A CULTURAL RESOURCES SURVEY FOR THE MEN WATER SUPPLY CORPORATION PROPOSED WATER SYSTEM IMPROVEMENTS PROJECT IN CENTRAL NAVARRO COUNTY, TEXAS

Antiquities Permit 7453

By

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Project Number 15-10

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ABSTRACT

The MEN Water Supply Corporation (WSC) – aka Client - proposes new construction that will improve its central water system in Navarro County, Texas. These improvements are a new elevated storage plant that includes a 200,000 gallon elevated storage tank, plant site improvements at two existing plants, and 22.77 miles of distribution line ranging in size from 3” to 10” in diameter. After a project review by the Archeology Division of the Texas Historical Commission, Ms. Rebecca Shelton requested that a Phase I archaeological survey be conducted. Jesse Todd, Project Archaeologist, performed the field survey on November 4-5, 2015. This investigation consisted of a 100% visual and pedestrian survey of the entire route and shovel testing at creek crossings, other high probability areas as determined in the field, and the site of the proposed storage tank. No cultural resource sites were found. Based on the results of this survey, it is recommended that no further cultural resource investigations are warranted and that the Client be allowed to proceed with construction as planned. If significant cultural resources not mentioned in this report are discovered during construction, work should cease in the area of the find and the Texas Historical Commission (THC) should be notified immediately. Copies of the final report will be submitted to the THC, Texas Archeological Research Laboratory (TARL), Texas State Library, various libraries and research facilities, Brazos Valley Research Associates (BVRA), the Client, and J. F. Fontaine & Associates, Inc. The Antiquities Permit for this project is 7453. The total area examined was 4.73 acres.

ACKNOWLEDGEMENTS

I am grateful to the following individuals for their assistance during this project. Laura Moody, P.E. at J. F. Fontaine & Associates, Inc. was my initial contact for this project. She discussed the project with me and provided photos and maps. The staff at the MEN WSC was also very helpful. Dennis Donoho is the Manager and he accompanied Jesse Todd (Project Archaeologist) in the field. Lili G. Lyddon drafted the maps that appear in this report and edited the manuscript. Jonathan Jarvis is the Associate Director at TARL and he checked the files for previously recorded sites in the project area and vicinity. Michele Amason at J. F. Fontaine & Associates, Inc. prepared the Shapefiles for this project.

CONTENTS

FIGURES

INTRODUCTION

The Client proposes new construction that will improve its central water system in central Navarro County, Texas (Figure 1). These improvements include a new 200,000-gallon elevated storage tank and 22.77 miles of water distribution line ranging in size from 3" to 10" in diameter. Most of the pipeline will be placed on private property as close to the fence as possible. The various pipes will be placed in trenches that will average 3 ft. deep and 1.5 ft. wide. The working easement on privately owned land will be 10-15 ft. and the final permanent easement will be the same distance. When private land is not available the pipeline will be installed in the rights-of-way of various county roads (CR), farm-to-market roads (FM), and United States Highway (US) 287. The storage tank will be constructed in an area no greater than 100 x 100 ft. Construction will involve clearing and scraping to a depth of one to two feet and the elevated tank footings will requite digging to depths of 4-7 ft. The route of the proposed pipeline crosses several small drainages and a swampy area that is considered to be an unlikely setting for a prehistoric or historic site. No cemeteries are depicted on the topographic quadrangles. The project area (figures 2-3) is depicted on the USGS 7.5' topographic quadrangles Corsicana (3206-122), Goodlow Park (3296-112), Powell (3296-121), Richland (3196-433), and Streetman (3196-434).

The Client retained J. F. Fontaine, Inc. to draw up the plans for this project and consult with the THC regarding the need for a cultural resources survey. The reply from THC reviewer Rebecca Shelton stated that a professional archaeologist should survey the project area. In order to comply with this request, BVRA was retained to conduct the field survey. The purpose of this survey was to determine if cultural materials related to a prehistoric or historic site were present within the Area of Potential Effect (APE). If cultural materials were found, they were to be recorded and evaluated for their significance and potential impact by the proposed construction. An Antiquities Permit was required before the field survey could commence. The Archeology Division of the THC issued Texas Antiquities Permit Number 7453 for this project.

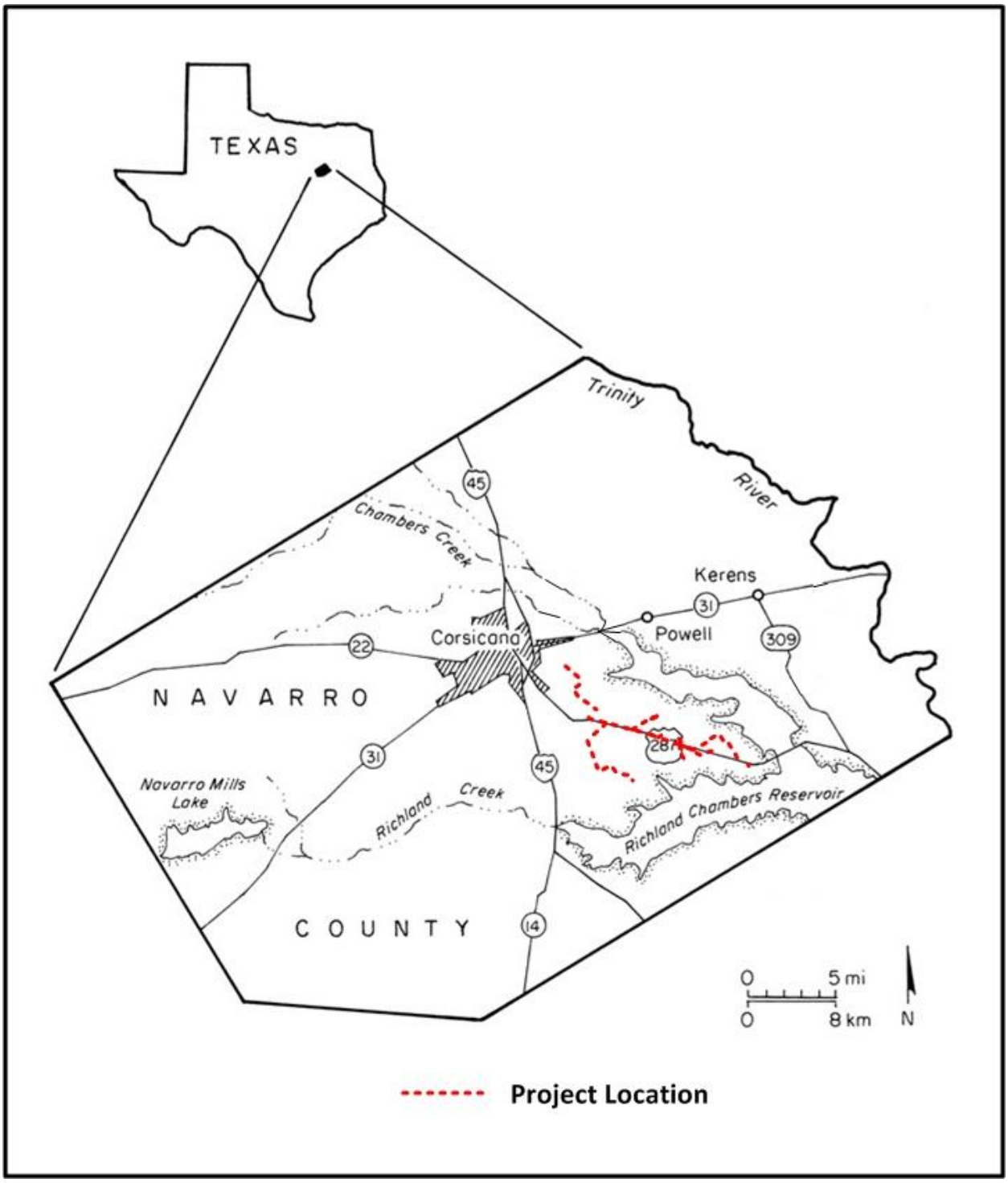

Figure 1. General Location Map

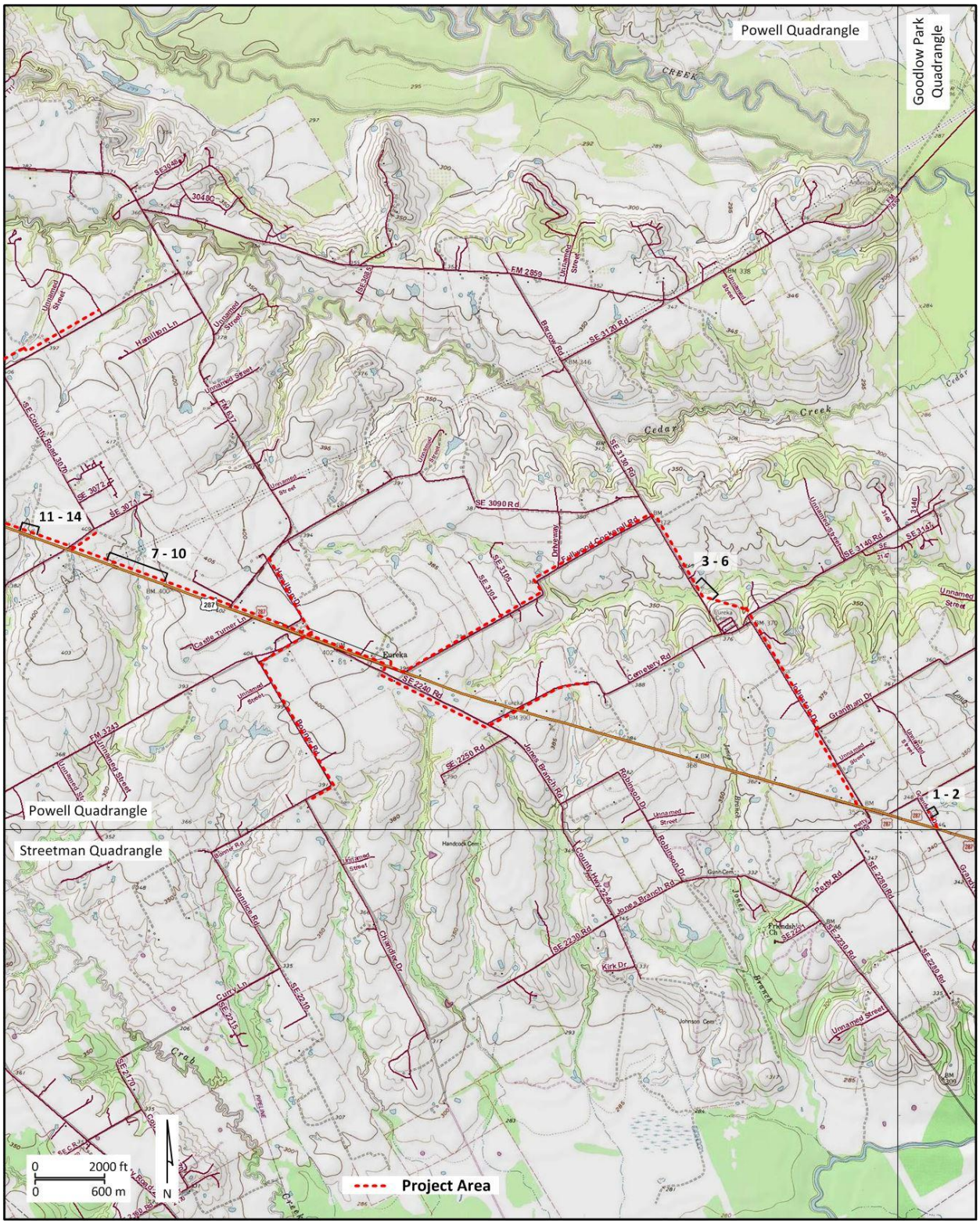

Figure 2. Project Area on 7.5' Topographic Quadrangles

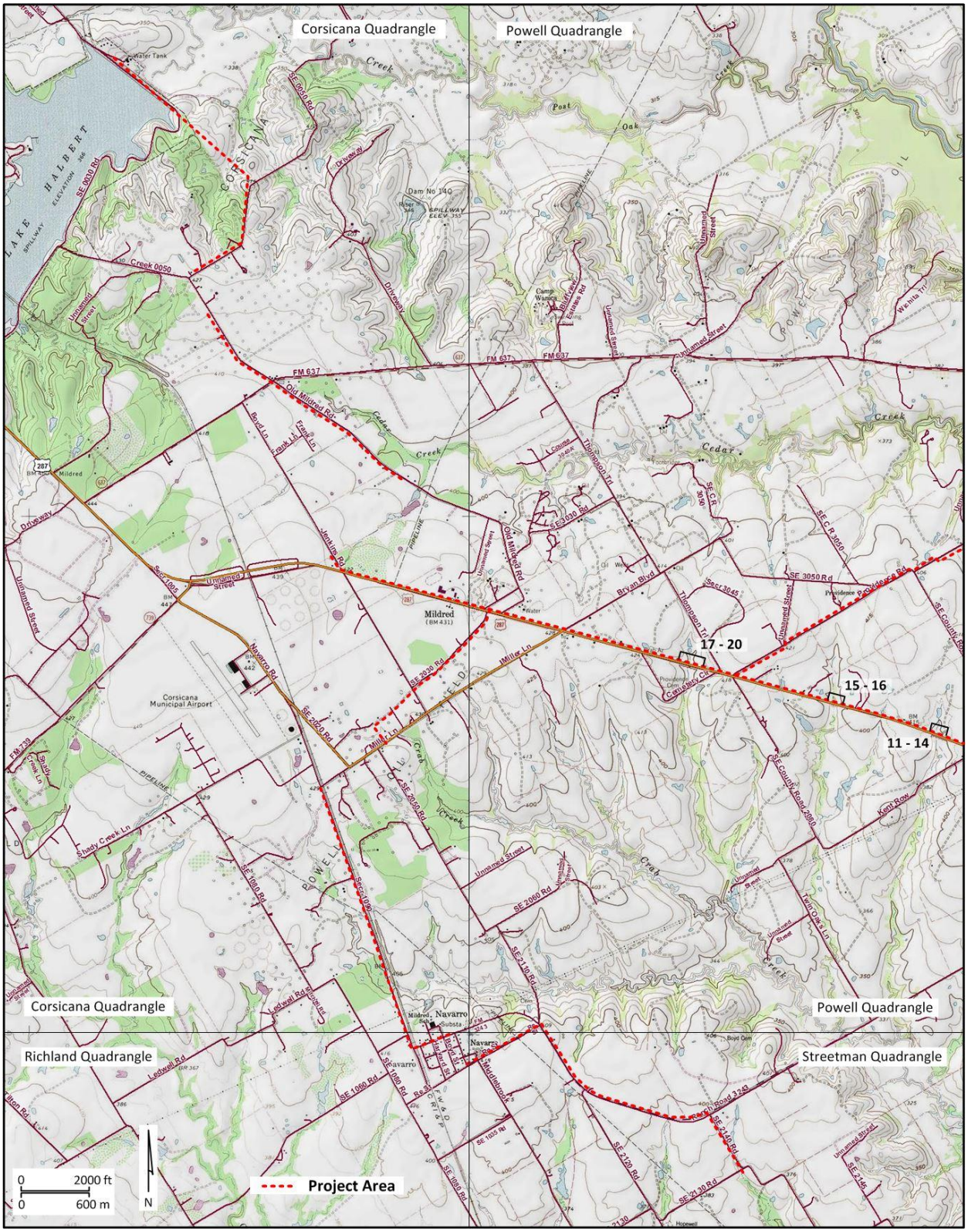

Figure 3. Project Area on 7.5’ Topographic Quadrangles

ENVIRONMENT

Navarro County is located in North Central Texas. The total area of the county is 696,320 acres or 1088 square miles. Approximately 7200 acres of the county are under water. The nearest river is the Trinity that forms the eastern boundary of the county. There are numerous first order streams and tributaries in the county. The two that are most relevant to this project are Chambers and Richland creeks. Because of a drought in 1956 and 1957, the Tarrant Regional Water District made plans for a reservoir on these creeks. The Richland-Chambers Reservoir is the third largest inland reservoir by surface area and the eighth largest reservoir by water volume in Texas. The surface area of this reservoir is 41,356 acres and it covers portions of Navarro and Freestone counties. The construction of this reservoir triggered massive cultural resources investigations and environmental studies. Therefore, most of the data regarding the prehistory of the two counties was collected as a result of this project.

The soils in the county are part of the Crockett-Wilson association. In general, these soils are moderately fine textured and moderately coarse textured, very slowly permeable calcareous soils (Meade et al. 1974:General Soil Map). Approximately two-thirds or more of the county is located in the Blackland Prairie while the northern one-third consists of Post Oak Savannah. Blackland Prairie soils are mainly a black, calcareous, alkaline heavy, waxy soil from which the prairie derives its name. The Post Oak Savannah consists of sandy soils and contains a variety of oak tree species as well as cottonwood, hickory, pecan and hackberry trees. Grapes (*Vitis vinifera*), Poke salad (*Phytolacca Americana*), watercrest (*Rorippa nasturtium-aquaticum*) and other perennial species also are present. Since both clayey and sandy soils are present, hybridization of plants occur. The major aquifers for Navarro County are the Trinity subcrop that covers the western tip of the county and the Carrizo-Wilcox outcrop that is found in the eastern tip of the county. The minor aquifers are the Woodbine subcrop, which is present in the western tip of the county and the Nacatoch outcrop, which runs through the center of the county. Drainages within the proposed pipeline route are unnamed, mapped as intermittent, and are tributaries to Iron Ore Creek.

PREVIOUS INVESTIGATIONS

General

Navarro County is located in the North Central Texas region as defined by Biesaart et al. (1985:76) in *Prehistoric Archeological Sites in Texas: A Statistical Overview* published by the Office of the State Archeologist, Texas Historical Commission (Figure 4). This is an area that was well documented in terms of numbers of sites in 1985 when compared to other regions of Texas. When the statistical overview was compiled, a total of 2678 prehistoric sites (13.25% of the state) were recorded in the entire region, mainly due to work on Richland and Chambers creeks. Only the Central Texas region reported more sites or had a higher percentage statewide, and only four counties, Bell (197), Coleman (151), Dallas (204), and Hill (242) had more recorded sites (Biesaart et al. 1985:83). The 132 sites recorded in Navarro County in 1985 consisted of 4.93% of the region and 0.65% of the state. The reader is referred to the overview for additional statistical information concerning Navarro County and its relation to the rest of Texas. As of November 9, 2015 there were 731 prehistoric and historic sites recorded at TARL.

It is important to note that Navarro County borders on Henderson County to the east. Henderson County is part of the Northeastern Region of Texas as defined by the THC in an *Archeological Bibliography for the Northeastern Region of Texas* compiled by William A. Martin (1990). Because of its proximity to this region, it is a logical assumption that cultural traits were shared between the two regions and certain sites may contain similar artifacts and also be similar in age, function, and location.

Ross C. Fields (2004:347-369) discusses the archaeology of the Post Oak Savannah of East-Central Texas and his work touches on the eastern edge of the Blackland Prairie. He states that Cooper Lake, Lake Fork Reservoir, Jewett Mine, Richland-Chambers Reservoir, and Gibbons Creek Mine provide a north-south transect along the western edge of East Texas. Although Richland-Chambers Reservoir is mentioned as part of this boundary, his discussion focuses on the two areas he is most familiar with – Cooper Lake and Jewett Mine. He writes that he uses them as a springboard to point out overall trends in the prehistory of the region. For this reason, his work is a significant source for the current project area. The following information was taken from his chapter and selected archaeological reports relevant to this project.

Previous work in the county has been synthesized by Calvin B. Sanders (1996) in his survey report entitled *Cultural Resources Survey of the Mill Creek Project, Navarro County, Texas*. The following discussion is taken from his work and other major reports, especially those dealing with studies along Richland and Chambers creeks.

Most of the archaeological investigations in Navarro County have been the result of archaeological salvage projects associated with reservoir construction, often involving multiple counties. The earliest reservoir projects were conducted in the 1960s and include Navarro Mills (Duffield 1960, 1963) and Bardwell (Shafer 1964; Sorrow 1966). Tennessee Colony Reservoir was the scene of archaeological activity in the 1970s (Richner and Lee 1976; Richner and Bagot 1978; Richner 1982). The majority of archaeological data for Navarro County was collected during surveys at Richland and Chambers creeks in the 1970s and 1980s. Most of these studies were the result of proposed watershed projects by the Soil Conservation Service, and much of the work was performed by Southern Methodist University.

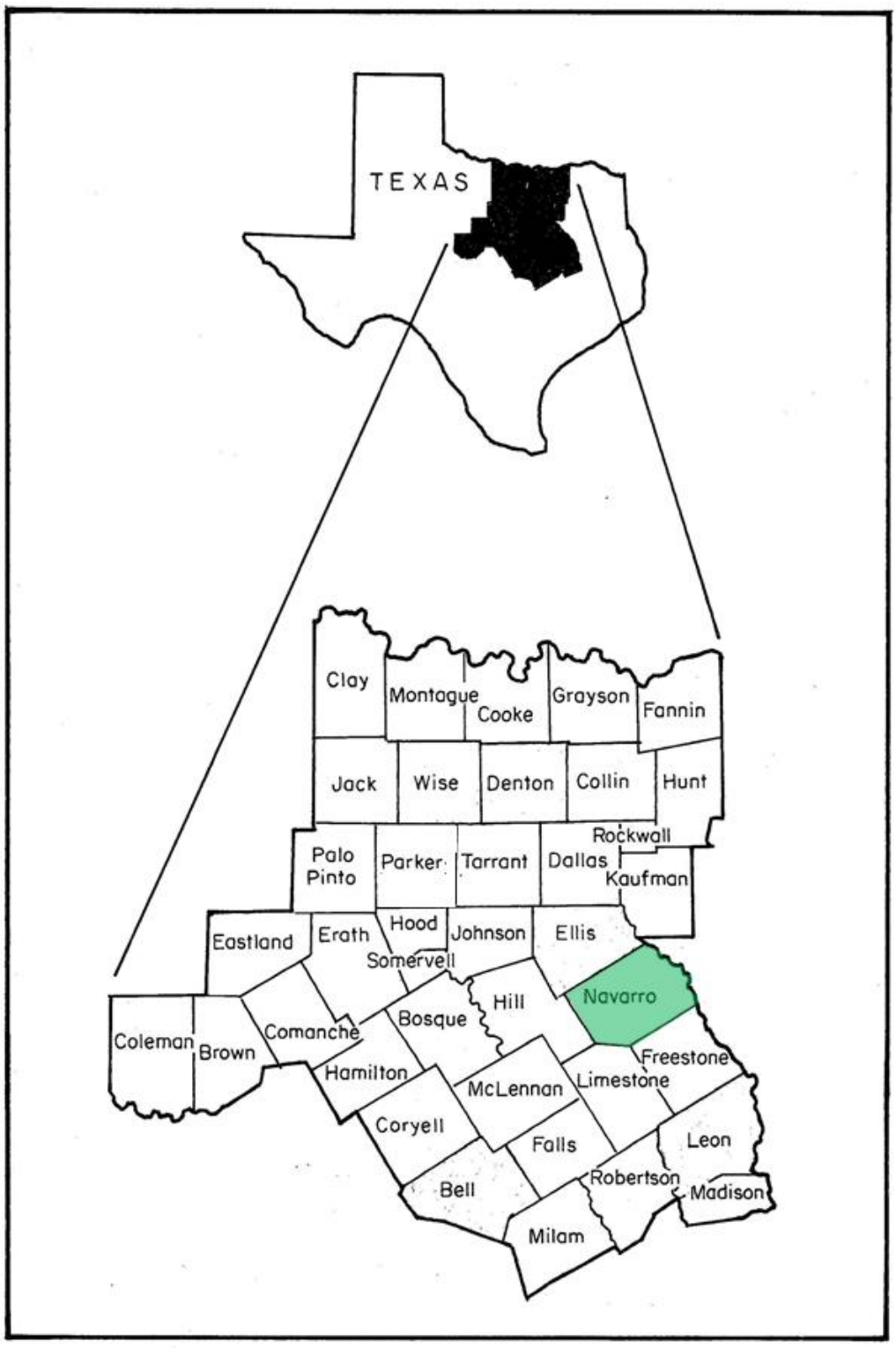

Figure 4. North Central Texas Region

Later, when the Richland-Chambers Reservoir was proposed, archaeologists were on hand to survey there as well (Raab et al. 1980, 1981). Work at the reservoir is especially relevant to the current study because it is only about 8 km to the south.

Excluding work at Richland-Chambers Reservoir, only seven archaeological surveys are documented by Sanders (1996:9-10) in the Chambers Creek watershed with the first conducted by C. Reid Ferring (1975). Ferring's work "revealed a relative absence of sites on the ephemeral drainages in which the majority of planned floodwater structures are located" (Sanders 1996:9). The only exceptions were two lithic quarries on terraces near Chambers Creek proper (Ferring 1975:3-4). Ferring hypothesized that the paucity of knappable raw material may have been a factor in the low number of sites in the areas surveyed.

Other surveys conducted by Soil Conservation Service archaeologists have reported similar results. Nancy M. Cole (1981) found only one prehistoric lithic scatter on an eroded and heavily disturbed upland area, and the last professional archaeological investigation in this watershed (Nunley 1983) failed to locate prehistoric sites in any of the three floodwater retarding structures examined. According to Nunley (1983:4), the results of his study provided further evidence "supporting the relative scarcity of significant cultural resources in upland areas of the Blackland Prairie suggested in the previous investigations."

Investigations Near the Project Area

According to the Atlas, three archeological investigations have been conducted near the project area and the results of these studies are relevant to this study. W. Hayden Whitsett conducted an archaeological reconnaissance for the Texas Department of Water Resources in 1980. The project area was about 425 m northeast of Lake Halbert. No sites were found.

The next survey in the immediate area was conducted by Jeff A. Craver, S. Alan Skinner, and Jesse Todd (2006). Approximately 150 acres were investigated in the survey and five historical sites were recorded. One of the historic sites recorded is 41NV690 that is along CR 3124. Site 41NV690 is located approximately 165 m northwest of the proposed elevated storage tank.

Jeffrey D. Owens performed an intensive reconnaissance survey for the proposed Lake Halbert water treatment plant expansion project in 2010. This survey was carried immediately northeast of and adjacent to the dam on Lake Halbert. Owens examined approximately 26.2 acres and found no evidence of a cultural resource site

CULTURAL CHRONOLOGY

The prehistory of North Central and East Texas has been summarized in a regional overview by Dee Ann Story (1990) and a planning document by Kenmotsu and Perttula (1993). Of course, there are detailed overviews in some of the larger contract reports cited above. The reader is referred to these works for a thorough coverage of the cultural chronology of the region. According to Story et al. (1990), Navarro County is located within the Gulf Coastal Plain study unit as defined in the Southwestern Division of the United States Army Corps of Engineers. It is cited as part of the Prairie-Savanna Archeological Region of the greater Eastern Planning Region as delineated by the Texas Historical Commission (Kenmotsu and Perttula 1993). In general, the prehistory of Navarro County contains elements of the Paleoindian, Archaic, and Late Prehistoric periods. The following discussion is taken from Kenmotsu and Perttula 1993, Turner and Hester (1985:46-49), the summary by Sanders (1996:10-11), and the discussion by Fields (2004).

Paleoindian Period (9200 B.C. - 6000 B.C.)

Paleoindians are viewed by most archaeologists as small, highly mobile bands who survived by exploiting now-extinct megafauna of the terminal Pleistocene (mammoth and bison), smaller game (deer, rabbit, and turtle), and gathering wild plants. Paleoindian sites in the region usually consist of isolated surface finds of distinctive projectile points or finds of such points in temporally mixed contexts. According to Story (1990:180-181), only three Paleoindian sites have been identified in Navarro County, and at least several Paleoindian points or fragments have been recorded in adjacent counties.

Archaic Period (6000 B.C. - A.D. 700)

The primary adaptation of this period is described as broad-based hunting and gathering groups organized into small, mobile bands (Weir 1976). The Archaic spanned at least three-fourths of North Central Texas prehistory and is characterized by changes in projectile point types, sites containing larger accumulations of occupational debris, increased use of expedient tools of locally available raw materials as opposed to finely crafted formal tools of exotic, high quality raw materials, and the introduction of stone-lined hearths, baking pits, and milling implements (Story 1990:213).

Navarro County is located in the west-central portion of the Prairie Savanna Archeological Region. According to Prikryl (1993), the Archaic of this region probably consists of the following: Early Archaic (circa 6500 B.C. - 4000 B.C.), Middle Archaic (circa 4000 B.C. - 1500 B.C.), and Late Archaic (circa 1500 B.C. - A.D. 700).

Late Prehistoric Period (A.D. 700 - A.D. 1600)

This period is distinguished by the bow and arrow, pottery, house structures, and corn horticulture in the region. Various chronological divisions of this period have been suggested by different researchers. Prikryl (1993) proposed the Late Prehistoric I (circa A.D. 700 - A.D. 1200) and Late Prehistoric II (circa A.D. 1200 - A.D. 1700) in the upper Trinity River basin of North Central Texas. Prewitt (1981, 1985) divides the period into the Austin Phase (circa A.D. 700 - A.D. 1300) and Toyah Phase (circa A.D. 1300 - A.D. 1600). He refers to his area as the Central Texas Region south and west of the current project area.

As a result of information collected in the Richland Creek Archaeological Project (Richland-Chambers Reservoir), Bruseth and Martin (1987) proposed a local three-phase chronology for the middle Trinity River basin. Their Late Prehistoric sequence begins with the Richland Creek phase (circa A.D. 700 - A.D. 900) with temporally diagnostic arrow point types *Scallorn* and *Steiner* present in the local assemblages. The middle phase, Round Prairie (circa A.D. 900 - A.D. 1300) is distinguished by *Alba* points. The final temporal phase is St. Elmo (circa A.D. 1300 - A.D. 1650); during this time *Cliffton* and *Perdiz* arrow points are recognized as the diagnostic types. Ceramics tempered with grog, grit, and bone are the dominant types. Decorated sherds appeared sometime after A.D. 1000.

Although there are variations of subsistence during this period, as reflected in artifact assemblages and site types, the emerging Late Prehistoric Period is distinctive in several ways. The major difference is the introduction of the bow and arrow, pottery, horticulture, and (in some areas) a more sedentary lifestyle. At some sites, dart points and large stemmed bifaces that may have served as knives (*Cleburne Biface*) or spears are found with arrow points suggesting that adoption of the bow and arrow, as an exclusive weapon of choice, may not have been immediate. Hunting and gathering probably remained the primary method of subsistence over much of Texas during much of this period even though limited horticulture may have been practiced by certain nomadic groups.

Ground sandstone objects dating to the Late Prehistoric period are common throughout Texas. These are milling stones, grinding slabs upon which a mano was used in a rotary motion, and metates, upon which a back-and-forth motion was used. Both forms were used in plant processing. The return of bison to the area is most significant and appears to be very important in most regions (Turner and Hester 1985:52). One site associated with bison procurement (41NV670) was found during an evaluation of the potential impact of a flood control structure on Mill Creek (Moore and Bradle 1997). Site 41NV670 consists of a stratum of bison bone identified as modern bison (*Bison bison*) representing minimally five individuals. Although no conclusive evidence of cultural modification to the bone was observed, the presence of human intervention was found in the form of possible burned bone (field observation); flakes; biface fragments; two arrow points; and burned rock, charcoal, and ash.

This site is located in the Mill Creek paleosol. Radiocarbon dates taken from charcoal mixed with bison bone produced a conventional radiocarbon age of 390 ± 60 years Before Present (B.P.). The calibrated results, prepared by Beta Analytic Radiocarbon Dating Laboratory, produced calendar dates of A.D. 1425 to A.D. 1650 (2 sigma, 95% probability). These dates place site 41NV670 in the Late Prehistoric or Protohistoric period. The geomorphological analysis was conducted by Lee C. Nordt and the faunal analysis was performed by Michael A. Nash.

METHODS

Prior to entering the field, the Principal Investigator checked the Texas Archeological Sites Atlas in order to identify any previously recorded archaeological sites in the project area and immediate vicinity and conducted the field survey. Jonathan Jarvis checked the site files at TARL and found that no sites have been identified in the current project area and that a professional archaeologist had not investigated the area. Several contract reports documenting work in Navarro County were reviewed in order to ascertain the kinds of archaeological sites known in the area. The APE was investigated by a surface inspection of the pipeline route and shovel testing at all creek crossings and at the footprint of the proposed elevated storage tank. The soil from each shovel test was screened using ¼ inch hardware cloth and the soil color was described using the Munsell Color Chart. Shovel test data were recorded on a log that appears as Appendix I to this report. The location of each test was plotted on a field map and their relative position is depicted in figures 2 and 3. In addition, GPS coordinates were taken at each test. In all, 20 shovel tests were dug to depths of 33 to 44 cm below the existing ground surface. The areas investigated were documented through digital photography intended to illustrate the various field conditions, as they existed at the time of this survey. The survey began at the site of the proposed storage tank. The terrain is best described as gently undulating. The vegetation consisted of mesquite trees, berry vines, and miscellaneous perennials (Figure 5). Standing water was present from recent rains and ground visibility was less than 10%. Two shovel tests were dug here.

Figure 5. Site of Proposed Elevated Storage Tank

Throughout the investigation, the Project Archaeologist drove all of the roads in the APE and inspected them for standing structures that are 45 years of age or older within 100 ft. of the proposed pipeline. As part of this task, certain areas were inspected on foot in an effort to locate historic trash or features on the surface that might be overlooked from a vehicle. The next phase of this project was the investigation of a sandy knoll near Lake Halbert (Figure 6). The knoll had been disturbed by the construction of two pipelines and a gulley created by erosion associated with the pipelines cut across it. A thorough surface inspection was conducted in these eroded areas with negative results. The surface visibility was as high as 80% in some places. Because of the extensive disturbance, shovel testing was not necessary.

Figure 6. Sandy Knoll

The pipeline, as currently planned, will cross five streams and a swampy area with no evidence of a stream channel. Vegetation adjacent to and near the drainages consists of various species of trees and understory plants. During this survey the Project Archaeologist identified the following trees at or near the various drainages as oaks (Quercus), elms (*Ulmus*), and hackberry (*Celtis spp.).* The understory vegetation included Hogberry (*Margaritaria nobilis*), Hogweed (*Heracleum*), grapevine (*Vitis vinifera*), Blooming Daisies (*Bellis perennis*), grama grass (*Bouteloua curtipendula*), Johnson grass (*Sorghum halepense*), bunch grass (*Poaceae* family), abundant saw greenbrier (*Smilax bona-nox L.),* and miscellaneous perennials. Usually, there was a long, gentle slope to the drainage.

The first drainage examined was Little Cedar Creek where it crosses CR 3130 (aka Fullwood-Cockerell). This drainage is approximately 4.5 m wide and about 2 m deep (Figure 7). At the time of this visit, shallow, clear water was flowing over a clayey loam substrate. Shovel test 3 was dug approximately 100 m southeast of the creek while Shovel tests 4 and 5 were excavated approximately 4 m from the southeast and northwest tbanks, respectively. Shovel test 6 was placed approximately 75 m northwest of the creek.

A sandy knoll is present southeast of the dam that is a likely location to contain a prehistoric site. However, the knoll was extremely disturbed from the construction of two pipelines, one owned by MEN WSC and the other by the RAW Pipeline Company, across the top of the knoll. A gulley cross-sectioned the knoll and it was closely inspected for cultural materials but none were seen. In addition, in several places, ground visibility was about 80 percent around the knoll and no cultural materials were noted in these places either. According to the Atlas, three archeological surveys were conducted north of Lake Halbert and southeast of the dam and no archeological sites were recorded. From southeast of the dam, the proposed pipeline will parallel RAW's pipeline which means it would be placed in already disturbed ground. From the RAW pipeline, the proposed pipeline will parallel an existing transmission line owned by the ONCOR Transmission Line Company for a short distance until CR 0060 is encountered. This area was not investigated since no cultural materials were discovered in the other surveys and there is a lack of a perennial water supply.

Figure 7. Little Cedar Creek

The second drainage is located approximately 834 m northwest of the intersection of FM 637 and US 287. It is approximately 4.5 m wide and at least 1 m deep. Clear water less than 0.5 m deep was flowing over a loamy clay substrate. Shovel test 7 was excavated approximately 100 m southeast of the drainage where the terrain begins to slope. Shovel tests 8 and 9 were dug approximately 2 m southeast and of the drainage. Shovel test 10 was placed about 55 m northwest of the drainage near a small bench. Shovel testing was not continued further to the northwest due to the presence of a pipeline and a gravel, two-track road. Ground visibility was less than 10%.

Figure 8. Second Drainage Looking North

The third drainage is located approximately 1902 m northwest of the intersection of FM 637 and US 287. It is approximately 4.5 m wide and 2 m deep. Clear water less than 0.25 m deep was flowing over a loamy clay substrate. Ground visibility averaged 50%. Shovel test 11 was excavated approximately 110 m southeast of the drainage at the base of the slope. Shovel tests 12 and 13 were dug about 1 m from the southeast and northwest banks, respectively. Shovel test 14 was placed approximately 35 m northwest of the drainage where the slope began to descend.

Figure 9. Slope to Third Drainage

The fourth drainage is located approximately 2877 ft. northwest of the intersection of FM 637 and USC 287. It is approximately 2 m wide and 0.5 m deep. Clear water less than 0.5 m deep was flowing over a clayey loam substrate. The valley through which the stream flows is at least 2 m deep. Shovel tests 15 and 16 were excavated about one meter from the southeast and northwest banks, respectively. No tests were dug upslope due to the presence of gravel and two-track roads leading to residences.

The fifth drainage is located approximately 410 m northwest of the intersection of County Road 3060 and US Highway 287. It is approximately 20 m wide and about 2.5 m deep. Clear water less than 0.5 m deep was standing adjacent to Highway 287. The remainder of the drainage had a loamy clay substrate. Ground visibility ranged between 10% and 20%. Shovel test 17 was excavated about 125 m southeast of the drainage at the base of the slope, whereas shovel tests 18 and 19 were placed about one meter southeast and northwest of the drainage, respectively. Shovel test 20 was dug approximately 70 m northwest of the drainage where the slope began to descend.

RESULTS AND CONCLUSIONS

No prehistoric or historic sites were found within the boundaries of the APE. The two shovel tests at the site of the proposed elevated storage tank were dug through clay at depths of 41 and 44 cm. This area is not near any dependable water source and, therefore, is viewed as a very low probability area for a prehistoric site. A sandy knoll was observed and at first glance it appeared to be a likely area for a site. No shovel tests were dug there because of the intensive disturbance caused by pipeline construction. Much of the area had excellent surface visibility due to the disturbance and no cultural materials were observed. The soils on the banks of the drainages consisted mainly of clayey loam and loamy clay. It is difficult at best to surmise why prehistoric and historic populations did not select certain areas for temporary or permanent utilization. The absence of evidence of temporary utilization of an area can often be explained by a lack of cultural materials left behind. The streams in the APE are viewed as minor and this could explain why long-term prehistoric sites were not located. The same may be said for use of the area in historic times. Sites dating to the historic period often are identified by artifacts and/or features on the surface. Since this was not the case here, it seems probable that the only use of the area was temporary.

RECOMMENDATIONS

No significant archaeological sites were found during this cultural resources survey. Therefore, it is the recommended that the client be allowed to proceed with construction as planned. Should cultural materials be identified in areas not discussed in this report, all work should cease until the situation can be evaluated by the Archeology Division, THC, and BVRA.

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APPENDIX I: SHOVEL TEST LOG *

ST NO.	DEPTH (CM)	DESCRIPTION	GPS COORDINATES (ALL GPS 14 S)
1	0-31 32-44	Black clay (10YR 2/1) Brown clay (10YR 4/3)	07 60 059 East 35 43 920 North
2.	0-34 35-41	Black clay (10YR 2/1) Brown clay (10YR 4/3)	07 60 052 East 35 42 899 North
3.	0-34 30-39	Very dark brown loamy clay (10YR 2/2) Yellowish-brown loamy clay (10YR 5/4)	07 58 019 East 35 45 742 North
4.	0-29 30-39	Very dark brown loamy clay (10YR 2/2) Yellowish-brown loamy clay (10YR 5/4)	07 57 977 East 35 45 814 North
5	0-37	Very dark brown loamy clay (10YR 2/2)	07 57 983 East 35 45 843 North
6	0-37	Very dark brown loamy clay (10YR 2/2)	07 57 901 East 35 45 918 North
7	0-35	Brown slightly clayey loam (10YR 4/3)	07 53 219 East 35 45 869 North
8	0-36	Very dark brown slightly clayey loam (10YR 2/2)	07 53 077 East 35 45 893 North
9	0-33	Brown slightly clayey loam (10YR 4/3)	07 53 061 East 35 45 895 North
10	0-41	Brown slightly clayey loam (10YR 4/3)	07 53 013 East 35 45 920 North
11	0-41	Dark grayish-brown slightly clayey loam (10YR 4/3)	07 52 158 East 35 46 216 North
12	0-37	Very dark grayish-brown slightly clayey loam (10YR 3/2)	07 52 064 East 35 46 248 North

ST NO.	DEPTH (CM)	DESCRIPTION	GPS COORDINATES (ALL GPS 14 S)
13	0-33	Very dark grayish-brown slightly clayey loam (10YR 3/2)	07 52 053 East 35 46 248 North
14	0-40	Very dark grayish-brown slightly clayey loam (10YR 3/2)	07 52 039 East 35 46 254 North
15	0-44	Very dark brown loamy clay (10YR 2/2)	07 51 165 East 35 46 499 North
16	0-41	Brown loamy clay (10YR 4/3)	07 51 096 East 35 46 518 North
17	0-36	Very dark grayish-brown slightly clayey loam (10YR3/2)	07 49 977 East 35 46 784 North
18	0-11	Very dark grayish-brown slightly clayey loam (10YR3/2)	07 49 850 East 35 46 806 North
	12-34	Pale brown loam (10YR 6/3)	
19	0-22	Very dark grayish-brown slightly clayey loam (10YR 3/2)	07 49 812 East 35 46 815 North
	23-35	Pale brown (10YR6/3) loam	
20	0-33	Very dark grayish-brown slightly clayey loam (10YR 3/2)	07 49 784 East 35 46 826 North
	34-39	Pale brown loam (10YR 6/3)	

* All tests were negative