A CULTURAL RESOURCES SURVEY FOR THE CITY OF HUDSON WASTEWATER TREATMENT PLANT EXPANSION IN ANGELINA COUNTY, TEXAS

Antiquities Permit 7471

By

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A CULTURAL RESOURCES SURVEY FOR THE CITY OF HUDSON WASTEWATER TREATMENT PLANT EXPANSION IN ANGELINA COUNTY, TEXAS

BVRA Project Number 15-12

Prepared for

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ABSTRACT

An archaeological survey for the City of Hudson, Texas was performed by Brazos Valley Research Associates (BVRA) on November 20 and 21, 2015 under Antiquities Permit 7471 issued by the Texas Historical Commission (THC). This survey examined the site of the proposed wastewater treatment plant, approximately 6.25 acres. The field methods included a 100% pedestrian survey and shovel testing. No evidence of a prehistoric or historic site was observed. It is recommended that the City of Hudson be allowed to proceed with construction as planned. Copies of the report will be housed at the THC, Texas Archeological Research Laboratory (TARL), Texas State Library, City of Hudson, CME Testing and Engineering, Inc, regional libraries, and BVRA.

ACKNOWLEDGMENTS

I am appreciative of the assistance provided by others during this project. M. Frederick Conlin, Jr., P.E. provided the maps and made the initial contact with the City of Hudson. James Freeman is the City Administrator and he signed the permit application. Jesse Todd conducted the field survey and he was assisted by David Womack, Wastewater Operator for the City of Hudson. The figures were prepared by Lili G. Lyddon who also edited the manuscript.

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INTRODUCTION

The City of Hudson proposes new construction that will expand its existing wastewater treatment plant (WWTP) in central Angelina County (Figure 1). The existing facility was constructed in 1978 and has reached its useful service life. Most mechanical equipment has been replaced multiple times and the concrete structures are deteriorating. This facility currently has problems with the removal and handling of solid waste under the present loading conditions. The proposed project will consist of two parallel trains, each with treatment capacity of 0.49 million gallons per day (MGD). The layout of the proposed units will include reserved space for a future third train in parallel to achieve total capacity of 1.47 million gallons per day. The new treatment facility will be designed to serve a population of 9800 persons. The proposed improvements will include one 1,000,000-gallon storm water equalization basin, new lift station with bar screen and grit channels, two 0.49 MGD design flow oxidation ditches, 2 MGD peak flow clarifiers, a new dual chamber chlorine contact basin and flow-proportional chlorination system, a Parshall Flume with ultrasonic meter, and a 1.0 meter sludge belt press. In addition, the existing contact basin will be converted to a post aeration basin.

The project area is located adjacent to an unnamed street and consists of two distinctive tracts. Tract A is approximately 2.06 acres in size and is located within the fenced area of the existing WWTP. It has been cleared of all trees and major shrubs and it is in this area where most of the proposed treatment units, namely the new lift station, oxidation ditches, clarifiers, chlorine contact basin, and the sludge belt press, will be constructed. Tract B is directly adjacent to Tract A and is 4.19 acres in size and very thickly wooded. The proposed earthen structure, known as the stormwater equalization basin, will be located in Tract B. To the north, and adjacent to Tract B, is an existing treatment pond that will not be affected by the proposed construction.

There are no cemeteries or standing structures in or near the Area of Potential Effect (APE). Funding for this project will be provided by the State of Texas through the Texas Water Development Board. Figure 2 depicts the project area on the USGS 7.5' topographic quadrangle Keltys (3194-231).

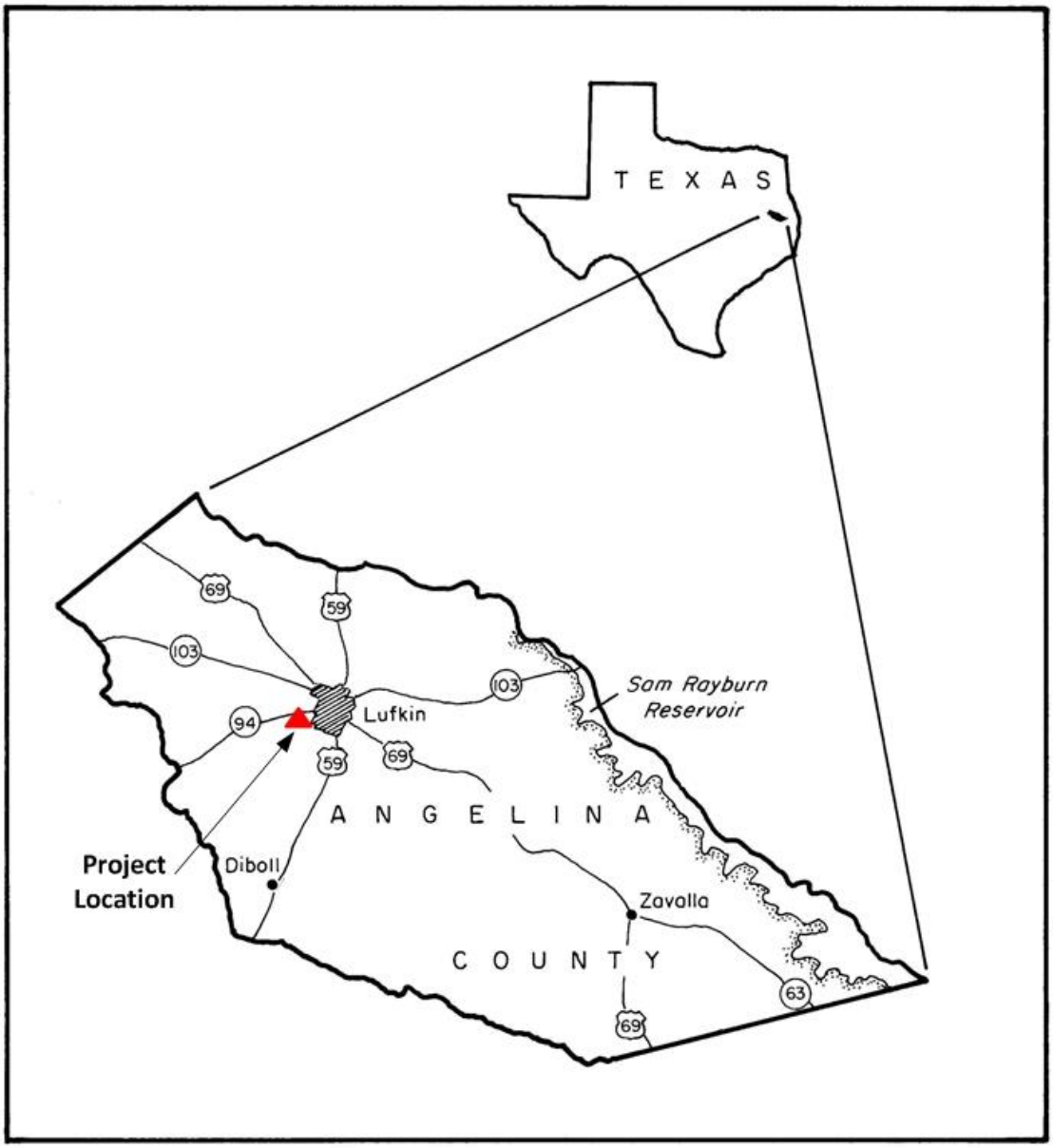

Figure 1. General Location of Project Area

Figure 2. Project Area on Topographic Quadrangle Keltys

ENVIRONMENT

Angelina County is located in the central part of East Texas. It is about 48 miles in length from northwest to southeast and about 24 miles long from northeast to southwest. The western-southwestern boundary is the Neches River and the eastern-northeastern boundary is the Angelina River and Sam Rayburn Reservoir. The rest of the county is bounded on the northwest by Cherokee County and on the southeast by Jasper County. In 1988, the county consisted of 514,465 acres of land and 38,974 acres of water. Additional reservoirs built since that time would have changed this ratio. According to the soil survey for Angelina County (Dolezel 1988:1), the county is located within the East Texas Timberlands Land Resource Area. Dolezel (1988:1) writes that the soils in the county "formed mainly under forest vegetation in a humid environment" and that most soils are "light in color and low in natural fertility." The terrain varies from low, level areas to hills that rise and the variation in altitude ranges from 100 feet in the south to about 460 feet in the north. The low-lying areas are often wet and the steeper landforms erode easily. The drainage pattern in the northern and southern parts of the county, due to the presence of the Angelina and Neches rivers, is dendrtitic with many large streams. In the central part of the county, the drainage patterns are poorly defined. The nearest source of water to the APE is Jack Creek less than 0.47 km to the west. The January mean minimum temperature is 37° F and the July mean maximum temperature is 93° F. Rainfall averages 38.9 inches annually (Alvarez 2004:140).

According to the General Soils Map in the soil survey for Angelina County (Dolezel 1988), the majority of the APE is located within the Koury soil association that consists of nearly level loams and clays underlain by clays and loams on floodplains. The specific soil in the project area is Koury loam, occasionally flooded (Ko). It is depicted in the soil survey on Sheet 15. In a typical profile, this soil has a pale brown surface layer about 17 inches thick (Dolezel 1988:44). At this depth, the B horizon is usually present (Dolezel 1988:96). Holocene alluvial fill may be present on the surface but the parent material may belong to the Yegua Formation of the Eocene epoch (Dolezel 1988:118).

ARCHAEOLOGICAL BACKGROUND

According to a statistical overview of prehistoric sites in Texas by Biesaart, et al. (1985:Figure 15), Angelina County is located in the Northeast Texas Cultural-geographical region of Texas, an area that encompasses 30 counties (Figure 3). It is one of the counties in the extreme lower reaches of this region and it borders Polk, Tyler, and Jasper counties in the Southeast Texas Cultural-geographical region. Because of the proximity of Angelina County to this adjacent region, some cultural traits were probably shared between the prehistoric inhabitants of both regions. The statistical overview cannot be viewed as 100% accurate but it does provide a time frame for comparisons. For example, the overview reports that 52 prehistoric sites in Angelina County had been recorded at TARL in 1985. Unfortunately, the overview does not give site numbers but it does list them by temporal period. According to the overview nine sites were identified as Archaic and forty-one as Late Prehistoric. There is an obvious mistake in the overview because the number of Archaic and Late Prehistoric sites equals only fifty. No Paleoindian sites had been reported. Only one site had been formally excavated while twenty-one sites are described as having been tested by hand. Surprisingly, only three sites are listed as having been disturbed by erosion and only two by construction. The major form of disturbance was caused by vandals at twenty-one sites. One site was described as destroyed. Information on the kinds of sites is also limited but the overview does report that five burials had been documented. Five sites are listed as "earthenworks" and it is likely that they are referring to earthen mounds. Today, there are 220 prehistoric and historic sites in the county that have been recorded at TARL. This increase is related to an increase in construction projects associated with a growing population of the area.

In 1991, an evaluation was made of significant sites in the Northeast Texas Archeological Region (Kenmotsu and Perttula 1993:Table 2.1.1). At this time, Angelina County contained 126 recorded prehistoric sites. Of this number, 19 were listed as not significant, 67 as unknown significance, 35 as probably significant, and 5 as significant.

The archaeological significance of Angelina County is partially reflected in the following statistics. According to Kenmotsu and Perttula (1993:Figure 2.3.3), the county contained the second highest number of important hunter-gatherer sites in Northeast Texas (n=3) in 1993. It also contained at least 13 important Late Caddoan sites (Kenmotsu and Perttula 1993:Figure 2.5.2). Unfortunately, there are major forces that continue to threaten the integrity of archaeological sites in Angelina County. These include population growth (City of Lufkin and surrounding area), highway construction, surface lignite mining, Sam Rayburn Reservoir (formerly McGee Bend), and the lumbering industry.

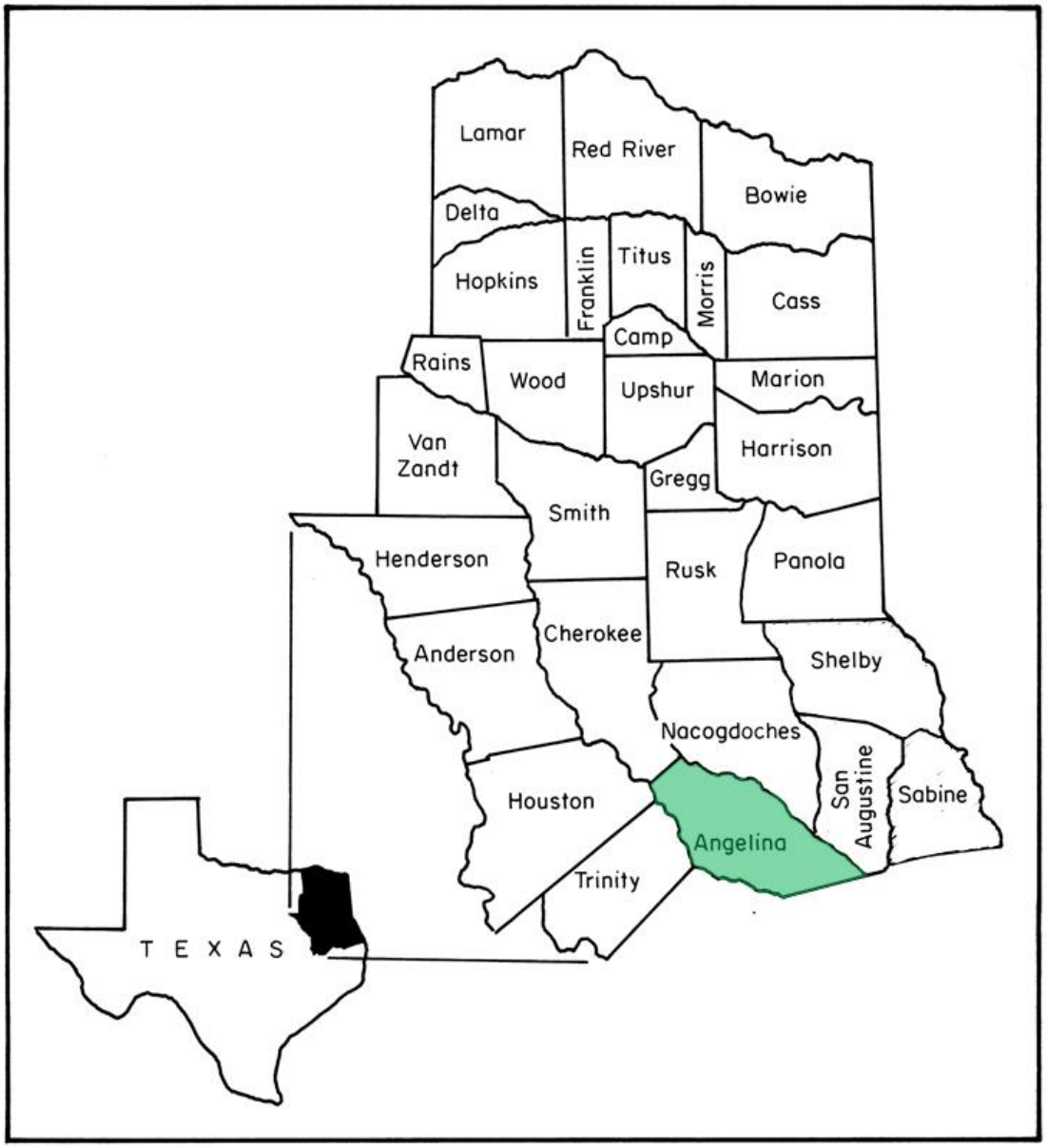

Figure 3. Archaeological Region

Although private contract archaeology firms have played a part, most of the archaeological sites known to exist in Angelina County have been identified by surveys associated with reservoir construction and in-house projects by National Forest personnel. The earliest archaeological research in the area was performed in the late 1930s and early 1940s by researchers from The University of Texas at Austin. At that time, prehistoric cemeteries and mound sites were considered to be of primary importance. From the late 1940s until the mid 1970s, most of the archaeological research in East Texas was carried out in connection with reservoir construction. In 1948, Robert L. Stephenson (1948a, 1948b) published the results of his work at the proposed McGee Bend Reservoir in Angelina, Jasper, Nacogdoches, Sabine, and San Augustine counties. At the time, this was the only major archaeological investigation in the county performed by a professional archaeologist in a systematic manner.

In the 1970s, Ross Fields (1979) presented an overview of the cultural resources of the Davy Crockett, Sam Houston, Angelina, and Sabine National Forests of Texas. This document provides a brief discussion of all sites in each forest and 23 sites in Angelina County are mentioned. Another important document for this area is a cultural resource overview of the National Forests in Texas by John Ippolito (1983).

It is beyond the scope of this report to discuss in detail the archaeological background of Angelina County, especially when numerous contract reports are available. The interested reader is referred to the statistical overview (Biesaart et al. 1985), the planning document published by the THC (Kenmotsu and Perttula 1993), and Perttula's (2004) *Prehistory of Texas*.

Gus E. Arnold was an employee of The University of Texas at Austin in the 1930s and 1940s. During this time, he travelled about the state documenting prehistoric sites. In 1939, he reported a large site in Angelina County that contained several mounds on three acres of land adjacent to Jack Creek. He described it as a village and burial site. Three of the mounds were measured at 2.5 to 3 feet in height and 60 to 75 feet in diameter. Some had already been disturbed by collectors. Numerous artifacts are known to have been collected at this site with pottery being the most common. The owner of the site at the time found a skeleton, gun, and trade beads while plowing. W. Hayden Whitsett visited the area in 1976 and was unable to locate the site, now known as 41AG22. On the site form, Whitsett writes that the site "is not at either location shown on the maps at TARL. One natural feature resembling a mound was found, but no cultural remains were present. The western uplands and east and west bottoms were checked." This site is especially relevant to the current project because it is on the opposite side of Jack Creek from the area that was investigated for the City of Hudson by BVRA.

METHODS

Prior to entering the field, the site records at TARL and the Texas Archeological Sites Atlas were checked for the presence of previously recorded sites and other archaeological surveys in the project area and vicinity. Relevant archaeological reports documenting work in Angelina County were reviewed in order to become familiar with the types of prehistoric and historic sites found in the area. BVRA has conducted eight projects in Angelina County and these reports were also reviewed. The survey began on November 20, 2015 and was concluded the next day. The field methods included a 100% surface inspection and shovel testing. Shovel test data were entered onto a shovel test log (Appendix I) and digital photography was used to capture the various areas and features of the project area. Shovel test data were dug in the APE. They were plotted on a sketch map and later onto an aerial photograph (Figure 4). The daily activities were written in a field notebook. The total area surveyed was approximately 6.25 acres and 16 shovel tests were dug.

The project area was divided by a dirt/gravel two-track road (Figure 5). The western portion is referred to as the "Plant Area – Area A" and the eastern portion is referred to as the "Forested Area – Area B." The B horizon is supposed to be present at about 43 centimeters below the ground surface. Therfore, all shovel tests were dug to depths of 51 to 71 cm to ensure that the B horizon was encountered. The soil consists of silt from the surface to the maximum depth of the shovel tests dug in this area. According to the soil survey for Angelina County (Dolezel 1988), the Koury series is loam and the B horizon is silty loam. Sixteen shovel tests were dug in the two areas.

Area A

Area A is approximately 2.06 acres in size and had been cleared of all major vegetation prior to this survey. At the time of this investigation, the vegetation consisted of recently mowed Johnson grass (Figure 6), which made it difficult to see the ground surface.

Areas of disturbance or alteration to the landscape consisted of a pile of dirt at the western end that had been brought there to serve as a backstop for the firing range for local police. Other forms of disturbance included a manhole and probable pipeline north of the pile of dirt. Low areas in the southern portion of the area have been filled with dirt in order to elevate the buildings and other utility areas in the plant area.

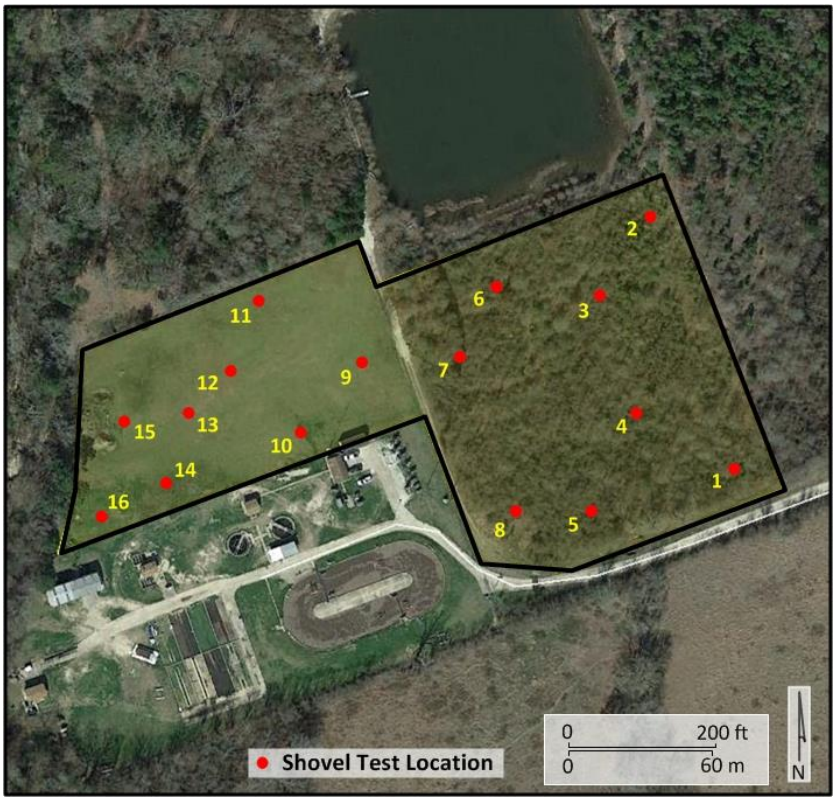

Figure 4. Shovel Test Map

Figure 5. Two-Track Road Dividing Areas A and B

Shovel test 9-16 were dug in this area and they varied in depth from 60 to 71 cm. Soil diversity was greater here than in the forested area. The soil from Shovel test 9 is a pale brown silty loam (the color is the description for the Kourys series) that extends at least 60 cm below the ground surface. The brown soil matrices found in the forested area are present but they are shallow in nature in the western portion where they overlie the pale gray silty loam. Since they are closer to the creek, the different colors may be due to differential sedimentation during flooding.

Figure 6. Johnson Grass in Area A

Area B

Area B is approximately 4.19 acres in size and was thickly wooded at the time of this survey. The only cleared areas were the narrow lanes that had been cleared for a topographical survey (Figure 7). The vegetation consisted of trees and understory plants. The density of vegetation varied considerably. It was much easier to see the ground within the cleared lanes but virtually impossible in the wooded areas. Piles of trees were observed on the sides of the cleared lanes and the majority was less than two inches in diameter, indicating recent growth. Those trees identified included oaks, pines, elms, and hackberries.

Understory vegetation present was Johnson grass, berry vines, saw greenbrier, grape vines, Spanish moss, and other miscellaneous perennial species. The vegetation varied from areas that were virtually impenetrable to other areas that were savannah-like. Entry to the forested area was easy since the Hudson WSC had cleared four lanes within it. The terrain was gently undulating and several small drainages were present. In the central portion, standing water not more than one inch deep was abundant from recent rains. No shovel tests were excavated within the cleared lanes. Only those areas above the standing water and not saturated were tested. Shovel tests 1-8 were excavated in Area B and water was encountered about 60 centimeters below the ground surface on average. The depth of the tests varied from 51 cm to 69 cm. The procedure for digging and recording shovel test data was the same as that employed in Area A.

Figure 7. Cleared Lane in Area B

RESULTS AND CONCLUSIONS

Examination of the files at TARL in Austin, Texas and the Atlas revealed no sites had been previously recorded within the boundaries of the current project area and no portion had been examined by a professional archaeologist. The field survey involved two days of surface inspection and shovel testing. No evidence of a prehistoric or historic site was found. There are several probable reasons for the absence of a prehistoric site. Although the western portion of the project area is very close to a creek, the terrain is flat and subject to flooding. Gray silty loam was in the upper 20 cm of some of the shovel tests and this may reflect the presence of standing water over time. Prehistoric site 41AG22, complete with mounds and burials, is reported on the Atlas to be directly across the creek from the APE. Since this site is described on the site form and Atlas as a village site with mounds, it is not unreasonable to expect cultural materials on the opposite side of the creek somewhere within the current project area. However, a survey in 1976 by W. Hayden Whitsett failed to find any evidence of the mounds reported in 1939 by Gus Arnold. Therefore, the probability of a significant prehistoric site being in the project area is reduced from high to very low. Historic sites can occur anywhere on the landscape but the potential of flooding probably was a major factor in the absence of a homesite. The wooded portion of the project area is even less likely for prehistoric utilization except for collecting forest resources for food and shelter. This type of temporary activity is not likely to leave evidence of its occurrence.

RECOMMENDATIONS

It is recommended that the client be allowed to proceed with construction as planned. Should evidence of a prehistoric or historic site be encountered during any phase of construction in any of the areas investigated, all work must stop until the THC can evaluate the situation. This survey was conducted in accordance with the Minimum Survey Standards as outlined by the THC.

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APPENDIX I: SHOVEL TEST LOG *

ST NO.	DEPTH (CM)	DESCRIPTION	GPS COORDINATES (ALL GPS 15 R)
1	0-66	Brown silty loam (10YR 5/3)	03 27 304 East 34 36 356 North
2	0-61	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 275 East 34 36 462 North
3	0-28 29-51 52	Gray silty loam (10YR 5/1) Brown (10YR 5/3) silty loam Silt increased with depth Root bound	03 27 275 East 34 36 361 North
4	0-33 34-65	Gray silty loam (10YR 5/1) Brown silty loam(10YR 5/3) Silt increased with depth	03 27 257 East 34 36 427 North
5	0-24 25-62	Gray silty loam (10YR 5/1) Brown silty loam(10YR 5/3) Silt increased with depth	03 27 222 East 36 65 440 North
6	0-58	Brown (silty loam (10YR 5/3) Silt increased with depth	03 27 253 East 34 36 428 North
7	0-65	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 195 East 34 36 412 North
8	0-69	Brown silty loam(10YR 5/3) Silt increased with depth	03 27 226 East 34 36 333 North
9	0-64	Pale brown silty loam (10YR 6/3) Silt increased with depth; Also a hint of reddish-brown mottling (5YR 5/8)	03 27 170 East 34 36 410 North
10	0-68	Brown silty loam(10YR 5/3) Silt increased with depth	03 27 144 East 34 36 374 North

ST NO.	DEPTH (CM)	DESCRIPTION	GPS COORDINATES (ALL GPS 15 R)
11	0-61	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 135 East 34 36 433 North
	62-71	Pale brown silty loam (10YR 6/3) Silt increased with depth and has a Hint of reddish-brown mottling (10YR 5/8)	
12	0-29	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 3106 East 34 36 383 North
	30-60	Pale brown silty loam (10YR 6/3) Silt increased with depth and has a hint of reddish-brown mottling (10YR 5/8)	
13	0-62	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 078 East 34 36 391 North
14	0-64	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 068 East 34 36 353 North
15	0-22	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 056 East 34 36 406 North
	23-67	Pale brown (10YR6/3) silty loam Silt increased with depth and has a hint of reddish-brown mottling (10YR 5/3)	
16	0-15	Brown silty loam (10YR 5/3) Silt increased with depth	03 27 038 East 34 36 330 North
	16-61	Pale brown silty loam (10YR 6/3) Silt increased with depth and has a hint of reddish-brown mottling (10YR 5/8)	

* All tests were negative and dug in soils from recent rains