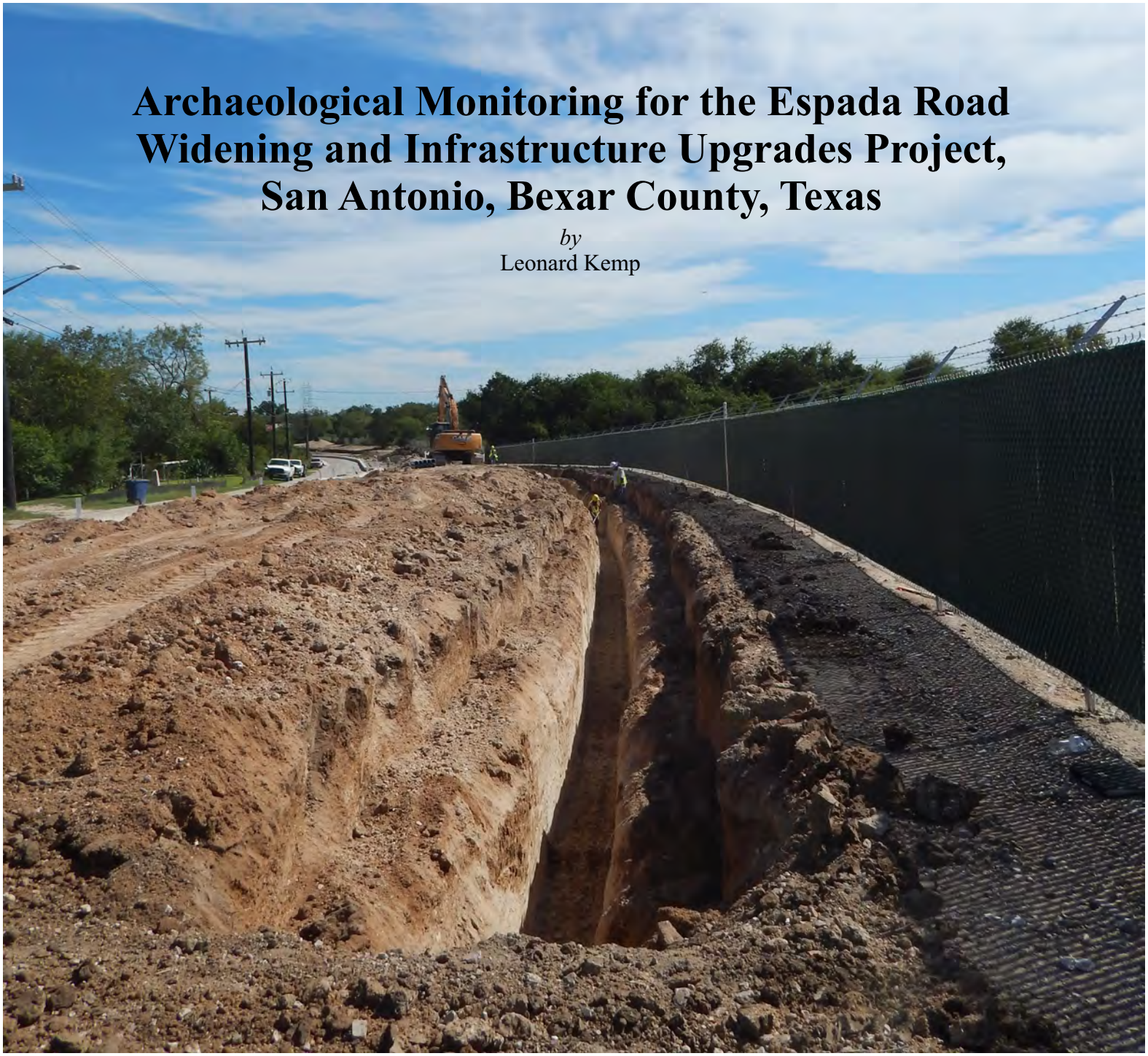
Archaeological Monitoring for the Espada Road Widening and Infrastructure Upgrades Project, San Antonio, Bexar County, Texas

by
Leonard Kemp



Texas Antiquities Permit No. 7789

NON-REDACTED

Principal Investigator
Paul Shawn Marceaux

Prepared for:
Poznecki-Camarillo, Inc.
5835 Callaghan Road
Suite 200
San Antonio, Texas 78228

Prepared by:
Center for Archaeological Research
The University of Texas at San Antonio
One UTSA Circle
San Antonio, Texas 78249
Technical Report, No. 75

© 2018

Archaeological Monitoring for the Espada Road Widening and Infrastructure Upgrades Project, San Antonio, Bexar County, Texas

by
Leonard Kemp

Texas Antiquities Permit No. 7789

NON-REDACTED

Principal Investigator
Paul Shawn Marceaux

Prepared for:
Poznecki-Camarillo, Inc.
5835 Callaghan Road
Suite 200
San Antonio, Texas 78228

Prepared by:
Center for Archaeological Research
The University of Texas at San Antonio
One UTSA Circle
San Antonio, Texas 78249
Technical Report, No. 75

©2018

Abstract:

From September 30, 2016, through October 19, 2017, the Center for Archaeological Research (CAR) at The University of Texas at San Antonio (UTSA) conducted archaeological monitoring for the Espada Road Widening and Infrastructure Upgrades Project. The City of San Antonio's (COSA) Transportation and Capital Improvements (TCI) Department contracted Poznecki-Camarillo, Inc. (PCI), who hired CAR to conduct the archaeological monitoring. The COSA's Office of Historic Preservation (OHP) and TCI designated three areas within the Project Area to monitor, as recommended by an earlier study. CAR archaeologists did not find archaeological features or other artifacts that would warrant further investigation in any of the three areas. Espada Road construction was allowed to proceed without interruption. The archaeological monitoring was conducted under Texas Antiquities Permit No.7789 issued to Dr. Paul Shawn Marceaux, the Principal Investigator, with Leonard Kemp serving as Project Archaeologist.

This page intentionally left blank.

Table of Contents:

Abstract i
List of Figures v
List of Tables vii
Acknowledgements ix
Chapter 1: Introduction 1
The Area of Potential Effect 1
Report Organization 4
Chapter 2: Historical Background for the Espada Road APE 5
Mission Espada and Environs 5
Previous Archaeology 6
Chapter 3: Field and Laboratory Methods 11
Field Methods 11
Laboratory Methods 11
Chapter 4: Results and Summary of the Field Investigation 13
Area 1 13
Area 2 16
Area 3 18
Summary 20
References Cited 21

This page intentionally left blank.

List of Figures:

Figure 1-1. The location of the three areas (in yellow) defined as the APE on the Southton USGS 2013 7.5-minute series quadrangle map. The Project Area (in green) stretched from Interstate 410 to Ashley Road. Note the locations of the Espada Ditch, Aqueduct, and Mission relative to the Project Area 2
Figure 1-2. The location of the three areas defined as the APE on the satellite imagery 3
Figure 2-1. Previous Archaeology within 1 km (0.62 miles) of the Espada Road Project Area..... 9
Figure 4-1. Monitoring (top in red) of Area 1 with Google Earth street view (bottom) prior to construction 14
Figure 4-2. Area 1 viewed south from Rilling Road..... 15
Figure 4-3. Glass artifacts observed in Area 1..... 15
Figure 4-4. Monitoring (top in red) of Area 2 with Google Earth street view (bottom) prior to construction 17
Figure 4-5. View to the northwest of excavation for waterline in Area 2..... 18
Figure 4-6. Original (top) and revised (middle) plans for monitoring of Area 3 with Google Earth street view (bottom) prior to construction..... 19
Figure 4-7. Beginning of the trench excavation for storm drain on Espada Road northwest of the Espada *Acequia* in Area 3 (left). The excavated storm pipe outfall to Six-Mile Creek (right)..... 20

This page intentionally left blank.

List of Tables:

Table 2-1. Previous Archaeology within 1 km (0.62 miles) of the Espada Road Project Area 7

This page intentionally left blank.

Acknowledgements:

This work could not have been completed without the efforts of the archaeologists who monitored the excavation of the Espada Road Widening and Infrastructure Upgrades Project. The archaeologists included Linda Martinez, Jason Perez, Andrea Thomas, and Charles S. Smith. Jackie Lopez of Poznecki-Camarillo, Inc. and Jennifer DiCocco, Celine Finney, and Armando Huron of the City of San Antonio's Transportation and Capital Improvements Department, along with Edward Maldonado of J. Sanchez Contracting, provided logistical support throughout the course of the project. The author would also like to thank Kay Hindes of the City's Office of Historic Preservation for guidance and assistance during the course of this project. The Center for Archaeological Research (CAR) also wishes to acknowledge the help of the Texas Historical Commission throughout the project. Kelly Harris of CAR edited the final document. Cynthia Munoz, also of CAR, prepared the records and digital photographs of the project for final curation.

This page intentionally left blank.

Chapter 1: Introduction

From September 30, 2016, through October 19, 2017, the Center for Archaeological Research (CAR) at The University of Texas at San Antonio (UTSA) conducted archaeological monitoring for the Espada Road Widening and Infrastructure Upgrades Project. The project included street widening, construction of a bike lane and sidewalks, and infrastructure upgrades including streetlights, drainage, water, and gas lines (Garcia 2017). The City of San Antonio's (COSA) Transportation and Capital Improvements (TCI) Department contracted Poznecki-Camarillo, Inc. (PCI), who subcontracted CAR to conduct the monitoring. As a political subdivision of the State of Texas, COSA is required under the Texas Antiquities Code and the City's Unified Development Code (UDC) Chapter 35 to consider the impact to known or potential archaeological sites and/or deposits and to mitigate those effects. A previous study (Smith et al. 2016) identified three areas of concern that contained or possibly contained archaeological deposits or features. Smith et al. (2016) recommended monitoring construction activities that could affect the three areas. The project was conducted under Texas Antiquities Permit No. 7789 issued by the Archeology Division of the Texas Historical Commission (THC). Dr. Paul Shawn Marceaux served as the Principal Investigator, and Leonard Kemp served as the Project Archaeologist.

The Area of Potential Effect

The COSA's Office of Historic Preservation (OHP), in consultation with TCI, defined the project's Area of Potential Effect (APE) as the three areas of concern (Figures 1-1 and 1-2) recommended by a previous archaeological survey conducted by Atkins North America (Atkins; Smith et al. 2016). Area 1 is directly south of Rilling Road on the west side of Espada Road. An archival review conducted by Atkins found that three acequia laterals might cross into a parcel currently occupied by a concrete company (Harris and Russell 2015). Area 1 is 213 meters (m; 700 ft.) in length. Area 2 is also located on the west side of Espada Road, approximately 239 m (787 ft.) north of Rilling Road, and is 30.4 m (100 ft.) in length. Area 3 initially consisted of the monitoring for two bore pits located at the Espada Aqueduct Park (41BX281), a National Historic Landmark and Historic Civil Engineering Landmark. Due to existing utilities, the monitoring plan changed and focused on the excavation of a trench measuring 21.3 m (70 ft.) from the north side of Espada Road to the outfall at Six-Mile Creek, also known as "Piedras Creek."

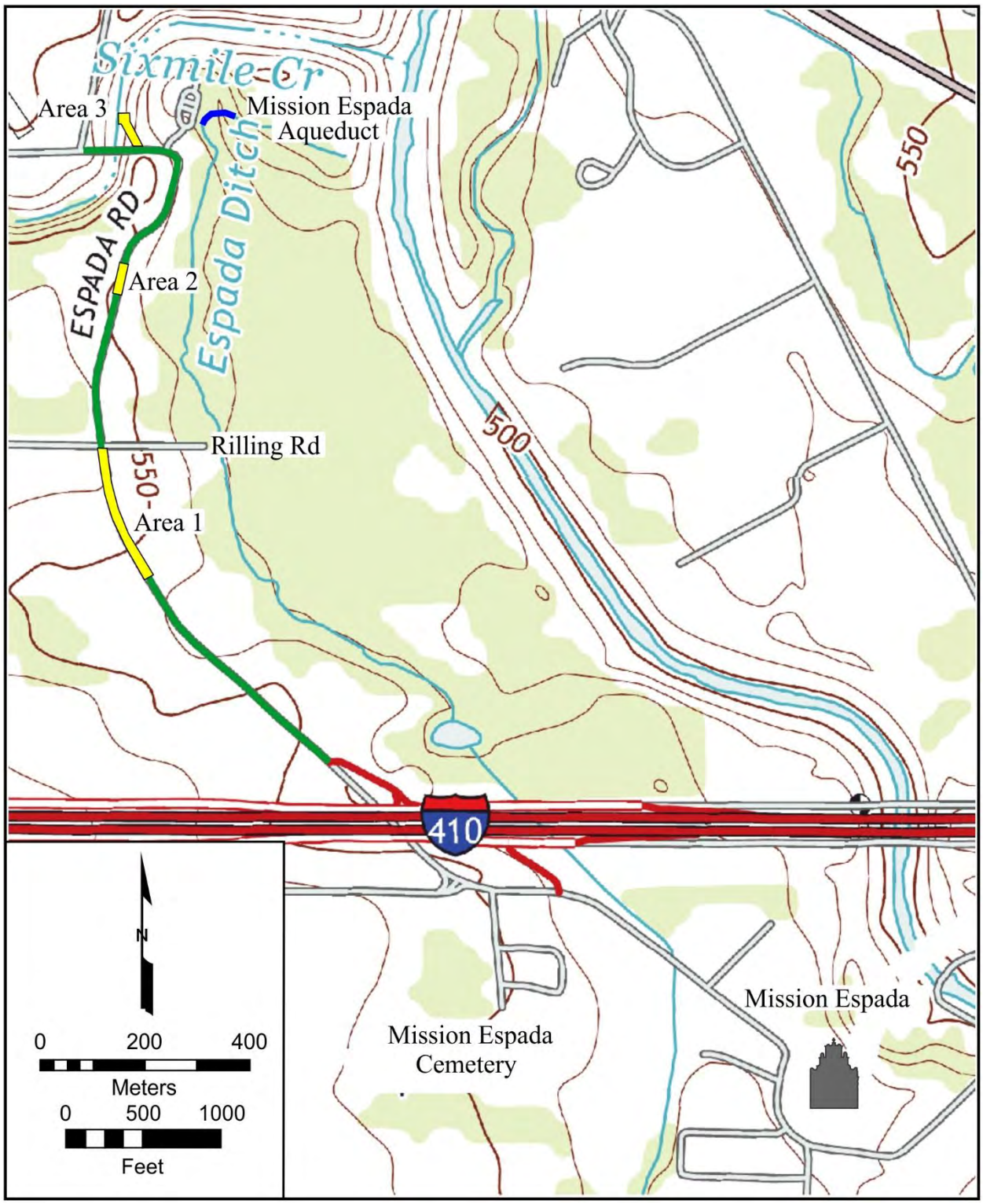


Figure 1-1. The location of the three areas (in yellow) defined as the APE on the Southton USGS 2013 7.5-minute series quadrangle map. The Project Area (in green) stretched from Interstate 410 to Ashley Road. Note the locations of the Espada Ditch, Aqueduct, and Mission relative to the Project Area.

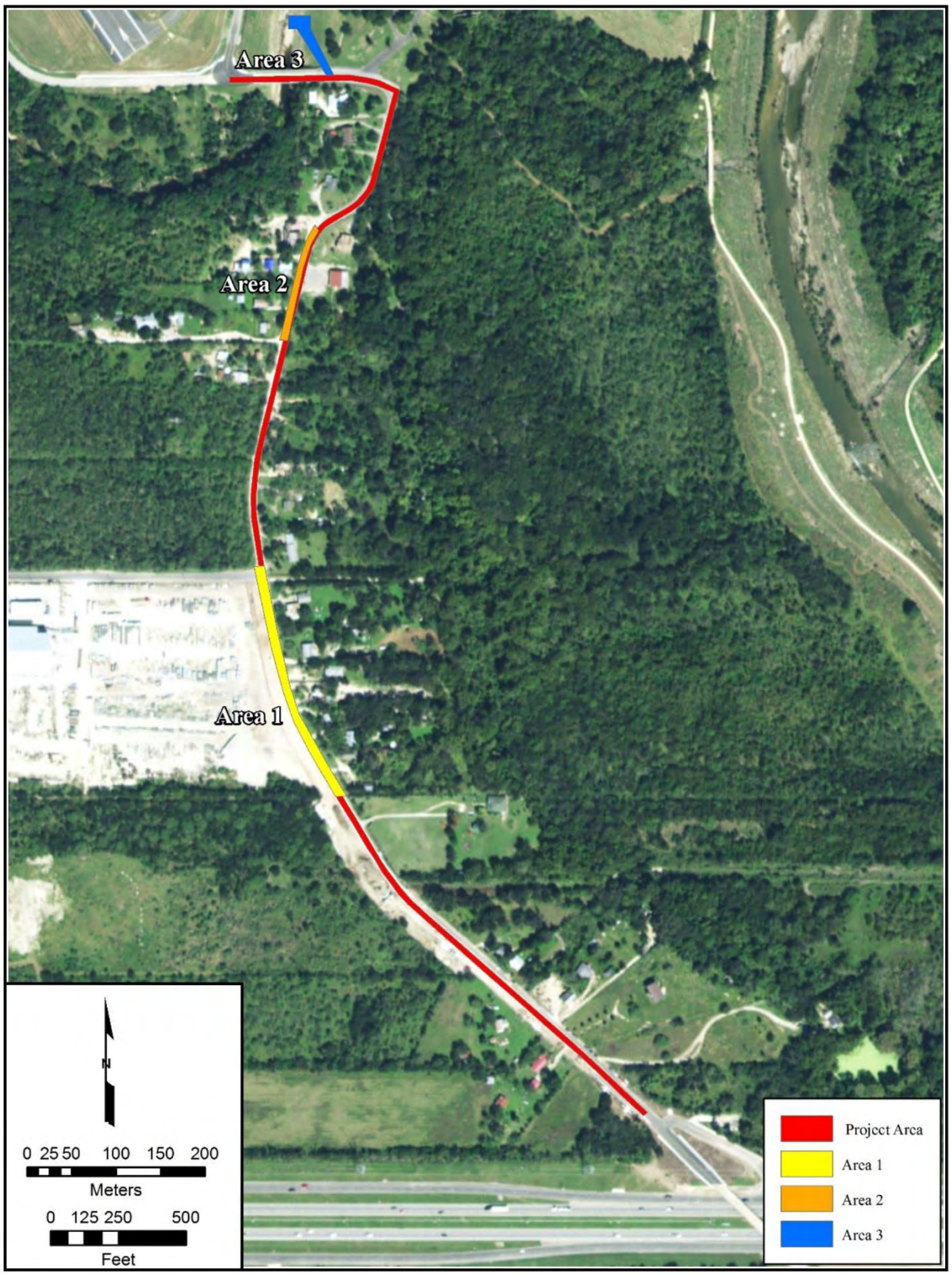


Figure 1-2. The location of the three areas defined as the APE on the satellite imagery.

Report Organization

This report documents the archaeological monitoring for the Espada Road Widening and Infrastructure Upgrades Project. Following this introductory chapter, the second chapter provides a brief history of Mission Espada, its acequia, and the development of the area surrounding the APE. The third chapter summarizes the field and laboratory methods used by CAR to conduct this project. The final chapter presents the results of the fieldwork and a summary of the project.

Chapter 2: Historical Background for the Espada Road APE

This chapter begins with a brief account of the historical context of Mission Espada and the development of the community surrounding it. Additional information and research can be found in Scurlock et al. (1976), Fox and Hester (1976), Meskill (1992), Zapata et al. (2000), Cargill et al. (2004), and San Antonio Missions, Nomination for Inscription on the World Heritage List (2014). The final section reports on previously recorded archaeological sites near the APE, with a summary of the most recent archaeological survey conducted by Smith et al. (2016).

Mission Espada and Environs

The APE is located in a largely rural area of present-day San Antonio. However, it was an area that was settled relatively early in the history of San Antonio following the founding of Mission Espada in 1731. Mission *San Francisco de la Espada* (41BX4) was the fifth and final mission built along the San Antonio River. Like all Spanish missions, it was used as a tool of colonization with the purpose to convert, train, and settle Native Americans as Spanish subjects. These groups formed the labor force that built and sustained the mission. They constructed the Espada *Acequia* between 1731 and 1745 and the stone aqueduct (1745) crossing over Six-Mile Creek. In addition to constructing the acequia, the neophytes were taught to farm and ranch. By the 1740s (Habig 1968), the mission began to use locally quarried stone to construct permanent structures, including churches, living quarters, and defensive walls.

In 1794, the San Antonio missions began a process of secularization, and mission land was distributed to the remaining Native population. This edict included Mission Espada, which began to divide land and property among the remaining 15 Native American families (Habig 1968). The number of Native Americans living at the mission declined throughout the eighteenth and early nineteenth century, and the Spanish population increased, as reflected in an 1815 report that reported 72 Spaniards and 27 Native American individuals as residents of the mission (Habig 1968:221). De la Teja (1992) noted that ethnic designations such as “Spaniard” or “Indian” were applied loosely and inconsistently in colonial San Antonio. A Spaniard could be a *peninsulare* (Spaniard born in Spain), a *criollo* (Spaniard born in the New World), an *isleño* (Canary Islander), a *mestizo* (offspring of Spanish and Native American), a *coyote* (offspring of *mestizo* and Native American), or a *mulato* (offspring of Spanish and African origin), conversely, an *indio* (Native American) might actually be a *mestizo*, *coyote,* or *mulato*.

Over the next century and a half following secularization, the area remained agrarian, maintaining ties to Mission Espada (Torres 1997). In 1820, a school was created for the children living in the area surrounding the mission (Habig 1968). In 1858, Father Francis Bouchu came to San Antonio and eventually became

Mission Espada's priest. He was an active minister to the Espada community from 1873 to 1907 (Habig 1968). Bouchu also undertook the reconstruction of the mission, which had fallen into disrepair. After Bouchu's death in 1907, Mission Espada was closed until 1915 when Father W. W. Hume reopened it after additional renovation (Habig 1968).

Like the mission, the Espada *Acequia* had been neglected; however, in 1895, the Espada Ditch Company was formed to revitalize the irrigation system (Rivera 2009). The Company remained active until the 1970s, when it became unprofitable for smaller farms to maintain the system. Since that time, the Espada *Acequia* has been maintained through an informal agreement between its users guided by a ditch master (personal communication with James Oliver of the National Park Service 2018; Rivera 2009).

While the community surrounding the Mission Espada was based in agriculture, the mission and the acequia became the focus of historical conservationists. In the 1930s, the architect Harvey Smith documented the surviving buildings at Espada and began excavation and restoration at the mission through the Works Progress Administration (Smith 1980). Coinciding with restoration, the San Antonio Conservation Society assumed ownership of the land encompassing the Espada Aqueduct in 1937, undertaking repairs to stabilize the structure (Fisher 1996). In 1955, the San Antonio Archdiocese began major repairs at Espada, which were supervised by Smith (Fisher 1998). The Espada Aqueduct was designated a National Historic Landmark in 1965 (Habig 1968). In 1967, the first of multiple attempts to create the San Antonio Missions National Historical Park bill was introduced in the U.S. Congress, eventually passing in 1978. Mission Espada and its acequia became part of the National Park Service (NPS) in 1983.

Previous Archaeology

Numerous archaeological surveys have taken place in the area surrounding Mission Espada. The first major archaeological survey was for the Mission Parkway, conducted by Scurlock et al. (1976). They reported on 84 archaeological sites and structures, laying the foundation for subsequent investigations. Scurlock et al. (1976) also nominated the area to the National Register of Historic Places as Mission Parkway Historic-Archeological District in 1975. The vast majority of archaeological projects since that time have focused on Mission Espada and the acequia system (Cargill et al. 2004; Cox 1993; Zapata et al. 2000). The Mission Reach Project, consisting of several investigations, focused on the reconstruction of the San Antonio River from Mission Concepción to Mission Espada, and it was the last major undertaking in the vicinity of the current project (see Fox et al. 2002; Kemp and Mauldin 2017; Osburn et al. 2007; Padilla and Nickels 2010; Padilla and Trierweiler 2012; Peter et al. 2006). In the most recent archaeological investigation, Espada Road south of Ashley Road to Interstate 410 was subject to an intensive pedestrian survey, shovel testing, and backhoe trenching by Atkins North America, Inc. in 2014 and 2015 (Smith et al. 2016). No new sites

were documented during this investigation. Smith et al. (2016) recommended that three areas warrant monitoring during construction activities because they contained or could contain cultural resources.

The following table lists the 31 archaeological sites found within a 1-km (0.62-mile) radius of the APE (Figure 2-1; THC 2017a). The majority of these sites are historic or having both historic and prehistoric components. Of the five sites that are exclusive to the prehistoric period, three are described as prehistoric occupations with pithouse features.

Table 2-1. Previous Archaeology within 1 km (0.62 miles) of the Espada Road Project Area

Site	Name	Time Period	Site Type
41BX4	Mission *Francisco de la Espada*	Historic	Spanish Colonial Mission
41BX5	Mission *San Juan Capistrano*	Historic	Spanish Colonial Mission
41BX242	James House	Historic	
41BX243	Grothaus	Historic	
41BX244	n/a	Historic	Historic structures, possible acequia noted
41BX245	Kuntz Store and Saloon	Historic	Historic structures
41BX246	Berg's Mill	Historic	
41BX247	Bazan Store and House	Historic	
41BX248	n/a	Prehistoric	Lithic scatter
41BX249	n/a	Prehistoric	Lithic scatter
41BX250	Huron House	Historic	19th/20th century structure
41BX251	n/a	Prehistoric/Historic	Lithic and historic artifact scatter
41BX252	*Jacales* Site	Historic	19th/20th century structures
41BX253	Ashley House	Historic	19th/20th century structure
41BX254	Olivas Site 1	Prehistoric	Prehistoric occupation
41BX255	Olivas Site 2	Prehistoric/Historic	Lithic and historic scatter; historic structure
41BX256	n/a	Prehistoric	Prehistoric occupation
41BX260	Bustillo-Rivas House	Historic	Historic structure
41BX265	Berg Brother's Mill	Historic	19th/20th century structures
41BX 268	San Juan *Acequia*	Historic	Irrigation system
41BX 269	Espada *Acequia*	Historic	Irrigation system
41BX281	Espada Aqueduct	Historic	Irrigation system
41BX340	n/a	Prehistoric/Historic	Lithic and historic artifact scatter
41BX341	n/a	Prehistoric/Historic	Lithic and historic artifact scatter
41BX706	n/a	Prehistoric/Historic	Lithic and historic scatter; historic structure
41BX1780	Hierhozer/Rankin Farmstead and Dairy	Historic	Historic farmstead
41BX1782	Lower *San Juan Acequia*	Historic	Irrigation system

Table 2-1. Previous Archaeology within 1 km (0.62 miles) of the Espada Road APE, continued

Site	Name	Time Period	Site Type
41BX1785	Ringlestein Farmstead	Prehistoric/Historic	Prehistoric occupation site; historic farmstead
41BX1796	n/a	Historic	acequia
41BX2021	n/a	Prehistoric	Prehistoric occupation site
41BX2138	n/a	Historic	Trash pit

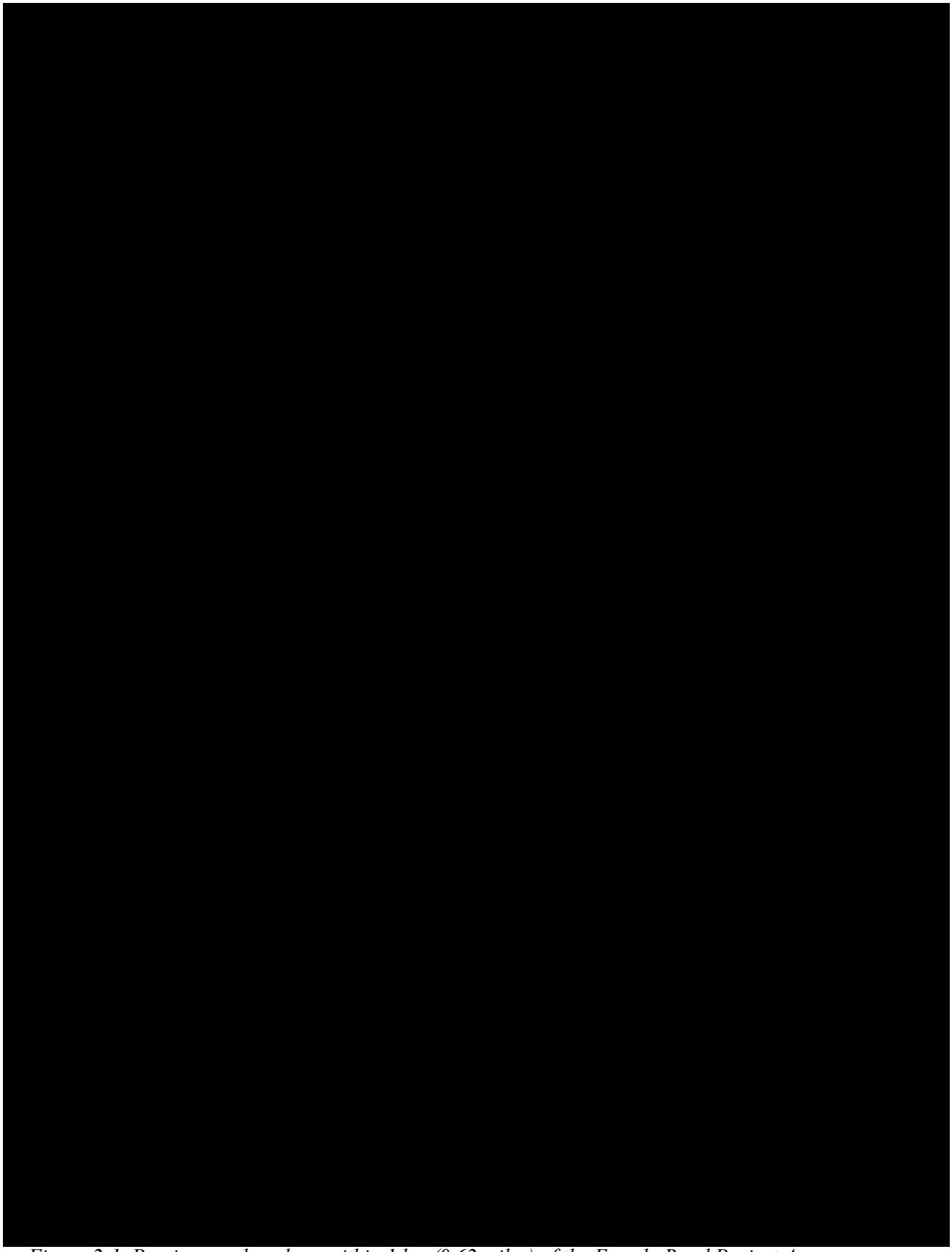


Figure 2-1. Previous archaeology within 1 km (0.62 miles) of the Espada Road Project Area.

This page intentionally left blank.

Chapter 3: Field and Laboratory Methods

CAR archaeologists created a scope of work (SOW) to define procedures associated with the Espada Road Widening and Infrastructure Upgrades Project. The THC and the OHP approved these procedures, the latter as the representative for COSA. Prior to the investigations, CAR archaeologists initiated a background review of the Project Area using the Texas Archaeological Site Atlas (THC 2017a) and reviewed the most current project (Smith et al. 2016) within the area. A Geographic Information System (GIS) data specialist constructed a field map of the three areas designated by the OHP and the TCI as the APE.

Field Methods

Archaeological monitoring is defined in this report as the identification of remnants or components of the acequia, as well as identification of any previously unknown archaeological deposits or features, if encountered. Each day, the archaeologist completed a standardized form that included the description of the construction activity, the length or area monitored, and the observation of any artifacts, features, or deposits. Digital photographs supported this form and, if appropriate, the collection of data points by a submeter accurate Global Positioning System (GPS) unit. The CAR provided monthly updates and summaries of all field activities to PCI, TCI, and OHP.

Laboratory Methods

No cultural material was collected during the monitoring. The records generated during the project were prepared in accordance with federal regulation 36 Code of Federal Regulations (CFR) part 79 and THC requirements for State Held-in-Trust collections. Digital photographs were printed on acid-free paper, labeled with archival appropriate materials, and placed in archival-quality sleeves. All field forms were completed with pencil. All field documentation was printed on acid-free paper and placed in an archival folder. A copy of the report was printed on acid-free paper, and all digital data associated with the investigation and analysis was transferred to an archival-rated computer disc. The report and the computer disc are stored in an archival box and curated with the field notes and documentation. Upon completion of the project, all records were permanently curated at CAR, a state-held-in-trust facility.

This page intentionally left blank.

Chapter 4: Results and Summary of the Field Investigation

CAR conducted monitoring of the Espada Road Widening and Infrastructure Upgrades Project APE from September 30, 2016, through October 19, 2017. Archaeologists monitored three areas identified by the COSA's OHP and TCI divisions. The CAR identified the locations as Areas 1, 2, and 3, from south to north. This chapter discusses the investigation by area and concludes with a summary of the project.

Area 1

Area 1 was on the west side of Espada Road adjacent to the Old Castle Precast Plant (Figure 4-1). Monitoring of the trenching for the construction of water lines occurred from September 30, 2016, to October 5, 2016. The main trench was approximately 122 m (400 ft.) in length, south to north, and was excavated to a depth of 1.5 m (5 ft.) below the surface (Figure 4-2). Additionally, seven lateral trenches, measuring 9.1 m (30 ft.) in length, were dug to place water lines to the houses on the east side of Espada Road. Lateral trenches were excavated to a depth of 1.2 m (4 ft.) below the surface. Two fire hydrants were placed off the main trench. Artifacts observed on the surface consisted of modern glass fragments, concrete, cement, and metal scraps (Figure 4-3). A modern metal water pipe fastener was also found when scraping the surface near the trench. The soil consisted of clay on top of caliche with pockets of gravel. The clay soil was gray in color, while the caliche was white. The caliche was observed relatively close to the surface, approximately 0.61 m (2 ft.) below the surface.

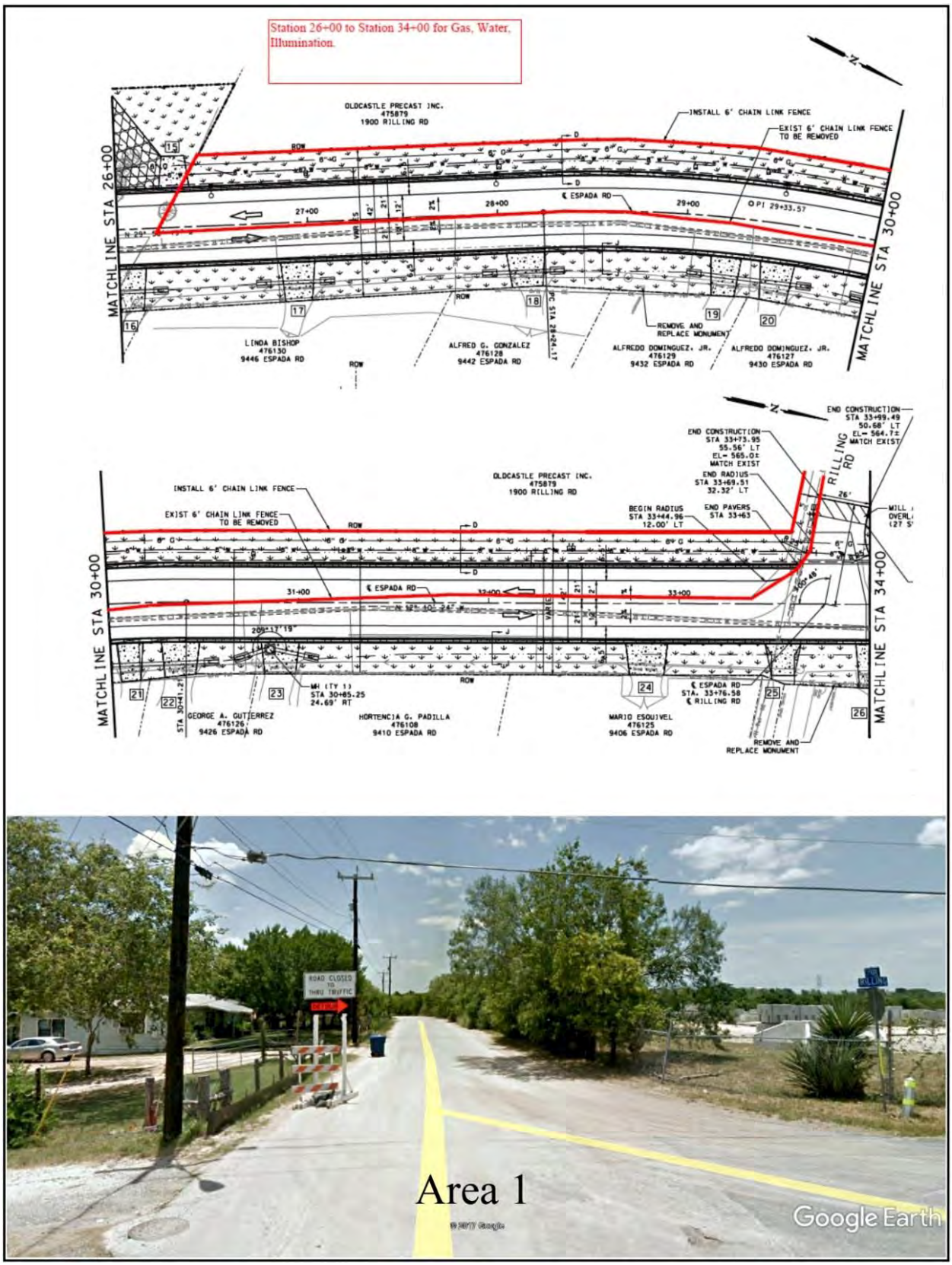


Figure 4-1. Monitoring (top in red) of Area 1 with Google Earth street view (bottom) prior to construction.

Figure 4-2. Area 1 viewed south from Rilling Road.

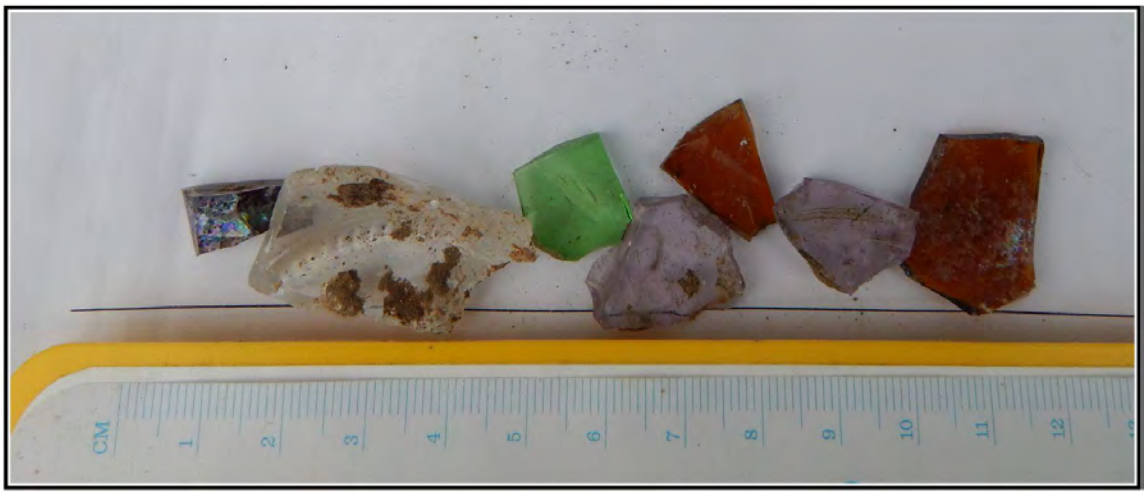


Figure 4-3. Glass artifacts observed in Area 1.

Monitoring for other infrastructure (gas lines and streetlights) was initially proposed in the SOW for Area 1. However, based on the lack of findings in the water line trench, the proximity (1-1.5 m; 3.28-4.92 ft.) of the proposed streetlight trench to the water line trench, and the use of a bore drill for the excavation of the gas line, TCI proposed that additional monitoring would not be necessary. City Archaeologist Kay Hindes, representing OHP, agreed to this change, and Mark Denton of the THC concurred with the stipulation that the City Archaeologist was to be notified in the event that cultural material or features were observed during the construction process (Hindes and Denton, personal communication October 4 and 5, 2016).

Area 2

Area 2 was located at 9235 Espada Road, approximately 265 m (869.42 ft.) north of Rilling Road. The Texas Archeological Site Atlas placed the Teresa Bustillo Rivas House (41BX260), a resource recommended by Smith et al. (2016) for monitoring, within Area 2. However, Scurlock et al. (1976) recorded the site location at 9143 Espada Road. CAR communicated this discrepancy to the OHP and provided the Site Atlas administrator with the correct location. CAR archaeologists monitored Area 2 as defined by the OHP and the TCI (Figure 4-4). While the CAR did not monitor construction activities in proximity to 41X260, it did observe after the fact that the structure was not impacted by construction activities. Monitoring of Area 2 and the trenching for a water line occurred on March 28 and 31, 2017. The trench was 30.4-m (100-ft.) long, south to north, and dug to a depth of 1.6-1.8 m (5.5-6.5 ft.) below the surface (Figure 4-5). A piece of burned chert and two fragments of modern ceramic tile were observed in the backfill. No artifacts were observed in the walls or floor of the trench.

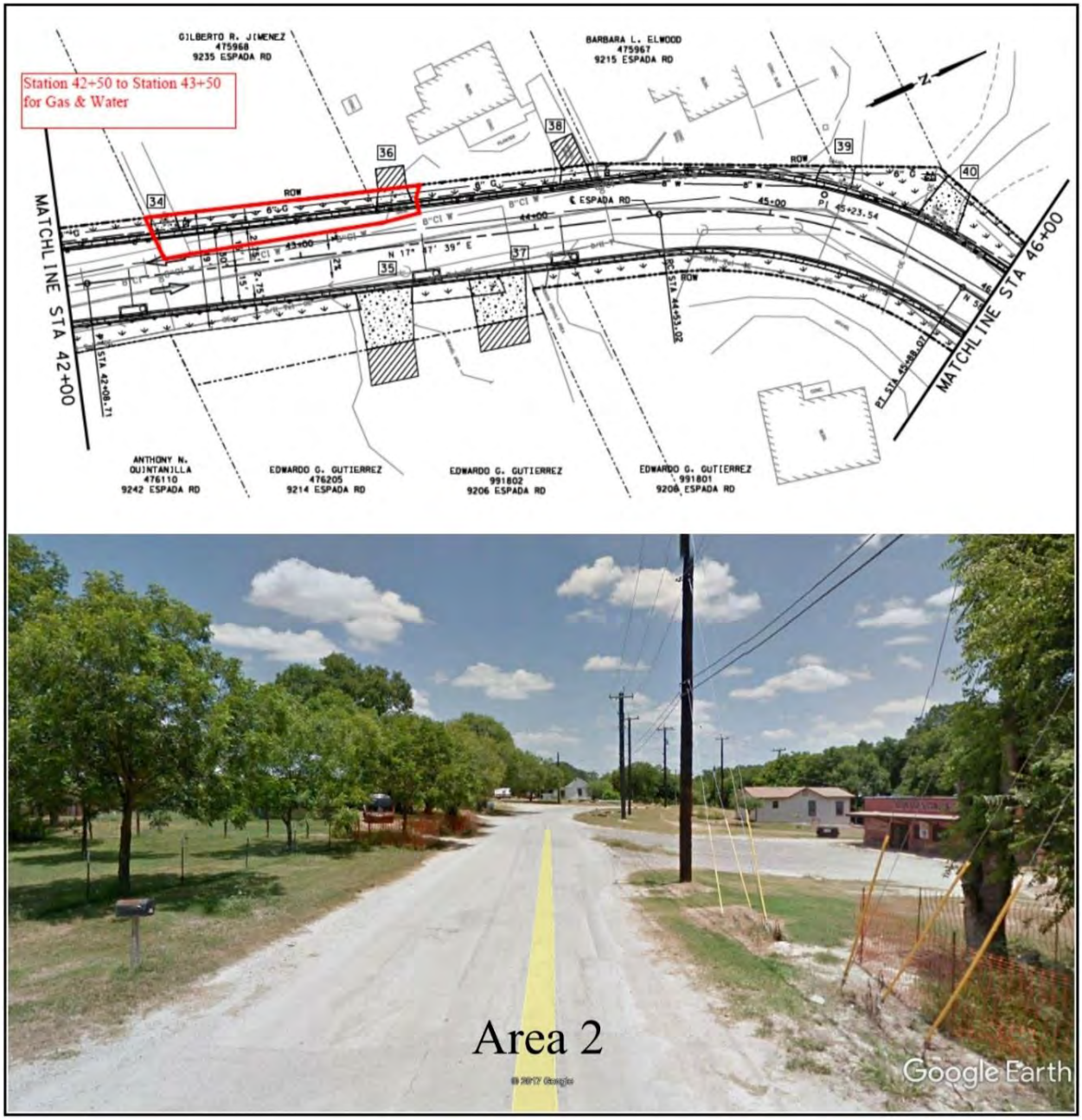


Figure 4-4. Monitoring (top in red) of Area 2 with Google Earth street view (bottom) prior to construction.

Figure 4-5. View to the northwest of excavation for waterline in Area 2.

Area 3

Area 3 is located in the northernmost part of the Espada Road Project Area. Initially, CAR was to monitor two locations (Figure 4-6). Due to construction changes, monitoring was redefined to focus solely on the area approximately 21.33 m (70 ft.) from the northern side of Espada Road to the northwest outfall of Six-Mile Creek (Figure 4-6). Monitoring of Borehole 1, located on the southern portion of Espada Road, was deemed unnecessary due to impacts from previous construction (Jennifer DiCocco, personal communication May 24, 2017).

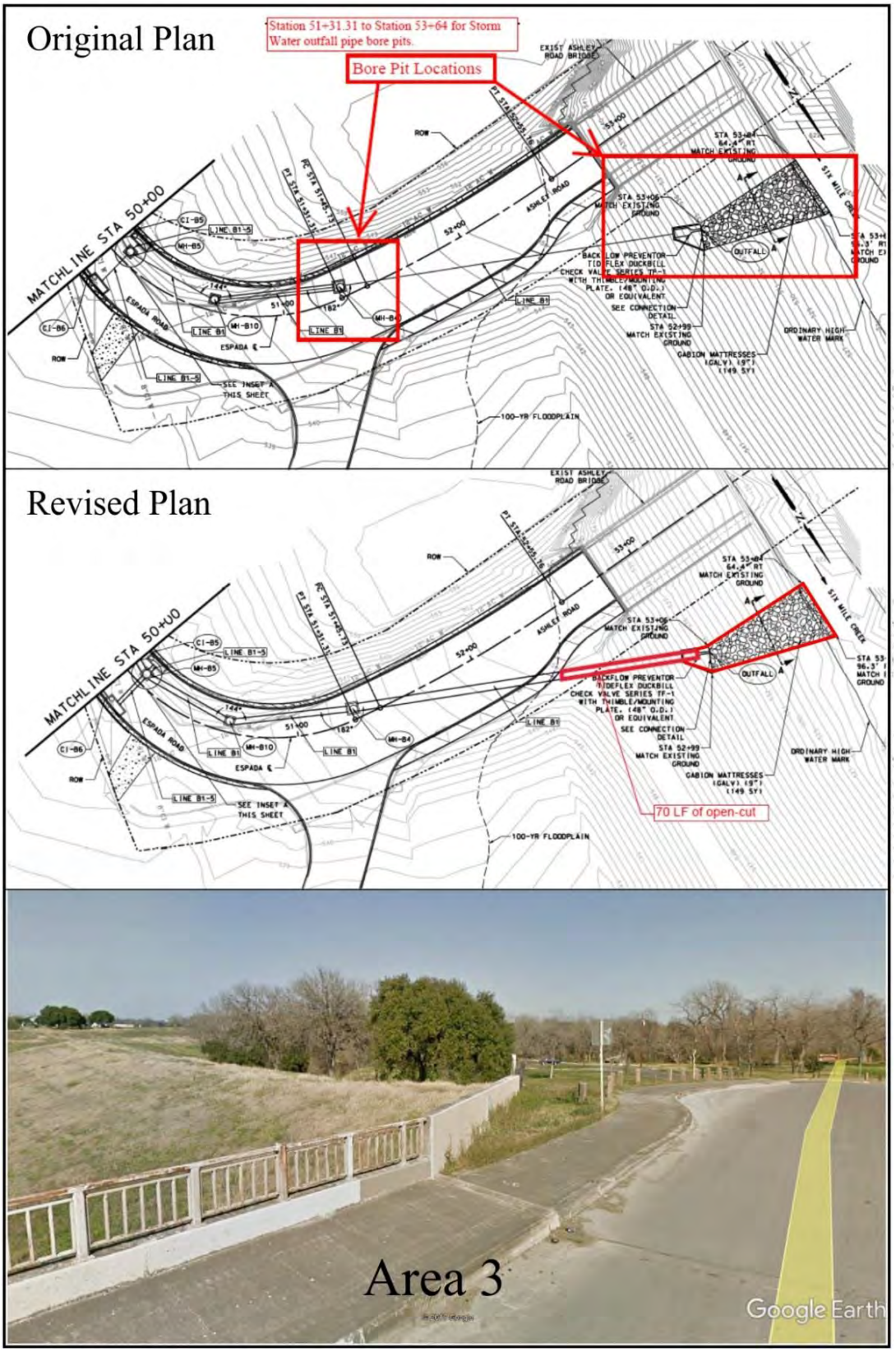


Figure 4-6. Original (top) and revised (middle) plans for monitoring of Area 3 with Google Earth street view (bottom) prior to construction.

Monitoring of the trenching for the construction of the storm drain occurred on September 11-13 and October 19, 2017 (Figure 4-7). The excavated trench ran to the northwest 21.3 m (70 ft.) from the north side of Espada Road to Six-Mile Creek. The trench was approximately 3.9-m (13-ft.) deep and 1.8-m (6-ft.) wide. Sediments observed during the excavation suggest the area had been impacted by previous construction (likely the Espada *Acequia* Aqueduct Protection Project) associated with Six-Mile Creek, as referenced in a 1978 communication between the U.S. Army Corps of Engineers, Fort Worth District, and the THC (THC 2017b). Soils were a dark clay over a lighter gray clay followed by a tan layer with large boulders beneath that horizon. No artifacts or features were observed in either the trench walls or floor.

Figure 4-7. Beginning of the trench excavation for storm drain on Espada Road northwest of the Espada Acequia *in Area 3 (left). The excavated storm drainage pipe outfall to Six-Mile Creek (right).*

Summary

CAR monitored three areas slated for ground disturbing activities, designated by the City's OHP and TCI divisions, for the Espada Road Widening and Infrastructure Upgrades Project. Based on this investigation, CAR suggests that no evidence of the Espada *Acequia* or laterals are present within Area 1 as suggested by Smith et al. (2016). Likewise, no archaeological features or artifacts that would warrant further investigation were found in either Area 2 or Area 3. CAR concluded that Espada Road construction should be allowed to proceed without interruption, and no cultural resources were impacted during the Espada Road Widening and Infrastructure Upgrades Project.

References Cited:

Cargill, D.A., B.A. Meissner, A.A. Fox, and I.W. Cox
2004 *San Antonio Mission Trails: Statewide Transportation Enhancement Project. Vol. 1: Archeological Investigations at Mission San Francisco de la Espada (41BX4), City of San Antonio, Bexar County, Texas*. Archaeological Survey Report, No. 308. Center for Archaeological Research, The University of Texas at San Antonio.

Chabot, F.C.
1937 *With the Makers of San Antonio: Genealogies of the Early Latin, Anglo-American, and German Families with Occasional Biographies*. Artes Graficas, San Antonio. Electronic document, http://hdl.handle.net/2027/ucl.b3624118, accessed April 17, 2017.

Cox, I.W.
1993 *Archaeological Monitoring at Espada Road Acequia Crossing, South San Antonio, Bexar County, Texas*. Archaeological Survey Report, No. 221. Center for Archaeological Research, The University of Texas at San Antonio.

Davis, C.E.
2010 San Francisco De La Espada Mission. Handbook of Texas Online. Texas State Historical Association. Electronic document, http//www.tshaonline.org/handbook/online/articles/uqs12, accessed December 8, 2017.

de la Teja, J.F.
1995 *San Antonio de Bexar: A Community on New Spain's Northern Frontier*. University of New Mexico Press, Albuquerque.

Fisher, L.F.
1996 *Saving San Antonio: The Precarious Preservation of a Heritage*. Texas Tech University Press, Lubbock.

1998 *The Spanish Missions of San Antonio*. Maverick Publishing Company, San Antonio.

Fox, A.A., I.W. Cox, S.A. Tomka, and J.M. Hunziker
2002 San Antonio River Improvement Project, San Antonio, Bexar County, Texas: Archaeological Background, Historical Mission Reach. Manuscript on file, Center for Archaeological Research, The University of Texas at San Antonio.

Fox, A.A., and T.R. Hester
1976 *Archaeological Testing of the New Plaza at Mission San Francisco de la Espada (41BX4), San Antonio, Texas*. Archaeological Survey Report, No. 22. Center for Archaeological Research, The University of Texas at San Antonio.

Garcia, C.
2017 *Espada Road Improvements to Enhance World Heritage.* Rivard Report. Electronic document, https://therivardreport.com/espada-road-improvements-to-enhance-world-heritage-access/, accessed November 2017.

Habig, M.A.
1968 *The Alamo Chain of Missions: A History of San Antonio's Five Old Missions*. Franciscan Herald, Chicago.

Harris, B., and K. Russell
2015 *Historic Resources Reconnaissance/ Intensive Survey Report, Mission Trails Proposed Roadway Improvements, Espada Road from IH 410 to East Ashley Road, City of San Antonio, Bexar County, Texas*. Atkins North America, Inc., Austin.

Kemp, L., and R. Mauldin
2017 Archaeological along the San Antonio River: The Mission Reach Project Vol 1: Introduction, Background, and Summary, Bexar County, Texas (draft). On file, Center for Archaeological Research, The University of Texas at San Antonio.

Meskill, F.K.
1992 *Archaeological Testing within the Southeast Corner of the Plaza at Mission Espada, San Antonio, Bexar County, Texas, Architectural, and Historic Sites on the San Antonio River from Olmos Dam to South Alamo Street and on San Pedro Creek from San Pedro Park to Guadalupe Street*. Archaeological Survey Report, No. 80. Center for Archaeological Research, The University of Texas at San Antonio.

Osburn, T.L., C.D. Frederick, and C.G. Ward
2007 *Phase II Archaeological Investigations at Sites 41BX254, 41BX256, 41BX1628, and 41BX1621 within the Historical Mission Reach Project Area, San Antonio, Texas*. Miscellaneous Reports of Investigations No. 373. Prepared for United States Army Corps of Engineers, Fort Worth District, by Geo-Marine Inc., Plano, Texas.

Padilla, A.E., and D.L. Nickels
2010 *Archaeological Data Recovery on Three Sites along the San Antonio River, Bexar County, Texas*. Project No. 011-038. Ecological Communications Corporation, Austin.

Padilla, A.E., and W.N. Trierweiler
2012 *Investigation of a Middle Archaic Domestic Structure: Further Archeological Excavations at 41BX256*. AmaTerra Environmental, Inc., Austin.

Peter, D.E., D. Kuehn, S.N. Allday, A.L. Tiné, S.M. Hunt, and M.D. Freeman
2006 *Archeological Assessment of the Potential Impact of the San Antonio River Improvement Project—Mission Reach—on Historic Properties*. NPS Scientific Research and Collecting Permit No. SAAN-2005-SCI-0001. Geo-Marine, Inc., Plano, Texas.

Rivera, J.A.
2009 Restoring the Oldest Water Right in Texas: Land Grant Suertes, Water Dulas, and Archimedes Screw Pumps. Southwest Hispanic Research Institute. University of New Mexico Digital Repository. Electronic document, http://digitalrepository.unm.edu/shri_publications/32, accessed February 9, 2018.

San Antonio Missions
2014 San Antonio Missions, Nomination for Inscription on the World Heritage List. United Nations Educational, Scientific, and Cultural Organization, World Heritage Convention. Electronic document, http://whc.unesco.org/en/list/1466/documents/, accessed February 9, 2018.

Schuetz, M.K.
1980 Indians of the San Antonio Missions, 17181-1821. Unpublished dissertation, The University of Texas at Austin.

Scurlock, D., A. Benavides, Jr., D. Isham, and J.W. Clark. Jr.
1976 *Archaeological and Historical Survey of the Proposed Mission Parkway, San Antonio, Texas*. Office of the State Archeologist, Texas Historical Commission, Austin.

Smith, H.P., Jr.
1980 Espada Mission, Research and Restoration. *La Tierra* 7(2):3-18.

Smith, M., M. Nichols, B. Harris, and K. Russell
2016 *Cultural Resources Investigations for the Proposed Espada Road Widening Project, City of San Antonio, Bexar County, Texas*. Atkins North America, Inc., Austin.

Texas Historical Commission (THC)
2017a Texas Archeological Site Atlas. Electronic document, https://atlas.thc.state.tx.us, accessed November 2017.

2017b National Register of Historic Places: Espada Aqueduct and Acequia Documentation. Electronic document, https://atlas.thc.state.tx.us/NR/pdfs/66000809/66000809_NHL.pdf, accessed November 2017.

Torres, L.
1997 *Voices from the San Antonio Missions*. Texas Tech University Press, Lubbock.

Zapata, J.E., M.J. Brown, and J.J. Durst
2000 *Archaeological Excavation of the Priest Quarters, Mission San Francisco de la Espada (41BX4), San Antonio, Texas*. Archaeological Survey Report, No. 295. Center for Archaeological Research, The University of Texas at San Antonio.