of Texas at San Antonio.
 2005 *The Spanish Acequias of San Antonio*. Maverick Publishing Company, San Antonio.
- de Croix, T.
 1779 Letter to Domingo Cavello, Number 19. Bexar Archives, Archives File Box 2S40, Barker History Center, University of Texas, Austin.
- Dibble, D.S.
 1967 Excavations at Arenosa Shelter, 1965-66. Manuscript on file, Texas Archeological Salvage Project, University of Texas, Austin.
- Dibble, D.S., and Lorrian, D.
 1968 *Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas*. Miscellaneous Papers 1. Texas Memorial Museum, University of Texas at Austin.
- Foster, W.C.
 1995 *Spanish Expeditions into Texas, 1689-1768*. University of Texas Press, Austin.
- Habig, M.A.
 1968 *San Antonio's Mission San José, State and National Historic Site 1720-1968*. Naylor, San Antonio.
 1970 Translation of "Letter of Fray Margil, 1719," *Lesser Brothers* 4.
 1976 *The Alamo Chain of Missions*. Revised. Franciscan Herald Press, Chicago. Originally published 1968, Franciscan Herald Press, Chicago.
- Habig, M.A. (editor)
 1983 *The San José Papers*. 2 vols. Translated by Benedict Leutenegger et al. Old Spanish Missions Historical Research Library, San Antonio.
- Hall, G.D.
 1981 *Allen's Creek: A Study in the Prehistory of the Lower Brazos River Valley, Texas*. Research Report No. 61. Austin: Texas Archeological Survey, University of Texas, Austin.
- Hester, T.R.
 1995 The Prehistory of South Texas. *Bulletin of the Texas Archeological Society* 66:427-459.
- Hester, T.R., E.S. Turner, and R.L. McReynolds
 2011 *Stone Artifacts of Texas Indians*. Taylor Trade Publishing, Lanham, Maryland.

- Hoermann, Rev. P.A.S.
1932 *The Daughter of Tehuan; or, Texas of the Past Century*. Translated from the German by Alois Braun. Standard Printing Company, San Antonio.
- Houk, B.A. K.A. Miller, and E.R. Oksanen
2009 The Gatlin Site and the Early to Middle Archaic Chronology of the Southern Edwards Plateau, Texas. *Bulletin of the Texas Archeological Society* 80:51-75.
- Johnson, L., Jr.
1995 *Past Cultures and Climates at Jonas Terrace, 41ME29, Medina County, Texas*. Office of the State Archeologist Report No. 40. Texas Department of Transportation and Texas Historical Commission, Austin.
- Johnson, L., Jr., and G. Goode
1994 A New Try at Dating and Characterizing Holocene Climates, as well as Archeological Periods on the Eastern Edwards Plateau. *Bulletin of the Texas Archeological Society* 65:1-15.
- Kenmotsu, N.A., and D.K. Boyd (editors)
2012 *The Toyah Phase of Central Texas: Late Prehistoric Economic and Social Processes*. Texas A&M University, College Station.
- Long, C.
2010 Bexar County. Handbook of Texas Online. Texas State Historical Association. Electronic document, <http://www.tshaonline.org/handbook/online/articles/hcb07>, accessed August 26, 2014.
- Lukowski, P.
1988 *Archaeological Investigations at 41BX1, Bexar County, Texas*. Archaeological Survey Report, No. 135. Center for Archaeological Research, The University of Texas at San Antonio.
- Mandujano, A.S.
1983 General Census of the Mission San José: June 12, 1809. In *The San José Papers: The Primary Sources for the History of Mission San José y San Miguel de Aguayo from its Founding in 1720 to the Present (Part 2: 1791-1809)*, translated from the Spanish by Father B. Leutenegger, finalized by Sister M.C. Casso, pp. 259-269. Old Spanish Missions Historical Research Library at San José Mission Inc., San Antonio, Texas.
- Mauldin, R.P., R.J. Hard, C.M. Munoz, J.Z. Rice, K. Versotick, D. Potter, and N. Dollar
2013 Carbon and Nitrogen Stable Isotope Analysis of Hunter-gatherers from the Coleman Site, a Late Prehistoric Cemetery in Central Texas. *Journal of Archaeological Science* 40:1369-1381.
- McGraw, A.J., and Hindes, V.K.
1987 *Chipped Stone and Adobe: A Cultural Resource Assessment of the Proposed Applewhite Reservoir, Bexar County, Texas*. Archaeological Survey Report, No. 163. Center for Archaeological Research, The University of Texas at San Antonio.
- Munoz, C.M., R.P. Mauldin, J.L. Thompson, and S.C. Caran
2011 Subsistence Strategies. In Archaeological Significance Testing at 41BX17/271, the Granberg Site: a Multicomponent Site along the Salado Creek in Bexar County, Texas. Environmental Affairs Division, Archeological Studies Program, Report No. 140, pp. 105-130. Texas Department of Transportation and Archaeological Report No. 393, Center for Archaeological Research, University of Texas at San Antonio.

- Munoz, M.
 1983 Inventory of Possessions of the Mission San José, and Distribution of these among the Indians by Governor Munoz: July 23, 1794. In *the San José Papers: The Primary Sources for the History of Mission San José y San Miguel de Aguayo from its Founding in 1720 to the Present (Part 2: 1791-1809)*, translated from the Spanish by Father B. Leutenegger, OFM, finalized by Sister M.C. Casso, IWBS, pp. 123-140. Old Spanish Missions Historical Research Library at San José Mission, Inc., San Antonio.
- Neely, J.A.
 1999 The Gristmill at Mission San José y San Miguel de Aguayo: Insights into the Technology and Agricultural Focus of Spanish Colonial Texas. *Bulletin of the Texas Archeological Society* 70:215-239.
- Oksanen, E.R.
 2008 Archeological Investigations at the Icehouse Site, 41HY161: A Reevaluation of Early Archaic Technology, Subsistence and Settlement along the Balcones Escarpment and Central Texas. Master's thesis, Department of Anthropology, Texas State University, San Marcos.
- Peter, D., Kuehn, D., Allday, S., Tine, A., Hunt S., and Freeman M.
 2006 *Archeological Assessment of the Potential Impact of the San Antonio River Improvement Project, Mission Reach, on Historic Properties*. Geo-Marine, Inc., Plano, Texas.
- Prewit, E.
 1974 *Archaeological Investigations at the Loeve-Fox Site, Williamson County, Texas*. Research Report No. 49. Texas Archeological Survey, University of Texas, Austin.
 1981 Cultural Chronology in Central Texas. *Bulletin of the Texas Archeological Society* 52:65-89.
 1985 From Circleville to Toyah: Comments on Central Texas Chronology. *Bulletin of the Texas Archeological Society* 54:201-238.
- Rickliss, R.A., and Collins, M.B.
 1994 *Archaic and Late Prehistoric Human Ecology in the Middle Onion Creek Valley, Hays County, Texas*. 2 vols. Studies in Archeology Number 19. Texas Archeological Research Laboratory, University of Texas, Austin.
- Rock, R.Z., and Chavez R.A.
 1997 *Grist Mill Historic Structure Report – Mission San José*. National Park Service Intermountain Region - San Antonio Missions National Historic Park, San Antonio, Texas.
- Scease, A., and Gross, K.
 1998 *Archaeological Investigations of the Gristmill at Mission San José y San Miguel de Aguayo, San Antonio, Texas*. Archaeological Survey Report, No. 272. Center for Archaeological Research, The University of Texas at San Antonio.
- Snow, S.R.
 2000 Brief Summary of Archaeological Excavations for the Creation of an Overflow Pipe at the Grist Mill, Mission San José (41BX3). Manuscript on file, Center for Archaeological Research, The University of Texas at San Antonio.

- Story, D.A.
1985 Adaptive Strategies of Archaic Cultures of the West Gulf Coastal Plain. In *Prehistoric Food Production in North America*, edited by R.I. Ford, pp. 19-56. Anthropological Papers No. 75. Museum of Anthropology, University of Michigan, Ann Arbor.
- Taylor, A.J., and C.L. Highley
1995 Archeological Investigations at the Loma Sandia Site (41LK28): A Prehistoric Cemetery in Live Oak County, Texas. Studies in Archeology No. 20. Texas Archeological Research Laboratory, Austin.
- Taylor, F.B., R.B. Hailey, and D.L. Richmond
1966 *Soil Survey of Bexar County Texas*. Series 1962, No. 12. United States Department of Agriculture, Soil Conservation Service in Cooperation with the Texas Agricultural Experiment Station, U.S. Government Printing Office, Washington, D.C.
- Thoms, A.V., D.D. Kuehn, B.W. Olive, J.E. Dockall, P.A. Claybaugh, and R.D. Mandel
1996 Early and Middle Holocene Occupations at the Richard Beene Site: The 1995 Southern Texas Archaeological Association Field School Project. *La Tierra* 32:8-36.
- Turner, E.S., Hester, T.R., and McReynolds, R.
2011 *Stone Artifacts of Texas Indians*. Taylor Trade Publishing, Lanham, Maryland.
- Turpin, S.A.
2004 The Lower Pecos River Region of Texas and Northern Mexico. In *Prehistory of Texas*, edited by T. K. Pertulla, pp. 266-282. Texas A&M Press, College Station.
- Weir, F.A.
1976 The Central Texas Archaic. Unpublished Ph.D. dissertation, Washington State University, Pullman.