

**AN ARCHEOLOGICAL INVESTIGATION OF
THE PROPOSED LONE STAR RAILROAD PROJECT
IN HOWARD COUNTY, TEXAS**

Texas Antiquities Permit No. 7258

For
ICF International

By
Douglas G. Mangum M.A.
Principal Investigator

With contributions by
Anastasia Gilmer M.A.
Geoarcheologist



Moore Archeological Consulting, Inc.
Report of Investigations Number 648

January 2016

ABSTRACT

In May of 2015, Moore Archeological Consulting, Inc. of Houston, Texas conducted an archeological investigation of a proposed railroad line in Howard County, Texas. The proposed project will involve the construction of two mainline tracks (referred to as Tracks A and B) and two potential connecting lines (Tracks A-1 and B-1). The distance involved in these alignments is approximately 5120 meters (3.18 miles) and will include associated berms. The anticipated right-of-way (ROW) for the track is roughly 15.25 meters (50 feet) for the bulk of the alignment and in no place will be wider than 30 meters (100 feet). This amounts to an overall area roughly 25.3 acres in size (based on an average anticipated ROW width of 20 m [65.5 feet]). It is anticipated that the area of potential direct effect for this project, at least as far as archeology is concerned, will be limited to proposed ROW corridor. The precise depth of impact is not known, however, the improvements are likely to result in significantly deep (as far as archeology is concerned) excavations. The project is found on the Big Spring North USGS Quadrangle maps (3201-132) in Howard County. The investigations were conducted for ICF International, under Texas Antiquities Permit Number 7258.

Property ownership within the project corridor is a mixture of public and private. The project applicant owned the eastern two thirds of the project area, while City of Big Spring Economic Development Corporation owned the western third. It was not necessary to obtain right of entry for the project, however, as both private and public entities were participating in the sponsorship of the project.

A total of 96 shovel tests were excavated, and these revealed three new historic/prehistoric sites and one isolated object. The sites were delineated by a combination of shovel testing and examination of surface expression. These sites were initially designated Temporary Sites 1-4 (Temporary 2 being the isolate), but the sites have since been given the state of Texas issued trinomials 41HW134, 41HW135, and 41HW136.

Based on the shovel tests excavated and the surface examinations of the sites it is recommended that construction of the railroad should be allowed to proceed without further archeological investigations. This is based on the accessible portions of the sites (i.e., within the project ROW) being determined to have no potential for the National Register of Historic Places and having no further research value. However, because the sites extend beyond the boundaries of the current proposed construction, there is also a secondary recommendation. Specifically, it is recommended that any future construction proposed outside of the existing ROW but close to these newly recorded sites, and which is subject to state, federal, or local governmental jurisdiction or oversight, should have additional archeological investigations to determine the extent, integrity, and significance of the sites.

CONTENTS

ABSTRACT	ii
TABLE OF CONTENTS	iii
INTRODUCTION	1
ENVIRONMENTAL AND CULTURAL SETTINGS	6
PREVIOUS ARCHEOLOGICAL INVESTIGATIONS	12
METHODS	13
RESULTS	17
Description of 41HW134	17
Description of Temporary Site 2	20
Description of 41HW135	20
Description of 41HW136	22
RECOMMENDATIONS	24
REFERENCES CITED	25
APPENDIX A: Shovel Test Inventory	27
APPENDIX B: Photographs	37

LIST OF FIGURES

Figure 1. Project Corridor in Howard County, Texas	2
Figure 2. Project Corridor on the Big Spring North USGS Quadrangle Map	3
Figure 3. Detail of Project Corridor on the Big Spring North Quadrangle	4
Figure 4. Project Corridor on a 2015 aerial photograph	5
Figure 5. Location of the western part of the Central Rolling Red Plains within the Central Great Plains	9
Figure 6. Geologic map of the project area	10
Figure 7. The soils along the project corridor include the Circleback, Springer, Brownfield, and Patricia soil series	11
Figure 8. Map of proposed project area showing shovel test locations	16
Figure 9. Map of proposed project area showing site locations	18
Figure 10. 41HW134 Site Map	19
Figure 11. 41HW135 Site Map	21
Figure 12. 41HW136 Site Map	23

LIST OF TABLES

Table 1. Chronology for Central Texas	12
Table 2. Artifacts from 41HW134	19
Table 3. Artifacts from 41HW135	21

INTRODUCTION

In May of 2015, Moore Archeological Consulting, Inc. conducted a cultural resource survey investigation of the proposed railroad line in Howard County, Texas. The objectives of the investigation were to locate and identify cultural materials, sites, or historic properties within the proposed impact area, and to prepare management recommendations regarding any identified resources. The investigations were conducted for ICF International, under Texas Antiquities Permit Number 7258.

The proposed project will involve the construction of two mainline tracks (referred to as Tracks A and B) and two potential connecting lines (Tracks A-1 and B-1) (Figures 1-4). The distance involved in these alignments is approximately 5,120 meters (m) (3.18 miles) and will include associated berms. The anticipated ROW for the track is roughly 15.25 m (50 feet [ft]) for the bulk of the alignment and in no place will be wider than 30 m (100 ft). The precise depth of impact is not known, however, the improvements are likely to result in significantly deep (as far as archeology is concerned) excavations. The project is found on the Big Spring North USGS Quadrangle maps (3201-132) in Howard County.

An intensive pedestrian field survey of the project corridor was conducted, and included both surface and subsurface (shovel test) examination. A total of 96 shovel tests were excavated (Figure 9; Appendix 1) and roughly 25.3 acres of surface were examined (based on an average ROW width of 20 m). As a result of these excavations and surface finds, three previously unrecorded sites and one isolated object were found. These were initially designated Temporary Sites 1-4 (Temporary 2 being the isolate). The sites have since been given the State of Texas issued trinomials 41HW134, 41HW135, and 41HW136.

The field investigations were conducted by project archeologist Randy Ferguson and field technicians Sean Nash and Jared Pringle under the supervision of the principal investigator, Douglas Mangum.

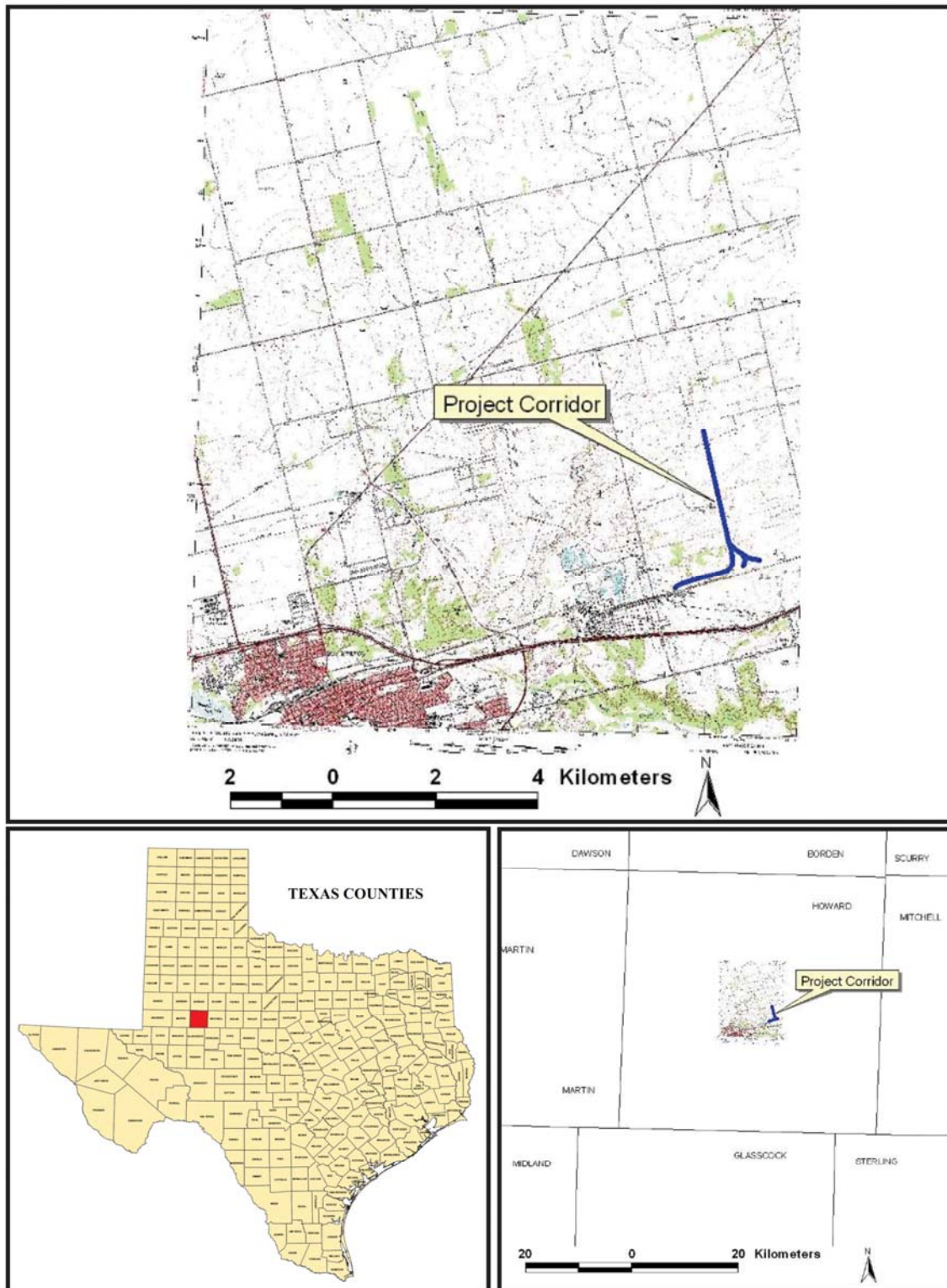


Figure1. Project Corridor in Howard County, Texas.

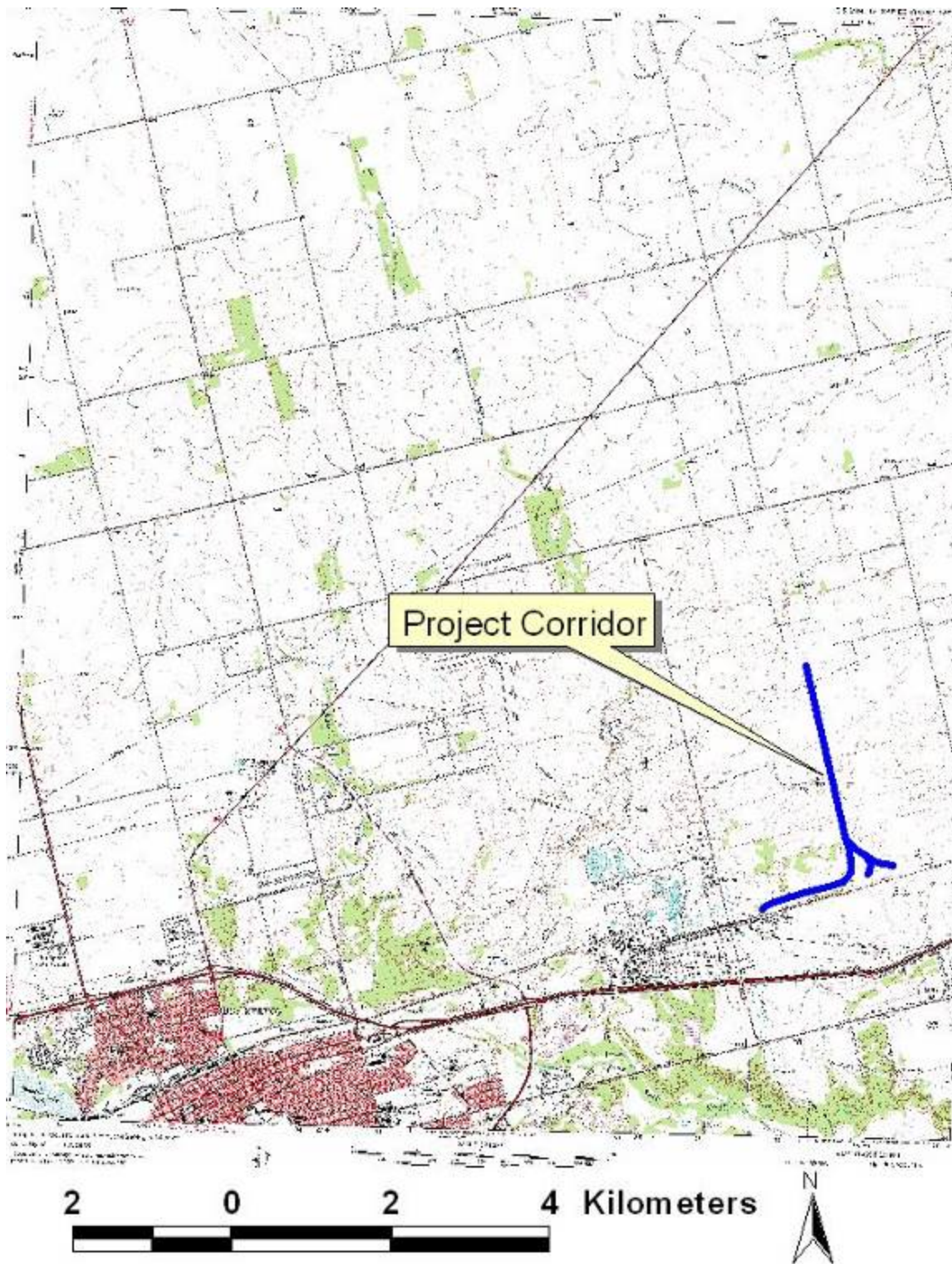


Figure 2. Project Corridor on the Big Spring North USGS Quadrangle Map.

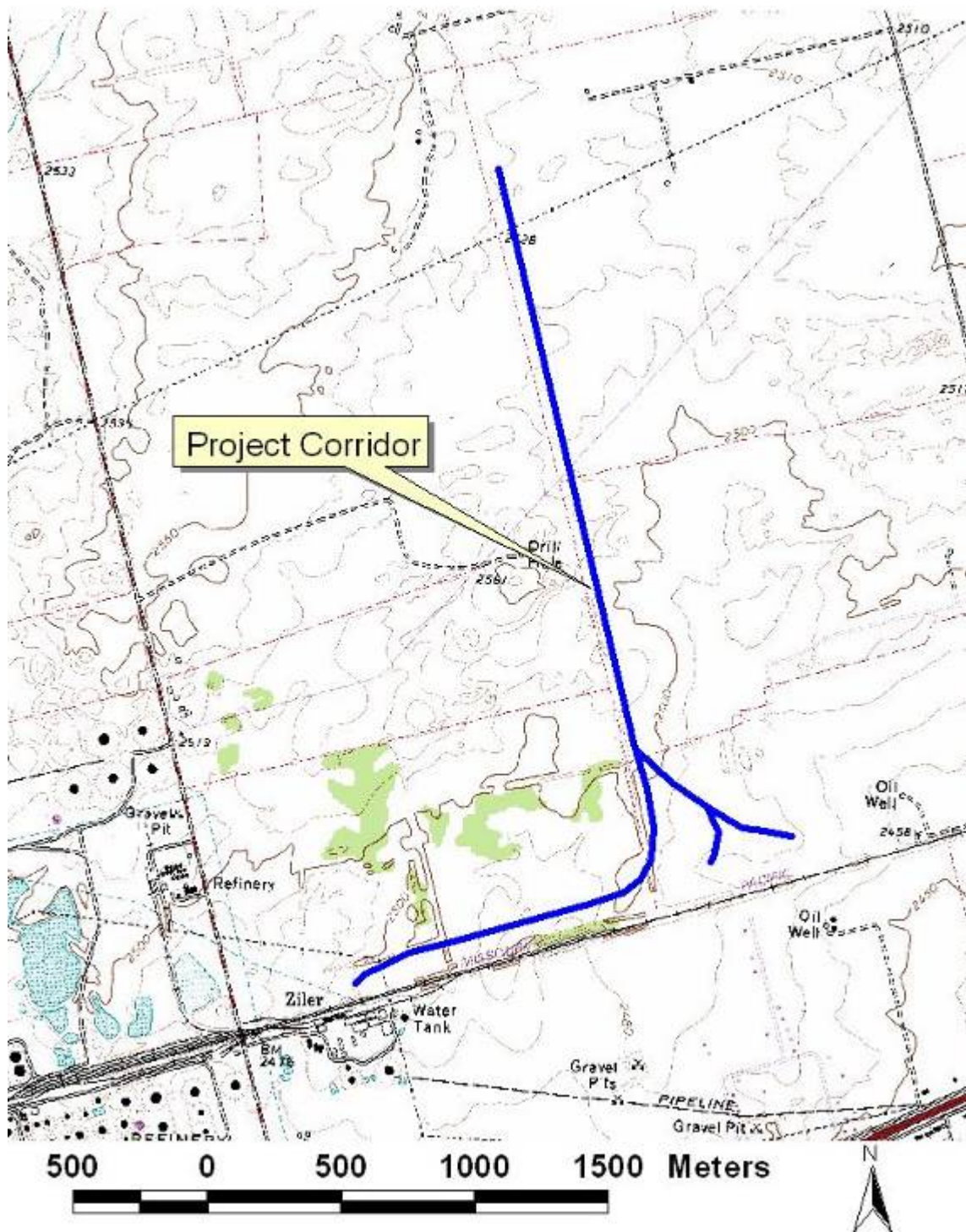


Figure 3. Detail of the Project Corridor on the Big Spring North Quadrangle.



Figure 4: Project Corridor on a 2015 aerial photograph (via Google Earth). Project corridor outlined in red.

ENVIRONMENTAL AND CULTURAL SETTINGS

The project corridor lies near the intersection of the rolling plains and the high plains regions (TPWD 2015a). The project area is located on the western part of the Central Rolling Red Plains (Major Land Resource Area 78B) within the Great Plains (Land Resource Region H) according to the USDA/NRCS's (2015a) land resource classification system (Figure 5). The Rolling Red Plains are characterized by rolling plains with ancient stream terraces or terrace remnants associated with stream dissection.

Modern Climate

The modern climate of the project corridors can be aptly characterized as warm and arid for most of the year. The mean annual temperature between 2000 and 2015 for Big Spring, Texas, was 17.6 °C (63.7°F), with a mean annual precipitation of 46.7 centimeters (18.4 inches). Summer temperatures average about 27 °C (81°F). The average winter temperature is mild and averages about 8.9 °C (48 °F). Between 2000 and 2015, the highest recorded temperature was 35 °C (95 °F) in May 2000 and the lowest recorded temperature was -8.9 °C (16 °F) in 2011 (NOAA 2015).

The mean monthly rainfall records for Big Spring between 2000 and 2015 vary from 1.3 centimeters (0.5 inches) in December to 7 centimeters (2.8 inches) in August. The annual rainfall records range from a low of 13 centimeters (5.2 inches) in 2011 to a high of 86 centimeters (33.9 inches) in 2004 (NOAA 2015). The majority of the rainfall in this region is brought in by late spring and early fall convective thunderstorms (USDA/NRCS 2015a). Snow is infrequent in Big Spring with an average of 1 snow day a year (NOAA 2015). The average length of the frost-free period is 235 days (USDA/NRCS 2015a).

Modern Flora and Fauna

The plains of the Texas Panhandle belong to the Kansan biotic province (Blair 1950). The plants and animals in this province are mostly grassland species; although, along the wooded stream valleys in the eastern part of the province, there are some Austroriparian species. The project area is about 30 km northwest of the border between the Kansan and Balconian biotic provinces. The Balconian biotic province is a region of intermediate ecological conditions between the eastern Austroriparian forest province and the western Chihuahuan desert province. The project area lies near the junction of various diverse biotic provinces.

The vegetation for this region predominantly includes species associated with the mixed grass prairie, although there are a number of invasive species. Soil type has a strong effect on where certain plant species will grow. Buffalograss, curlymesquite, sideoats grama, blue grama, vine mesquite, little bluestem, sand bluestem, Arizona cottontop, silver bluestem, Texas wintergrass, and tobosagrass grow in loamy and clayey soils. Common brushy invaders include mesquite, lotebush, and redberry juniper. Bluestems, switchgrass, sand lovegrass, sand dropseed, sideoats grama, hairy grama, hooded windmillgrass, sand paspalum, fall witchgrass, and sand sagebrush favor sandy soils

(USDA/NRCS 2015a, 2015c, 2015d). Thick stands of shinnery oak will occupy some sand areas. Saltcedar has invaded well-watered areas (USDA/NRCS 2015a). Yucca, snakeweed, annuals, and a few small mesquites invade areas when the range condition deteriorates under continued heavy grazing (USDA/NRCS 2015c).

Animal species include white-tailed deer, desert mule deer, coyote, bobcat, black-tailed jackrabbit, cottontail rabbit, prairie dog, feral hogs, turkey, bobwhite quail, blue quail, mourning dove, ducks, and geese. Antelope and mountain lion have a limited presence in the vicinity (USDA/NRCS 2015a).

Soils and Geology

The project area lies on a dynamic landscape that is dominated by a hummocky topography formed by dunes, interdunes, and sand sheets. Dunes result from deflation and deposition of sand-sized material. Dune formation is effected by wind direction and speed, sand supply, vegetation, and grain-size. The interdune areas are the flat regions between the dunes. Sandsheets are blanket like deposits with very little relief, over which dunes drift (Goldberg and Macphail 2006:131-137).

The geologic deposits along the project corridor are defined as Quaternary windblown sand (Qsu and Qs) (Figure 6). The Qsu rock unit is described as Holocene-aged eolian deposited sand sheets, dunes, and dune ridges (USGS 2015). The other rock unit of windblown sands (Qs) is described as Holocene-aged eolian deposited sand and silt in sheets. Landscapes controlled by eolian processes are quite dynamic. Archeological materials that have been deposited on these landscapes may be positively or adversely affected by dune formation. Sand dunes and sand sheets may bury an archeological site. However, as stated by Holliday (2004:112): “the easily erodible nature of many sand deposits and the dynamic nature of many dune systems...often mixes archaeological contexts and destroys stratigraphic relationships.” Additionally, even though archeological materials are buried, the homogeneous sand deposits of dunes are difficult to separate or correlate. Buried soils, or paleosols, are sometimes observed in eolian sands and can serve as a stratigraphic marker in these contexts. In addition, “clay bands” or “clay lamellae” from the argillic Bt horizons can serve as stratigraphic markers. These thin, relatively clay-rich zones within the sand material were formed through pedogenic processes and are generally associated with late Pleistocene and early Holocene Paleoindian occupations (Holliday 2004:112-113).

The Qs unit locally includes the Blackwater Draw Formation (Qbd), which outcrops 2.5 km (1.5 miles) to the north of the project corridor (USGS 2015). The Blackwater Draw Formation is a well-known geologic formation among archeologists. This is because the Blackwater Draw Locality No. 1 archeological site in Clovis, New Mexico is the *type* site of the Clovis culture. The Blackwater Draw Formation contains as many as six well-developed buried soils, which indicate episodic sedimentation through eolian processes separated by long periods of landscape stability. Each cycle of sedimentation-stability lasted for several hundred thousand years and the last depositional event occurred at least

several tens of thousands of years ago (Holliday 1989). The soils within the project area, however, do not exhibit well-developed buried soils (USDA/NRCS 2015b).

The project area contains four types of soil: Circleback fine sand (Tf); Springer loamy fine sand, undulating (Sr); Brownfield fine sand, thick surface (BfB); and Patricia fine sand, 0 to 3 percent slopes (BfB) (Figure 7). Each of these soils is derived from sandy eolian deposits from the Blackwater Draw Formation of Pleistocene age (USDA/NRCS 2015b). Circleback series soils are deep, excessively drained, and rapidly permeable soils that are classified as siliceous, thermic Lamellic Ustipsammets. The typical profile is A-E-E&Bt2. These soils form on an undulating to duned upland surface. Slopes are complex with landscape base slopes from 1 to about 5 percent and individual dune side slopes from about 5 to 35 percent (USDA/NRCS 2015b, 2015c). The Springer series soils are very deep, well drained, and moderately permeable soils that are classified as coarse-loamy, mixed, superactive, thermic Typic Paleustalfs. The typical profile is A-Bt1-Bt2-Eb-Btb-BCb. These nearly level to hummocky soils form on interdunes and dunes of sand sheets on stream terraces alluvial plains. Slope ranges from 0 to 3 percent (USDA/NRCS 2015b, 2015d). The Brownfield series soils are very deep, well drained, and moderately permeable soils that are classified as loamy, mixed, superactive, thermic Arenic Aridic Paleustalfs. The typical profile is A-E1-E2-E/B-Bt1-Bt2-Bt3-Bt4. These soils occur on nearly level to gently sloping plains where the slope ranges from 0 to 3 percent (USDA/NRCS 2015b, 2015e). The Patricia series soils are very deep, well drained, and moderately permeable soils that are classified as fine-loamy, mixed, superactive, thermic Aridic Paleustalfs. The typical profile is A1-A2-Bt1-Bt2-Bt3-Btk. These soils form on very gently to gently sloping plains where the slope ranges from 0 to 3 percent (USDA/NRCS 2015a, 2015f).

Hydrology

The project area lies within the Colorado River Basin (TPWD 2015b). No rivers or streams cross the project corridor, although the Big Sandy Draw runs north-south approximately 2.5 km to the west, the Sandy Hollow Draw runs north-south approximately 4 km to the east, and the Coahoma Draw runs east-west approximately 5 km to the northeast of the project corridor (Big Spring North USGS Quadrangle map [3201-132]). The topographic maps show that there are a number of small depressions in the area. These depressions may have been ponds in the past and ponds were commonly used by Native Americans for resource acquisition.

The town of Big Spring, Texas, was named after a local spring that is, today, located in Comanche Trail Park. The spring, which had to be recharged in recent years due to over use by the local population, is located a little over 10 km to the southwest of the project corridor. The spring has long been a highly utilized resource for local animal populations, Native Americans, and European settlers. The spring is sourced by a small aquifer that is structurally described as a collecting basin. A sink that formed in the lower Cretaceous Fredericksburg limestone collects groundwater drained from the overlying Trinity sands. The perennial yield of the sink was estimated to be 100,000 gallons a day at the time of the railroad's arrival to the area in the late 1880s (Livingston and Bennett 1944).

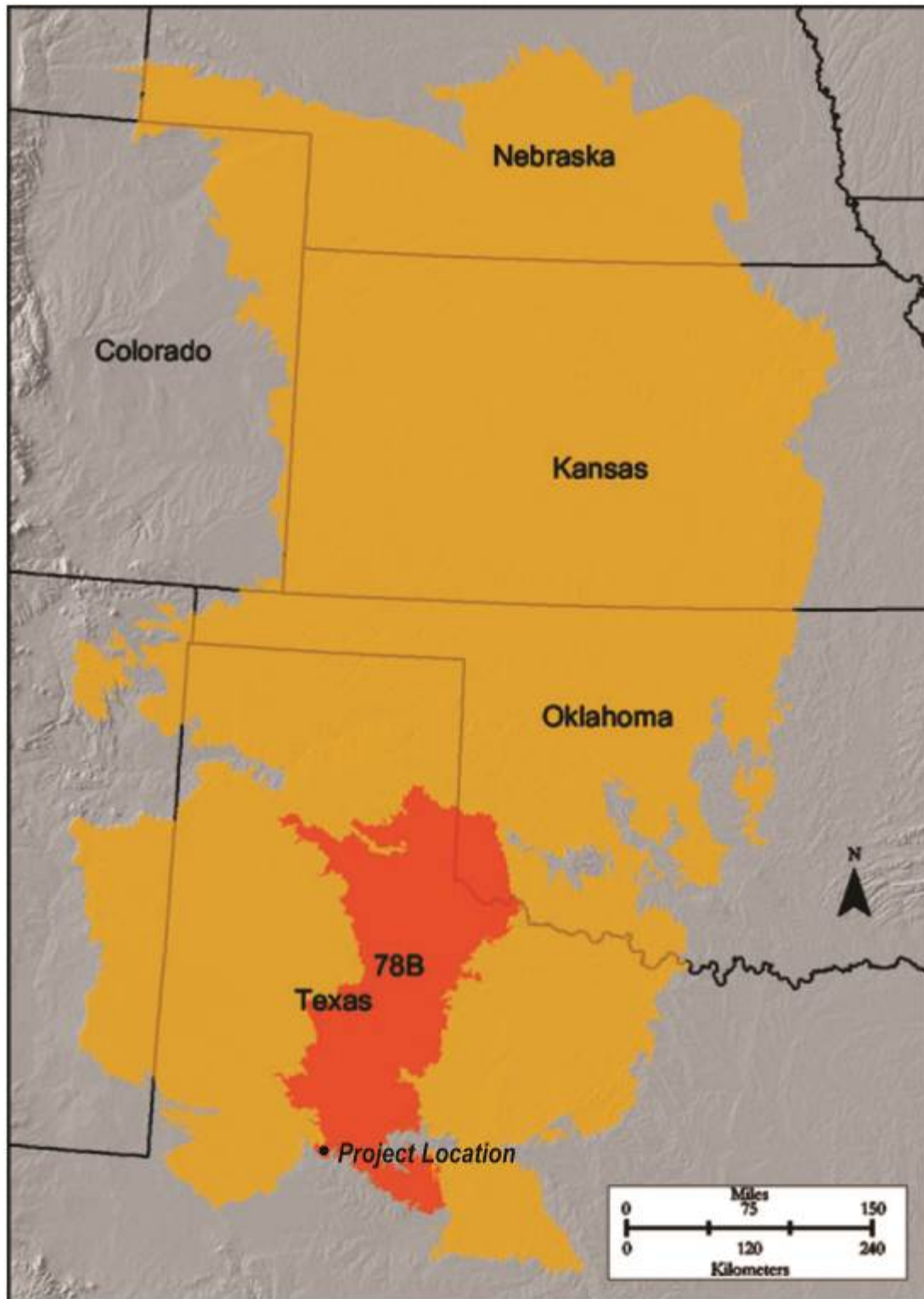


Figure 5. Location of the western part of the Central Rolling Red Plains (MLRA 78B, red) within the Central Great Plains (Land Resource Region H, yellow) (USDA/NRCS 2015a).





Figure 7. The soils along the project corridor include the Circleback (Tf), Springer (Sr), Brownfield (BfB), and Patricia (BfB) soil series (USDA/NRCS 2015b).

Central Texas Archeological Chronology

The project area is located on the edge of the central Texas archaeological region (Perttula 2004). This region includes portions of the Edwards Plateau, the Blackland Prairie on the edge of the Balcones Escarpment, and the Llano Uplift (Collins 2004). One of the unifying things present across this otherwise varied region is the frequency of burned rock middens. Yet despite the ubiquitous nature of these features across this region and over a long stretch of time, the chronology for the area is similar to that used in much of the rest of Texas (Table 1).

Time Period	Dates (BP)
Paleoindian	11,500-8,800
Archaic	8,800-1,200
Late Prehistoric	1,200-400
Historic	400-50

Table 1. Chronology for Central Texas (after Collins, 2004: 113, Figure 3.9a).

Another commonality for the region, and part of why it is considered to have high potential for prehistoric cultural resources, is the presence of so many chert quarrying locales. Numerous prehistoric quarry and primary reduction sites utilizing Edwards chert exist across the region (Collins 2004). Some of these sites are quite significant in size. A modest example of such a site is 41HW40, minimum of 15 acres in size (though likely much larger), which can be found adjacent to the current project area. This site is discussed below in the Previous Archeological Investigations section.

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Examination of the Texas Archeological Sites Atlas reveals that there were a number of previous archeological surveys within the vicinity of the project corridor. One survey was conducted by ACI Consulting along a transmission line corridor in 2011. This survey corridor ran nearly north-south approximately 1 km to the west of Tracks A and B. The western spur of Track B-1 abutted ACI Consulting's survey corridor. This survey, which located 51 new sites in all, delineated two sites (41HW96 and 41HW97) to the south-west of the project area (Texas Archeological Sites Atlas site forms). 41HW96 is located about 150 m to the west of Track B-1. The site consisted on one partially standing historic house that had board and batton décor siding and a cedar shake roof. There were no associated outbuildings or temporally diagnostic artifacts, although surface scatter of debris extended about 30 m around the structure. 41HW97 is also historic and is located about 350 m to the southwest of 41HR96. The site consists of scattered building materials that are associated with mainly modern and some possibly historic debris with an artificial berm, push pile and pit. Additionally, another survey by Cox McLain for the City of Big Springs located about 3 km to the northwest of the project corridor delineated one site. No site survey form was available for this site.

In 1972, the Texas Archeological Salvage Project found a number of fairly large sites (41HW39, 41HW40, 41HW41, 41HW42) within 3 km of the project area. Site 41HW39 appears to be a Late-Archaic to Late Prehistoric site with a diverse assemblage, including, ceramic sherds, manos, cores, debitage, burned rocks, and various dart and arrow points. The artifact assemblage from site 41HW41 was limited to burned rock, debitage, a grinding stone, one untyped dart point, and two Darl points (Texas Archeological Sites Atlas site form). Site 41HW42 is a Mid- to Late-Archaic site that yielded three large bifaces, one untyped stem dart point, one graver, utilized debitage, debitage, a mano, and metate fragments (Texas Archeological Sites Atlas site form).

Of most interest to this project is a prehistoric site, 41HW40, which flanks Tracks A and B (Texas Archeological Sites Atlas site form). This site was described as a Late Paleoindian camp site. The size of the site was defined as a minimum of 15 acres. The center of the site was located in a depression that was interpreted as an old draw of an extinct spring. The site extended into the surrounding dune field. The artifacts were contained within a red sand that was overlaid by a lighter colored, artifact-free sand. The artifacts included two Plainview points, one Harrell point, a punch, numerous hearths, metate fragments, several cores, and debitage. Additionally, numerous bone fragments were noted, indicating the site was either a kill site or a butchering site.

METHODS

The pedestrian cultural resources survey covered 100% of the proposed Project Area. The Project Archeologist and two field assistants conducted the survey, examining all areas of exposed soil for surface exposure of cultural remains and features. Particular attention was paid to any floodplain rises, high stream banks, and mound or other raised landforms. The survey was conducted in accordance with prevailing standards accepted by the State, the Council of Texas Archeologists, and Section 106 regulations. Texas Historical Commission minimum standards for required shovel tests in a linear survey were met and (because of sites) exceeded. Small (40 cm by 40 cm) shovel tests were excavated in 10-cm arbitrary levels. Shovel tests were excavated to at least one meter deep or until intact basal clay or other subsoil was reached. Each test was documented, including information on location (utilizing a hand-held GPS), soil profile and cultural yield. Soil fill from tests was screened (when possible) through ¼-inch hardware cloth and examined for cultural materials, and the units were backfilled immediately.

Shovel testing was conducted in an attempt to identify buried cultural resources. A single transect was established along the project alignment. One shovel test was excavated every 100 meters along the transect. The exception to this interval of shovel tests involved a segment of the project corridor that flanks a large, known prehistoric site (41HW40). In this segment the interval was every 50 meters. Based on the proposed methodology a minimum of 67 shovel tests needed to be excavated in the project corridor to meet THC standards. However this number was increased to a final total of 96 due to the need to delineate and further examine sites discovered during the initial survey (Figure 8, Appendix 1).

Based on the soils present in the project area it was not anticipated that deep reconnaissance (in the form of backhoe trenching) would be necessary for this project. Therefore no backhoe work was proposed or conducted.

Where localities producing either prehistoric or historic cultural remains were found, there were recorded on State of Texas archeological site forms for submission to the appropriate regulatory agencies. In addition to form information, sites and features were documented by photographs, plan and stratigraphic sketches and measured drawings, and crewmembers' daily field notes.

Investigations at the identified sites sought to determine site boundaries, depth, nature of the archeological deposits, and the site's state of preservation. The archeological sites were photographed, mapped in plan view and plotted with accuracy on USGS quadrangle maps and project maps. Recommendations for State Archeological Landmark and National Register of Historic Places eligibility (in this case, not eligible) were made for each site. However, this project did not include a historic structures assessment beyond the basic documentation of location and photographs of structures found within the footprint of the project.

At the sites found, boundaries were delineated through a combination of soil surface examination and shovel test excavation. Where necessary, shovel tests were dug at 10-

meter intervals radially in the cardinal directions from the presumed center of each site until no further artifacts were encountered in two successive units (or until the boundary of the Project Area is reached). The site boundary on each radius was presumed to lie between the last artifact-producing test and the first sterile unit, though in this case most of the site boundaries were based primarily on the project corridor limits. Information on the depth and nature of the deposits was derived from shovel test results, as well as available surface observations.

The collection policy for this survey was that (1) we retained any prehistoric or potentially pre-1870 historic materials recovered from shovel tests or other subsurface investigations that did not prove, after extensive site delineation tests, to be isolated artifacts, and (2) for surface materials: only diagnostic cultural materials from the above periods were collected and retained. However, photographs of many such artifacts were taken before they were returned to the surface where they were found. Isolated artifacts were defined as artifacts such as a single flake surrounded by multiple, negative shovel tests. These artifacts were reburied and the isolate was not recorded as an archeological site.

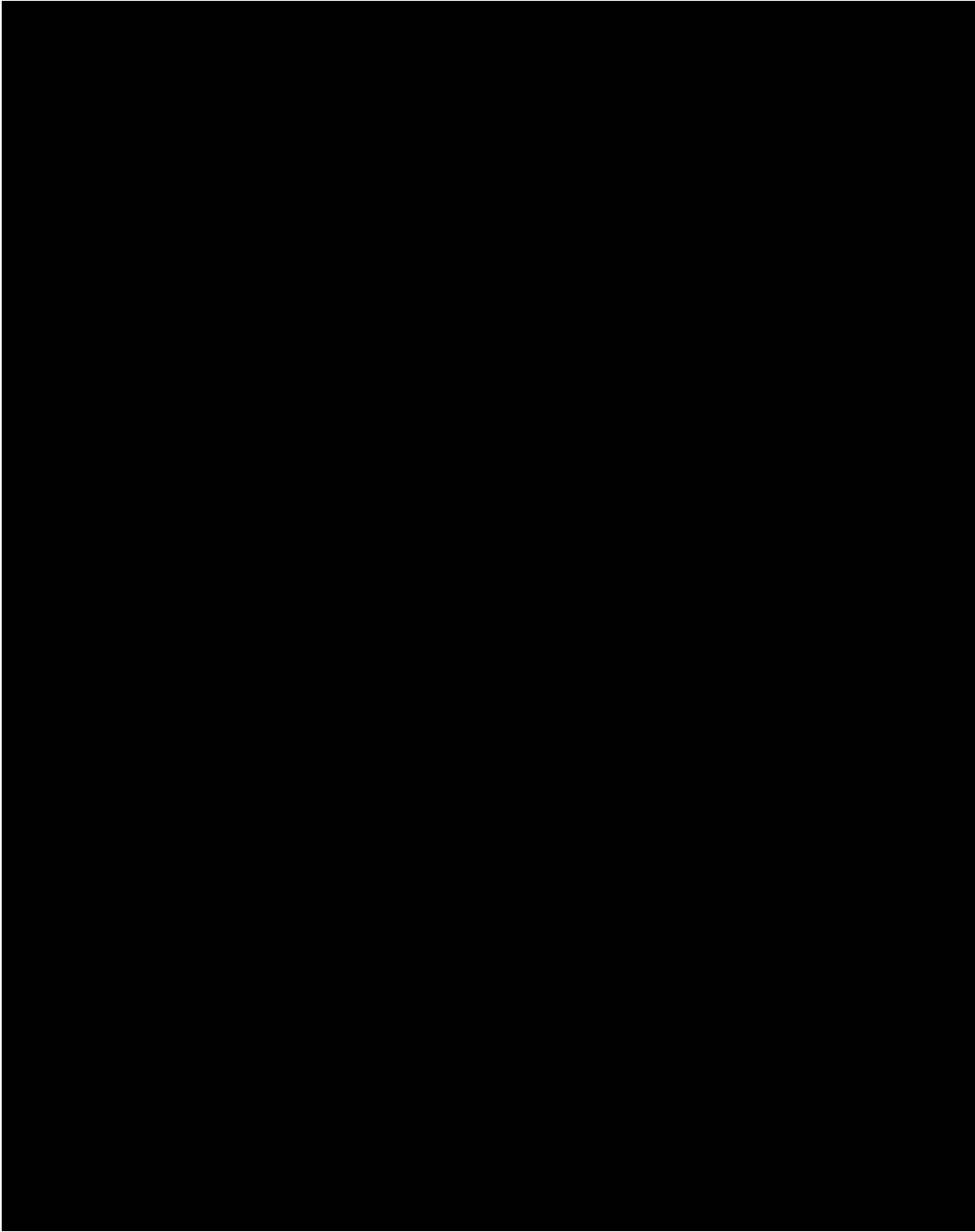


Figure 8. Map of proposed project area showing shovel test locations (in red). Redacted.

RESULTS

Visual examination and shovel testing was conducted in the proposed rail ROW. During this initial examination a total of 96 shovel tests were excavated. Of these nine (9) were positive (ST 1, 11, 47, 52, 55, 59, 63, 84, and 93). In addition to the positive shovel tests portions of the corridor contained surface exposures of prehistoric or historic artifacts. Site 41HW136 (Temporary Site 4) was entirely identified by surface finds. The combination of the positive shovel tests and the surface finds resulted in the assigning of 4 temporary site numbers. However, additional shovel testing and delineation of the four sites resulted in the determination that Temporary Site 2 was, in fact an isolated artifact (a single piece of lithic debitage which, as per the collections policy, was reburied in place).

Site Delineation and Determination Results

Description of 41HW134 (Temporary Site 1)

Site 41HW134 (Temporary Site 1) is on the western leg of the alignment just after the westerly turn (Figure 9). It is a combination prehistoric and historic site. The size of the site is roughly 180 m east-northeast to west-southwest by 100 m north-northwest to south-southeast, which amounts to roughly 4.4 acres. The site sits on a small piece of high ground in the east and stretches across a large area of lower eroded soil to the west (Site map Figure 10). Shovel tests to delineate the site did not extend beyond the 30 m wide alignment and contained prehistoric artifacts in a soil context for an E/W distance of 70 m. The remainder of the length and width of the site was derived from surface expression of artifacts in the erosional area. There was no surface expression of artifacts in the high ground portion of the site but there were artifacts in the profile soils.

The prehistoric artifacts collected at the site consisted of lithic debitage from three shovel tests and a metate fragment from the surface. The historic artifacts recovered included glass, ceramic, and metal artifacts that appear to date no earlier than the late nineteenth to early 20th century. Most of the historic artifacts were on the surface in the erosional area and towards the southern side of the site near the proposed railroad. There was a light scatter of lithic debitage throughout the erosional portion of the site. A total of 15 shovel tests were excavated at the site with four positive and 11 negative for cultural material. There was a single shovel test, number 52, on the upland portion of the site that contained coal, fired clay, lithic debitage, and some thin copper and iron fragments. The remainder of the shovel test finds were fairly low in number with just one or two pieces of lithic debitage per test.

Among the small number of pieces of lithic debitage were one secondary flake, two tertiary flakes, four flake fragments, and one groundstone fragment that is most likely part of a metate. No other prehistoric artifact types were present in the corridor. Though the numbers are too small to be sure, it appears likely the source of these flakes is late stage reduction, or reworking of existing tools. The lack of ceramics suggests that this site dates from either the Paleo-Indian or Archaic period. The absence of diagnostic artifacts that could be typed prevents being more specific.

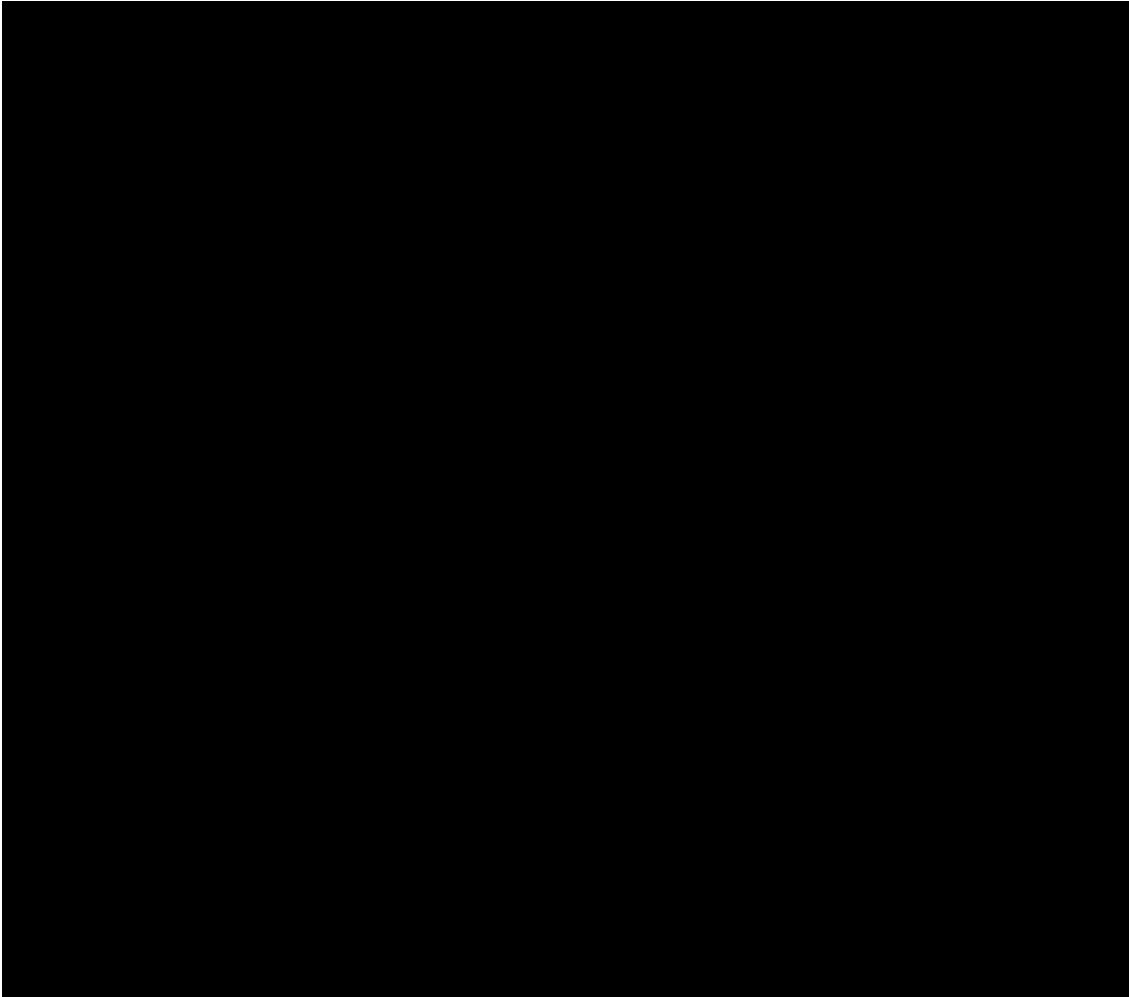


Figure 9. Map of proposed project area showing site locations. Redacted.

The historic artifacts recovered were all found in shovel test 52. However, as with the prehistoric artifacts, the bulk of the historic finds were found on the surface. But all were non-diagnostic and thus not recovered. The finds made in shovel test 52 were a mix of anthracite coal (non-native to the area), fragments of slag, and a collection of small copper fragments of unknown use.

Artifacts from 41HW134

The artifacts recovered at 41HW134 consisted of lithic debitage, some historic items, and a metate fragment. (Appendix B: Photograph 8). Table 2

STP	Level	CMBS	Artifact	Count	Comments
11	1	0-10	Flake fragment	1	chert
11	4	30-40	Flake fragment	1	quartzite
52	2	10-20	Flake fragment	1	chert
52	3	20-30	Secondary flake	1	silicified wood
52	3	20-30	Tertiary flake	1	chert
52	3	20-30	Slag	10	
52	3	20-30	Coal	17	anthracite
52	3	20-30	Metal- indeterminate	6	copper
52	4	30-40	Coal	9	anthracite
52	4	30-40	Slag	1	
55	3	20-30	Flake fragment	1	silicified wood
93	1	0-10	Tertiary flake	1	silicified wood
surface	n/a	n/a	Groundstone	1	hematitic sandstone fragment, probably a mano or metate

Table 2. Artifacts from 41HW134

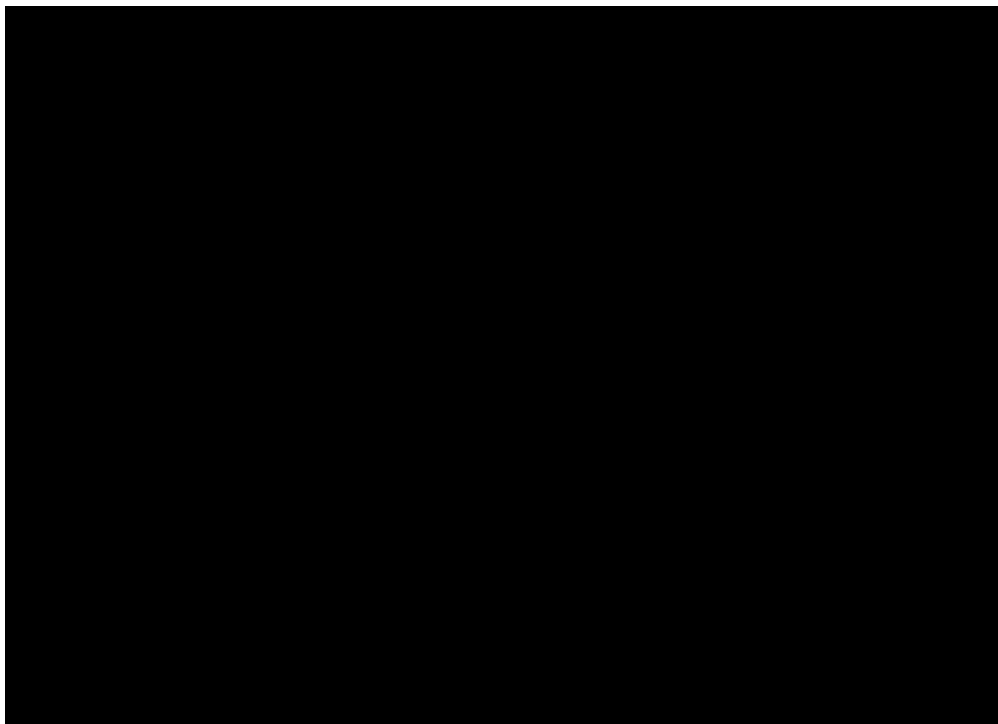


Figure 10. 41HW134 (formerly Temporary Site 1) Site Map. Redacted.

Description of Temporary Site 2

Temporary Site 2 was found on the northern end of the north south leg of the project corridor in shovel test 47. The location is in an open field with a scattering of sand dunes. The soils there were deep and sandy. The initial find was of a single piece of lithic debitage found between 20 and 30 cmbs. Additional shovel tests were immediately dug in the area around the initial find, but no additional cultural material was recovered. As a result it was determined that Temporary Site 2 was an isolated artifact, which was then reburied in place.

Description of 41HW135 (Temporary Site 3)

Site 41HW135 (Temporary Site 3) is on the far west end of the western leg of the alignment (Figure 9, Figure 11). The site is in a Mesquite grove and, as with 41HW134, a portion of the site extends into an erosional area to the west. It is a prehistoric site with a small historic component. The size of the site is roughly 40 m by 40 m, which amounts to roughly .4 acres. The predominant aspect of the site is a surface scatter of prehistoric lithics (none diagnostic), with a lesser component of subsurface debitage (Table 3). Thirteen shovel tests were excavated at this site with five being positive and eight negative for cultural material. The subsurface cultural material is limited to the upper 20 cm of the profile. The surface artifacts included lithic debitage outside of the railroad easement in an erosional area and a couple pieces of modern whiteware that probably date to the early to mid-twentieth century.

The soils at this site are very dark and burned in the upper 10-15 cm. The soils then transition quickly into a firm SCL and SC. Among the small number of pieces of lithic debitage recovered from four shovel tests were six flake fragments. No other prehistoric artifact types were present in the corridor. Though the numbers are too small to be sure it appears likely the source of these flakes is late stage reduction, or reworking of existing tools. The lack of ceramics suggests that this site dates from either the Paleo-Indian or Archaic period. The absence of diagnostic artifacts that could be typed prevents being more specific.

It is worth noting that this site is roughly 150 m east of the historic structure/site designated 41HW96 and that it is possible that the historic component of 41HW135 is related to that site. However, given the distance between the two, this seems unlikely.

Artifacts from 41HW135

The artifacts recovered at 41HW135 consisted only of a few pieces of lithic debitage. (Photograph 9). Table 3

STP	Level	CMBS	Artifact	Count	Comments
1	4	30-40	Flake fragment	1	chert
59	1	0-10	Flake fragment	1	silicified wood
59	2	10-20	Flake fragment	1	silicified wood
63	1	0-10	Flake fragment	1	chert
63	2	10-20	Flake fragment	1	chert
84	1	0-10	Flake fragment	1	chert

Table 3. Artifacts from 41HW135

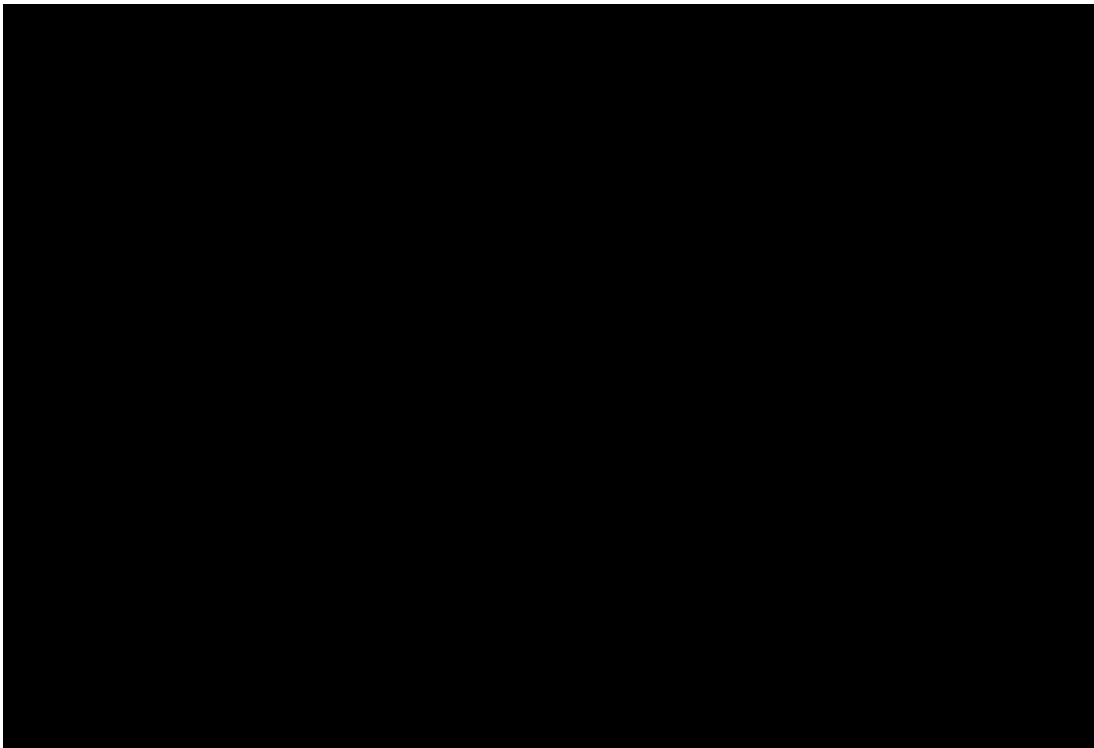


Figure 11. 41HW135 (formerly Temporary Site 3) Site Map. Redacted.

Description of 41HW136 (Temporary Site 4)

Site 41HW136 (Temporary Site 4) is on the far east end of the eastern leg of the alignment (Figure 9 and Figure 12). The site is in a Mesquite grove and, as with 41HW134, a portion of the site extends into an erosional area to the west. It is a historic site with a small prehistoric component. The size of the site is roughly 120 m by 65 m, which amounts to roughly 1.9 acres. This is based partially on shovel testing and the rest on surface expressions. It sits partially within a fallow agricultural field (with relatively fresh plow marks), part within an active oil well pad, and partially in a small Mesquite tree grove. The predominant aspect of the site is a surface scatter of historic debris (none diagnostic), all of which dates from the early to middle twentieth century. A total of ten shovel tests were excavated at this site with eight being positive and two negative for cultural material. The subsurface cultural material was all historic items dating to the early to middle twentieth century. They were minimally recorded and then reburied as per the collections policy agreed upon for this project. Among the historic artifacts were bottle glass, modern ceramics, iron tools and pieces of machinery. The surface artifacts included numerous items similar to those found in the shovel tests and a few pieces of lithic debitage scattered around the site.

Artifacts from 41HW136

The artifacts recovered at 41HW136 consisted only of a few pieces of lithic debitage observed, but not collected, on the surface and a mix of surface and subsurface historic items. As previously mentioned, none of the historic items were collected because they clearly post-dated 1870, the cut-off date for keeping items as per the collections policy for this project. Although no artifacts were collected from 41HW136, photographs of a few of them were taken (Photograph 7).

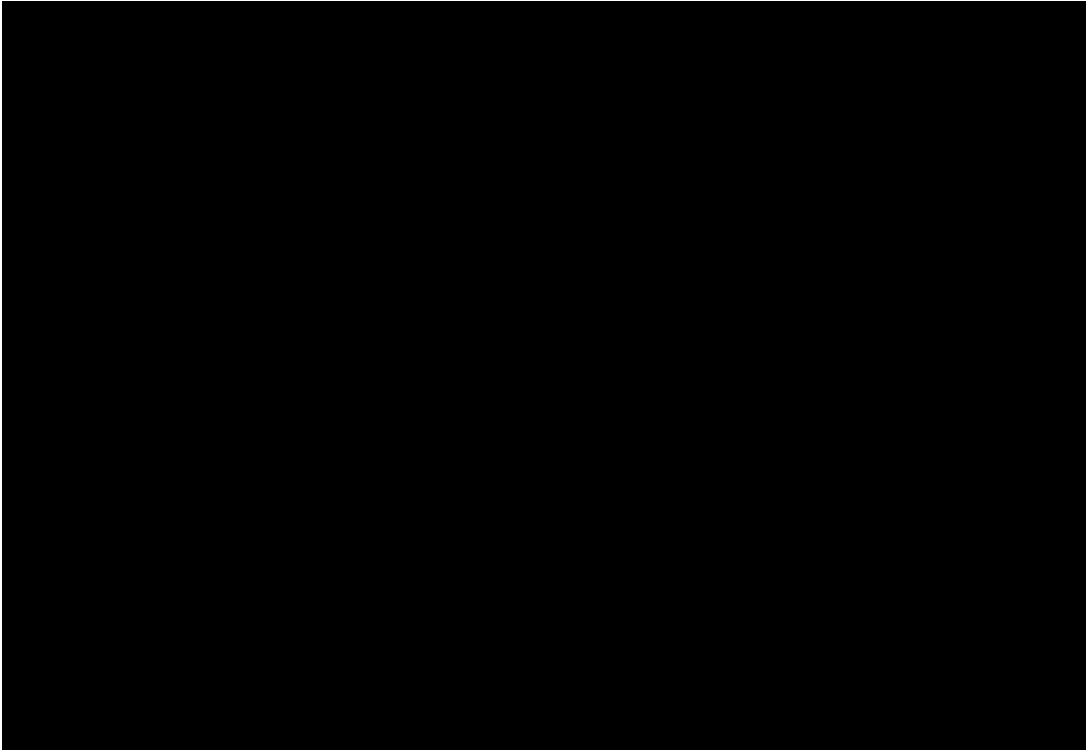


Figure 12. 41HW136 (formerly Temporary Site 4) Site Map. Redacted.

RECOMMENDATIONS

As a result of this archeological investigation and the findings thereof, it was determined that Temporary Site 2 is an isolated find and not a site. Furthermore, 41HW134, 41HW135, and 41HW136 (previously Temporary Sites 1, 3, and 4) appear to be very limited multi-component sites containing a thin mixture of historic and prehistoric artifacts. The sections of these three sites that fall within and immediately adjacent to the project corridor appear to be sparse scatters of artifacts, both surface and subsurface, with few diagnostics and no concentrations evident. The site deposits at all three sites are relatively shallow in depth and exhibit low artifact density and diversity.

It is possible that each of these sites was crossed in full by the corridor at the center of this investigation and that each is little more than a thin scatter of prehistoric and/or historic artifacts. However, it is equally likely that the project corridor has only narrowly passed through the periphery of the sites in question and that more (significant or otherwise) of the sites exists outside of the project corridor than within. However, a determination of the presence or absence of such a larger aspect of any of these sites beyond what can be seen on the surface exceeds the scope of the current investigation.

A complication with interpreting the temporal relationships across these scattered sites is the hummocky nature of the dune/interdune landscape. The dynamic surface topography makes it difficult to correlate the temporally diagnostic artifacts across the sites by their relative depths below surface. The undulations in the surface in the present day certainly do not represent the surface in the past. As discussed in the environmental background, paleosols and lamellae bands can serve as temporal markers in eolian landscapes. However, the shovel tests did not show any indication of lamellae bands and only one shovel test suggested evidence of buried soil horizons. This means that not only did deflation occur within the project area as a result of the typical geomorphic processes that occur on eolian landscapes, but that there was no period of landscape stability, nor a following period of deposition, to stratify the artifacts. There was no evidence of archeological materials relating to Late Paleoindian camp site 41HW40, which flanks Tracks A and B. The lack of lamellae bands, an indication of Pleistocene soils (Holliday 2004), suggests that the Pleistocene deposits were either too deeply buried underneath Holocene over-burden for the shovel tests to reach or the archeological deposits did not extend this far to the east.

Based on this assessment it is felt that the portions of all three sites that fall within the project corridor do not appear to possess the potential for being worthy of future study. Nor do they meet any of the standards for being potentially eligible for inclusion in the National Register of Historic Places. Therefore no further archeological work is recommended for any of these three sites prior to the onset of the construction of the proposed rail lines within the expected ROW.

However, all three sites extend outside the ROW for the proposed project corridor. Because of this it is further recommended that, should any future work be proposed adjacent to but outside the ROW of the current project corridor within the vicinity of the

sites recorded during this investigation, additional archeological investigations should be conducted prior to such construction to determine the extent, integrity, and potential significance of these sites. This recommendation is dependent, as always, on whether the project and property involved in the construction are subject to state, federal, or local governmental jurisdiction or oversight.

In the event that archeological deposits or features should be encountered during construction, work should cease in the immediate vicinity and the Archeology Division of the Texas Historical Commission contacted for further consultation.

REFERENCES CITED

Blair, Frank W.

1950 The Biotic Provinces of Texas. *The Texas Journal of Science* 2(1):93-117

Collins, Michael B.

2004 Archeology in Central Texas. In *The Prehistory of Texas*, edited by Tim Perttula, pp. 101-126. Texas A&M Press, College Station.

Goldberg, Paul and Richard I. Macphail

2006 *Practical and Theoretical Geoarchaeology*. Blackwell Publishing, USA, Malden.

Holliday, Vance T.

1989 The Blackwater Draw Formation (Quaternary): A 1.4-plus-m.y. record of eolian sedimentation and soil formation on the Souther High Plains. *Geological Society of America Bulletin* 101: 1598-1607.

Holliday, Vance T.

2004 *Soils in Archaeological Research*. Oxford University Press, USA, Cary.

Livingston, Penn Poore and Robert R. Bennett

1944 Geology and Ground-Water Resources of the Big Spring Area. *Texas Water Supply Paper* 913.

NOAA (National Oceanic and Atmospheric Administration)

2015 *Online Weather Data*. Available from NOWData, <http://w2.weather.gov/climate/xmacis.php?wfo=maf>, accessed July 14, 2015.

Perttula, Tim K.

2004 An Introduction to Texas Prehistoric Archeology. In *The Prehistory of Texas*, edited by Tim Perttula, pp. 101-126. Texas A&M Press, College Station.

TPWD (Texas Parks and Wildlife Department)

2015a *Natural Regions of Texas*. Available from, https://tpwd.texas.gov/publications/pwdpubs/media/pwd_mp_e0100_1070r_24.pdf, accessed July 14, 2015.

2015b *Texas River Basins, Major Bays and Streams*. Available from,

https://tpwd.texas.gov/publications/pwdpubs/media/pwd_mp_e0100_1070k_34.pdf, accessed July 14, 2015.

USDA (United States Department of Agriculture), NRCS (Natural Resources Conservation Service)

2015a *Custom MLRA Report*. Available from the MLRA Explorer, <http://apps.cei.psu.edu/mlra/>, accessed July 14, 2015.

- 2015b *Custom Soil Report*. Available from the Web Soil Survey,
<http://websoilsurvey.nrcs.usda.gov>, accessed July 14, 2015.
- 2015c Circleback Series. Official Soil Series Description.,
https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CIRCLEBACK.html, accessed
July 14, 2015.
- 2015d Springer Series. Official Soil Series Description.,
https://soilseries.sc.egov.usda.gov/OSD_Docs/S/SPRINGER.html, accessed July
14, 2015.
- 2015e Brownfield Series. Official Soil Series Description.,
https://soilseries.sc.egov.usda.gov/OSD_Docs/B/BROWNFIELD.html, accessed
July 14, 2015.
- 2015f Patricia Series. Official Soil Series Description.,
https://soilseries.sc.egov.usda.gov/OSD_Docs/P/PATRICIA.html, accessed July
14, 2015.
- USGS (United States Geologic Service)
- 2015 *Geologic Atlas of Texas*. Available from Texas Geology,
<http://txpub.usgs.gov/dss/texasgeology/>, accessed July 14, 2015.

APPENDIX 1 **SHOVEL TEST INVENTORY**

ST #	+/-	site #	depth	description	comments
1	+	TS3	0-10	7.5yr3/1 very dark gray sandy loam. Moist and friable.	
			10-48	5yr4/6 yellowish red sandy clay loam. Dry and hard.	Lev. 4 - 1 piece lithic debitage
			48-90	5yr4/6 yellowish red sandy clay. Moist and friable.	
2	-		0-10	10yr2/1 black sandy clay loam. Dry and hard. Burned.	
			10-20	10yr2/2 very dark brown sandy loam. Moist and friable.	
			20-40	5yr3/4 dark reddish brown sandy clay. Moist and firm.	
3	-		0-8	10yr2/2 very dark brown sandy loam. Moist and friable.	
			8-20	7.5yr3/1 very dark gray sandy loam. Moist and friable.	
			20-40	7.5yr4/3 brown loamy sand. Moist and friable.	
			40-55	5yr4/6 yellowish red sandy clay. Moist and firm..	
4	-		0-29	7.5yr3/1 very dark gray sandy loam	slope wash from dune
			29-50	7.5yr4/6 strong brown sandy clay loam. Moist and friable.	
			50-75	5yr4/6 yellowish red sandy clay loam. Dry and hard.	
5	-		0-20	5yr3/4 dark reddish brown clay loam. Moist and friable.	
			20-70	2.5yr4/8 red sandy clay loam. Moist and firm	
6	-		0-6	7.5yr3/4 dark brown sandy loam. Moist and friable.	
			6-34	7.5yr3/3 dark brown clay loam. Dry and very hard.	
			34-49	7.5yr4/4 brown sandy clay loam. Dry and hard.	
7	-		0-20	5yr4/6 yellowish red sandy clay loam. Moist and friable..	
			20-80	5yr5/6 yellowish red sandy clay loam. Moist and firm	
8	-		0-16	7.5yr3/2 dark sandy loam. Moist and friable.	
			16-30	7.5yr4/6 strong brown sandy clay loam. Dry and hard..	
			30-63	5yr4/6 yellowish red sandy clay loam. Dry and hard.	
9	-		0-10	10yr3/3 dark brown sandy loam. Moist and friable.	
			10-15	10yr3/4 dark yellowish brown sandy loam. Moist and friable.	
			15-40	7.5yr4/6 strong brown sandy clay loam. Dry and hard.	

10	-		0-10	5yr3/4 dark reddish brown sandy loam. Moist and friable.	
			10-60	2.5yr4/6 red sandy clay loam. Moist and firm.	
11	+	TS1	0-10	2.5yr4/8 red sandy loam. Moist and friable.	
			10-75	2.5yr5/8 red sandy clay loam. Moist and firm.	
12	-	TS1	0-10	7.5yr3/4 - 4/4 dark brown to brown sandy loam.	
			10-100	7.5yr5/8 strong brown loamy sand. Moist and friable.	
13	-		0-7	7.5yr4/2 brown sandy loam. Dry and somewhat loose.	
			7-100	5yr5/8 yellowish red sand. Moist and friable.	
14	-		0-10	2.5yr4/6 red sand humic	
			10-48	2.5yr4/6 red sandy loam	
			48-50	2.5yr5/6 red sandy loam. Hard	
15	-		0-20	5yr4/4 reddish brown sandy clay loam. Moist and friable.	
			20-60	2.5yr4/8 red sandy clay. Moist and firm.	
16	-		0-5	7.5yr3/3 dark brown sandy loam. Dry and loose	
			5-23	7.5yr4/6 strong brown loamy sand. Moist and friable.	
			23-40	2.5yr4/6 red sandy clay. Moist and firm.	
17	-		0-10	2.5yr4/6 red sand. Humic	
			10-40	2.5yr4/6 red sand	
			40-80	2.5yr 4/6 to 5/6 red sandy clay loam	
18	-		0-8	7.5yr3/3 dark brown sandy loam	
			8-18	7.5yr 4/6 strong brown sandy clay loam	
			18-30	2.5yr4/6 red sand clay. Moist and firm	
19	-		0-13	10yr 3/4 dark yellowish brown sand. Humic	
			13-20	7.5yr4/6 strong brown loamy sand	
			20-50	2.5yr4/6 strong brown with 4/4 brown	
20	-		0-40	2.5yr4/6 red sandy clay loam/sandy loam fill for well pad.	
			40-80	7.5yr4/4 brown sandy clay loam. Moist and friable.	
21	-		0-32	Reddish brown band sandy clay loam	plow zone
			32-42	5yr4/4 reddish brown sandy clay. Moist and firm	
22	-		0-22	7.5yr4/6 strong brown sandy loam.	plow zone
			22-42	2.5yr3/4 to 4/4, dark reddish brown to reddish brown sandy loam. Moist and friable.	
			42-60	2.5yr4/4 reddish brown sandy clay loam. Moist and firm.	

23	+	TS4	0-8	7.5yr3/3 dark brown sandy clay loam. Moist and friable.	Lev. 1 - small bits of metal and barbed wire.
			8-30	7.5yr4/4 brown sandy clay loam. Dry and hard.	
24	+	TS4	0-33	reddish brown sandy clay loam	plow zone
			33-58	5yr4/4 reddish brown sandy clay. Moist and firm	Lev. 1 - clear glass frag, 1 nail tip, and 1 flat metal frag Lev. 2 - 1 square tack, 5 metal frag, 2 tar frag Lev. 3 - 1 square nail, 1 nail tip, 6 flat metal frag None of the artifact was kept!
25	-		0-22	7.5yr4/6 strong brown sandy loam.	plow zone
			22-48	2.5yr3/4 to 4/4, dark reddish brown to reddish brown sandy loam. Moist and friable.	
			48-60	2.5yr4/4 reddish brown sandy clay loam. Moist and firm.	
26	-		0-22	7.5yr3/4 dark brown sandy loam.	plow zone
			22-75	2.5yr4/4 reddish brown sandy loam. Moist and friable.	
			75-95	2.5yr3/3 dark reddish brown sandy loam. Moist and friable.	
27	-		0-6	7.5yr3/3 dark brown sandy loam	
			6-23	7.5yr4/6 strong brown loamy sand. Moist and friable.	
			23-47	2.5yr4/6 red sandy clay. Moist and firm.	
28	-		0-20	7.5yr3/4 - 4/4 dark brown to brown sandy loam. Moist and friable.	
			20-35	10r5/8 red sandy loam. Moist and friable.	
			35-50	10yr5/8 red clayey sand. Moist and firm.	
29	-		0-13	7.5yr3/4 - 4/4 dark brown to brown sandy loam. Moist and friable.	
			13-40	7.5yr5/6 strong brown loamy sand. Moist and friable.	
			40-100	2.5yr5/8 red sandy clay loam. Moist and friable.	
30	-		0-10	7.5yr4/2 - 3/3 brown to dark brown sand.	
			10-80	7.5yr5/4 brown sand. Dry and loose. Massive.	
			80-100	7.5yr5/8 strong brown sand. Dry and loose.	
31	-		0-10	10yr3/3 dark brown sandy loam. Moist and friable.	
			10-50	7.5yr5/4 brown sand. Dry and loose. Massive.	
			50-100	7.5yr5/6 strong brown sand. Dry and loose.	

32	-	0-10	7.5yr4/2 - 3/3 brown to dark brown sand.
		10-50	7.5yr5/4 brown sand. Dry and loose. Massive.
		50-82	7.5yr5/8 strong brown sand. Dry and loose. Becomes clayier at 76cmbs.
33	-	0-12	10yr3/6 dark yellowish brown sandy loam. Moist and friable.
		12-45	7.5yr5/4 brown sand. Dry and loose. Massive.
		45-100	7.5yr5/8 strong brown sand. Dry and loose. Becomes clayier at 76cmbs.
34	-	0-19	7.5yr3/3 dark brown sandy loam. Moist and friable.
		19-78	7.5yr5/4 brown loamy sand. Moist and friable.
		78-110	7.5yr4/6 strong brown sand. Moist and friable.
35	-	0-10	7.5yr4/3 brown sandy loam. Moist and friable.
		10-100	7.5yr6/4 light brown sand. Moist and friable. Massive.
		100-120	7.5yr6/8 reddish yellow sandy clay loam.
36	-	0-10	10yr3/6 dark yellowish brown sandy loam. Moist and friable.
		10-100	7.5yr5/6 strong brown sand. Moist and friable. Massive.
37	-	0-13	7.5yr3/3 dark brown sandy loam. Moist and friable.
		13-48	7.5yr5/4 brown loamy sand. Moist and friable.
		48-105	7.5yr5/6 strong brown sand. Moist and friable.
38	-	0-10	7.5yr4/3 brown sandy loam. Moist and friable.
		10-70	7.5yr6/4 light brown loamy sand. Moist and friable. Massive.
		70-100	7.5yr6/8 reddish yellow sandy clay loam.
39	-	0-5	10yr3/2 very dark grayish brown sandy loam. Moist and friable.
		5-10	10yr4/4 dark yellowish brown loamy sand. Moist and friable.
		10-100	7.5yr5/4 brown loamy sand. Moist and friable.
40	-	0-10	7.5yr3/3 dark brown sandy loam. Moist and friable.
		10-44	7.5yr5/4 brown loamy sand. Moist and friable.

		44-76	7.5yr5/6 strong brown sand. Moist and friable.
		76-93	2.5yr4/6 red sandy clay. Moist and firm.
41	-	0-8	7.5yr4/3 brown sandy loam. Moist and friable.
		8-92	7.5yr6/4 light brown sand. Moist and friable. Massive.
		92-100	7.5yr6/8 reddish yellow loamy sand. Moist and friable.
42	-	0-10	10yr3/2 very dark grayish brown sandy loam. Moist and friable.
		10-15	10yr4/4 dark yellowish brown loamy sand. Moist and friable.
		15-100	7.5yr5/6 strong brown sand. Moist and friable.
43	-	0-15	7.5yr3/3 dark brown sandy loam. Moist and friable.
		15-60	7.5yr5/4 brown loamy sand. Moist and friable.
		60-120	7.5yr5/6 strong brown sand. Moist and friable.
44	-	0-9	7.5yr4/3 brown sandy loam. Moist and friable.
		9-76	7.5yr6/4 light brown sand. Moist and friable. Massive.
		76-102	7.5yr6/8 reddish yellow loamy sand. Moist and friable.
45	-	0-5	10yr3/3 dark brown sandy loam. Moist and friable.
		5-10	10yr4/4 dark yellowish brown loamy sand. Moist and friable.
		10-70	7.5yr5/4 brown loamy sand. Moist and friable.
		70-100	7.5yr5/6 strong brown sandy clay loam. Moist and friable.
46	-	0-9	7.5yr4/3 brown sandy loam. Moist and friable.
		9-76	7.5yr6/4 light brown sand. Moist and friable. Massive.
		76-102	7.5yr6/8 reddish yellow loamy sand. Moist and friable.
47	+ TS2	0-15	7.5yr3/3 dark brown sandy loam. Moist and friable.
		15-52	7.5yr5/4 brown loamy sand. Moist and friable.
		52-78	2.5yr4/6 red sandy clay loam. Moist and firm.
48	-	0-10	7.5yr4/3 brown sandy loam. Moist and friable.
		10-100	7.5yr6/4 light brown sand. Moist and friable. Massive.

			100-130	7.5yr6/6 reddish yellow sand. Moist and friable. Massive	
49	-		0-5	10yr3/3 dark brown sandy loam. Moist and friable.	
			5-10	10yr4/4 dark yellowish brown loamy sand. Moist and friable.	
			10-40	7.5yr5/4 brown loamy sand. Moist and friable.	
			40-100	7.5yr5/6 strong brown sandy clay loam. Moist and friable.	
50	-	TS1	0-6	5yr4/4 brown sandy loam. Dry and Hard.	Truncated. Erosional area.
			6-100	2.5yr4/8 red sandy clay loam. Moist and friable.	
51	-	TS1	0-5	7.5yr3/4 dark brown sand	
			5-9	bedded layers of aeolian deposition	
			9-100	2.5yr4/8 red sand. Moist and friable.	
52	+	TS1	0-14	5yr4/4 brown sandy loam. Dry and hard.	Flat grassy area, not truncated.
			14-38	5yr4/6 yellowish red sandy clay loam. Moist and friable.	
			38-70	2.5yr4/8 red sandy clay loam. Moist and friable.	
53	-	TS1	0-8	2.5yr4/6 red sand. Humic	
			8-58	2.5yr 4/6 to 5/6 red sand	
			58-70	2.5yr 4/6 red sandy clay loam	
54	-	TS1	0-10	5yr4/8 red sandy clay loam. Moist and friable.	
			10-60	2.5yr4/6 yellowish red sandy clay loam. Moist and firm.	
55	+	TS1	0-10	2.5yr 4/6 red sand. Humic	Lev. 3 - 1 flake
			10-20	2.5yr4/6 to 5/6 red sand	
			20-120	2.5yr4/6 to 5/6 red sand	
56	-	TS1	0-10	5yr4/8 red sandy clay loam. Moist and friable.	
			10-60	2.5yr4/6 yellowish red sandy clay loam. Moist and firm.	
57	-	TS2	0-9	7.5yr3/3 dark brown sandy loam. Moist and friable.	
			9-45	7.5yr5/4 brown loamy sand. Moist and friable.	
			45-59	2.5yr4/6 red sandy clay loam. Moist and firm.	
58	-	TS2	0-10	7.5yr3/3 dark brown sandy loam. Moist and friable.	
			10-38	7.5yr5/4 brown loamy sand. Moist and friable.	
			38-49	2.5yr4/6 red sandy clay loam. Moist and firm.	
59	+	TS3	0-16	7.5yr3/1 very dark gray sandy loam	Burned Lev. 1- 1 piece of debitage Lev. 2 - 1 piece of debitage
			16-34	5yr4/6 yellowish brown sandy clay loam. Dry and hard	
			34-55	5yr4/6 yellowish red sandy clay loam. Moist and friable	

60	-	TS2	0-14	7.5yr4/3 brown. Humic sand	
			14-72	7.5yr 6/6 reddish yellow sand	
			72-92	7.5yr6/6 reddish yellow loamy sand	
61	-		0-10	10yr3/4dark yellowish brown sandy loam. Moist and friable.	
			10-20	10yr4/4 dark yellowish brown loamy sand. Moist and friable.	
			20-50	7.5yr5/4 brown loamy sand. Moist and friable.	
			50-90	7.5yr5/6 strong brown sandy clay loam. Moist and friable.	
62	+	TS3	0-12	7.5yr3/1 very dark gray sandy loam	Lev. 1 - 1 flake
			12-92	7.5yr4/6 strong brown	
63	+	TS3	0-10	10yr2/1 black sandy clay loam. Dry and somewhat loose. Burned.	lev. 1 - 1 piece of lithic debitage
			10-20	10yr2/2 very dark brown sandy clay loam. Moist and friable.	Lev. 2 - 1 piece of lithic debitage
			20-80	5yr3/4 dark reddish brown sandy clay loam. Moist and firm.	
64	-	TS3	0-12	7.5yr very dark gray sandy loam	Burned
			12-25	7.5yr 4/4 brown sandy clay loam	
			25-50	5yr 4/6 yellowish red sandy clay loam. Dry and very hard	
65	+	TS4	0-10	5yr4/6 yellowish red sandy clay loam. Moist and friable. Plow Zone	Lev. 1 - metal bits, slag/coal, glass sherd
			10-20	7.5yr5/8 strong brown sandy clay loam. Dry and hard. Plow Zone.	Lev. 2 - metal bits, slag/coal, glass sherds clear and brown.
			20-40	5yr4/6 yellowish red sandy clay loam. Dry and hard.	
66	+	TS4	0-26	7.5yr4/6 strong brown loamy sand. Moist and friable.	plow zone
			26-46	2.5yr4/6 red sandy loam. Moist and friable.	some coal flecks
			46-65	2.5yr4/6 red sandy clay loam. Moist and firm.	
67	+	TS4	0-9	7.5yr3/4 dark brown sandy loam	Lev 1- 1 iron wire frag., 1 iron nail round
			9-18	7.5yr4/6 strong brown sandy clay loam	
			18-40	5yr4/6 yellowish red sandy clay loam. Dry and hard	
68	+	TS4	0-10	5yr4/6 yellowish red sandy loam. Moist and friable. Plow zone.	lev. 1 - 1 barbed wire fragment, several rusted metal pieces, pieces of slag/coal.
			10-60	5yr4/6 yellowish red sandy clay loam. Moist and firm.	Lev. 2 - 1 yellow glass sherd, 1 whiteware sherd, several rusted metal pieces. Lev. 3 - 1 clear glass sherd, several rusted metal pieces. Lev. 4 - several rusted metal pieces.
69	-	TS4	0-17	7.5yr4/6 strong brown loamy sand. Moist and friable.	

			17-54	2.5yr4/4 to 4/6 reddish brown to red sandy loam. Moist and firm	
70	+	TS4	0-12	7.5yr3/4 dark brown sandy loam	Lev. 2 - 4 iron frag.
			12-30	7.5yr4/6 strong brown sandy clay loam	Lev. 3 - 1 iron frag, two coal
			30-50	5yr4/6 yellowish red sandy clay loam	
71	-	TS4	0-5	7.5yr3/4 dark brown sandy clay loam. Moist and friable.	
			5-50	5yr4/4 reddish brown sandy clay loam, Dry and hard.	
72	0		0-12	7.5yr3/3 dark brown sand. Dry and soft.	
			12-40	7.5yr4/4 brown sand. Moist and friable.	
			40-60	2.5yr5/8 red sandy clay loam. Moist and firm.	
73	+	TS4	0-12	7.5yr3/4 dark brown sandy loam	Lev. 1 - 1 barbed wire strap
			12-30	7.5yr4/6 strong brown loamy sand	Lev. 2 - 1 flat iron frag, 1 wirw frag
			30-59	5yr4/6 yellowish red sandy clay loam	Lev. 3 - 3 clear glass, 4 flat iron frag, 2 iron can rim, 2 comp shingle frag
					5 flat iron frag, 1 iron rim
74	-		0-10	7.5yr4/3 brown sandy loam. Moist and friable.	
			10-20	7.5yr4/6 strong brown sandy clay loam. Moist and friable.	
			20-60	7.5yr5/6 strong brown sandy clay loam. Moist and firm.	
75	-	TS3	0-10	7.5yr3/4 dark brown loamy sand	
			10-20	5yr5/8 yellowish red loamy sand. Hard and baked	
			20-36	2.5yr4/6 red loamy sand. Hard and baked	
76	-		0-15	7.5yr3/2 dark brown sandy loam	
			15-72	7.5yr4/4 brown loamy sand	
			72-108	5yr4/6 yellowish red loamy sand	
77	-	TS3	0-10	10yr2/1 black sandy loam. Dry and soft. Burned.	
			10-25	10yr3/2 very dark grayish brown sandy loam. Moist and friable.	
			25-70	5yr4/6 yellowish red sandy clay loam. Moist and firm.	
78	-		0-17	7.5yr4/3, 3/3 brown to dark brown loamy sand. Moist and friable.	
			17-55	7.5yr6/4 light brown sand, massive. Moist and friable.	
			55-95	7.5yr5/6 strong brown sand grading to sandy loam at bottom. Moist and friable.	
79	-		0-5	10yr 4/3 brown sandy	
			5-15	10yr4/4 dark yellowish brown sandy clay loam	
			15-60	7.5yr 5/6 strong brown sandy clay loam	

80	-		0-12	7.5yr4/3 brown sandy loam	
			12-56	7.5yr5/4 brown loamy sand	
			56-103	7.5yr5/8 strong brown Loamy sand	
81	-		0-19	7.5yr4/3, 3/3 brown to dark brown loamy sand. Moist and friable.	
			19-100	7.5yr6/4 light brown sand, massive. Moist and friable.	
			100-123	7.5yr5/6 strong brown sand grading to sandy loam at bottom. Moist and friable.	
82	-		0-18	10yr 4/3 brown sandy	
			18-50	10yr4/4 dark yellowish brown sandy clay loam	
			50-110	7.5yr 5/6 strong brown sandy clay loam	
83	-		0-10	7.5yr4/3 brown sandy loam	
			10-48	7.5yr5/4 brown loamy sand	
			48-105	7.5yr5/8 strong brown	
84	+	TS3	0-14	10yr2/1 black ashy sand.	1 piece of lithic debitage
			14-24	7.5yr3/4 dark brown loamy sand. Heat altered	
			24-46	2.5yr5/8 red loamy sand	
85	-		0-13	10yr 2/1 black sandy loam. Burned.	
			13-25	10yr 2/2 very dark brown sandy clay loam	
			25-70	5yr 4/6 yellowish red sandy clay loam	
86	-	TS3	0-14	7.5yr3/1 very dark gray sandy loam	
			14-48	5yr4/6 yellowish red sandy clay loam. Moist and firm	
87	-	TS3	0-14	10yr2/1 black ashy sand.	
			14-22	7.5yr3/4 dark brown loamy sand. Heat altered	
			22-71	2.5yr5/8 red loamy sand	
88	-	TS3	0-6	10yr 3/4dark yellowish brown sandy loam	
			6-12	10yr 2/2 very dark brown sandy clay loam	
			12-40	5yr 4/6 yellowish red sandy clay loam	
89	-	TS3	0-20	7.5yr3/1 very dark gray sandy loam	Burned
			20-45	5yr4/6 yellowish red sandy clay loam. Moist and firm	
90	-	TS3	0-18	7.5yr3/4 dark brown Loamy sandy	

			18-40	2.5yr4/6 red sandy loam	
91	-	TS1	0-4 4-60	10yr 3/4 dark yellowish brown sandy loam 5yr4/6 yellowish brown sandy clay loam	
92	-	TS1	0-7 7-35 35-54 54-70 70- 103	7.5yr3/4 dark brown sandy loam 2.5yr4/6 red sandy clay loam 5yr4/6 yellowish red sandy clay loam 5yr4/4 reddish brown sandy loam (possible buried surface) 2.5yr4/6 red sandy clay loam	No artifacts but interesting profile
93	+	TS1	0-9 9-54 54-84 84- 100	7.5yr 4/4 brown loamy sand 2.5yr 4/6 to 5/8 red 2.5yr 4/6 red sandy silt clay 2.5yr 4/8 red loamy sand	Lev. 1 - 1 flake frag
94	-		0-6 6-80	5yr4/3 reddish brown sandy 5yr4/4 reddish brown sandy clay loam	
95	-		0-12 12-78 78- 120	7.5yr 3/4 dark brown sandy loam 5yr 4/6 yellowish red sandy clay loam 7.5yr 5/4 brown sand	
96	-		0-7 7-60	7.5yr 4/3 brown sand 7.5yr 4/6 strong brown	

APPENDIX B: Photographs



Photograph 1: Typical mesquite breaks



Photograph 2: Shovel testing in a more open but still overgrown area.



Photograph 3: Shovel testing in agricultural fill



Photograph 4: Shovel testing close to oil well pad.



Photograph 5: Lithic debitage observed on surface of 41HW134 but not collected.



Photograph 6: Example of salt glazed modern ceramic from surface of 41HW135



Photograph 7: General glass and metal collection (not collected) from 41HW136



Photograph 8: Metate fragment, lithic debitage, and metal/slag collected from 41HW134



Photograph 9: Lithic debitage (flake fragments) collected from 41HW135