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Intensive Archeological Survey For Proposed City Of Muleshoe Sanitary Landfill, Bailey County, Texas

Haley Rush

Rebecca Schultz

David Sandrock

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Intensive Archeological Survey For Proposed City Of Muleshoe Sanitary Landfill, Bailey County, Texas

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INTENSIVE ARCHEOLOGICAL SURVEY FOR PROPOSED CITY OF MULESHOE SANITARY LANDFILL, BAILEY COUNTY, TEXAS



Prepared by:

Haley Rush, MA, RPA
Rebecca Schultz
David Sandrock, MA, RPA (Principal Investigator)

Cox | McLain Environmental Consulting, Inc.

8401 Shoal Creek Blvd.
Austin, Texas 78759

Prepared for:

Parkhill, Smith & Cooper
4222 85th Street
Lubbock, Texas, 79423

and

City of Muleshoe
215 S. First Street
Muleshoe, Texas, 79347

Under

Texas Antiquities Permit 8153

Cox | McLain Environmental Consulting, Inc. Archeological Report 164
(CMEC-AR-164)



December 17, 2017

Intensive Archeological Survey for the City of Muleshoe Landfill

Management Summary

The City of Muleshoe, Texas, proposes to expand an existing municipal landfill by adding a permit area to the south of the existing landfill. The existing city landfill and the proposed expansion are located in northwestern Bailey County, Texas just southeast of the City of Muleshoe.

In October 2017, an intensive archeological survey was completed in order to inventory and evaluate archeological resources within the footprint of the landfill expansion area. The archeological area of potential effects (APE) is defined as the entire 60-acre (24.28-hectare) parcel where the landfill is planned. The APE is located in an undeveloped parcel immediately south of the existing landfill. Anticipated construction depth will extend beyond 3.28 feet (1 meter). The work was carried out for the City of Muleshoe under Texas Antiquities Permit 8153 by Haley Rush and Rebecca Shultz of Cox | McLain Environmental Consulting, Inc. (CMEC) under the direction of David Sandrock (Principal Investigator). CMEC acted as a subcontractor to Parkhill, Smith and Cooper, Inc.

Ground surfaces within the APE were moderately (30 percent) to highly (50 percent) visible. The entire parcel has been utilized for agricultural activities, although much of the APE is currently fallow and overgrown with tall grass and shrubs. No cultural materials were observed on the surface or in the 30 shovel tests excavated across the APE. Shovel tests revealed sandy soils of varying depths and were excavated to at least 60 centimeters below surface (cbms) with most extending to 80 or 100 cbms. No evidence was observed of dune formation or eolian deposits with potential for deeply buried archeological materials. Therefore, no mechanical excavations were undertaken.

All materials (notes, photographs, administrative documents, and other project data) generated from this work will be housed at the Center for Archaeological Studies at Texas State University, where they will be made permanently available to future researchers per 13 Texas Administrative Code 26.16-17.

No evidence was found of preserved deposits with a high degree of integrity; associations with distinctive architectural and material culture styles; rare materials and assemblages; the potential to yield data important to the study of preservation techniques and the past in general; or potential attractiveness to relic hunters (13 TAC 26.10; 36 CFR 60.4). Thus, the proposed project can proceed with construction activities. If any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease and THC personnel should be notified immediately.

The Texas Historical Commission concurred with the findings of this report on December 4, 2017.

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1.0 INTRODUCTION

Overview of the Project

The City of Muleshoe, Texas, proposes to expand an existing municipal landfill by adding a permit area to the south of the existing landfill. The existing city landfill and the proposed expansion are located in northwestern Bailey County, Texas just southeast of the City of Muleshoe (**Figure 1**). The archeological area of potential effects (APE) is defined as the entire 60-acre (24.28-hectare) parcel where the landfill is planned. The APE is located in an undeveloped parcel immediately south of the existing landfill. Anticipated construction depth will extend beyond 3.28 feet (1 meter). The entire parcel has been utilized for agricultural activities, although much of the APE is currently fallow and overgrown with tall grass and shrubs.

The project is owned and funded by the City of Muleshoe, a political subdivision of the State of Texas rendering the project subject to the Antiquities Code of Texas. No federal nexus is currently known. All materials generated from this work will be permanently housed at the Center for Archaeological Studies (CAS) at Texas State University per Texas Administrative Code (TAC) 26.16 and 26.17.

Methodological and Logistical Considerations

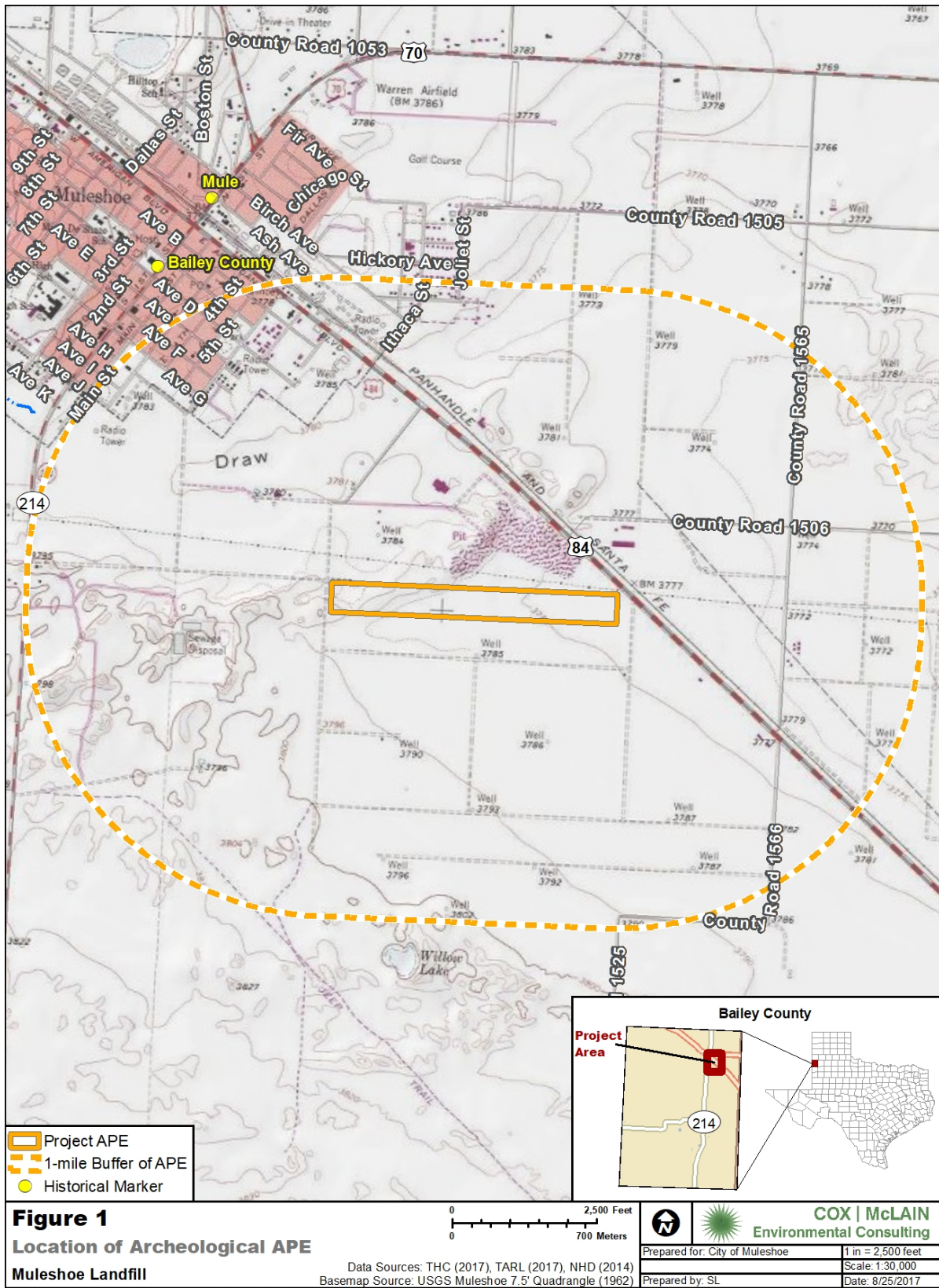
The work was carried out under Texas Antiquities Permit 8153 in October 2017 by Haley Rush and Rebecca Shultz of Cox|McLain Environmental Consulting, Inc. (CMEC) under the direction of David Sandrock (Principal Investigator). CMEC acted as a subcontractor to Parkhill, Smith and Cooper, Inc.

The APE was subject to a pedestrian survey augmented with the excavation of 30 shovel test units. All shovel tests were placed based on guidelines established by the Council of Texas Archeologists (CTA) and approved by the Texas Historical Commission (THC). The methods employed during this study and relevant constraints are discussed further in Chapters 3 and 4.

Structure of the Report

Following this introduction, Chapter 2 presents environmental parameters, a brief cultural context, and a summary of previous archeological research near the APE; Chapter 3 discusses research goals, relevant methods, and the underlying regulatory considerations; Chapter 4 presents the results of the survey and summarizes the implications of the investigations; and references are in Chapter 5.

Intensive Archeological Survey for the City of Muleshoe Landfill



2.0 ENVIRONMENTAL AND CULTURAL CONTEXT

Topography, Geology, and Soils

The APE is located at an elevation of approximately 3,785 feet above mean sea level. Geologically, the APE is underlain by Quaternary-age windblown deposits, as well as Quaternary-age Clovis Formation (USGS 2017). According to Natural Resource Conservation Service (NRCS) data, soils within the APE are mapped as Gomez-Arch complex, which contains deep, well-drained, and permeable soils (NRCS 2017). The Gomez series consists of coarse-loamy, mixed, active, and thermic Aridic Calcustepts that formed in sandy and loamy calcareous eolian or fluvial sediments in the Blackwater Draw Formation of Pleistocene age (NRCS 2017). The Arch series consists of fine-loamy, carbonatic, and thermic Aridic Calcustepts that formed from calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age (NRCS 2017). NRCS data shows the A horizon of the Gomez series mapped at 38 cm deep, and the A horizon for the Arch series is mapped at 15 cm deep (NRCS 2017).

Vegetation, Physiography, and Land Use

The project is located in the High Plains ecoregion (Gould et al. 1960), falling in the Llano Estacado subregion (Griffith et al. 2004). The High Plains are characterized by generally low topographic relief; relief on the landscape is primarily in the form of seasonal playa lakes and draws that form in small depressions. The area often gets little rainfall, so playas are important to supporting populations of small mammals, birds, and amphibians. Average annual precipitation in this region is reported to have been between 20 and 24 inches from 1981 to 2017 (SCAS 2000). Although levels of rainfall likely fluctuated throughout prehistory (detailed below), the region generally tends to be dry.

According to the Texas Parks and Wildlife Department's *Vegetation Types of Texas* map and accompanying descriptions of the APE, the project area is mapped as having Sandsage-Harvard Shin Oak Brush (McMahan et al. 1984). The earliest aerial photographs of the APE (1996) provide visual evidence of two center-pivot irrigation systems on the western half of the project area. Those systems appear to have been decommissioned by or before 2004 (NETR 2017). Additionally, the entire project area has been used for agricultural pursuits in recent years but has remained fallow since at least 2014 (NETR 2017).

Archeological Chronology for the Southern High Plains

The APE is in the Southern High Plains archeological region, which extends into eastern New Mexico (Johnson and Holliday 2004; Perttula 2004). The Southern High Plains is also known as the Llano Estacado. The Llano Estacado is a large plateau that is bounded by the Caprock Canyonlands to the east, the Canadian River to the north, and the Mescalero Escarpment to the west.

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Table 1 presents the chronology of the Southern High Plains. Following Perttula (2004:9), Table 1 combines the chronology of the Southern High Plains and the Panhandle into one region, simply known as the “High Plains.”

Table 1. Archeological Chronology for the High Plains in Texas*	
Period	Years Before Present (BP)**
Early Paleoindian	11,500–10,500
Late Paleoindian	10,500–8,500
Archaic	8,500–2,000
Ceramic (Late Prehistoric)	2,000–1,000
Antelope Creek	1,000–500
Protohistoric	500–250

* After Perttula 2004: 9, Table 1.1
** Based on uncalibrated radiocarbon dates, which are typical in Texas archeology (see Perttula 2004:14, Note 1).

Johnson and Holliday (2004:294–295) note that the Late Quaternary paleoenvironmental records of the Southern Plains are well preserved in the draws, dunes, and lake basins, with draws providing the most complete and sensitive environmental record available. Likewise, the known archeological record provides a lengthy and rich record of heritage for the region, with people living on and using the Southern Plains for at least 11,000 years and possibly longer due to the ample and varied natural resources available. Climate changes over the millennia determined the availability and variety of resources, but the occupation of the Southern Plains generally consisted of small, mobile groups making repeated, short-duration, seasonal visits to resource gathering and residential areas. Below, more specific information about the Paleoindian, Archaic, Ceramic, and Historic Periods is presented.

Paleoindian finds are common on the upland areas in the region, but usually have poor context (Johnson and Holliday 2004). There are just over a dozen documented Clovis sites known in the region. Lubbock Lake, located approximately 60 miles southeast of the APE, is one of the best-known sites in the region. Like the APE, the Lubbock Lake site is located along Yellowhouse Draw, though the draw is a far more substantial drainage at Lubbock Lake. The majority of the draws that cross this region are believed to have developed in the Late Pleistocene or Early Holocene (Johnson and Holliday 2004). These streams likely flowed until around 9500 B.P.

From around the beginning of the Paleoindian Period there is a general warming trend in the region; this warming and drying trend continued into the Archaic Period. During warmer, drier periods, finding potable water in this region is one of the biggest limitations to occupation. Water would likely only be seasonally available in larger playas or Salinas, and that water could be brackish or salinized (Johnson and Holliday 2004). This climatic change is reflected in the Archaic record, as very few Archaic sites are known in the region. Only two documented sites in the region were found to have intact Archaic Period deposits and have also been excavated: Lubbock Lake (near Lubbock) and San Jon (in eastern New Mexico). Although the region was likely a harsh place to live at that

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time, there is evidence of intensive use at Lubbock Lake during this period. This is evidenced by the presence of camping areas, bison kill and butchery areas, and at least one oven (Johnson and Holliday 2004). At the end of the Archaic Period, cooler and moister conditions returned, the vegetation changed, and potable water was more readily available.

From 2000 to 1000 B.P. there is a transition in the region from the Archaic Period to what is called the Ceramic Period, demonstrated by the presence of ceramics and the bow and arrow (Johnson and Holliday 2004). This transition took place over time as demonstrated by the instances of Archaic dart points found with arrow points and ceramics. Ceramics are not present at every Ceramic Period site in the region, including Lubbock Lake, where radiocarbon assays and stratigraphy indicate that it was occupied during the Ceramic Period. Johnson and Holliday's chronology for the region varies slightly from the chronology presented in **Table 1**; generally, Johnson and Holliday (2004:284) combine the Ceramic Period and the Antelope Creek Period into one longer Ceramic Period dating from 2000 BP to AD 1450. The Antelope Creek Phase is not discussed herein, as it is confined to the most northern portion of the Texas Panhandle; for a discussion on Antelope Creek, see Brooks (2004).

The shifts between wetter and drier conditions have been occurring at a faster rate during the last two thousand years (Ceramic to Historic Period) than in the years preceding (Paleoindian to Archaic Period). These drier periods have led to a decrease in vegetation during the drier times, which can increase levels of erosion, which in turn decreases the preservation of archeological materials. This is also true for the Protohistoric and Historic Periods. Documented aboriginal sites from the Protohistoric and Historic Periods (like the Ceramic Period that precedes them) are poorly stratified and few and far between (Johnson and Holliday 2004). Lubbock Lake is a notable exception, where stratified Protohistoric and Historic aboriginal occupations are present. Other aboriginal historic sites include rock art sites and several Comanche occupations. Historic aboriginal sites are marked by the appearance of European trade goods, like seed beads, and the appearance of the horse (Johnson and Holliday 2004).

Further detailed descriptions of the archeological chronology will not be presented here; for further discussion regarding the prehistory of the Llano Estacado the reader is referred to Hofman et al. (1989) and Johnson and Holliday (1995; 2004).

Historic Context

The project area lies at the southern end of the Great Plains, which was often home to large, grazing bison (or buffalo) herds. Large bison herds were first documented by the Spanish when they passed through the Panhandle region (north of the APE) in 1521 on Francisco Vazquez de Coronado's expedition (Newcomb 1961; Rathjen 2015). European occupation in the Southern High Plains began with the arrival of bison hunters in the mid to late nineteenth century (Johnson and Holliday 2004).

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The growth of the non-tribal settler population in Bailey County was a slow process, as much of Bailey County was part of the XIT Ranch from 1882 to 1901 (Hunt and Leffler 2016). The 1900 United States Census only counted 4 people in Bailey County. Following the division of former XIT ranchland into smaller ranches, the population of Bailey County grew rapidly during the early twentieth century; 312 people were counted in the 1910 Census. The county's population was negatively impacted by a 1913 drought, but soon rebounded when the Atchison, Topeka, and Santa Fe Railway Company built railways across the county in 1913 (Hunt and Leffler 2016).

The town of Muleshoe was established along the railroad in 1913 and was named for the nearby Muleshoe Ranch in Fannin County. Muleshoe was officially incorporated in 1926 (Hunt 2016). The discovery of ground water in the 1920s led to the transition of Bailey County's economy from ranching to farming, and the larger ranches were subdivided into smaller farming lots. By 1929 cotton was the dominant crop (Hunt and Leffler 2016).

Previous Investigations, Previously Identified Resources, and Historic Map and Aerial Photograph Review

A search of the *Texas Archeological Sites Atlas* (Atlas), maintained by the THC and the Texas Archeological Research Laboratory, was conducted in order to identify archeological sites, historical markers (Recorded Texas Historic Landmarks), properties or districts listed in the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), cemeteries, or other cultural resources that may have been previously recorded in or near the APE, as well as previous surveys undertaken in the area.

The Atlas revealed no documented archeological sites, historical markers, cemeteries, or other resources recorded within the APE, and no known surveys cross the APE. Additionally, no archeological sites, historical markers, cemeteries, or previous surveys are recorded within 1 mile of the APE (THC 2017).

Prior to conducting the survey, a review of available historic aerials and topographic maps was undertaken to determine how the parcel had been utilized over time. The earliest aerial photograph available was produced in 1996 (NETR 2017). As discussed above, the parcel has been at least partially utilized for agricultural activities since before 1996. The APE is currently fallow, but based on grasses present has been utilized in the recent past for growing hay. Topographic maps from 1965 and 1981 were reviewed; no buildings or structures appear within the APE on these maps. The Santa Fe Railroad corridor follows US Highway 84 on the east; US Highway 84 is adjacent to the APE on the east.

3.0 RESEARCH GOALS AND METHODS

Purpose of the Research

The present study was carried out to accomplish three major goals:

1. Identify all historic and prehistoric archeological resources located within the APE defined in Chapter 1.
2. Perform a preliminary evaluation of the identified resources' potential for inclusion in the NRHP and/or for designation as a SAL (typically performed concurrently).
3. Make recommendations for further research concerning the identified resources based on the preliminary NRHP/SAL evaluation and guidance on methodology and ethics from the THC and CTA.

The Antiquities Code of Texas

Because the project is proposed by the City of Muleshoe, a political subdivision of the State of Texas, the project is subject to the Antiquities Code of Texas (9 TNRC 191), which requires consideration of effects on properties designated as—or eligible to be designated as—SALs, which are defined as:

... sites, objects, buildings, structures and historic shipwrecks, and locations of historical, archeological, educational, or scientific interest including, but not limited to, prehistoric American Indian or aboriginal campsites, dwellings, and habitation sites, aboriginal paintings, petroglyphs, and other marks or carvings on rock or elsewhere which pertain to early American Indian or other archeological sites of every character, treasure imbedded in the earth, sunken or abandoned ships and wrecks of the sea or any part of their contents, maps, records, documents, books, artifacts, and implements of culture in any way related to the inhabitants, prehistory, history, government, or culture in, on, or under any of the lands of the State of Texas, including the tidelands, submerged land, and the bed of the sea within the jurisdiction of the State of Texas (13 TAC 26.2).

Guidelines for the evaluation of cultural resources as SALs and/or for listing in the NRHP, which is also explicitly referenced at the state level, are detailed in 13 TAC 26. An archeological site identified on lands owned or controlled by the State of Texas may be of sufficient significance to allow designation as a SAL if at least one of the following criteria applies:

1. the site has the potential to contribute to a better understanding of the prehistory and/or history of Texas by the addition of new and important information;
2. the site's archeological deposits and the artifacts within the site are preserved and intact, thereby supporting the research potential or preservation interests of the site;
3. the site possesses unique or rare attributes concerning Texas prehistory and/or history;
4. the study of the site offers the opportunity to test theories and methods of preservation, thereby contributing to new scientific knowledge; and
5. there is a high likelihood that vandalism and relic collecting has occurred or could occur, and official landmark designation is needed to ensure maximum legal protection, or alternatively,

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further investigations are needed to mitigate the effects of vandalism and relic collecting when the site cannot be protected. (13 TAC 26.10)

For archeological resources, the state-level process requires securing and maintaining a valid Texas Antiquities Permit from the THC, the lead state agency for Antiquities Code compliance, throughout all stages of investigation, analysis, and reporting.

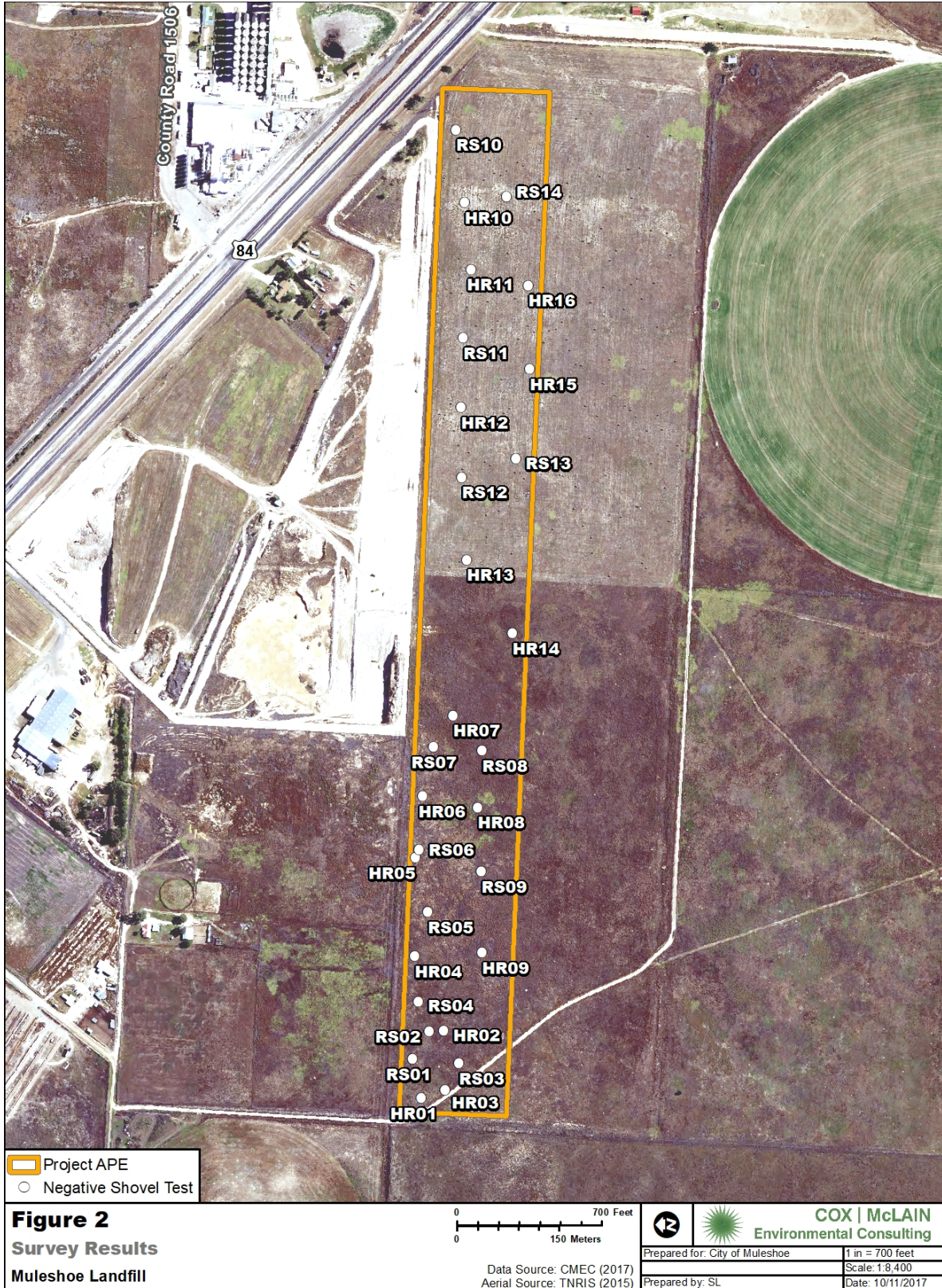
Survey Methods and Protocols

With the goals and guidelines above in mind, CMEC personnel conducted an intensive survey in October 2017 per category 6 under 13 TAC 26.15. The crew used the definitions in 13 TAC 26.3 to search for previously identified and unidentified archeological sites. Field methods complied with the coverage requirements of 13 TAC 26.15, as elaborated by the THC and CTA.

Shovel tests, shown on **Figure 2**, were excavated in natural levels to major color/texture changes or restrictive features, as allowed by compaction and hardness of the deposits. Excavated matrix was screened through 0.635-centimeter (0.25-inch) hardware cloth as allowed by moisture and clay content, which occasionally required that the removed sediment be crumbled/sorted by hand, trowel, and/or shovel point. Deposits were described using conventional texture classifications and Munsell color designations, and all observations were recorded on standard CMEC shovel test forms. The shovel testing protocol detailed in the approved scope for Texas Antiquities Permit 8153 called for radial shovel tests to be placed at 5-meter (16-foot) intervals around each shovel test positive for cultural material until two negative units were established in each cardinal direction. None of the shovel test units were positive with cultural material.

No artifacts were collected during the investigation; therefore, only project field notes, forms, and other data will be permanently curated and made available to future researchers at the CAS at Texas State University per 13 TAC 26.16 and 26.17.

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G:\Projects\CityofMuleshoe\Muleshoe_Landfill\Arch_Figure 2_Survey Results_20171011.mxd

4.0 RESULTS AND RECOMMENDATIONS

General Field Observations

In October 2017, CMEC personnel conducted an intensive survey of the 60-acre APE (see **Figure 2**). The entire parcel is a fallow plowed field but has been used for hay production in the recent past (**Figure 3**). The APE was covered in tall grasses and shrubs (**Figure 4**), but had moderate (40 to 50 percent) visibility across the entire ground surface (**Figure 5**). Local conditions during the survey were overcast with intermittent rainstorms throughout the day.

Although there was some deviation, shovel tests were excavated at 100-meter intervals along two transects spaced approximately 90 meters apart (see **Figure 2**). Deviation in transect and shovel test placement was to avoid severely disturbed areas and focus on areas that had low ground surface visibility.

In all, 30 shovel tests were excavated, all of which were negative for cultural materials. All shovel tests were excavated to a minimum depth of 60 cmbs, although most shovel tests were deeper, with some up 1 meter deep. Typical deposits were loose, granular, yellow brown (10YR5/6) sand over moist, friable, dark yellow brown (10YR4/4) sand (**Figure 6**). There were a few exceptions when the upper yellow brown sand was over friable, brown (10YR4/3) or strong brown (7.5YR4/6) sandy clay or clay. Two shovel tests contained calcium carbonate, which was interpreted to signify great age of the deposits (**Figure 7**). Shovel tests were terminated at permit depth (i.e., 60 cmbs), after at least 10 centimeters of the clay layer were excavated, and/or the presence of calcium carbonate was noted.

Based on background research, there was moderate potential for deeply buried deposits in the APE. During the survey, the APE was found to have very little topographic relief, and no dune formation (i.e., eolian deposition) was observed. Further, the deposits revealed in excavated shovel test units were consistent with the Gomez and Arch Soil Series descriptions, both of which form in the Pleistocene-age Blackwater Draw Formation. Gomez and Arch soils tend to be located on uplands with low probability of buried archeological deposits. For these reasons, no mechanical excavations were undertaken.

Intensive Archeological Survey for the City of Muleshoe Landfill



Figure 1. View from shovel test HR13 toward existing landfill, showing hay bale at right; facing northwest.



Figure 2. View from western end of APE toward center of APE showing typical vegetation across the APE; facing east.

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Figure 3. View of typical ground surface visibility.



Figure 4. View of shovel test HR05.

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Figure 5. View of calcium carbonate from shovel test HR13.

Recommendations

No evidence was found of preserved deposits with a high degree of integrity; associations with distinctive architectural and material culture styles; rare materials and assemblages; the potential to yield data important to the study of preservation techniques and the past in general; or potential attractiveness to relic hunters (13 TAC 26.10; 36 CFR 60.4). Thus, the proposed project can proceed with construction activities. If any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease and THC personnel should be immediately notified.

No artifacts were collected during the survey. However, all notes, photographs, administrative documents, and other pertinent project data generated from this investigation will be housed at CAS at Texas State University-San Marcos, where they will be made permanently available to future researchers per 13 TAC 26.16-17.

The Texas Historical Commission concurred with the findings of this report on December 4, 2017.

5.0 REFERENCES

Brooks, R. L.

2004 From Stone Slab Architecture to Abandonment. In *The Prehistory of Texas*, edited by T. Perttula, pp. 331–346. Texas A&M University Press, College Station.

Gould, F. W., G. O. Hoffman, and C. A. Rechenhain

1960 *Vegetational Areas of Texas*. Texas A&M University, Texas Agricultural Experiment Station Leaflet No. 492.

Griffith, G. E., S. A. Bryce, J. A. Comstock, A. C. Rogers, B. Harrison, S. L. Hatch, and D. Bezanson

2004 Ecoregions of Texas. U.S. Geological Survey. Available at ftp://ftp.epa.gov/wed/ecoregions/tx/tx_front.pdf. Accessed October 14, 2015.

Hofman, J. L., R. L. Brooks, J. S. Hays, D. W. Owsley, R. L. Jantz, M. K. Marks, and M. H. Manhein

1989 From Clovis to Comanchero: Archeological Overview of the Southern Great Plain. *Arkansas Archeological Research Series* No. 35. Arkansas Archeological Survey, Fayetteville.

Hunt, W. R. and J. Leffler

2016 Bailey County. In *Handbook of Texas Online*. Available at <https://tshaonline.org/handbook/online/articles/hcb01>. Accessed October 19, 2017.

Hunt, W. R.

2016 Muleshoe, Texas. In *Handbook of Texas Online*. Available at <https://tshaonline.org/handbook/online/articles/hgm09>. Accessed October 19, 2017.

Johnson, E., and V. T. Holliday

1995 Archeology and Late Quaternary Environments of the Southern Plains. *Bulletin of the Texas Archeological Society* 66:519–540.

2004 Archeology and Late Quaternary Environments of the Southern High Plains. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 283–295. Texas A&M University Press, College Station.

McMahan, C. A., R. G. Frye, and K. L. Brown

1984 *The Vegetation Types of Texas*. Wildlife Division, Texas Parks and Wildlife Department, Austin.

Nationwide Environmental Title Research (NETR)

2017 *Historic Aerials Database*. Nationwide Environmental Title Research. Available at <http://historicaerials.com>. Accessed October 4, 2017.

Natural Resources Conservation Service (NRCS)

2017 NRCS SSURGO and STATSGO soil data viewed through SoilWeb KMZ interface for Google Earth, available at <http://casoilresource.lawr.ucdavis.edu/soilweb/>. U.S. Department of Agriculture and California Soil Resource Laboratory, University of California, Davis. Accessed October 4, 2017.

Intensive Archeological Survey for the City of Muleshoe Landfill

Newcomb, Jr. W. W.

1961 *The Indians of Texas from Prehistoric to Modern Times*. University of Texas Press, Austin.

Perttula, T. K.

2004 An Introduction to Texas Prehistoric Archeology. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 5–14. Texas A&M University Press, College Station.

Rathjen, F. W.

2015 Panhandle. In *Handbook of Texas Online*. Available <http://www.tshaonline.org/handbook/online/articles/ryp01>. Accessed October 14, 2015.

Texas Historical Commission (THC)

2017 *Texas Archeological Sites Atlas*. Texas Archeological Research Laboratory and the Texas Historical Commission. Available at <http://nueces.thc.state.tx.us>. Accessed October 4, 2017.

Spatial Climate Analysis Service (SCAS)

2017 *Average Annual Precipitation for Texas*. PRISM Climate Group at Oregon State University. Available at http://www.prism.oregonstate.edu/gallery/view.php?state=TX_W. Accessed October 6, 2017.

U.S. Geological Survey (USGS)

2017 *Texas Geology Map Viewer*. Available at <http://txpub.usgs.gov/dss/texasgeology/>. Accessed October 4, 2017.

From: Info_Tech@thc.state.tx.us
To: Haley_Rush:reviews@thc.state.tx.us
Subject: Project Review: 201804174
Date: Friday, December 01, 2017 5:21:05 PM



Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
Permit 8153
201804174
Muleshoe Landfill Expansion
Muleshoe, TX 79347

Dear Haley Rush:

Thank you for your submittal regarding the above-referenced project.

The review staff led by David Camarena and Justin Kockritz has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties present or affected

Archeology Comments

- No effect on archeological sites. However, if buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided
- Draft report acceptable. Please submit another copy as a final report along with shapefiles showing the area where the archeological work was conducted. Shapefiles should be submitted electronically to Archeological_projects@thc.texas.gov.

We have the following comments: For the final report please include in the Appendix a table that summarizes the shovel test results.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: david.camarena@thc.texas.gov, justin.kockritz@thc.texas.gov.

Sincerely,