
EXCAVATION METHODS

*J. Homer Thiel and Jonathan B. Mabry
Desert Archaeology, Inc.*

From October 2000 through February 2003, archaeological testing and excavations at seven major locations within or close to downtown Tucson were conducted by Desert Archaeology, Inc. (see Figure 1.1). Two of the areas—one at the southeastern corner of Congress Street and Interstate 10 (I-10), and the other on the southern side of Congress Street west of I-10, are scheduled to be developed for new residences, businesses, and museums. The City of Tucson plans to create cultural parks at the three other locations—the San Agustín Mission, the Mission Gardens, and the Tucson Presidio, AZ BB:13:13 (ASM).

The archaeological research conducted for the Rio Nuevo Archaeology project had several goals, including the mitigation of archaeological resources in areas where development was to occur. Work in the planned cultural parks documented the range of cultural resources present and identified areas damaged by previous ground-disturbing activities. Selected features were also sought that would guide the planned reconstructions. Finally, artifacts and historical information was sought that will be used in future exhibits.

STANDARD EXCAVATION METHODS

A combination of mechanical and hand-excavation was used during the Rio Nuevo Archaeology project. Dan Arnit, Innovative Excavating, Inc., operated his backhoe during trenching and stripping of overburden. Trenches were excavated to a depth of 1.5 m (5.0 ft) below the present ground surface, with selected segments excavated to a depth of 3 m (10 ft) to expose the natural layers of the floodplain. The walls of these deeper segments were shored to ensure safety and compliance with OSHA requirements. The sides of the trenches were scraped by hand, and measured drawings were made of archaeological features visible in the trench sides.

Subsets of the identified cultural features were selected for hand-excavation. All hand-excavated sediments were screened through ¼-inch mesh. In certain instances, 1/8-inch mesh was used to ensure complete recovery of bones and other artifacts.

Standardized forms were used in all phases of the Rio Nuevo Archaeology project. These forms were entered into a computer database and then proofed

to ensure that all data were correct. Black-and-white negative and color slide photographs were taken throughout the course of the project.

Artifacts were sorted and bagged by material type in the field. The bags were returned to the laboratory, and the information written on each bag was compared with the provenience catalogues to ensure accuracy. The artifacts were then washed, a sample labeled, and they were re-bagged and placed in archival storage boxes.

All field notes, photographs, artifacts, and samples created or discovered during the Rio Nuevo Archaeology project will be curated at the Arizona State Museum (ASM).

Prior to the start of the project, Desert Archaeology, Inc., consulted with ASM personnel, Native American groups, and Los Descendientes del Presidio de Tucson to prepare a burial agreement, identifying what actions should be taken if human remains were discovered during fieldwork. The agreement stated that all prehistoric burials were to be excavated after notification and were to be analyzed in the field. The human remains and their associated artifacts were to be repatriated to the Tohono O'odham Nation, as were the occasional isolated human bones found during the project. The burial agreement further specified that any historic-era burials located at the San Agustín Mission be left in place, unexcavated.

EAST OF INTERSTATE 10, AZ BB:13:510 (ASM)

Area 1 of the Rio Nuevo project is located within the former floodplain of the Santa Cruz River, east of the current channel. Historical documents indicate Area 1 was used predominantly for irrigated agriculture between the late seventeenth century and the late nineteenth century. During the 1690s, Father Eusebio Francisco Kino and Captain Juan Mateo Manje described irrigation canals and fields in the floodplain between A-Mountain and the Rillito. Canals and fields in Area 1 are recorded on the 1862 Fergusson map (see Figure 1.2). The 1883 Sanborn Fire Insurance Company map of Tucson shows a 3-m- (10-ft-) wide canal on the eastern side of the current location of Granada Avenue. Sanborn maps and other documents indicate the area was cultivated until the

turn of the nineteenth century. During monitoring of recent construction projects and utility installations and replacements, archaeologists from Desert Archaeology have identified a possible prehistoric canal and two possible historic canals in this area.

From the mid-nineteenth century until an urban renewal project began in the late 1960s, Area 1 was on the margins of several historic barrios. It was just north of the historic El Membrillo and El Hoyo barrios, and just north and west of Barrio Libre (designated a National Register Historic District and a City of Tucson Historic District, and assigned the archaeological site number AZ BB:13:38 [ASM]). Barrio Libre was half razed during construction of the Tucson Community Center between 1969 and 1971; the remaining southern half is now called Barrio Historico (or Barrio Viejo). These predominantly Mexican-American neighborhoods were established between the 1850s and the 1880s.

Also just south of Area 1, at the northwestern corner of Simpson Street and Main Avenue, is the former location of “El Ojito,” the spring that was Tucson’s primary water source from presidio times until the 1880s. In the late nineteenth century, a privately operated park, called Carrillo’s Gardens and later the Elysian Grove, was located slightly farther south. The park was west of Main Avenue, between Simpson and Seventeenth streets, and had a small lake between 1870 and the turn of the nineteenth century.

Previous Work

Previous archaeological monitoring, testing, and data recovery projects in Area 1 and surrounding areas – most of them conducted by Desert Archaeology – have documented several possible canals, both prehistoric and historic; a few possible Early Agricultural period (circa 2100 B.C.-A.D. 50) pit structures and surfaces with prehistoric artifacts; historical household features, such as trash pits, privy pits, and wells, and household debris dating between the 1870s and the 1930s; historical community trash dumps dating to the same interval; a few human burials dating to the Protohistoric period (circa A.D. 1450-1694); and a nineteenth-century Mexican-American burial (Ayres 1990; Faught 1993; Gilman 1997; Gilman and Swartz 1998; Heidke and Masse 1988; Levi 1997; Sliva 1997; Thiel 1996a).

Goals

Archaeological testing in Area 1 of the Rio Nuevo project was conducted in phases, according to when access was available to different portions. The goals of archaeological testing were to: (1) determine the

nature, location, and condition of subsurface archaeological features; (2) assess the significance of those features in terms of the research questions identified in the Research Design for the Rio Nuevo archaeological program; and (3) obtain sufficient information to plan specific data recovery efforts.

Rio Nuevo Archaeological Work in Area 1

Archaeological work at the southeastern corner of the intersection of the I-10 frontage road and Congress Street was conducted in two phases. The first phase was in October 2000, in the area west of the train tracks and south of Congress Street. A series of nine east-west backhoe trenches was cut in the area, which was discovered to consist primarily of cienega clay, which develops in marshy areas. Although a small number of prehistoric and historic artifacts were found, no intact cultural features were revealed in this area.

The second phase occurred in 2001, with the excavation of eight additional trenches, six along the now-abandoned Southern Pacific Railroad tracks. Trenching resulted in the location of six features dating to the American Statehood period, all related to homes that once stood along Clark Street and Sentinel Avenue. The features were not likely to provide significant information and were not excavated. No additional work was conducted in this area.

THE SAN AGUSTÍN MISSION AND THE MISSION GARDENS, THE CLEARWATER SITE, AZ BB:13:6 (ASM)

The San Agustín Mission and the Mission Gardens, the Clearwater site, AZ BB:13:6 (ASM), are located south of the Clearwater property and are immediately east of Mission Road. They were explored in separate phases. The area was first occupied about 2,500 years ago, during the Cienega phase of the Early Agricultural period (Chapter 20, this report). A number of pithouses were found on, or to the west of, the mission area. Hohokam artifacts are also abundant in the area, suggesting use of the area between about 1,500 and 500 years ago. Father Kino documented a Piman village in the area in the 1690s.

The San Agustín Mission was established in the mid-1700s, with the convento built in the late 1790s to early 1800s. The mission included the convento, a chapel, a granary, and other outbuildings – all surrounded by a wall. Nearby were the Mission Gardens and a Piman village. The mission was abandoned by the 1840s, with the chapel falling down after 1854. The convento, however, remained in good condition

until the late 1890s. By the 1940s, clay mining had encroached into the mission, and in the 1950s and 1960s, the City of Tucson used the area as a dump (Hard and Doelle 1978).

Previous Work

The San Agustín Mission was largely neglected by archaeologists until the 1940s. Prior to that time, the mission was the focus of treasure-hunting activities, which damaged the standing structures and subsurface remains. The University of Arizona conducted several excavations in the area between 1949 and 1956, mapping the convento and the chapel and recovering burials from several cemetery areas (Wasley 1956). The Arizona Historical Society explored the western side of the mission in 1967, exposing the granary and western compound wall; a report was not prepared for this project. In the mid-1970s, ASM tested the eastern portion of the mission, revealing that this area was disturbed (Hard and Doelle 1978).

In 1987, the Institute for American Research (now Desert Archaeology, Inc.) tested the parcel immediately west of Brickyard Lane and discovered Early Agricultural period pithouses and a house foundation dating to the mid-1800s (Elson and Doelle 1987). Jack Williams conducted excavations just south of the convento on the southern side of Mission Lane, discovering an *acequia* (canal). He also excavated test trenches in the Mission Gardens and exposed several wall alignments. However, a report on this work has not been completed, and the disposition of the recovered artifacts is unknown. In 2000, Desert Archaeology excavated a test unit in the Mission Gardens, revealing that prehistoric cultural features and deposits are preserved up to 1.0 m (3.3 ft) below the present ground surface (Dutt 2000).

Goals

The 1956 excavation by the University of Arizona documented the convento and chapel foundations. It was unclear if these were destroyed when the City of Tucson was using the area as a dump. A large pile of fill material lay on top of the mission, perhaps preserving undisturbed cultural resources.

Three areas in the mission complex were slated for testing and excavation: (1) the location of the main mission complex area at the northeastern corner of Mission Lane and Brickyard Lane; (2) the Mission Gardens; and (3) the area south of Mission Lane and east of the Mission Gardens where the location of features such as *acequias* (canals) and the Carrillo House were expected to be found.

Work at the mission site had several goals, one of which was to determine how much of the mission had survived clay mining and use of the area as a landfill between 1949 and 1960. Another goal was to discover and inventory features from other time periods to increase current understanding about the history of human use at the location.

Rio Nuevo Archaeological Work at the Mission

Archaeological work at the San Agustín Mission began in November 2000, and continued through early February 2001.

A series of 30 east-west backhoe trenches were cut across the project area and quickly delineated the zone of disturbance. Approximately 19 percent of the area within the mission walls had survived at least partially intact. The area beneath Mission Lane, directly south of the mission, was fairly intact, although an east-to-west water main had damaged some archaeological resources. Testing south of Mission Lane revealed that the northern boundary of the landfill present in that area, beginning approximately 15 m (50 ft) south of the southern side of Mission Lane.

After determining the boundaries of the undisturbed area of the mission, 16 additional backhoe trenches were cut to examine site stratigraphy or to confirm that the convento and chapel foundations had been destroyed in the 1950s. Afterward, a wide scraping blade was attached to the backhoe. The blade was used to strip away overburden down to undisturbed sediments. Features were typically located based on differences in sediment color and texture. Most features had been cut through the underlying greenish-brown cienega clays and were filled with either water-deposited light brown silts or redeposited cienega clays containing abundant charcoal and fire-cracked rocks.

A total of 204 features was discovered, including Cienega phase pithouses, pits, and canals; the mission granary; trash deposits and Native American burials dating to the mission occupation; the northern cemetery of the mission; Solomon Warner's millrace; and a well filled with trash by Chinese gardeners in the 1890s. Excavations were directed toward clearing the foundations of the granary, the western compound wall, and the southern wall of the northern cemetery. A sample of the other features discovered was selected for excavation, including Cienega phase pithouses, prehistoric and historic-era canals, mission-occupation trash middens, and other historic-era features. In all, 85 features (42 percent) of the documented features were partially or completely excavated. All excavated soils were screened through ¼-inch mesh screen, and all artifacts were collected.

Nine prehistoric human burial features were excavated, analyzed in the field, and repatriated to the Tohono O'odham Nation. The 13 mission-occupation burials discovered in the northern cemetery were left in place. Four canals and Solomon Warner's millrace were also discovered at the mission and were assigned site number AZ BB:13:481 (ASM). These features were profiled, and several excavation units were placed within the canals, allowing for the collection of artifacts and soil samples.

Rio Nuevo Archaeological Work at the Mission Gardens

The Mission Gardens, located at the southeastern corner of Mission Road and Mission Lane, were tested in November 2001 through January 2002. A total of 39 backhoe trenches were cut within and adjacent to the garden in an effort to identify the density and types of features present, trace irrigation canals, and determine the boundary between undisturbed sediments and the nearby 1950s landfill. In all, 100 features were documented during this project, 34 of which were partially or completely excavated. Additionally, 13 prehistoric and historic-era canals were assigned to site BB:13:481 and were documented through profiles and sediment samples, and their courses were mapped.

The rock foundations of the gardens were uncovered and mapped, where possible. Excavation of features was limited to two Early Ceramic period pithouses, the remnants of several historic-era structures, a historic-era well, and several pit features. All soil from the excavated features was screened through ¼-inch mesh, and all artifacts—except Native American ceramics smaller than a U.S. quarter—were collected. Fourteen Native American inhumations and cremations were discovered. These were excavated, analyzed in the field, and all human remains and associated artifacts were repatriated to the Tohono O'odham Nation.

A floorplan was made of the foundation of Warner's Mill, located on the western side of Mission Road, and the locations of nearby petroglyphs and bedrock mortars on the eastern slope of A-Mountain were mapped.

THE CONGRESS STREET AND BRICKYARD LOCI OF THE CLEARWATER SITE, AZ BB:13:6 (ASM)

Area 3 (also known as the Rio Nuevo South property) is located in the western floodplain of the Santa Cruz River, bounded on the east by the Santa Cruz River channel, on the north by Congress Street, on

the west by private residences, and on the south by a privately owned bus maintenance facility. The northern part of this large area is referred to as the Congress Street locus, and the southern part is called the Brickyard locus. A series of investigations by Desert Archaeology personnel and others has identified and recovered limited data from prehistoric occupations dating back at least 4,100 years, numerous prehistoric and historic-era canals, and a historic brick factory (see "Previous Work" section below).

Historical documents indicate irrigation canals and fields, a brick factory, a welding shop, a grocery store, a private sports club, and several residences were located on the property between the late seventeenth century and the 1970s. Much of the surface has been disturbed by the agricultural, industrial, and residential uses of the property during the last 200 years. Large mounds of construction fill are currently located in the central and southern parts of the property.

Previous Work

The Rio Nuevo South property has been archaeologically surveyed several times in the last 25 years (the results of the first few surveys are summarized in Betancourt 1978). The Institute for American Research excavated seven trenches across the property as part of the Mission Road Extension testing project (Elson and Doelle 1987). No archaeological features were identified in those trenches (although several trenches contained bricks from the historic Tucson Pressed Brick Company), but numerous features were identified south of the property. Williams (1989) resurveyed this and other areas at the base of A-Mountain. He identified several possible archaeological sites, although site cards and information about what he found are not on file with ASM.

In 1993, Desert Archaeology personnel surveyed an area along the proposed right-of-way for a storm drain that crossed the property and identified surface evidence of several archaeological sites (Thiel 1993b). Subsequent borehole testing delimited the boundaries of trash deposits and deep subsurface disturbances created by the brick factory, as well as later landfill operations on the property (Thiel 1993a). In 1994, additional auger testing on the Rio Nuevo South property identified extensive undisturbed areas between the disturbed areas (Ahlstrom et al. 1994).

In March and April of 1995, Desert Archaeology personnel conducted archaeological testing on the Rio Nuevo South property, as well as on the remainder of the property (Thiel 1995a, 1995b). Sixty-eight trenches were excavated, revealing 104 potentially significant features. These included prehistoric burials, roasting

pits, canals, pit structures, and a possible historic-era burial and portions of the brickyard.

A further testing stage was conducted by Desert Archaeology between October and December of 1995 (Diehl 1996). Nineteen additional trenches were excavated in the Rio Nuevo South property, and several more prehistoric and historic features were identified. These features included Early Agricultural period pit structures, pits, and burials; Hohokam period pithouses, pits, and burials; segments of prehistoric and historic canals; portions of the historic brick factory; and remains from late twentieth century uses of the area.

During the fall and winter of 1995, Desert Archaeology personnel conducted data recovery fieldwork concurrently with testing within the portion of the A-Mountain storm drain right-of-way that crossed the Rio Nuevo South property. Excavated prehistoric features, all dating to the Cienega phase (circa 800 B.C.-A.D. 50) of the Early Agricultural period, included two pithouses, 13 extramural pits, a trash midden, and a human burial (Diehl 1997). Archaeological remains of the Tucson Pressed Brick Company, in operation between the 1890s and the 1960s, were also excavated in the storm drain right-of-way where it crossed the Rio Nuevo South property (Diehl and Diehl 1996).

Goals

This area is the focus of planned construction for the City of Tucson's Rio Nuevo project on the western side of the Santa Cruz River. Plans were developed for the placement of new housing units, businesses, and museums on the property. This required the mitigation of the cultural resources present at the locality.

The first goal of data recovery in this area was to test previously untested areas with additional backhoe trenches. Several areas could not be tested during previous stages, either because certain parcels had not yet been acquired, or because they were covered with cement building foundations. In particular, this additional testing would help identify the alignments of canals across the property.

The second goal was to investigate the prehistoric occupations. Work focused on two areas where previous work had indicated that prehistoric features were concentrated, and it included exposure of the settlement layout, excavation of a representative sample of the range of pit structures and other features, and recovery of samples of artifacts and subsistence remains from both features and outdoor "trash" areas.

The third goal was to define, date, and sample the prehistoric and historic canals crossing the prop-

erty. A series of carefully located short trenches were placed to reveal the alignments of canals and the designs of the canal systems, including primary and secondary canals, turnout structures, and other water-control features. Multiple cross sections through canals allowed reconstruction of gradients, flow capacities, and other engineering and hydraulic characteristics. The trenches also provided a range of contexts for sampling sediments that indicate flow characteristics and that provide materials for radiocarbon dating and biological indicators of environmental conditions.

The fourth goal was to further investigate the historic brick factory. The facilities of the Tucson Pressed Brick Company in the south-central part of the property were only partially excavated during a previous data recovery phase. During the Rio Nuevo Archaeology project, the layouts of other buildings were defined and their functions identified.

The fifth goal was to locate and excavate human burials on the property. A combination of trenching, horizontal exposure, and test excavations identified burials that would potentially be damaged through the proposed construction. All identified burials were excavated and treated according to a prior consultation agreement negotiated by ASM with groups claiming affinity.

The final goal was to examine the sequence of floodplain layers that record the history of the river and its floodplain in this location.

Rio Nuevo Archaeological Work in the Congress Street and Brickyard Loci

The first stage of fieldwork in this area was conducted in the summer and fall of 2001, and a second stage was carried out during the summer of 2002. Archaeologists excavated 100 new backhoe trenches to identify subsurface cultural features and to document canals. In Block 5 of the Congress Street locus, a grid of 2-m by 2-m excavation units was laid out; 38 of these units were excavated to extramural cultural deposits in strata 503 and 504. Within these strata, extramural deposits in the units were excavated in 10-cm levels. A total of 335 features, not including canals, was discovered during archaeological work, and 174 (52 percent) were partially or completely excavated. These ranged from 4,100-year-old pithouses and pits, to Cienega phase pithouses, to structures associated with the Tucson Pressed Brick Company. A total of 10 burials was found, and all were excavated, analyzed in field, and repatriated to the Tohono O'odham Nation. Eighteen prehistoric and historic-era canals from BB:13:481 were documented through profiles, mapping, and sediment sampling.

THE TUCSON PRESIDIO, AZ BB:13:13 (ASM)

The Tucson Presidio was located in the downtown core of the community, bounded by Washington Street, Church Avenue, Pennington Street, and Main Street. This area was a prehistoric Hohokam village over 1,000 years ago. Historic settlement began in 1775, when the Tubac Presidio was moved north to this location. By 1783, the thick adobe walls of the presidio were in place, protecting soldiers and civilians. The fortress stood until 1856, although within a few years of the American entrance into the community, the walls were dismantled and reused to build new structures.

Previous Work

Archaeological exploration of the presidio began in 1929, only 11 years after the last wall segment had been torn down. City Engineer Donald Page mapped the location of the eastern wall and collected bricks that were later used in a display (Thiel et al. 1995). Archaeologists from the University of Arizona uncovered the northeastern corner in 1954, also locating a Hohokam pithouse at this time (Olson 1985). The Tucson Urban Renewal project saw the excavation of a portion of the presidio cemetery, as well as a backyard area that yielded large numbers of artifacts (Barnes 1983).

In 1992, a Center for Desert Archaeology excavation located the eastern wall beneath the sidewalk of the Pima County Courthouse courtyard. The previous year, Desert Archaeology staff had excavated over 20 burials from the presidio cemetery, discovered in a gasline trench (Thiel et al. 1995). The presidio area was revisited in 1995, with excavations within Sunset Park; a foundation of a presidio-occupation structure was uncovered during this work (Thiel 1996b). The Center for Desert Archaeology excavated trenches around the perimeter of the walls in 1998 and 1999, ultimately discovering the western wall in the western lawn of City Hall (Thiel 2004). A few smaller projects have occurred within the area, including testing of the backyard west of the corner parking lot (Mazany 1981). Altogether, these projects indicate that, despite modern development of the area, many portions of the presidio have intact archaeological deposits.

Goals

The final report of the Tucson Origins project identifies the parking lot at the southwestern corner of Church Avenue and Washington Street as the

primary area for interpretive development for the Tucson Presidio. However, due to uncertainties regarding the types of features and archaeological deposits and their degree of preservation, it is critical that this area be explored thoroughly. A second goal of the work in Area 2 was to more firmly document the full footprint of the presidio. The eastern and western walls are the best-documented, but what remains of the northern and southern walls is currently inadequately understood.

The primary focus of the Rio Nuevo project excavations within the presidio were at the northeastern corner of the fort – today, a parking lot located at the southwestern corner of Church Avenue and Washington Street. The parking lot was the location of the 1954 excavations by the University of Arizona, during which a thick adobe wall and a puddled adobe wall that formed a corner were discovered (Olson 1985). This is probably either the corner of the wall or the foundation of a corner *torreón* (tower).

Work in the parking lot was directed toward answering the following questions. (1) Is the section found in 1954 the presidio wall? (2) Do other sections of the wall survive? (3) Are other presidio-occupation structures or features present inside the walls? (4) How was the area used during the American Territorial period? (5) Are additional prehistoric pithouses and features present?

Rio Nuevo Archaeological Work at the Tucson Presidio

Work was conducted in three locations within the boundaries of the Tucson Presidio. Project RNA 9 consisted of the excavation of two 1-m by 2-m units on the eastern side of the 1929 Pima County Courthouse and the excavation of a long trench between the Edward Nye Fish and Hiram S. Stevens houses on the eastern side of Main Avenue. The courthouse work resulted in the discovery of one feature, a portion of the foundation of the 1883 City Firehouse. Both units revealed that intact Territorial period archaeological deposits were present several meters below the current ground surface, similar to a previous excavation conducted in the courtyard of the courthouse in 1992 (Thiel et al. 1995).

The work between the Fish and Stevens houses was conducted in February 2002, and resulted in the discovery of 34 archaeological features, all of which were excavated. The features included adobe walls, compact ground surfaces, postholes, and a dog burial. Most of the features and artifacts uncovered dated to the occupation of the presidio. The adobe walls were left in place and covered with protective fabric. The area was later covered with fine gravel and a modern room was built over the area.

Work beneath the parking lot installed in 1954 at the southwestern corner of Church Avenue and Washington Street was conducted between November 2002 and February 2003. Because the lot was to remain in use after the project was completed, only a limited number of parking spaces could be made available. Eventually 15 spaces, each measuring about 15 ft by 9 ft, and two corner areas where parking did not take place, were opened up. A backhoe was used to remove the asphalt and strip a small amount of soil down to undisturbed sediments. An area previously excavated in 1954 was reopened, revealing a Hohokam pithouse and a segment of a wide adobe wall. Most of the remaining areas had not been previously excavated. Work uncovered a total of 85 features, ranging from Hohokam pithouses and adobe walls, to large trash-filled borrow pits. All of the features were partially or completely excavated.

All in situ soil excavated at these three locations was hand-excavated and screened through ¼-inch mesh. All artifacts were collected except Native American ceramics smaller than a U.S. quarter. Large numbers of flotation samples were collected. Consequently, a large number of artifacts, animal bone, and macrobotanical materials were recovered.

SUMMARY

In all, archaeologists located 764 archaeological features and 36 irrigation canals during the course of the Rio Nuevo Archaeology project. Of the non-canal features, 412 (54 percent) were excavated according to the procedures described here. This approach yielded a large amount of data about the prehistory and history of Tucson. Excavated features are described in detail in Chapter 4 (this volume).

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