# GTI Environmental, LLC

Environmental Consultants

# An Intensive Archaeological Survey for the Benton City Water Supply Corporation Project, Medina County, Texas

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**July 2019**

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## Texas Antiquities Permit: 7006

**Prepared For:**
**Grant Works, Inc.**

**Prepared By:**
**GTI Environmental, LLC**

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# Abstract

In accordance with the National Historic Preservation Act and the Antiquities Code of Texas, GTI conduct an intensive archaeological survey of the proposed survey for the Benton City Water Supply Corporation Project in Medina County, Texas (Project). The archaeological survey followed the Texas Historical Commission's (THC) *Minimum Archaeology Survey Standards for Texas* and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. The County, in conjunction with the Benton City WSC, proposes to install approximately 17,000 Linear feet (LF) of 6 inch water line, 98 LF of bore with steel casing, valves and fittings, service reconnections, 2 first-time water service yard lines, pavement and driveway repair and all associated appurtenances. The waterline replacement project will be taking place within existing rights-of-way (ROW) of FM 3176 and County Roads 7714 and 7611. FM 3176 crosses Chacon Creek via a bridge. Directional boring shall be used to install this segment of water line and there shall be no new ground disturbance between the two bridge abutments. At San Francisco Creek, the line will also be bored due to the existing culvert structure installed years ago. This project description constitutes the Project's direct Area of Potential Effects (APE). The THC, however, stated in its letter dated June 20, 2014: "[THC]…believes that the only areas with the potential to contain intact archaeological deposits are the locations on either side of the creeks (San Francisco Perez and Chacon). Specifically, the bore shafts on both sides of the creeks need to be examined to the depth that will be excavated to complete the directional drill. This may requires the use of backhoe trenches. All other lines within current rights-of-way do not require survey." Based on the Minimum Archaeological Survey Standards for Texas and the 2014 Soil Series, it was GTI Principal Investigator's (PI) opinion that shovel testing was an appropriate Level of Effort to assess the Project's impact to potential archaeological sites and backhoe trenching was not necessary. GTI justified its reasons in the antiquities permit application, and THC issued antiquities permit number 7006. GTI's PI conducted the archaeological survey on September 4, 2014.

GTI excavated a total of 12 shovel tests and documented one soil profile column, and there was no evidence of significant archaeological sites within the intensive archaeological survey area. Because the Project's direct *Area of Potential Effect* (APE) is the water line construction length of 17, 000 linear feet, GTI conducted the survey as agreed upon in consultation between THC and Grant Works, Inc. and Medina County, as well as documented a reconnaissance archaeological survey level effort beyond the prescribed 1000 feet on both sides of the creeks at no expense to the project sponsor. GTI's PI did not observe any cultural artifacts on the ground surface within the reconnaissance survey area, and ground surface visibility was greater than 30 percent.

Accordingly, GTI has assessed that the proposed Project will have No Effect to archaeological sites eligible for listing in the National Register of Historic Places or worthy for State Antiquities Landmark designation. Archaeologists did not collect artifacts, so there are no curation issues. It is GTI's opinion that no further archeological work is necessary and the project should be allowed to proceed as planned.

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# Introduction

This report presents the results of an intensive archaeological survey for the Benton City Water Supply Corporation Project in Medina County, Texas (Project). The Project is located on Ghost Hill, Texas 7.5 minute USGS Topographic Quadrangle Map (2998-222) as seen on Figure 1 and Figure 2. The Project is receiving funds from the U.S. Department of Agriculture (USDA) administered by the Texas Department of Agriculture- Office of Rural Affairs for a Water Improvements Projects. Accordingly, the Project is considered a federal Undertaking under the National Historic Preservation Act [36CFR800.16.(y)] and the Antiquities Code of Texas [Section 191.003(4)] and [13TAC26 Section 191.0525], which required an Antiquities Permit Application [Section 191.054].

In accordance with the National Historic Preservation Act and the Antiquities Code of Texas, GTI conduct an intensive archaeological survey of the proposed survey, which took place on September 4, 2014. The archaeological survey followed the Texas Historical Commission's (THC) *Minimum Archaeology Survey Standards for Texas* and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. The County, in conjunction with the Benton City WSC, proposes to install approximately 17,000 linear feet (LF) of 6 inch water line, 98 LF of bore with steel casing, valves and fittings, service reconnections, 2 first-time water service yard lines, pavement and driveway repair and all associated appurtenances. The waterline replacement project will be taking place within existing rights-of-way (ROW) of FM 3176 and County Roads 7714 and 7611. With regards to FM 3176, the new waterline will be installed right next to existing waterlines from IH 35, south to CR 7716 within the previously disturbed ROW. From CR 7716 to the County line we will be installing the proposed waterline, again in previously disturbed ROW. FM 3176 crosses Chacon Creek via a bridge. Directional boring shall be used to install this segment of water line and there shall be no new ground disturbance between the two bridge abutments. In regards to CR 7611 the waterline will also be installed within the previously disturbed ROW. At San Francisco Creek, the line will also be bored due to the existing culvert structure installed years ago.

This project description constitutes the Project's direct Area of Potential Effects (APE). The THC, however, stated in its letter dated June 20, 2014: "[THC]…believes that the only areas with the potential to contain intact archaeological deposits are the locations on either side of the creeks (San Francisco Perez and Chacon). Specifically, the bore shafts on both sides of the creeks need to be examined to the depth that will be excavated to complete the directional drill. This may requires the use of backhoe trenches. All other lines within current rights-of-way do not require survey." Based on the Minimum Archaeological Survey Standards for Texas and the 2014 Soil Series, it was GTI Principal Investigator's (PI) opinion that shovel testing was an appropriate Level of Effort [36CFR800.4(B)(1)] to assess the Project's impact to potential archaeological sites and backhoe trenching was not necessary. GTI justified its reasons in the antiquities permit application, and THC issued antiquities permit number 7006.

GTI excavated a total of 12 shovel tests and documented one soil profile column, and there was no evidence of significant archaeological sites within the intensive archaeological survey area. Because the Project's direct *Area of Potential Effect* (APE) is the water line construction length of 17, 000 linear feet, GTI conducted the survey as agreed upon in consultation between THC and Grant Works, Inc. and Medina County. Because Benton City Water Supply Corporation contracted with GTI under the Use of Contractors clause of the National Historic Preservation Act [36CFR800.2(a)(3)], GTI's PI took into consideration that the USDA agency official was using the services of the applicant's cultural resources management consultant to prepare information, analyses and recommendations. According to the clause, the agency official remained legally responsible for all required findings and determinations for the entire Project area where federal funds were being used. In addition, THC originally recommended a survey of the entire Project's direct APE on April 29, 2014. Accordingly, GTI's PI documented a reconnaissance archaeological survey level effort beyond the prescribed 1000 feet on both sides of the creeks at no expense to the project sponsor in anticipation of USDA recommending assessment of the remainder of the Project's direct APE to release the federal funds for the entire Project. GTI's PI did not observe any cultural artifacts on the ground surface within the reconnaissance survey area, and ground surface visibility was greater than 30 percent throughout the entire Project's direct APE.

Accordingly, GTI has assessed that the proposed Project will have No Effect to archaeological sites eligible for listing in the National Register of Historic Places or worthy for State Antiquities Landmark designation. Archaeologists did not collect artifacts, so there are no curation issues. It is GTI's opinion that no further archeological work is necessary and the project should be allowed to proceed as planned.

This report is divided into seven sections and one appendix. Following the Introduction is the Project Description which discusses the Project dimensions, and type, as well as, the topography, soils, geology, and flora of the Project area. The next section is the Archival Review presenting the examination of the historical map collections in order to identify any potential historic sites or structures representing homesteads, schools, churches, ranches or communities, as well as identify any locations for historic cemeteries within the Project area. The Archival Review also considers important events or individuals that may have a historic role in Texas history in the context of the National Register criteria under 36CFR60.4(a) and 36CFR60.4(b). The Regional Archaeological Chronology discusses the prehistoric and historic time periods of the Project area. Survey Methodology and Results is the subsequent section that discusses the details of the intensive archaeological survey data and assessments of affect to archaeological resources within the Project's direct APE. The Summary and Recommendations discuss the conclusions and determination of effects based the intensive archeological survey, and the References section contains all the citations used in the report. Appendix A contains the shovel test data resulting from this intensive archaeological survey.

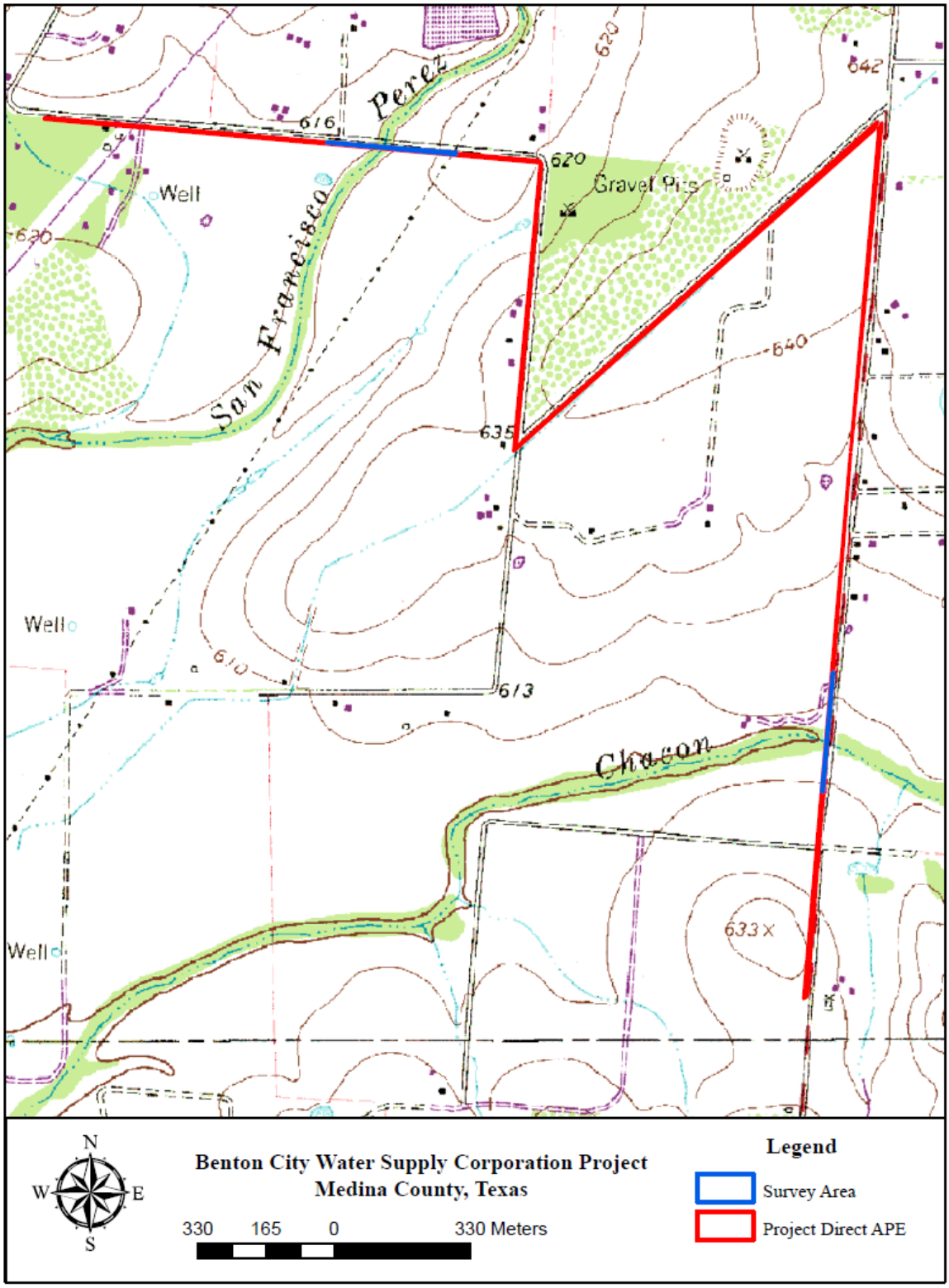


*Figure 1: Topographic Map of Project Location*

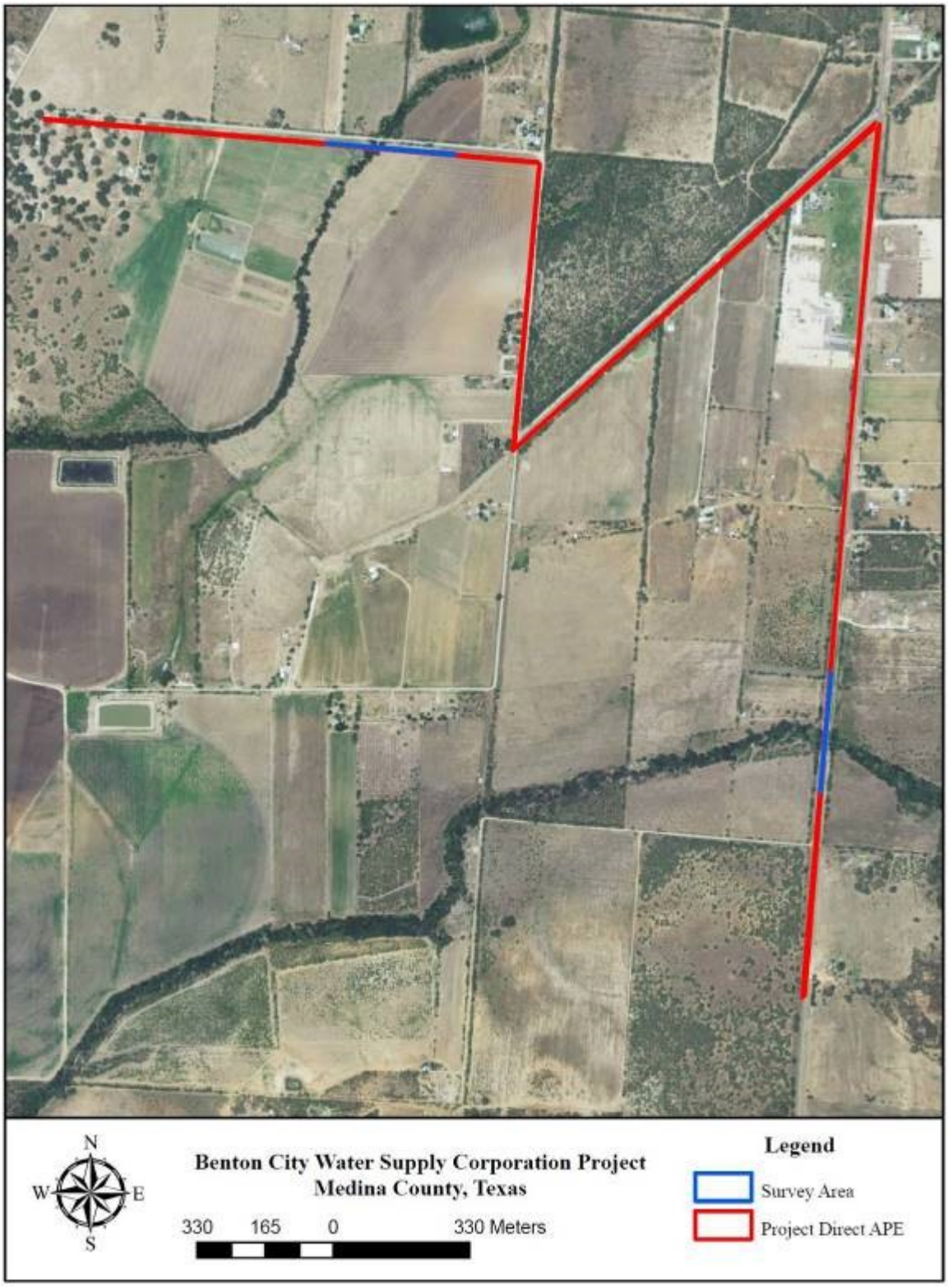


*Figure 2: Aerial Map of Project Location*

## Project Area Description

The Project location is east of IH 35 and southeast of Devine, Texas. The Project's direct APE crosses broad upland terrace and traversed San Francisco Perez Creek and Chacon Creek. The Project sponsor proposes to replace segments of the of previously constructed waterlines located within existing Right of Way (ROW), and place new waterlines in previously disturbed existing ROW. The Project sponsor consulted with the Texas Historical Commission (THC) in order to defined specific high probability areas where archaeological sites may located. These areas were defined as either side of San Francisco Perez Creek and Chacon Creek, and based on consultation these are the Intensive Archaeology Survey Areas.

Medina County is divided by the Balcones Escarpment. The northern portion of Medina County is located on the Edwards Plateau and Hill Country and the Rio Grande Plains to the south (Ochoa 2014). The Project is located in the southeast corner of Medina County placing it in the Rio Grande Plains. San Francisco Perez Creek and Chacon Creek serves as the drainage basin for the Project area. The southern portion of the county has both sandy loam and clay soils. Vegetation for the understory includes bluestem, buffalo and Arizona cottontop grasses while the over story consists of live oak and mesquite and cypress and pecan trees along the river banks (Figure 3 and Figure 4). The elevation for Medina County ranges from as low as 635 feet above sea level in the southern portion of the county to 1995 feet above sea level in the north. Rainfall averages 28.43 inches a year in this subtropical and subhumid climate, and the growing season for Medina County is 263 days a year (Ochoa 2014). Ground surface visibility was greater than 30 percent during the intensive archaeological survey (Figure 5).

*Figure 3: West End Project Beginning near IH-35*

*Figure 4: South Project End*

*Figure 5: Ground Surface Visibility Greater Than 30 Percent*

Soils

The soil mapped within the Benton City WSC Project's direct APE are classified as Amphion clay loam (AmA), Caid sandy loam (CdA, CdB), Divot clay loam (Do, Dp), Duval fine sandy loam (DuA, DwC), Hanis sandy clay loam (HaA), Miguel fine sandy loam (MgA), Nusil soils (NuC), Poth loamy fine sand (PoB), and Wilco loamy fine sandy (WoB). (USDA 2014; Figure 6). The following soil descriptions are confined to those of the intensive archaeology survey area.

The soil identified in the intensive archaeology survey area are the Divot clay loam occasionally-flooded and frequently-flooded (Do, Dp). Divot clay loam occasionally-flooded occupy 35.7 percent of the intensive archaeology survey area, and the Divot clay loam frequently-flooded occupy 64.3 percent of the intensive archaeology survey area (USDA 2014; Figure 7).

The Divot clay soil series are formed in calcareous clayey or loamy alluvium, and occur on flood plains and flood plain steps (USDA 2013). There are four layers in this soil series. The top layer measures 0 to 16 inches below ground surface, and it is dark grayish brown to very dark grayish brown clay loam (10YR4/2 to 3/2). The structure is moderate fine subangular, blocky, and medium granular. The texture is hard and firm. Constituents within the top layer include fine roots, very fine calcium carbonate concretions, and a few snail shells. The boundary between the first and second layer is gradual and smooth. The color of the second layer is brown to dark brown clay (10YR4/3 to 3/3) and measures 16 to 34 inches below ground surface. The structure is moderate fine to medium subangular and blocky. The texture again is hard and firm. The constituents in the second layer are described as a few fine roots, with a few films and threads of calcium carbonate which are visible when dry, and a few fine limestone fragments. The boundary between the second and third layer is gradual and smooth. The third layer measures 34 to 65 inches below ground surface, and it is brown clay (10YR5/3 to 4/3). The structure is moderate fine, medium, subangular and blocky. The texture very hard, firm and crumbly. Constituents within the third layer include a common visible threads and soft masses of calcium carbonate and a few fine limestone fragments. The boundary between the third and fourth layer is diffuse and smooth. The fourth layer measures 65 to 94 inches below ground surface, and the soil light yellowish-brown to yellowish-brown clay (10YR6/4 to 5/4). The structure is weak fine, subangular and blocky. The texture is hard and firm. Constituents in the fourth layer included visible thread and soft masses of calcium carbonate.

*Figure 6: USDA Soils Map Project's Direct APE*

*Figure 7: USDA Soils Map Survey Area*

## Geology

The Benton City WSC Project's direct APE is situated within three geologic formations that include Carrizo Sand (Ec), Alluvium (Qal), and Leona Formation (Qle) (Figure 8) (Bureau of Economic Geology 1982). The geologic formation with the intensive archaeology survey area is Alluvium (Qal) which is identified as floodplain deposits

Ec

**Carrizo Sand**

Sandstone, medium to very coarse grained up to size of rice, finer grained toward top, poorly sorted, friable to locally indurated, noncalcareous, thick bedded, light yellow to orange and brown; weathers yellowish brown, locally iron-oxide banded; characterized by ridges thickly forested with oak in eastern part of sheet; thickness 140-200 feet, thickens westward. The stippled area shows the site of the postulated astrobleme of Wilson and Wilson (1979), who state: "Breccia" (of Carrizo Sandstone, according to text) "is common over the entire area but some of it may have been reworked in lake deposits . . . "

Qal

**Alluvium**

Floodplain deposits

Qle

**Leona Formation**

Fine calcareous silt grading down into coarse gravel; type locality first wide terrace of Nueces and Leona Rivers below level of Uvalde Gravel. May correlate with Onion Creek Marl of Austin Sheet

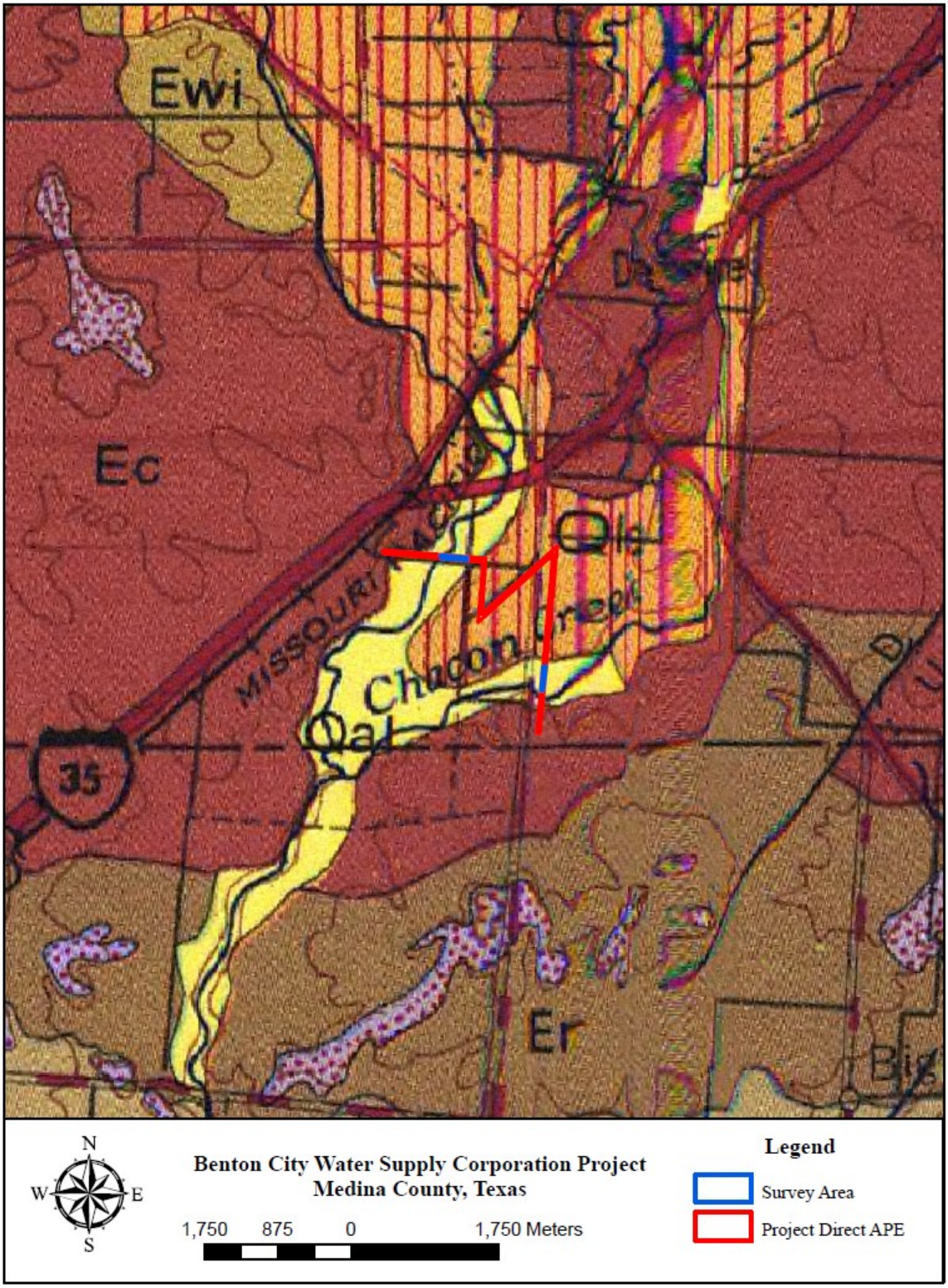


*Figure 8: Geologic Map of Project Area.*

## Archival Review

GTI's historian reviewed various historic map collections, which included the searchable land grant database, such as the GISWEB Viewer, historic maps databases housed at the Texas General Land Office, Perry Castañeda Library Map Collection, The Portal of Texas History, and Texas State Archives, in order to identify the earliest history of significant events or individuals for Medina County. During this research, archaeologists reviewed historic maps that included the 1862, and 1895 Medina County Plat Maps (Figure 9 and Figure 10), the 1936 Medina County General Highway Map (Figure 11), the 1942 Natalia Corps of Engineers Tactical Map (Figure 12), and the 1964 and the 1982 Ghost Hill 7.5 Minute Topographic Maps (Figure 13 and Figure 14). The general Project area location on each map is indicated on the historic maps with red line rectangular boxes.

During the early 18th century, the Medina River was the northern boundary of Coahuila y Tejas. It was Fray Olivares's glowing reports of the San Antonio River area that spurred the Spanish Crown to reoccupy and expand its colonization further into Tejas (Teja 1996). The new Governor of Tejas was Martín de Alarcón (Teja 1996), and the Spanish Crown charged him with settling the area. There were limited number of Spaniards in Coahuila available for recruitment as settlers, and Alarcón began preparing for the colonization efforts with a few militia men. The settlers that came with Alarcón included "an engineer, a stone mason, a blacksmith and a number of women and children," these individuals arrived in the vicinity of San Antonio on April 25, 1718 (Teja 1996). Fray Olivares and his small group responsible for the missions arrived a few days later on May 1st, and on May 5th they performed the official ceremony for the founding of Villa San Fernando de Bexar—what is known today as San Antonio. The Spanish Crown's efforts to colonize the region were centralized in San Antonio putting in place Missions and a Presidio. The Catholic Church offered Native Americans room and board at the Missions along the San Antonio River. These efforts lead to Villa San Fernando de Bexar being the hub of colonization in the region by the Spanish Crown. One-Hundred and Eighteen years later, the majority of the population at the beginning of the Texas Revolution was either Mexican (as opposed to Spanish because Mexico won its independence from Spain by this time), of Mexican descent, or meztizaje (Native American and Mexican). German immigrants began to move into the area during the 1840s. During this time, the growing town of San Antonio desired to create a protective zone to the south and west by establishing settlements in these areas (Ochoa 2014), which includes the Project's area.

This movement was fulfilled by an Empresario contract awarded to Henri Castro on February 15, 1842 (Ochoa 2014). His land grant was located four miles west of the Medina River. In addition to the awarded land, he also purchased an additional 16 leagues of land from John McMullen located between the land grant and the Medina River. Castro with the help of German wine merchant Ludwig Huth and his son brought German and French farmers from the Alsace region of northern France to settle the area (Ochoa 2014). They arrived in San Antonio on September 2, 1844, and quickly set out to settle the area which include communities such as Castroville Quihi, Vandenburg, New

Fountain, and Old D'Hanis. Medina County was formally established on February 12, 1848, and the county was enlarged from lands that were Bexar County on February 1, 1850 (Ochoa 2014). Medina County voted against secession during the Civil War. Sentiment among the European settlers in the county disfavored the institution of slavery, and the county's proximity to Mexico, as sanctuary for runaway slaves, solidified the county's view during that time period. Although values of land dropped in Medina County after the Civil War, areas such as Castroville prospered with its location on the commercial trade routes between Mexico and the US. In late 1880's, Medina County was transformed by the introduction of barbed wire and the railroads. The 1870's saw a rise in the cattle ranching industry. The introduction of barbed wire decreased conflicts over grazing access and the railways opened the market place. The International and Great Northern Railroad extended their line west and south through Medina County during this time period. The small town of Devine located northwest of the Project's direct APE was established along this railroad in 1881 (Russell 2014). Devine was named for Judge Thomas Jefferson Devine who was an attorney for the railroad (Russell 2014). The area surrounding Devine was under irrigation farming in 1915 by the Medina Irrigation Company who installed a gravity-flow irrigation system fed by waters from Medina Lake (Russell 2014). Corn and small grains became the main crops produced in the area.

The focus of the intensive archaeological survey for Benton City WSC Project's direct APE were on San Francisco Perez Creek and Chacon Creek. Review of the searchable land grant database GISWEB Viewer available at the Texas General Land Office identified that the area of interest on San Francisco Perez Creek is located within two historic land tracts belonging to Isaac Ticknor and John Rieden (Texas GLO File # 155338 and 155773). Chacon Creek is located within the historic land tract of Augustin Trevino (Texas GLO File # 159084). These land tracts are all visible on the 1862 and 1895 Medina County Plat Maps.

Isaac Ticknor's heirs were awarded a 640 acre Donation Land Certificate No. 65 on March 11, 1847. The certificate was awarded for his service in the Battle of the Coleto on March 19, 1836 where he was mortally wounded. Isaac Ticknor was captain of his battalion of Montgomery, Alabama, "Greys." According to Roell (2014), the Battle of Coleto was one the most significate engagements of the 1836 Goliad Campaign of 1836 and the Texas Revolution. On April 13, 1855 his wife Susan Ticknor, hired a Patrick H. Clayton, as an attorney to represent her on the claim of her husband's land. The claim was made official and the land was patented by the heirs of Ticknor on June 25, 1855 (Certificate No. 64, Patent No. 421, and Patent Volume 2). So, he passed away before obtaining the land. As a potentially significant individual [36CFR60.4(d)], he did not build a house on his property within the Project's direct APE.

John Rieden received title to his land on February 15, 1847. He patented his own property on June 5, 1852 (Certificate No. 77, Patent No. 999, and Patent Volume 6). John Rieden received the title to his 640 acre tract of land under a Colonization Contract with Henry Castro and the Government of Texas in "Castro's Colony." He was also one of the first settlers in Quihi Texas. So, his home is not within the Project's direct APE. There was no additional information available in the Handbook of Texas in regards to John Rieden.

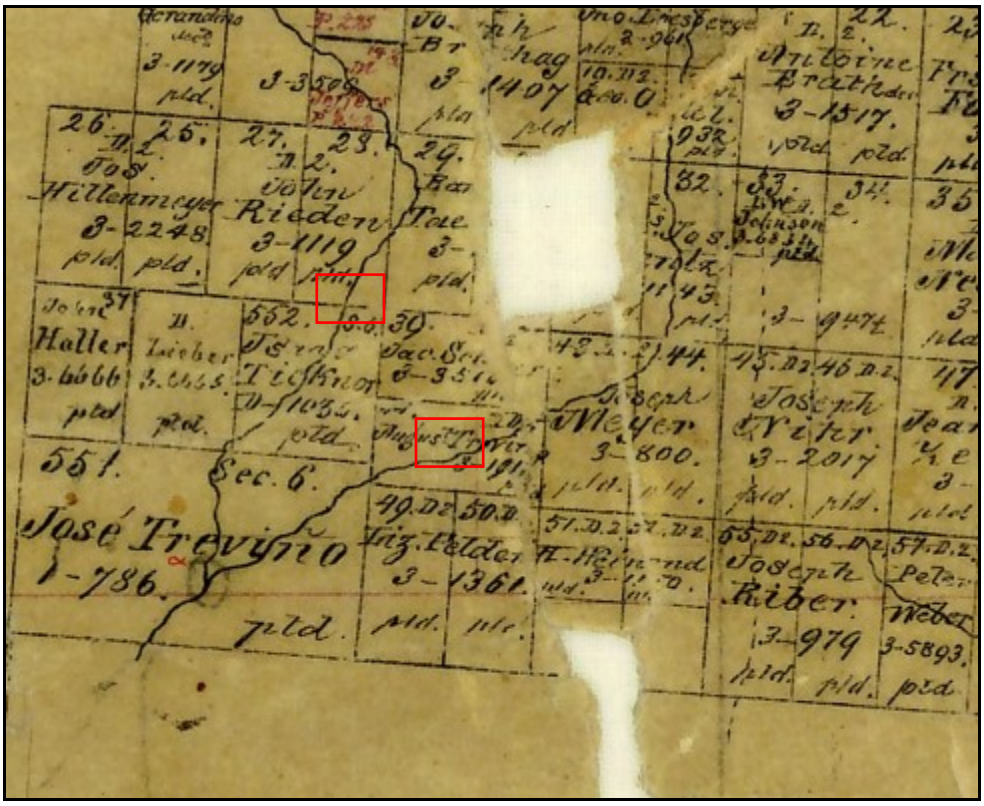


*Figure 9: 1862 Medina County Plat Map*

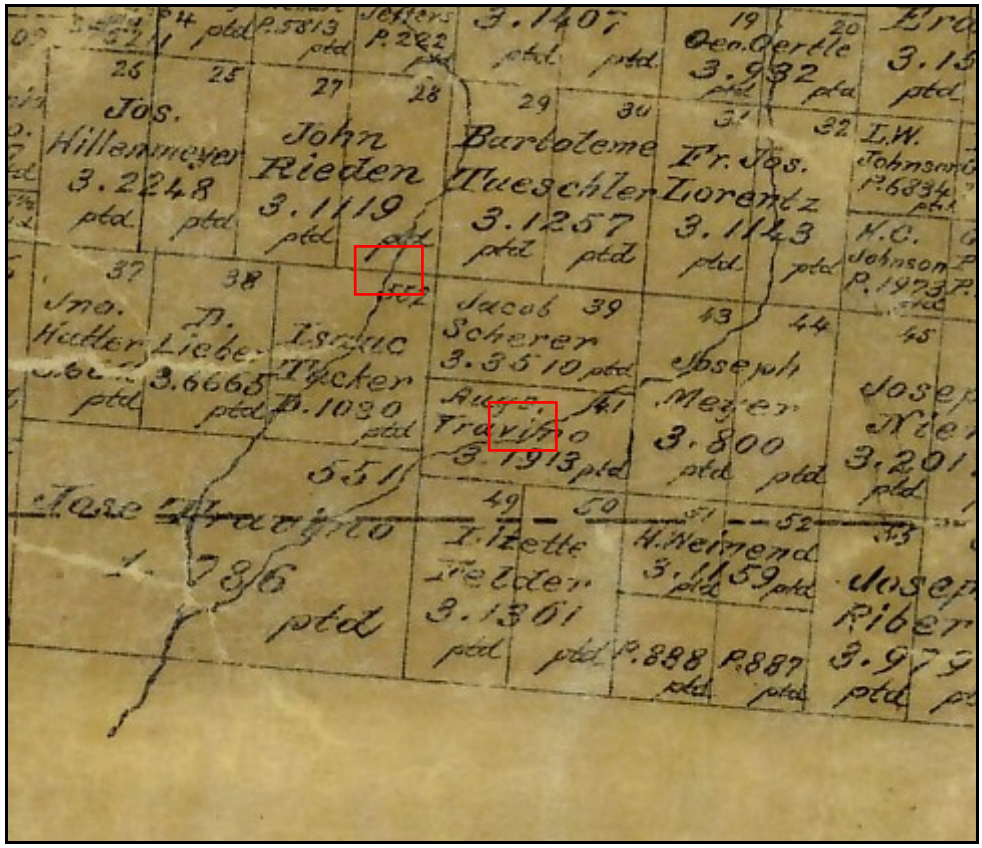


*Figure 10: 1895 Medina County Plat Map*

The land grant associated with Chacon Creek was awarded to Augustin Trevino through Henry Castro's Colonization Contract. His award was also dated February 15, 1847. Augustin Trevino was part of Henry Castro's colonization effort and "hired to serve as teamster and cattle raising instructor" (Weaver 1983). He sold the land to Joseph Ulrich for $75.00 on Aril 21, 1854. Joseph Ulrich patented the land on March 23, 1855 (Certificate No. 54, Patent Number 1200, and Patent Volume 11). Ulrich was a well-known merchant from San Antonio (Weaver 1983). There was no additional information in the Handbook of Texas regarding Augustin Trevino or Joseph Ulrich, and the historic maps do not show the location of their houses within the Project's direct APE.

GTI's historian also reviewed the 1936 Medina County General Highway Map. This map shows little to no development within the vicinity of both the San Francisco Perez Creek or Chacon Creek crossings. The review also included the 1942 Natalia Corps of Engineers Tactical Map, and the 1964 and the 1982 Ghost Hill 7.5 Minute Topographic Maps. The lack of development in the area of the creeks remains consistent over time.

Based on the archival research, the Project's direct APE is located within three historic land tracts belonging to Isaac Ticknor, John Rieden, and Augustin Trevino. Isaac Ticknor was a hero of the Texas Revolution. He died from a mortal wound that he obtained during the Battle of Coleto. His heirs inherited the land grant. There was no further evidence that they build their homes within the vicinity of the Project's direct APE. John Rieden and Augustin Trevino received land grants that were part of the Henry Castro's Colonization effort. John Rieden was one of the first settlers in Quihi, Texas. There was no evidence that he occupied the land grant southeast of Devine, Texas. Augustin Trevino's land tract was located on Chacon Creek. He was hired by Castro as a teamster and cattle raising instructor. He held his land for a short time, then sold it to a well-known merchant from San Antonio, John Ulrich. Ulrich had another land grant that was awarded to him by Castro. There was no evidence observed that indicated he inhabited this particular land grant located south of Devine, Texas. Therefore, there are no significant events or individuals that would be eligible for listing in the National Register of Historic Places or worthy for State Landmark designation within the Benton City WSC Project's direct APE [36CFR60.4(a) and 36CFR60.4(b)]. Accordingly, the probability for historical archaeological sites within the Project's direct APE was low.

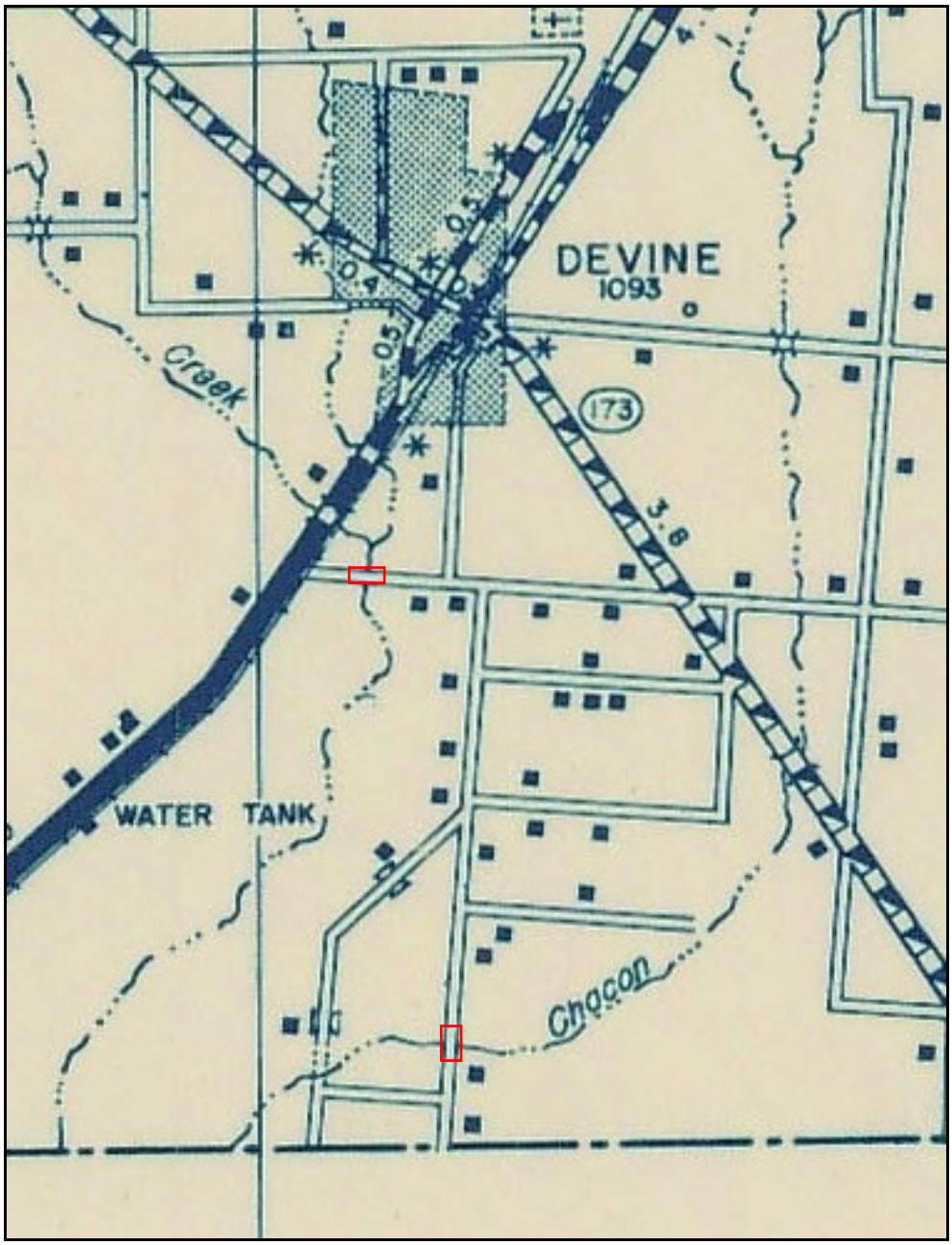


*Figure 11: 1936 Medina County General Highway Map*

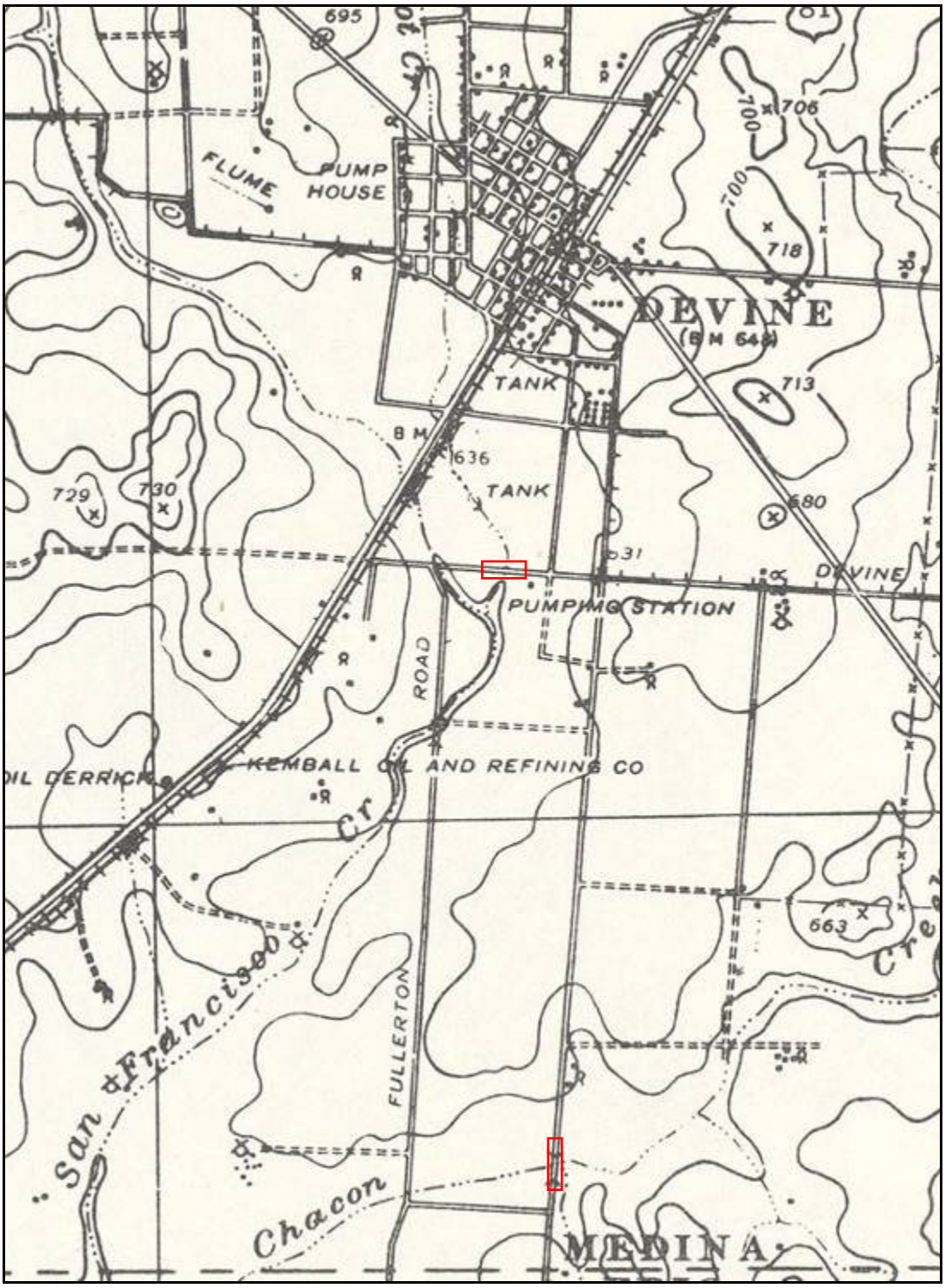


*Figure 12: 1942 Natalia Corps of Engineers Tactical Map*

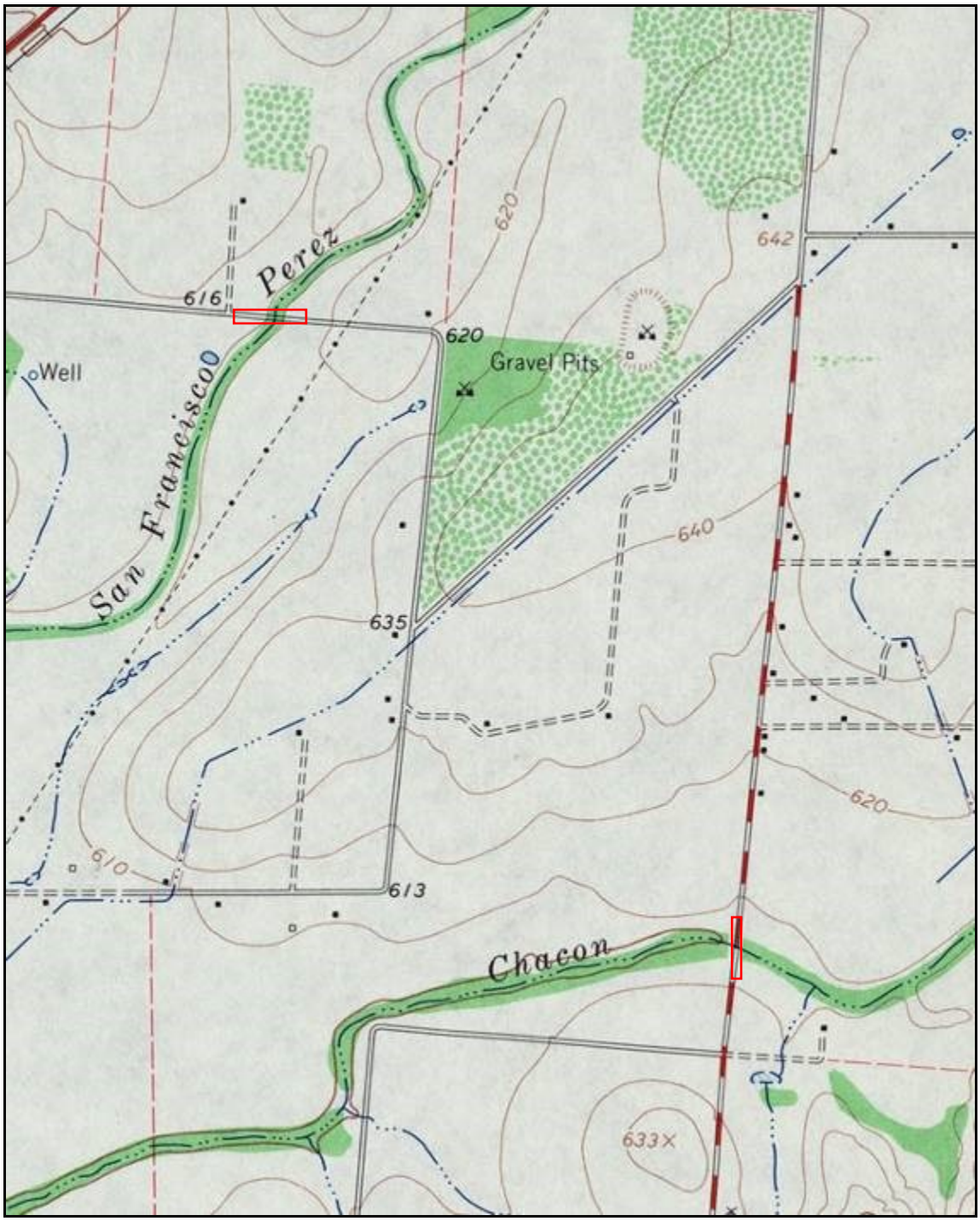


*Figure 13: 1964 Ghost Hill 7.5 Minute Topographic Map*

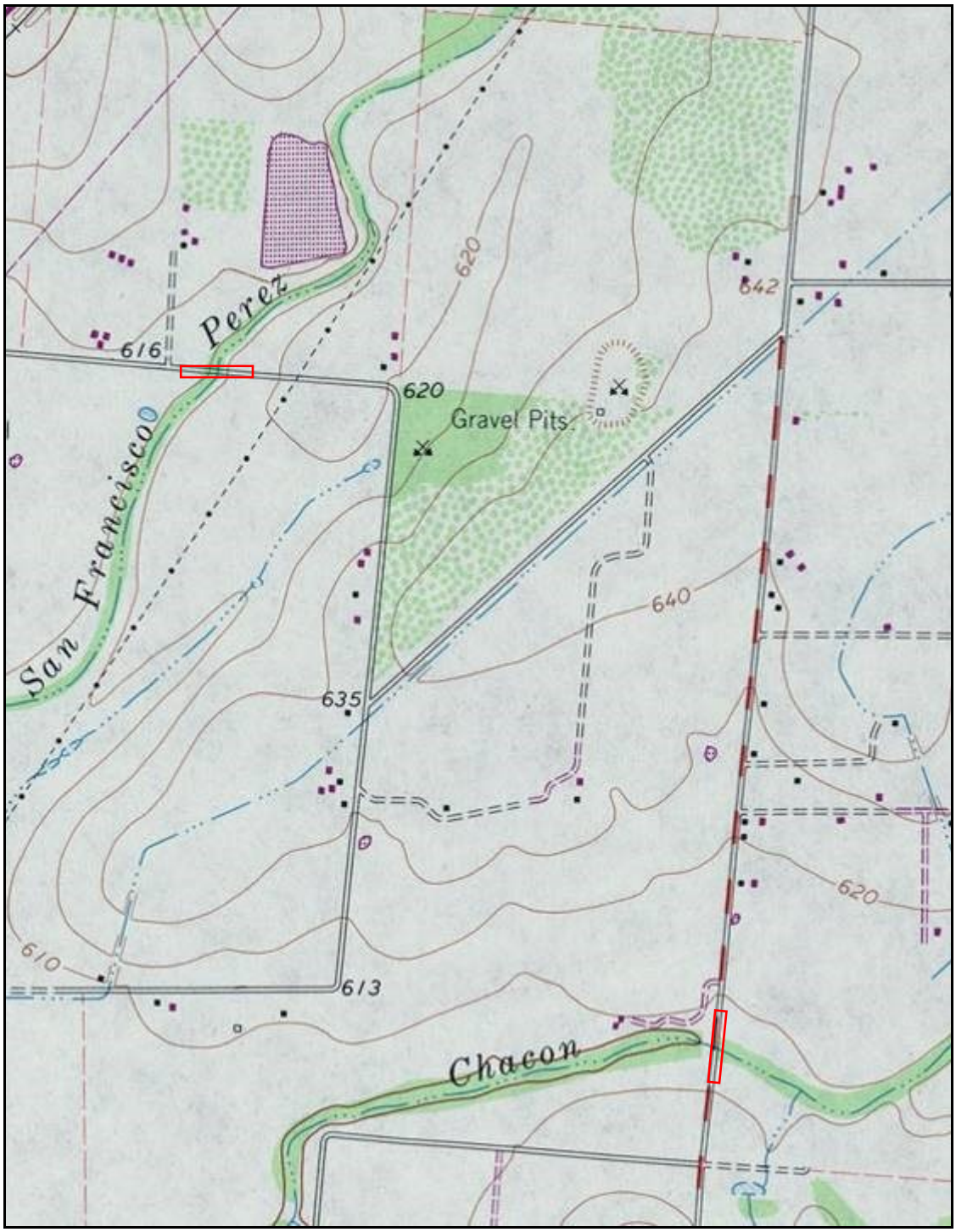


*Figure 14: 1982 Ghost Hill 7.5 Minute Topographic Map*

## Regional Archeological Chronology

A temporal framework for prehistoric archaeological sites in Texas can be categorized by three main periods: the Paleo-Indian (10,500–8500 Before Present [B.P.]), the Archaic (8500–1200 B.P.), and the Late Prehistoric (1200–400 B.P.). The Archaic period is further subdivided into the Early Archaic (8500–6000 B.P.), the Middle Archaic (6000–3500 B.P.), and the Late Archaic (3500–1200 B.P.). Suhm et al. (1954), Suhm and Jelks (1962), Prewitt (1981, 1985), and Turner and Hester (1999) established this temporal framework based on Projectile point type seriation and technological changes in diagnostic artifacts due to changing environment and subsistence strategy adaptations.

### Paleo-Indian

The Paleo-Indian period dates from approximately 10,500 to 8,500 B.P. Archaeological sites from this period have been found in rock shelters and out in the open. Mobile hunters and gathers exploited mega faunal species such as mastodon, mammoth, bison, horse, and camel. The Paleo-Indian period has been documented as the earliest occupation of Texas archaeological prehistoric sites and straddles the end of the Pleistocene era and the beginning of the Holocene. Few mega faunal assemblages have been recovered at archaeological sites, however, stone tool assemblages are better known. The stone tools of this period are generally lanceolate Projectile points that include *Plainview, Clovis and Folsom* type points. Processing tools include *Clear Fork* bifaces *Albany* tools, and end scrapers (Hester 1999:246, 277, 280). Much debate has occurred in recent years regarding the beginning of this period or that a pre-Clovis culture entered North America prior to 10,500 B.P. and as early as 13,500 B.P. as evidenced at Monte Verde in Chile, South America. The basic chronology, however, remains the same for Texas at this time.

### Archaic

The Archaic Period dates from approximately 8,500 to 1,200 B.P. Researchers have divided this period into the Early Archaic (8500–6000 B.P.), Middle Archaic (6000–3500 B. P.), and Late Archaic (3500–1200 B.P.). This time period was characterized by warmer temperatures and rising sea, river, and stream levels. These changing environmental conditions were the impetus for a burgeoning new ecosystem. Early inhabitants exploited these new ecosystems, which caused the demise of some big game animals like the mastodon and mammoth. As the environment changed, the Archaic people's diet changed, and their stone tool technology they used to procure and process these new plants and animals. Regional diversification in diet and material culture occurred during the Archaic Period. In general, Archaic people began to make their Projectile points with stems, and the lanceloate form fell from use. Early Archaic *Angostura, Scottsbluff, Golondrina, Merserve, Gower, Hoxie, wells, Bell, Andice, Martindale, Uvalde, Baird,* and *Taylor* points show this change in stone tool technology.

During the transition from the Early Archaic to Middle Archaic periods, stemmed points became more common and began to show a greater degree of diversity in point forms. Archaic peoples began to deposit burned rock middens. Point types found at burned rock midden sites typically include *Nolan, Travis, Bulverde, Pedernales, Marshall, Williams,* and *Lange* forms. The last three forms are considered transitional to the Late Archaic. Archaeologists know very little about the cultural practices of this time period, and the environmental conditions remained the same as previous periods. Typical Late Archaic point forms include *Marcos, Montell, Castroville, Frio, Fairland, Ensor,* and *Mahomet*. Archaic populations increased throughout this period. Social and exchange relationships developed as indicated by the ubiquitous variety of point types, forms and material cultural evidence.

Late Prehistoric

The Late Prehistoric Period dates approximately from 1,200–400 B.P. The greatest innovation during this period was the development of the bow and arrow. Stone tool technology evolved in step with this new innovation. Late Prehistoric people made their stone points smaller and more diverse in form depending on the game animals that were being hunted. Some of these stone arrow points include *Edwards, Scallorn, Zavala, Perdiz, Cuney, Padre* and *Alba* types. The second greatest innovation during this period was the development of ceramics. Settlement patterns also changed at this time as sedentary and horticultural communities became more common. Southwestern cultural groups introduced corn to groups in Texas, which indicated the existence of exchange networks between sedentary and nomadic groups. Archaeological site types also include open camps, lithic scatters, and cemeteries.

Historic Native American Period

The Historic Native American Period begins at the point of contact with European explorers in A.D. 1492. The first European explorer to reach Texas was Alvar Nunez Cabeza de Vaca during the 1528 Narvaez Expedition of the Gulf coast. Cabeza de Vaca was stranded in Texas for eight years and traveled throughout South Texas and Mexico meeting different Native American groups. He was eventually rescued and went back to Spain. During his journey, Cabeza de Vaca documented numerous groups of people, their customs, and cultural differences. Subsequent Spanish entradas in Texas began during the early 1700s with the establishment of the Spanish missions. Changing and shifting social and cultural ties characterize this time. For example, although the Tonkawa were one of the more numerous Native American groups in Texas, the Ervipiame moved into the area from northern Mexico and many of them joined the Tonkawa groups as a matter of survival (Hester 1980: 51). The Lipan Apaches immigrated and came from the northwest into Texas. Hester (1980: 51) has noted that by the early 1700s, the Lipan Apache numbered between 3,000 and 5,000 in population size and controlled the Central Texas area by 1775. Shortly there after, the Comanche moved into Texas from the Colorado and Wyoming areas and displaced the Tonkawa and Lipan Apache groups.

## Archaeological Survey Methodology

GTI Environmental, LLC's (GTI) qualified Professional Archaeologist, Sergio A. Iruegas RPA (Register of Professional Archaeologists) served as the Principal Investigator (PI). The Project is receiving funds from the Department of Agriculture administered by the Texas Department of Agriculture- Office of Rural Affairs for a Water Improvements Projects. Accordingly, the Project is considered a federal Undertaking under the National Historic Preservation Act [36CFR800.16(y)] and the Antiquities Code of Texas [Section 191.003(4)] and [13TAC26 Section 191.0525], which required an Antiquities Permit Application [Section 191.054].

GTI conducted an intensive archaeological survey of the proposed Project as illustrated on the attached maps provided by Grant Works Inc. The archaeological survey followed the Texas Historical Commission's (THC) *Minimum Archaeology Survey Standards for Texas* and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. The County, in conjunction with the Benton City WSC, proposed to install approximately 17,000 linear feet (LF) of 6 inch water line. The waterline replacement project will be taking place within disturbed existing rights-of-way (ROW) of FM 3176 and County Roads 7714 and 7611. FM 3176 crosses Chacon Creek via a bridge. Directional boring shall be used to install this segment of water line and there shall be no new ground disturbance between the two bridge abutments. At San Francisco Creek, the line will also be bored due to the existing culvert structure installed years ago.

This project description constitutes the Project's direct Area of Potential Effects (APE). The THC, however, stated in its letter dated June 20, 2014: "[THC]…believes that the only areas with the potential to contain intact archaeological deposits are the locations on either side of the creeks (San Francisco Perez and Chacon). Specifically, the bore shafts on both sides of the creeks need to be examined to the depth that will be excavated to complete the directional drill. This may requires the use of backhoe trenches. All other lines within current rights-of-way do not require survey."

Based on the Minimum Archaeological Survey Standards for Texas and the 2014 Soil Series, it is GTI PI's opinion that shovel testing will be an appropriate Level of Effort to assess the Project's impact to potential archaeological sites and backhoe trenching is not necessary. The Divot Clay Loam soil series indicates that calcium carbonate deposits are well within one meter below ground surface. Masses of calcium carbonate deposits form over thousands of years and indicate pre-human occupation levels. Moreover, GTI's PI proposes to document the creek bank soil profiles deeper than one meter below ground surface, if present. GTI's PI presented its justification in the antiquities permit application scope of work, and THC issued antiquities permit number 7006.

GTI performed a 100 percent pedestrian ground surface inspection with shovel tests of the portion of the Project's direct APE outlined in the Grant Works, Inc. Scope of Work to meet the definition of an Intensive Archaeological Survey. The shovel tests were

placed within 1000 feet at each side of the creeks. GTI's PI did not excavate shovel tests outside the prescribed 1000 feet at the creek crossings Because the Project's direct *Area of Potential Effect* (APE) is the water line construction length of 17, 000 linear feet, GTI conducted the survey as agreed upon in consultation between THC and Grant Works, Inc. and Medina County, as well as documented a reconnaissance archaeological survey level effort beyond the prescribed 1000 feet on both sides of the creeks at no expense to the project sponsor. GTI's PI did not observe any cultural artifacts on the ground surface within the reconnaissance survey area, and ground surface visibility was greater than 30 percent.

All excavated matrix was passed through 1/4-inch hardware mesh when possible or trowel sorted to inspect for cultural materials. Only temporally diagnostic artifacts (such as projectile points, ceramics, historic materials with maker's marks, etc.) and all other artifacts (such as debitage, burned rock, historic glass and metal scrap, etc.) were tabulated and assessed in the field and left where they were found. If artifacts were collected, they would be bagged and labeled appropriately. These artifacts would be formally curated at the Texas Archeological Research Laboratory (TARL) following analysis and reporting (permitted projects must curate artifacts). Field notes were maintained on location, disturbances, soils, shovel tests, etc. Digital photos were taken when appropriate and recorded on a photograph log. A handheld GPS unit (UTM, NAD 83) was used to mark the location of shovel tests as well as any newly recorded sites.

## Archaeological Survey Results

Benton City WSC, Project's direct APE crosses broad upland terrace and traversed San Francisco Perez Creek and Chacon Creek. The Project sponsor proposes to replace segments of the of previously constructed waterlines located within existing Right of Way (ROW), and place new waterlines in previously disturbed existing ROW. The Project sponsor consulted with the Texas Historical Commission (THC) in order to defined specific high probability areas where archaeological sites may be located. These areas were defined as within 1,000 feet of either side of San Francisco Perez Creek and Chacon Creek (Figure 15 and Figure 16). Based on consultation with the THC, these are the intensive archaeological survey areas within the Project's direct APE. GTI's PI excavated a total of 12 shovel tests and examined one column soil profile within the intensive archaeological survey areas. There were no cultural materials documented on the surface or within shovel tests or column soil profile in the intensive archaeological survey areas. In addition to the intensive archaeological survey areas, GTI's PI also performed a reconnaissance archaeological survey level of effort of the remainder of the Project's direct APE. These intensive and reconnaissance archaeological survey level of efforts were performed, because the U.S. Department of Agriculture federal funds were being used for the water improvements Project and THC originally had recommended an archaeological survey of the entire 17,000 LF on April 29, 2014. Presented below are two separate sections—first the Intensive Archaeological Survey Shovel Testing Results followed by the Reconnaissance Archaeological Survey Results from the remainder of the Project's direct APE.

### Intensive Archaeological Shovel Testing Results

As previously mentioned, the shovel testing efforts of the Intensive Archaeological Survey were focused on either side of San Francisco Perez Creek and Chacon Creek within 1000 feet of the creeks. San Francisco Creek is lined with native oaks and pecan trees (Figure 17 and Figure 18). The creek bed is cut moderately deep and the road southern ROW was the width of the intensive archaeological survey area. Shovel Test One (ST-1), ST-2 and ST-3 were excavated on the west bank of San Francisco Perez Creek, and ST-4, ST-5 and ST-6 were on the east side of the Creek. Chacon Creek is located near the southern end of the Project's direct APE on the western side of the road ROW. GTI's PI excavated ST-7, ST-8 and ST-9 on the north side of Chacon Creek which was deeper than San Francisco Perez Creek. Shovel Test Ten, ST-11 and ST-12 were excavated on the south side of Chacon Creek.

GTI's PI described ST-1 with two layers (Figure 19). The top layer extended from the ground surface to 19 cm below the ground surface, and the soil layer was characterized as brown silty loam. The underlying layer extended to 40 cm below ground surface, and it was dark-brown clayey silty loam. Shovel Test Two and ST-3, also on the west side of San Francisco Perez Creek, consisted of a single layer (Figure 20 and Figure 21). The layer was described as tan silty loam that extended consecutively below ground surface to 30 cm and 24 cm. The anticipated calcium carbonate deposits were evident in these shovel tests, which was consistent with the Divot Soil series.

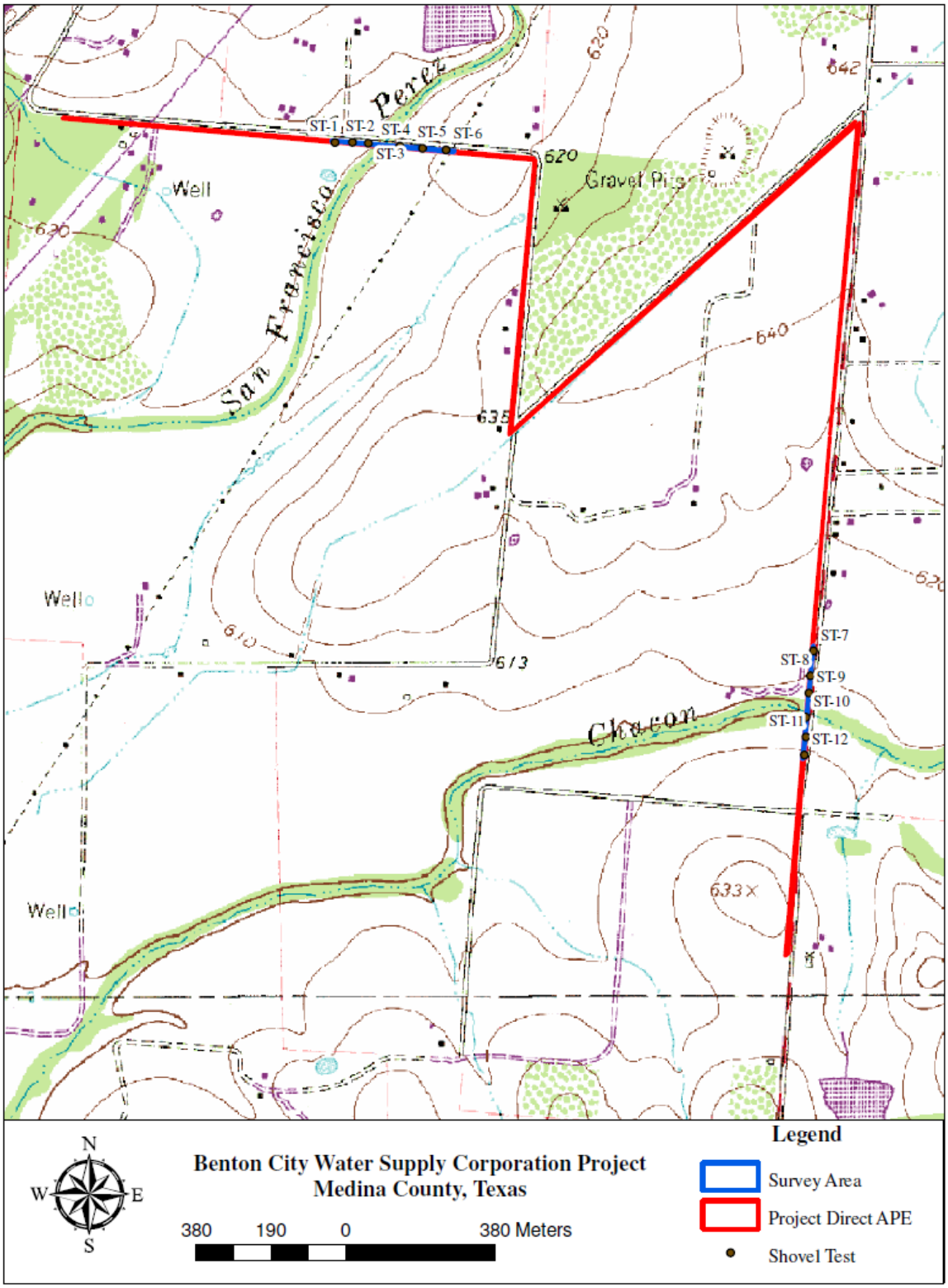


*Figure 15: Benton City WSC Project APE with Shovel Test Locations*

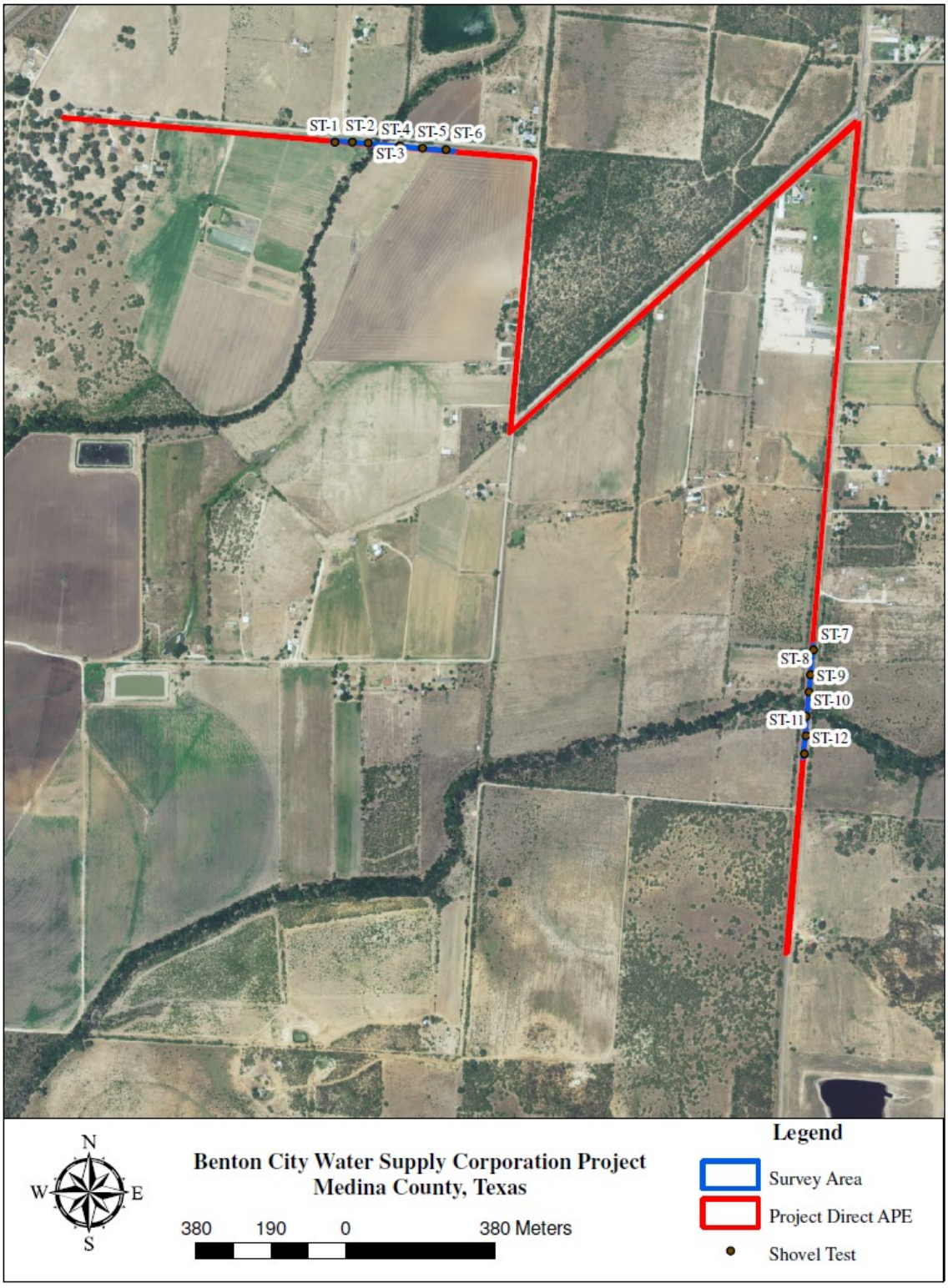


*Figure 16: Benton City WSC Project APE Aerial with Shovel Test Locations*

*Figure 17: East Bank of San Francisco Perez Creek Soil Profile*

*Figure 18: West Bank of San Francisco Perez Creek Soil Profile*

*Figure 19: Shovel Test 1 Soil Profile*

*Figure 20: Shovel Test 2 Soil Profile*

*Figure 21: Shovel Test 3 Soil Profile*

GTI's PI described ST-4 with three layers (Figure 22). The top layer extended from 0 to 11 cm below ground surface, and the soil layer was brown silty clay loam. The second and third layer of ST-4 extended to 22 cm and 30 cm consecutively below ground surface. Both soil layers were characterized as brown silty loam with calcium carbonate. The amount of calcium carbonate decreased with depth in the third layer. Shovel Test Five contained a single layer of brown silty loam that extended from 0 to 30 cm below ground surface (Figure 23). The last shovel test excavated on the east bank of San Francisco Perez Creek was ST-6. Shovel Test Six consisted of two stratigraphic layers (Figure 24). The upper layer was tan silty loam and extended from 0 to 7 cm below ground surface. The underlying second layer was brown silty loam, and it extended from 7 to 30 cm below ground surface.

GTI's PI observed the San Francisco Perez Creek bank soil profiles on the east and west side. The county road ROW was narrow at the corrugated culvert bridge crossing and direct examination of the soil profile was not possible. Recent heavy rain episodes, however, eroded the banks and the soil profile was clearly visible along with exposed tree roots as seen on Figure 17 and Figure 18. GTI PI did not notice artifacts in the soil profile beyond the fenced ROW, and there were no cultural feature deposits, such as intact or dispersed hearths that would indicate the possibility of significant prehistoric cultural deposits. While rain water runoff brought fresh silt as alluvial deposits immediately within the creek banks, the shovel tests in the upland first terrace of the creek demonstrated the stable soil stratigraphy. The calcium carbonate deposits indicated depths that predate human occupation roughly below 30 cm in this area of the creeks. This archaeological evidence indicates that if prehistoric human occupation was present within the Project's intensive archaeological survey area, it would be present within the first 30 cm below ground surface. Therefore, backhoe trenching was unnecessary.

*Figure 22: Shovel Test 4 Soil Profile*

*Figure 23: Shovel Test 5 Soil Profile*

*Figure 24: Shovel Test 6 Soil Profile*

Chacon Creek located in the southern portion of the Project's direct APE contained consistent similar vegetation as San Francisco Perez Creek. Shovel Test Seven through ST-12 were excavated in this location. GTI's PI described ST-7 in two stratigraphic layers (Figure 25). The top layer extended from 0 to 12 cm below ground surface, and it was brown silty loam. The underlying layer extended from 12 to 30 cm below ground surface, and soil layer was described as brown silty loam with calcium carbonate deposits. The calcium carbonate appeared as a concentrated lens within the second layer between 12 cm and 17 cm below ground surface and decreased with depth. Shovel Test Eight consisted of a stratigraphic single layer of brown silty loam extending from 0 to 10 cm below the ground surface, and it also contained the lens of calcium carbonate between 12 cm and 17 cm below ground surface (Figure 26). Shovel Test Nine had two stratigraphic layers. The top layer was light brown silty loam, and it extended from 0 to 18 cm below ground surface. The underlying second layer was also silty loam, but it showed mottle light brown and red clay that extended from 18 cm to 40 cm below ground surface (Figure 27). Shovel Test Ten was similar to ST-8. It contained a single stratigraphic layer of brown silty loam, and it also had a lens of calcium carbonate between 6 cm and 11 cm below ground surface (Figure 28). Shovel Test Ten was excavated to a depth of 30 cm below ground surface. Shovel Test Eleven contain two stratigraphic layers (Figure 29). The top layer was light brown silty loam, and it extended from 0 to 7 cm below ground surface. The underlying layer was brown silty loam, and the soil layer extended to 30 cm below ground surface. The underlying second layer also contained calcium carbonate which was confined near the transition between the stratigraphic layers. The last shovel test, ST-12, also contained two layers and was similar in profile to ST-9 (Figure 30). The upper stratigraphic layer was light brown silty loam, and it extended from 0 to 17 cm below ground surface. The underlying layer from 17 cm to 35 cm below ground surface was mottled light brown with red clay.

*Figure 25: Shovel Test 7 Soil Profile*

*Figure 26: Shovel Test 8 Soil Profile*

*Figure 27: Shovel Test 9 Soil Profile*

*Figure 28: Shovel Test 10 Soil Profile*

*Figure 29: Shovel Test 11 Soil Profile*

*Figure 30: Shovel Test 12 Soil Profile*

In addition to shovel testing efforts, GTI's PI also inspected the soil profiles of Chacon Creek for artifacts. Although the banks of San Francisco Perez Creek were not conducive for a soil profile, Chacon Creek was. GTI's PI was able to examine a 240 cm profile of Chacon Creek northern bank soil profile (Figure 31). Two stratigraphic layers were noted in the soil profile. The upper layer was described as light brown silty loam, and it extended from the surface to 38 cm below ground surface. The underlying layer was dark brown silty clay loam and extended to 240 cm below the ground surface elevation. There was no evidence of cultural deposits or cultural features.

*Figure 31: Chacon Creek South Bank Soil Profile*

Reconnaissance Archaeological Survey Results

As previously mention, GTI's PI also conducted a Reconnaissance level effort for the remainder of the Project's direct APE beyond 1000 feet from the creek banks. During the Reconnaissance level effort there were not cultural materials observed within the Project's direct APE. The beginning of the project was located near IH 35 and consisted of typical live oak and short grass vegetation seen in cattle ranching and agricultural areas of Medina County. The project end was a broad open short grass field. Photographs of the project beginning and ending are presented in the Project Description section of this report. GTI's PI stopped and examined the area east of San Francisco Perez Creek on CR 7611. This area contained a four foot deep drainage ditch where back dirt soils could be observed (Figure 32). Another ditch was observed along the north/south section of CR 7611, which was inspected for cultural resources (Figure 33). The Project's direct APE also runs adjacent to CR 7614. This area was generally flat and consisted of open field of short grasses with greater than 30 percent ground surface visible (Figure 34). This was also consistent for the section of the Project's direct APE located adjacent to FM3176 (Figure 35). There were no cultural materials observed within the Project's direct APE.

*Figure 32: Project's direct APE CR 7611 Showing Ditch*

*Figure 33: Project's direct APE North/South Section CR 7611 Showing Ditch*

*Figure 34: Project's direct APE CR 7614 Showing Open Field*

*Figure 35: Project's direct APE FM 3176 Showing Open Field*

## Summary and Recommendations

This document presents the results of an intensive archaeological survey (TAC Permit 7006) for the Benton City Water Supply Corporation Project in Medina County, Texas (Project), in accordance with the National Historic Preservation Act and the Antiquities Code of Texas. The archaeological survey followed the Texas Historical Commission's (THC) *Minimum Archaeology Survey Standards for Texas* and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. The County, in conjunction with the Benton City WSC, proposed to install approximately 17,000 linear feet (LF) of 6 inch water line within existing disturbed rights-of-way (ROW) of FM 3176 and County Roads 7714 and 7611. FM 3176 crosses Chacon Creek via a bridge. Directional boring is proposed to install this segment of water line and there shall be no new ground disturbance between the two bridge abutments. At San Francisco Creek, the line also will be bored due to the existing culvert structure installed years ago. This project description constitutes the Project's direct Area of Potential Effects (APE).

The THC, however, stated in its letter dated June 20, 2014: "[THC]…believes that the only areas with the potential to contain intact archaeological deposits are the locations on either side of the creeks (San Francisco Perez and Chacon). Specifically, the bore shafts on both sides of the creeks need to be examined to the depth that will be excavated to complete the directional drill. This may requires the use of backhoe trenches. All other lines within current rights-of-way do not require survey." Based on the Minimum Archaeological Survey Standards for Texas and the 2014 Soil Series, it was GTI Principal Investigator's (PI) opinion that shovel testing was an appropriate Level of Effort [36CFR800.4(b)(1)] to assess the Project's impact to potential archaeological sites and backhoe trenching was not necessary. GTI justified its reasons in the antiquities permit application, and THC issued antiquities permit number 7006.

GTI excavated a total of 12 shovel tests and documented one soil profile column, and there was no evidence of significant archaeological sites within the intensive archaeological survey area. Because the Project's direct APE is the water line construction length of 17, 000 linear feet, GTI conducted the survey as agreed upon in consultation between THC and Grant Works, Inc. and Medina County, as well as documented a reconnaissance archaeological survey level effort beyond the prescribed 1000 feet on both sides of the creeks at no expense to the project sponsor. GTI's PI did not observe any cultural artifacts on the ground surface within the reconnaissance survey area, and ground surface visibility was greater than 30 percent throughout the entire Project's direct APE.

Accordingly, GTI has assessed that the proposed Project will have No Effect to archaeological sites eligible for listing in the National Register of Historic Places or worthy for State Antiquities Landmark designation. Archaeologists did not collect artifacts, so there are no curation issues. It is GTI's opinion that no further archeological work is necessary and the project should be allowed to proceed as planned.

# References

Bureau of Economic Geology
1982 Geologic Atlas of Texas, San Antonio Sheet, Robert Hamilton Cuyler Memorial Edition. Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.

Hester, Thomas R.
1985 Digging into South Texas Prehistory: A Guide for Amateur Archeologists. Corona Publishing Company, San Antonio.

1995 The Prehistory of South Texas. *Bulletin of the Texas Archeological Society* 66(95); 427-459.

Ochoa, Ruben E., "Medina County,"
2014 http://www.tshaonline.org/handbook/online/articles/hcm10, Handbook of Texas Online, accessed August 29, 2014.

Perry Castañeda Library
2014 Historic Map Collection Online, http://www.lib.utexas.edu/maps/historical/history_texas.html, visited August 29, 2014.

Prewitt, E.R.
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 (for 1983): 201-238.

Russell, Yancey L., "Devine, Texas,"
2014 http://www.tshaonline.org/handbook/online/articles/hgd05, Handbook of Texas Online, accessed September 8, 2014.

Suhm, D.A., and E. B. Jelks
1962 Handbook of Texas Archeology: Type Descriptions. The Texas Archeological Society. Special Publication No. 1 and The Texas Memorial Museum Bulletin No. 4. Austin.

Suhm, D.A., A.D. Krieger, and E. B. Jelks
1954 An Introductory Handbook of Texas Archeology. Bulletin of the Texas Archeological Society 25: 1-562.

Texas General Land Office
2014 Land Grant Database, Historic Map Collection, and GLO Interactive Land Lease Mapping Program, http://www.glo.texas.gov/, accessed August 29, 2014.

Texas State Archives
2014 Historic Map Collection, https://www.tsl.state.tx.us/apps/arc/maps/, accessed August 29, 2014.

The Portal to Texas History
2014 The University of North Texas. Historic Map Collection, http://texashistory.unt.edu/, accessed August 29, 2014.

Turner, E.S., and T.R. Hester
1986 Field Guide to Stone Artifacts of Texas Indians. Texas Monthly Press, Austin, Texas.

USDA
2013 Divot clay soil series. Electronic document, https://soilseries.sc.egov.usda.gov/OSD_Docs/D/DIVOT.html, accessed August 29, 2014.

USDA
2014 Web Soil Survey. Electronic Document, http://websoilsurvey.nrcs.usda.gov/app/, accessed August 29, 2014.

Weaver, Bobby
1983 A Dissertation in History, *Castro's Colony: Empresario Colonization in Texas, 1842-1865*, Texas Tech University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, Accepted

# Appendix A: Shovel Test Log

| Shovel Test # | Easting | Northing | Level | Depth (cm) | Soil Description | Color | Artifacts |
|---|---|---|---|---|---|---|---|
| ST-1 | 508043.82 | 3220142.87 | 1-2 | 0-19 | Silty Loam | Brown | None |
| ST-1 | 508043.82 | 3220142.87 | 2-4 | 19-40 | Clayey Silty Loam | Dark Brown | None |
| ST-2 | 508084.08 | 3220139.03 | 1-3 | 0-30 | Silty Loam | Tan | None |
| ST-3 | 508124.33 | 3220137.12 | 1-3 | 0-24 | Silty Loam | Tan | None |
| ST-4 | 508204.85 | 3220129.45 | 1-2 | 0-11 | Silty Loam | Brown | None |
| ST-4 | 508204.85 | 3220129.45 | 2-3 | 11-22 | Silty Loam with Calcium Carbonate | Brown | None |
| ST-4 | 508204.85 | 3220129.45 | 3 | 22-30 | Silty Loam with Calcium Carbonate | Brown | None: Descrease in Caclium Carbonate from level above. |
| ST-5 | 508262.36 | 3220123.70 | 1-3 | 0-30 | Silty Loam | Brown | None |
| ST-6 | 508321.78 | 3220119.86 | 1 | 0-7 | Silty Loam | Tan | None |
| ST-6 | 508321.78 | 3220119.86 | 1-30 | 7-30 | Sity Loam | Brown | |
| ST-7 | 509257.27 | 3218846.99 | 1-2 | 0-12 | Silty Loam | Light Brown | None |
| ST-7 | 509257.27 | 3218846.99 | 2-3 | 12-30 | Silty Loam with Calcium Carbonate | Brown | None: Lense of Calcium Carbonate between 12-17 cm below ground surface |
| ST-8 | 509249.60 | 3218783.73 | 1-3 | 0-30 | Silty Loam with Calcium Carbonate | Brown | None: Lense of Calcium Carbonate between 12-17 cm below ground surface |
| ST-9 | 509245.76 | 3218739.64 | 1-2 | 0-18 | Silty Loam | Light Brown | None |
| ST-9 | 509245.76 | 3218739.64 | 2-4 | 18-40 | Silty Loam | Mottled Light Brown & Red Clay | None |
| ST-10 | 509238.09 | 3218678.30 | 1-3 | 0-30 | Silty Loam with Calcium Carbonate | Brown | None: Lense of Calcium Carbonate between 6-11 cm below ground surface |
| ST-11 | 509238.09 | 3218628.45 | 1 | 0-7 | Silty Loam | Light Brown | None |
| | | | 1-3 | 7-30 | Silty Loam with Calcium Carbonate | Brown | None: Calcium Carbonate confined to just below transition. |
| ST-12 | 509234.26 | 3218582.45 | 1-2 | 0-17 | Silty Loam | Light Brown | None |
| ST-12 | 509234.26 | 3218582.45 | 2-4 | 17-35 | Silty Loam | Mottled Light Brown & Red Clay | None |